

Supporting women, girls and people who menstruate to participate in physical activity – Rapid evidence summary

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Abstract

Insufficient physical activity is a leading risk factor for non-communicable diseases and has a negative effect on mental health and quality of life. Women, girls and people who menstruate living in Wales are less likely to engage in regular physical activity than boys and men. The aim of this rapid evidence summary is to identify research focusing on physical activity participation (including exercise and sport) of women, girls and people who menstruate in relation to the menstrual cycle, to inform the Welsh Government Period Proud Action Plan.

Results

42 reports were identified, including overviews of reviews, systematic reviews, a scoping review, organisational reports, and primary studies. The secondary research evidence was published between 2008 and 2024 with the most recent searches being conducted in September 2023. The primary studies were published between 2020 and 2022. The organisational reports were published between 2018 and 2024.

Research Implications and Evidence Gaps

There is a need for interventions that could support physical activity participation (including exercise or sport) of women, girls and people who menstruate in relation to the menstrual cycle. These interventions need to consider and address barriers that women, girls and people who menstruate face in relation to their menstrual cycle, and robust evaluations are required to determine effectiveness.

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Supporting women, girls and people who menstruate to participate in physical activity – Rapid evidence summary

July 2024

Review conducted by the **Cardiff Evidence Synthesis Collaborative**, comprised of the Wales Centre for Evidence Based Care and the Specialist Unit for Review Evidence (SURE).

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Supporting women, girls and people who menstruate to participate in physical activity (Rapid evidence summary)

EXECUTIVE SUMMARY

Report number RES0035 | Date July 2024

What is a Rapid Evidence Summary?

Our Rapid Evidence Summaries (RES) are designed to provide a rapid response product. They are based on a limited search of key resources and the assessment of abstracts. Priority is given to studies representing robust evidence synthesis. No quality appraisal or evidence synthesis are conducted, and the summary should be interpreted with caution.

Who is this Rapid Evidence Summary for?

Equality, Poverty and Children's Evidence and Support Division (Welsh Government), Sport Wales

Background / Aim of Rapid Evidence Summary

Insufficient physical activity is a leading risk factor for non-communicable diseases and has a negative effect on mental health and quality of life. Women, girls and people who menstruate living in Wales are less likely to engage in regular physical activity than boys and men. The aim of this rapid evidence summary is to identify research focusing on physical activity participation (including exercise and sport) of women, girls and people who menstruate in relation to the menstrual cycle, to inform the Welsh Government Period Proud Action Plan.

Results

Extent of the evidence base

- 42 reports were identified, including overviews of reviews (n=2), systematic reviews (n=25), a scoping review (n=1), organisational reports (n=7), and primary studies (n=7)

Recency of the evidence base

- The secondary research evidence was published between 2008 and 2024 with the most recent searches being conducted in September 2023.
- The primary studies were published between 2020 and 2022.
- The organisational reports were published between 2018 and 2024.

Key findings

- There is limited evidence on interventions that could support physical activity participation (including exercise and sport) of women, girls, and people who menstruate in relation to the menstrual cycle. The identified evidence contained two primary research studies and an organisational report.
- As limited research was found on interventions to support physical activity participation in relation to the menstrual cycle, additional searches for evidence were conducted in the following topics: barriers to physical activity in relation to the menstrual cycle; wider barriers to physical activity

participation of women, girls, and people who menstruate; interventions (unrelated to managing the menstrual cycle) to support physical activity participation; the effects of physical activity on dysmenorrhea and premenstrual syndrome; and the menstrual cycle and exercise performance.

- Some evidence, including systematic reviews and UK organisational reports, exist on barriers to physical activity participation of women, girls, and people who menstruate in relation to their menstrual cycle. Common barriers included sociocultural taboo around menstruation, lack of knowledge and resources related to the menstrual cycle, and insufficient communication between coaches and athletes.
- A wealth of review evidence was identified that investigated the wider barriers to women's and girls' physical activity participation. Adolescent girls faced barriers, such as lack of support from peers and/or family, limited time, gender bias in sport, motivation and perceived competence. Young adult women experienced barriers including lack of time, body image, societal beauty standards, family duty, social support, religious and cultural norms, safety issues, facilities and physical environment. Evidence was also identified for pregnant, postpartum and midlife immigrant women which included specific barriers related to their life stage and experiences.
- A wealth of review evidence was discovered which investigated interventions (unrelated to managing the menstrual cycle) to support physical activity participation in women and girls. These included mobile-based interventions for midlife women; peer-leader and friendship group strategies, single or multicomponent school-based interventions for adolescent girls; and telehealth for postpartum women.
- Systematic review evidence investigating the effect of physical activity on premenstrual syndrome and dysmenorrhea was identified.
- A wealth of review evidence exists on how the menstrual cycle effects the exercise performance of women, girls, and people who menstruate.

Research Implications and Evidence Gaps

- There is a need for interventions that could support physical activity participation (including exercise or sport) of women, girls and people who menstruate in relation to the menstrual cycle. These interventions need to consider and address barriers that women, girls and people who menstruate face in relation to their menstrual cycle, and robust evaluations are required to determine effectiveness.

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TABLE OF CONTENTS

1. CONTEXT / BACKGROUND	8
2. RESEARCH QUESTION(S)	8
3. SUMMARY OF THE EVIDENCE BASE	9
3.1. Type and amount of evidence available	9
3.2. Key Findings	12
3.3. Areas of uncertainty	18
4. NEXT STEPS	18
5. REFERENCES	18
6. RAPID EVIDENCE SUMMARY METHODS	22
7. EVIDENCE	22
8. ADDITIONAL INFORMATION	53
8.1. Conflict of interest	53
8.2. Acknowledgments	53
9. APPENDIX	54

Abbreviations

Acronym	Full Description
CI	Confidence interval
GP	General practitioner
GRADE	Grading of Recommendations, Assessment, Development, and Evaluations
MC	Menstrual cycle
MVPA	Moderate-to-vigorous physical activity
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NSAID	Non-steroidal anti-inflammatory drugs
OoR	Overview of reviews
PA	Physical activity
PE	Physical education
PMS	Premenstrual syndrome
RPE	Rating of perceived exertion
ScR	Scoping review
SMD	Standardised mean difference
SR	Systematic review
SUCRA	Surface Under the Cumulative Ranking curve
VAS	Visual analogue scale

1. CONTEXT / BACKGROUND

Insufficient physical activity (PA) is a leading risk factor for non-communicable diseases and has a negative effect on mental health and quality of life (Guthold et al. 2018). Women living in Wales are less likely to engage in regular PA (150 min/week moderate-intensity, 75 min/week vigorous-intensity PA, or any combination of these) than men, in line with global trends (Sport Wales 2021, Guthold et al. 2018). Adolescent girls are less active than boys, with 84% reporting reduced interest in sport and activities following menarche and 23% feel embarrassed to participate in PA during their periods (Nuffield Health 2023). Associated menstrual symptoms can also be a barrier to PA, such as pain and discomfort (House of Commons 2024). Trans and non-binary populations can experience additional challenges related to menstruation, including the use of menstrual products and men's toilets (Frank 2020), which may also influence their PA participation. However, current NHS guidance does not include any advice on menstrual health during PA for women, girls and people who menstruate (NHS 2024). The Welsh Government is committed to promoting equity and inclusion in health and social care, as outlined in The Quality Statement for women and girls' health (Welsh Government 2022). Therefore, the aim of this rapid evidence summary is to identify research focusing on the PA participation (including exercise and sport) of women, girls and people who menstruate in relation to the menstrual cycle, to inform the Welsh Government Period Proud Action Plan (Welsh Government 2023).

2. RESEARCH QUESTION(S)

The original research question suggested by the stakeholder group was: What is the impact of periods on women, girls and people who menstruate in relation to participation in sport/exercise and what innovations/interventions could support/encourage participation?

Due to the broad scope of this research question, the Population, concept, context (PCC) mnemonic was used to develop the rapid evidence summary research question and search the evidence base (Peters et al. 2020).

Review question	
What innovations/interventions could support/encourage the PA participation (including exercise and sport) of women, girls, and people who menstruate, particularly in relation to the menstrual cycle?	
What is the impact of periods on the PA participation (including exercise and sport) of women, girls and people who menstruate?	
Population	Women, girls, and people who menstruate
Concept	Interventions to support PA participation (including exercise and sport) Barriers and facilitators to PA (including exercise and sport)
Context	Menstrual cycle, menstruation or any context
Other Study Considerations	
No geographical, time or study design limits were imposed	

3. SUMMARY OF THE EVIDENCE BASE

3.1. Type and amount of evidence available

Overviews of reviews (n=2), systematic reviews (n=25), a scoping review (n=1), organisational reports (n=7), and primary research studies (n=7) were included in this preliminary literature review to provide a brief overview of the available evidence. As limited evidence was found on the topic of interventions to support PA participation in relation to menstruation (primary studies n=2, organisational report n=1), additional searches for evidence in the following topics were conducted: barriers to PA in relation to the menstrual cycle; wider barriers to PA participation of women, girls, and people who menstruate; interventions (unrelated to managing the menstrual cycle) to support PA participation; the effects of PA on dysmenorrhea and premenstrual syndrome (PMS); and the menstrual cycle and exercise performance. Throughout this rapid evidence summary, multiple terms relating to different types of PA, exercise or sport is mentioned. While multiple definitions may exist for these concepts (WHO 2020), below the evidence is summarised by using the terms the original authors of the included evidence adopted.

3.1.1. Barriers to physical activity in relation to the menstrual cycle

Two systematic reviews were identified with a focus on:

- Factors in a sports environment which could facilitate or hinder cyclically menstruating athletes' healthy sports participation in relation to their menstrual cycles (Srinivasa Gopalan et al. 2024a).
- The impact of symptoms, experiences and perceptions of the menstrual cycle on recreational PA behaviours in the general population (Srinivasa Gopalan et al. 2024b).

Six organisational reports were identified from the grey literature, and these focused on:

- The health barriers to sport in two groups in the UK: school-aged girls and women experiencing menopausal and perimenopausal symptoms (House of Commons 2024).
- Girls' experiences of menstruation in the UK and explored the impact of menstruation on sport and exercise (Plan International UK 2018).
- Female participation in sport and PA in Scotland and discussed barriers faced by adolescent girls and women of all ages including menstruation (The Scottish Parliament: Health, Social Care and Sport Committee 2023).
- Supporting women aged 41-60 in the UK to be active during midlife and perimenopause/menopause, while exploring barriers to PA participation (Women in Sport 2021).
- Tackling adolescent girls' disengagement from sport and exercise in the UK while also considering the barrier of periods (Women in Sport 2022).
- School-aged girls' participation in sport and PAs in the UK, while it examined barriers to PA at school and physical education (PE) in relation to the menstrual cycle. Girls' ideas were also investigated regarding what schools could do to help them in PE during their menstruation (Youth Sport Trust 2023).

Five primary studies were identified:

- A UK qualitative study that explored adolescent girls' views on how menstruation influences their PA (Harvey et al. 2020).
- A cross-sectional study that investigated the relationship between menstruation and leisure time PA in female university students in South Korea (Kim et al. 2022).
- A mixed-methods study that aimed to quantify events of the menstrual cycle and self-reported PA avoidance in women in the UK; and to understand women's lived experiences of PA throughout the menstrual cycle (Kolic et al. 2021).
- A mixed-methods study that assessed the impact of the menstrual cycle on football performance and exercise ability, and identified barriers in relation to menstruation in amateur female footballers in the UK (Pinel et al. 2022).
- A mixed-methods study that examined the effect of menstruation and PMS on habitual participation in adventurous activities (mountaineering, wild camping, running, wild swimming, climbing, etc.) in the UK (Prince & Annison 2023).

3.1.2. Interventions to increase physical activity participation in relation to the menstrual cycle

Two primary studies were identified:

- A quasi-experimental study that examined the effects of social-media-based support on PMS and PA among female university students in South Korea (Nam & Cha 2020).
- A qualitative study that reported the results of a participatory project consisting of two workshops where adolescent participants in Sweden designed menstrual technologies (Sondergaard et al. 2021).

One organisational report was identified, which focused on:

- The impact of the "Big Sister: By girls for Girls" project which aimed to empower and support adolescent girls in the UK to enjoy sport, exercise and PA during puberty. A part of the project was "Hey Girls" which provided free sanitary products for girls in areas of deprivation (Women in Sport 2023).

3.1.3. Wider barriers to physical activity participation of women, girls, and people who menstruate

One overview of reviews was identified, and it focused on:

- Summarising the barriers and facilitators of PA participation in adolescent girls from existing systematic reviews and identifying key areas for fostering gender-responsive action and policy implications (Duffey et al. 2021).

Six systematic reviews were identified, and these focused on:

- Synthesising evidence from qualitative studies relating to adolescent girls' perceptions of PA participation (Corr et al. 2018).
- Synthesising current literature on barriers to exercise in postpartum women (Edie et al. 2021).
- Investigating pregnant women's attitudes and perceived barriers and enablers to PA, including the perspectives of women diagnosed with gestational diabetes mellitus (Harrison et al. 2018).

- Examining factors that influence adolescent girls' participation in sports and categorising these factors into constructs of the planned behaviour theory (Hopkins et al. 2022).
- Synthesising self-identified barriers and facilitators to young adult women's participation in PA and offering suggestions for future studies in this population (Peng et al. 2023).
- Investigating influencing factors and adaptation approaches of PA interventions among midlife immigrant women (Zou et al. 2021).

3.1.4. Interventions (unrelated to managing the menstrual cycle) to support physical activity participation of women, girls, and people who menstruate

Eight systematic reviews were identified, and these focused on:

- Assessing the impact of PA interventions on adolescent girls and young adults participation in team sport and identifying potential strategies for increasing participation (Allison et al. 2017).
- Evaluating the effectiveness, acceptability, and active behavioural change techniques of mobile PA technologies among midlife women undergoing menopause (AISwayied et al. 2022).
- Examining the effectiveness of interventions to increase PA among pre-adolescent girls aged 5–11 years (Biddle et al. 2014).
- Describing the available evidence from PA interventions that targeted young and adolescent girls and determining their effectiveness and key characteristics of success (Camacho-Minano et al. 2011).
- Investigating the relationship between social support and PA in adolescent girls aged 10-19 years, and exploring how different types and providers of social support might influence this relationship (Laird et al. 2016).
- Examining interventions targeting the intersection of body image and movement experiences among girls and women (Matheson et al. 2023).
- Examining the effectiveness of interventions for increasing levels of PA and core physical skills in adolescent girls aged 11-18 years (NICE 2008).
- Investigated the implementation and outcomes of telehealth exercise interventions in the postpartum population (Turner et al. 2023).

3.1.5. The effects of physical activity on dysmenorrhea

Three systematic reviews were identified, and these focused on:

- Investigating the effectiveness and safety of exercise for primary dysmenorrhoea (Armour et al. 2019a).
- Analysing the evidence for participant led self-care and lifestyle techniques in primary dysmenorrhea (Armour et al. 2019b).
- Evaluating the effectiveness of PA for the treatment of primary dysmenorrhea (Matthewman et al. 2018).

3.1.6. The effects of exercise on premenstrual syndrome

Two systematic reviews were identified, and these focused on:

- Examining the evidence for the effectiveness of exercise as a treatment for PMS (Pearce et al. 2020).
- Investigating the effect of exercise on premenstrual symptoms (Saglam & Orsal 2020).

3.1.7. The menstrual cycle and exercise performance

One overview of reviews was identified, and it focused on:

- Examining and critically evaluating the influence of menstrual cycle phase on acute performance and chronic adaptations to resistance exercise training (Colenso-Semple et al. 2023).

One scoping review were identified, and it focused on:

- Providing a summary of the biological mechanisms underlying the menstrual cycle's impact on various performance determining anatomical and physiological parameters, and to identify various proposed concepts and theories that may explain performance changes following hormonal fluctuations (Bernstein & Behringer 2023).

Four systematic reviews were identified, and these focused on:

- Determining the effects of the menstrual cycle on exercise performance and provide evidence-based, practical recommendations to eumenorrhic women (McNulty et al. 2020).
- Establishing a consensus across studies to enable evidence-based recommendations for training individualisation depending on menstrual cycle phases (Meignié et al. 2021).
- Examining the effects of the different menstrual cycle phases on isometric, isokinetic, and dynamic maximum strength in female athletes (Niering et al. 2024).
- The impact of the menstrual cycle phase on perceived exertion during aerobic exercise in eumenorrhic women (Prado et al. 2023).

3.2. Key Findings

This section summarises the key findings of the identified reviews and studies. Additionally, more information about the included evidence can be found in Tables 2, 3 and 4. Table 2 summarises the identified secondary research evidence (systematic and scoping reviews, and overviews of reviews). Table 3 contains details of primary research studies, while Table 4 presents information extracted from organisational reports.

3.2.1. Barriers to exercising in relation to the menstrual cycle

- A systematic review revealed that **cyclically menstruating athletes (amateur to elite level)** and their coaches experienced **barriers to sport participation**, such as menstruation taboo, lack of knowledge and awareness, and lack of communication among stakeholders. Facilitators included female coaches, positive experiences of communicating about the menstrual cycle, and trust (Srinivasa Gopalan et al. 2024a).
- A systematic review which focused on the **general population** found that **adult women and adolescent girls** experience **barriers to recreational PA participation**, such as sociocultural taboo against menstruation, lack of knowledge and resources related to the menstrual cycle. An individualised approach to recreational PA promotion is needed to account for variability in menstrual symptoms and experiences (Srinivasa Gopalan et al. 2024b).

- A House of Commons (2024) report suggested that **barriers to school-aged girls'** sport and exercise participation were partly driven by hormonal differences. The **barriers** included: difference between girls' and boys' puberty experiences; lack of timely school education on managing the menstrual cycle; insufficient training for teachers on how to educate on the menstrual cycle; PE teachers' inadequate understanding on girls' experiences of puberty. One highlighted recommendation to increase participation in PE was that schools should allow a wide choice of kit for girls to improve comfort. Identified **barriers for women's (aged 41-60)** participation included perimenopausal and menopausal symptoms.
- An organisational report, which focused on **girl's experience of menstruation** in the UK, identified the universal issues of stigma, taboo, access to menstrual products, and pain management. The main **barrier to sport and exercise participation** was concern over leaking (Plan International UK 2018).
- The Scottish Parliament: Health, Social Care and Sport Committee (2023) reported that there was a persistent gender gap in the rates of participation in sport and PA. **Barriers** faced by **adolescent girls** included a lack understanding of the impact that menstruation can have on their participation in PA. Further barriers included access and appropriateness of toilet/changing facilities and sports kit. The Scottish Government's Women's Health Plan encourages education about menstrual health as part of the Scottish curriculum, although evaluation of this plan has not been undertaken. Additionally, new statutory guidance on school uniforms could address issues with sport kit. **Barriers** faced by **women of all ages** included period pain, leakage, and lack of adequate toilet facilities in sports environments.
- An organisational report from Women in Sport (2021) found that approximately one third of **women aged 41-60** did not meet PA guidelines. Based on a survey, while 30% of women reported lower activity levels since menopause, 71% of women wanted to be more active. Ninety percent of respondents would be more open to the idea if PA was prescribed by a GP or healthcare professional. Reported **barriers** included limited perception of what PA could entail, fear of standing out and judgement. Suggested interventions included creating support networks, expanding their frame of reference on PA, and engaging health professionals and employers to help encourage women to take up PA in midlife.
- An organisational report of a large survey including over 4,000 **adolescent boys and girls** identified a gender gap regarding disengagement from sport and exercise, with 43% of girls saying that they used to be sporty but no longer are compared to 24% of boys (Women in Sport 2022). **Barriers faced by girls** included self-belief, capability, body image and periods. Around 7 in 10 avoided being active when on their period, with **barriers** including pain (73%), fear of leakage (62%), tiredness (52%) and self-consciousness (45%).
- An organisational report from Youth Sport Trust (2023) highlighted that 38% of **secondary school aged girls** reported their **periods as a barrier to participating in PA** in school, and 21% reported it out of school. Overall, periods were the most reported **barrier**. Only 51% of girls reported that they were comfortable to take part in PE whilst on their period. Almost half of the girls surveyed (48%) reported that they were not at all comfortable with discussing their period with their teacher, with 8% reporting that they were comfortable to do so. Girls' main concerns about participating in PE or school sport whilst on their period were: pain and discomfort (68%), leaking (60%), and low mood (57%). When asked about how school could help them take part in PE whilst on their period, 40% requested teachers to have more empathy and understanding. Over half of the responding girls (56%) wanted more options in PE kit.

- A qualitative study conducted by Harvey et al. (2020) identified **barriers to adolescent girls' PA participation during menstruation**, such as feeling unprepared due to insufficient information about menstruation received too late (following menarche); fear of leaking; feeling exposed and uncomfortable; clothing; disliking tampons; and menstrual symptoms. Facilitators included social influences, shared responsibility with peers in sports, and being active helped relieve premenstrual symptoms. Participants reported diverse strategies to overcome barriers including wearing dark clothing, carrying spare underwear, choosing lower intensity activities, among others.
- A cross-sectional survey of **female university students in South Korea** found that those with regular menstruation patterns had higher health consciousness, greater level of PA and intention to participate in **leisure time PA** than those with irregular periods (Kim et al. 2022).
- A mixed methods study of **women's experiences** revealed that those who avoided PA when menstruating reported heavier periods, higher levels of fatigue and pain compared to non-avoiders (Kolic et al. 2021). **Reasons for PA avoidance** or modification included menstrual symptoms, personal thoughts, and concerns about other people's views on menstruation.
- A mixed methods study, which focused on **amateur female footballers**, revealed that 73% of participants felt that menstruation presented **one or more barriers** to football participation. Confidence and aerobic capacity were identified to be the most negatively impacted during pre-menstrual and menstrual stages (Pinel et al. 2022).
- A mixed methods study of **women attending adventurous activities (mountaineering, wild camping, running, wild swimming, climbing, etc.)** found that 89% of participants felt that their activity participation was affected by menstruation/PMS. Barriers to participation in adventurous activities included challenges posed by hygiene and waste disposal during menstruation (Prince & Annison 2023).

3.2.2. Interventions to increase exercise participation in relation to the menstrual cycle

- A quasi-experimental study found that **female university students in South Korea** who used **social media-based support** significantly increased their amount of PA and their premenstrual symptoms decreased compared to the control group (Nam & Cha 2020).
- A qualitative workshop in Sweden focused on **designing menstrual technologies** which responded to **adolescents' premenstrual symptoms** in collaboration with the participants. They found that a toolkit approach to the design of menstrual technologies allowed for pluralist experiences of menstrual cycles (Sondergaard et al. 2021).
- The **Big Sister project** in 11 deprived areas of the UK aimed to empower and support **adolescent girls** to enjoy sport, exercise and PA during puberty. Some of the barriers it aimed to tackle were period poverty and stigma. By collaborating with the "Hey Girls" project (an award-winning "buy one, donate one" social enterprise) they provided free sanitary products for girls in areas of deprivation. Different types of products and information about periods were distributed in women's toilets/changing rooms at leisure centres, schools, and community projects. Evaluation of The Big Sister project showed positive impact on girls' engagement in sport and PA with 44% of girls doing a lot more exercise, 64% enjoying taking part, 61% feeling motivated to take part and 58% more confident to take part in sport and exercise (Women in Sport 2023).

3.2.3. Wider barriers to physical activity participation of women, girls, and people who menstruate

- An overview of reviews identified multiple factors that affect **adolescent girls'** participation in PAs. The most common **barriers** were lack of support from peers and/or family, and limited time, while family, peer and teacher support and weight loss were identified as facilitators of PA participation. Identified areas for practice and policy implementation included: inclusive approach to addressing gender norms in the curriculum; training for professionals working with adolescents; environmental change to ensure safety and attractiveness of the PA settings; engagement of multiple stakeholders at local, regional, and national level in incorporating a gender-responsive approach toward PA participation (Duffey et al. 2021).
- A systematic review of qualitative studies identified **adolescent girls' barriers** to PA participation, such as gender bias in sport, motivation and perceived competence, and competing priorities. Meeting societal expectations, such as peer and adult influences were seen to have both positive and negative aspects regarding PA participation. Community influences were also identified, and rural settings were associated with limited choice of activities. In urban settings while there was a variety of activities, financial constraints often **hindered participation** (Corr et al. 2018).
- A mixed methods systematic review reported that **postpartum women's barriers** to exercise commonly included tiredness/lack of sleep, lack of time due to domestic chores/responsibilities, and insufficient support from family, friends and other mothers, weather, and breast feeding. Additionally, it was advised that physical therapists and other healthcare professionals should be aware of the unique barriers to exercise amongst postpartum women to provide counselling strategies and meaningful education to this population (Edie et al. 2021).
- A systematic review revealed that **pregnant women** had positive attitudes regarding PA, acknowledging its importance and benefits. **Barriers** were often intrapersonal and included fatigue, lack of time, and pregnancy related discomfort. Additionally, enablers included maternal and foetal health benefits, social support, and pregnancy specific programs. Person-centred strategies using behaviour change techniques should be used to address barriers and translate pregnant women's positive attitudes into increased PA participation. There was little information found on barriers and enablers for PA in pregnant women with gestational diabetes (Harrison et al. 2018).
- A systematic review reported **factors** associated with **adolescent girls' sport participation** including personal, peer, family, socioeconomic, and other circumstances. Personal factors, including self-perceptions and desirable personal outcomes related to sport, were most frequently associated with participation (Hopkins et al. 2022).
- A systematic review identified **barriers** to PA for **young adult women** that included factors such as time, body image, societal beauty standards, family duty, social support, religious and cultural norms, safety issues, facilities and physical environment (Peng et al. 2023).
- A systematic review identified multiple factors that influenced **midlife immigrant women's PA participation**. These included individual, familial and community factors. Individual factors related to health status, limited time, lack of motivation and proficiency in life skills, such as language proficiency, driving, and PA knowledge. Familial factors consisted of family support and seasonality (as in seasonal

celebrations), while community factors related to social support and physical environment (Zou et al. 2021).

3.2.4. Interventions (unrelated to managing the menstrual cycle) to support PA participation of women, girls and people who menstruate

- A systematic review found that **PA interventions** may encourage **adolescent girls and young adults (11-25 years)** to try new sports. However, there was limited evidence of sustained participation. Recommended strategies included consultation with girls, implementation of peer-leaders and friendship group elements, early intervention, and considerations for setting (Allison et al. 2017).
- A systematic review with a meta-analysis conducted by AlSwayied et al. (2022) showed that there was a small to moderate increase of 61.38 weekly minutes in moderate to vigorous PA in **midlife women undergoing menopause** following **mobile based PA interventions**. Positive improvements were also found in menopause-related outcomes, such as weight reduction, anxiety management, sleep quality, and menopause-related quality of life. Participants perceived mobile PA interventions to be acceptable and helpful.
- A systematic review with a meta-analysis indicated that **PA interventions for pre-adolescent girls** had a small statistically significant effect in increasing participation. Subgroup analysis indicated that interventions that were **educational or multicomponent**, or those aimed at **girls only** were more effective than others (Biddle et al. 2014).
- A systematic review suggested that the most effective interventions to promote PA among **young and adolescent girls** were those that were **school-based and multicomponent with PE tailored to girls' unique needs**. Additionally, it showed influence of peers more promising than family support (Camacho-Minano et al. 2011).
- A systematic review and meta-analysis of cross-sectional studies suggested that **social support** is not a strong predictor of PA in **adolescent girls**. However, support from parents and friends may have a role in changing girls' PA behaviour (Laird et al. 2016).
- A systematic review and meta-analysis found that **interventions that target the intersection of body image and movement** for **girls and women** led to a small statistically significant improvement in body image at post-test. However, long-term effect detected at follow-up was not significant. Additionally, while body image and movement focused interventions had an effect on fitness outcomes, they were found to have no statistically significant effect on movement behaviour (Matheson et al. 2023).
- A systematic review by National Institute for Health and Care Excellence (NICE) (2008) identified school and primary care based interventions that promoted PA for **adolescent girls**. These interventions consisted of mediated (delivered via computer, phone or printed material) counselling and educational elements. Findings indicate that **school-based interventions outside of PE targeting PA behaviour only** could have a moderate-to-large effect.
- A systematic review found that **telehealth interventions** in **postpartum women** could increase moderate to vigorous PA (Turner et al. 2023). While the majority of included studies showed an effect (n=10), some studies had no significant impact. Findings indicate that video consultations might be most effective.

3.2.5. The effects of physical activity on dysmenorrhea

- A systematic review with meta-analysis found low quality evidence that **exercise for 45-60 minutes three times or more weekly** may provide a **significant reduction in menstrual pain intensity**, and therefore could be used solely or in conjunction with other modalities such as non-steroidal anti-inflammatory drugs (Armour et al. 2019a).
- A systematic review with meta-analysis suggested that **self-care and lifestyle interventions**, such as self-directed acupuncture, exercise, and heat all reduced menstrual pain symptoms. **Exercise had the largest effect** and alongside heat was more effective at reducing menstrual pain symptoms than analgesics (Armour et al. 2019b).
- A systematic review found moderate to low certainty evidence that **PA could effectively reduce menstrual pain intensity and duration**. However, there is a need for high quality trials (Matthewman et al. 2018).

3.2.6. The effects of physical activity on premenstrual syndrome

- A systematic review with meta-analysis suggests that **exercise interventions could reduce overall, psychological, physical, and behavioural symptoms** of PMS (Pearce et al. 2020). However, due to heterogeneity of included studies and high risk of bias, uncertainty remains.
- A systematic review found that **exercise improved premenstrual symptoms in women** including physical and psychological symptoms, such as pain, constipation, breast sensitivity, anxiety and anger. (Saglam & Orsal 2020).

3.2.7. The menstrual cycle and exercise performance

- An overview of reviews found largely **inconsistent evidence** of marked differences in strength, exercise performance, and hypertrophy throughout menstrual cycle phases (Colenso-Semple et al. 2023).
- A scoping review suggested that **oestrogen and progesterone is responsible for differences in athletic performance throughout the menstrual cycle** (Bernstein & Behringer 2023). However, the evidence base mainly consists of animal and in vitro research, and more high quality human studies using cycle monitoring methodology is needed.
- A systematic review with meta-analysis found that **exercise performance had a very small reduction during the early follicular phase** of the menstrual cycle, compared to all other phases. (McNulty et al. 2020).
- A systematic review found a **variable association between menstrual cycle and elite athletes' performance-related outcomes**, such as endurance or power resistance, ligament stiffness, decision making skills, psychology, or competitiveness. (Meignié et al. 2021).
- A systematic review with meta-analysis suggested that the **early follicular phase is unfavourable for all maximal strength performance**. Isometric strength peaks and dynamic strength is optimal in the late follicular phase, while isokinetic strength is the highest during ovulation (Niering et al. 2024).
- A systematic review and meta-analysis found that **menstrual cycle phases did not impact rating of perceived exertion** during exercise (Prado et al. 2023). However, further research is needed on the topic.

3.3. Areas of uncertainty

Remaining uncertainties include:

- There seems to be a lack of secondary and primary evidence on interventions that could support the PA (including exercise and sport) participation of women, girls, and people who menstruate in relation to the menstrual cycle.

4. NEXT STEPS

While there seems to be a lack of evidence regarding interventions that could support the PA (including exercise and sport) participation of women, girls and people who menstruate in relation to the menstrual cycle, a wealth of secondary research evidence is available for PA promotion that is unrelated to the menstrual cycle. Following the intermediary stakeholder meeting, it was decided to conduct a rapid overview of reviews on the effectiveness of interventions that support women, girls, and people who menstruate to participate in exercise/sport/physical activity. The protocol is registered on Open Science Framework: <https://doi.org/10.17605/OSF.IO/XTYCW>

5. REFERENCES

- Allison R, Bird EL, McClean S. (2017). Is team sport the key to getting everybody active, every day? A systematic review of physical activity interventions aimed at increasing girls' participation in team sport. *AIMS Public Health*. 4(2): 202-20. doi: <https://doi.org/10.3934/publichealth.2017.2.202>
- AlSwayied G, Guo H, Rookes T, et al. (2022). Assessing the acceptability and effectiveness of mobile-based physical activity interventions for midlife women during menopause: systematic review of the literature. *JMIR Mhealth Uhealth*. 10(12): e40271. doi: <https://doi.org/10.2196/40271>
- Armour M, Ee CC, Naidoo D, et al. (2019a). Exercise for dysmenorrhoea. *Cochrane Database of Systematic Reviews*. 9(9): CD004142. doi: <https://doi.org/10.1002/14651858.CD004142.pub4>
- Armour M, Smith CA, Steel KA, et al. (2019b). The effectiveness of self-care and lifestyle interventions in primary dysmenorrhea: a systematic review and meta-analysis. *BMC Complementary and Alternative Medicine*. 19(1): 22. doi: <https://doi.org/10.1186/s12906-019-2433-8>
- Bernstein C, Behringer M. (2023). Mechanisms underlying menstrual cycle effects on exercise performance: a scoping review. *Women in Sport and Physical Activity Journal*. 31(2): 129-46. doi: <https://doi.org/10.1123/wspaj.2022-0026>
- Biddle SJH, Braithwaite R, Pearson N. (2014). The effectiveness of interventions to increase physical activity among young girls: a meta-analysis. *Preventive Medicine*. 62: 119-31. doi: <https://doi.org/10.1016/j.ypmed.2014.02.009>
- Camacho-Miñano MJ, LaVoi NM, Barr-Anderson DJ. (2011). Interventions to promote physical activity among young and adolescent girls: a systematic review. *Health Education Research*. 26(6): 1025-49. doi: <https://doi.org/10.1093/her/cyr040>
- Colenso-Semple LM, D'Souza AC, Elliott-Sale KJ, et al. (2023). Current evidence shows no influence of women's menstrual cycle phase on acute strength performance or adaptations to resistance exercise training. *Frontiers in Sports and Active Living*. 23(5): 1054542. doi: <https://doi.org/10.3389/fspor.2023.1054542>
- Corr M, McSharry J, Murtagh EM. (2018). Adolescent girls' perceptions of physical activity: a systematic review of qualitative studies. *American Journal of Health Promotion*. 33(5): 806-19. doi: <https://doi.org/10.1177/0890117118818747>

- Duffey K, Barbosa A, Whiting S, et al. (2021). Barriers and facilitators of physical activity participation in adolescent girls: a systematic review of systematic review. *Frontiers in Public Health*. 15(9): 743935. doi: <https://doi.org/10.3389/fpubh.2021.743935>
- Edie R, Lacewell A, Streisel C, et al. (2021). Barriers to exercise in postpartum women: a mixed-methods systematic review. *The Journal of Women's & Pelvic Health Physical Therapy*. 45(2): 83-92. doi: <https://doi.org/10.1097/JWH.000000000000201>
- Frank SE. (2020). Queering Menstruation: Trans and non-binary identity and body politics. *Sociological Inquiry*. 90(2): 371-404. doi: <https://doi.org/10.1111/soin.12355>
- Guthold R, Stevens GA, Riley LM, et al. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. *The Lancet Global Health*. 6(10): e1077-e86. doi: [https://doi.org/10.1016/S2214-109X\(18\)30357-7](https://doi.org/10.1016/S2214-109X(18)30357-7)
- Harrison AL, Taylor NF, Shields N, et al. (2018). Attitudes, barriers and enablers to physical activity in pregnant women: a systematic review. *Journal of Physiotherapy*. 64(1): 24-32. doi: <https://doi.org/10.1016/j.jphys.2017.11.012>
- Harvey J, Emm-Collison L, Sebire SJ. (2020). "I feel proper self-conscious all the time": A qualitative study of adolescent girls' views of menstruation and physical activity. *Wellcome Open Research*. 5(279): 1-12. doi: <https://doi.org/10.12688/wellcomeopenres.16391.1>
- Hopkins CS, Hopkins C, Kanny S, et al. (2022). A systematic review of factors associated with sport participation among adolescent females. *International Journal of Environmental Research and Public Health*. 19(6): 3353. doi: <https://doi.org/10.3390/ijerph19063353>
- House of Commons. (2024). Health barriers for girls and women in sport UK Parliament. Available at: <https://publications.parliament.uk/pa/cm5804/cmselect/cmwomeq/130/report.html#heading-1> [Accessed 18/03/2024].
- Kim B-R, Kang S, Jeong W-S. (2022). The association of menstruation and leisure-time physical activity among korean female university students: a preliminary study. *International Journal of Environmental Research and Public Health*. 19(12): 7492. doi: <https://doi.org/10.3390/ijerph19127492>
- Kolić PV, Sims DT, Hicks K, et al. (2021). Physical activity and the menstrual cycle: a mixed-methods study of women's experiences. *Women in Sport and Physical Activity Journal*. 29(1): 47-58. doi: <https://doi.org/10.1123/wspaj.2020-0050>
- Laird Y, Fawkner S, Kelly P, et al. (2016). The role of social support on physical activity behaviour in adolescent girls: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*. 13: 79 (2016). doi: <https://doi.org/10.1186/s12966-016-0405-7>
- Matheson EL, Schneider J, Gentili C, et al. (2023). A systematic review and meta-analysis of interventions that target the intersection of body image and movement among girls and women. *International Review of Sport and Exercise Psychology*. 1-36. doi: <https://doi.org/10.1080/1750984X.2023.2258379>
- Matthewman G, Lee A, Kaur JG, et al. (2018). Physical activity for primary dysmenorrhea: a systematic review and meta-analysis of randomized controlled trials. *American Journal of Obstetrics and Gynecology*. 219(3): 255.e1-.e20. doi: <https://doi.org/10.1016/j.ajog.2018.04.001>
- McNulty KL, Elliott-Sale KJ, Dolan E, et al. (2020). The effects of menstrual cycle phase on exercise performance in eumenorrheic women: a systematic review and meta-analysis. *Sports Medicine*. 50(10): 1813-27. doi: <https://doi.org/10.1007/s40279-020-01319-3>
- Meignié A, Duclos M, Carling C, et al. (2021). The effects of menstrual cycle phase on elite athlete performance: a critical and systematic review. *Frontiers in Physiology*. 12: 654585. doi: <https://doi.org/10.3389/fphys.2021.654585>
- Nam SJ, Cha C. (2020). Effects of a social-media-based support on premenstrual syndrome and physical activity among female university students in South Korea. *Journal of*

- Psychosomatic Obstetrics & Gynecology. 41(1): 47-53. doi: <https://doi.org/10.1080/0167482X.2018.1559811>
- NHS. (2024). Exercise. Available at: <https://www.nhs.uk/live-well/exercise/> [Accessed 18/03/2024].
- NICE. (2008). Promoting physical activity for children: Review 6- Interventions for adolescent girls. National Institute of Health and Care Excellence. Available at: <https://www.nice.org.uk/guidance/ph17/evidence/review-6-interventions-for-adolescent-girls-pdf-371249533> [Accessed 18/03/2024].
- Niering M, Wolf-Belala N, Seifert J, et al. (2024). The influence of menstrual cycle phases on maximal strength performance in healthy female adults: a systematic review with meta-analysis. *Sports (Basel)*. 12(1): 31. doi: <https://doi.org/10.3390/sports12010031>
- Nuffield Health. (2023). Periods are making it harder for 84% of teenage girls to take part in sports and fitness. Available at: <https://www.nuffieldhealth.com/article/menstrual-cycle-impact-on-physical-activity> [Accessed 18/03/2024].
- Pearce E, Jolly K, Jones LL, et al. (2020). Exercise for premenstrual syndrome: a systematic review and meta-analysis of randomised controlled trials. *BJGP Open*. 4(3): bjgpopen20X101032. doi: <https://doi.org/10.3399/bjgpopen20X101032>
- Peng B, Ng JYY, Ha AS. (2023). Barriers and facilitators to physical activity for young adult women: a systematic review and thematic synthesis of qualitative literature. *International Journal of Behavioral Nutrition and Physical Activity*. 20(1): 23. doi: <https://doi.org/10.1186/s12966-023-01411-7>
- Peters MDJ, Godfrey C, McInerney P, et al. (2020). Chapter 11: Scoping Reviews. JBI. Available at: <https://synthesismanual.jbi.global>.
- Pinel CJJ, Mehta R, Okholm Kryger K. (2022). The impact and experienced barriers menstruation present to football participation in amateur female footballers. *Journal of Sports Sciences*. 40(17): 1950-63. doi: <https://doi.org/10.1080/02640414.2022.2122328>
- Plan International UK. (2018). Break the Barriers: Girls' experiences of menstruation in the UK. Plan International UK. Available at: <https://plan-uk.org/file/plan-uk-break-the-barriers-report-032018pdf/download?token=Fs-HYP3v> [Accessed 18/03/2024].
- Prado RCR, Hackney AC, Silveira R, et al. (2023). Effect of menstrual cycle phase on perceived exertion during aerobic exercise in eumenorrheic women: a systematic review and meta-analysis. *The Journal of Women's & Pelvic Health Physical Therapy*. 48(2): 1-102.
- Prince HE, Annison E. (2023). The impact of menstruation on participation in adventurous activities. *Sport, Education and Society*. 28(7): 811-23. doi: <https://doi.org/10.1080/13573322.2022.2059756>
- Saglam HY, Orsal O. (2020). Effect of exercise on premenstrual symptoms: a systematic review. *Complementary Therapies in Medicine*. 48: 102272. doi: <https://doi.org/10.1016/j.ctim.2019.102272>
- Søndergaard MLJ, Felice MC, Balaam M. (2021). Designing menstrual technologies with adolescents. *Association for Computing Machinery*. Available at: <https://doi.org/10.1145/3411764.3445471>.
- Sport Wales. (2021). Wales activity tracker survey 4 - August 2021. Available at: <https://www.sport.wales/research-and-insight/comres-research/comres-survey-4-august-2021/> [Accessed 18/03/2024].
- Srinivasa Gopalan S, Liu S, Mann C, et al. (2024a). Examining the coach–athlete relationship for facilitators and barriers to healthy sport participation for cyclically menstruating athletes: a systematic review. *International Journal of Sports Science & Coaching*. 17479541241239925. doi: <https://doi.org/10.1177/17479541241239925>
- Srinivasa Gopalan S, Mann C, Rhodes RE. (2024b). Impact of symptoms, experiences, and perceptions of the menstrual cycle on recreational physical activity of cyclically menstruating individuals: a systematic review. *Preventive Medicine*. 184: 107980. doi: <https://doi.org/10.1016/j.ypmed.2024.107980>

- The Scottish Parliament: Health Social Care and Sport Committee. (2023). Female participation in sport and physical activity. The Scottish Parliament. Available at: <https://digitalpublications.parliament.scot/Committees/Report/HSCS/2023/10/9/44f3cbcf-b4f5-429b-822d-93fdd1e60353-1#907b0806-d908-4928-96c4-791b373dcd60.dita> [Accessed 18/03/2024].
- Turner J, Clanchy K, Vincze L. (2023). Telehealth interventions for physical activity and exercise participation in postpartum women: a quantitative systematic review. *Preventive Medicine*. 167: 107413. doi: <https://doi.org/10.1016/j.ypmed.2022.107413>
- Welsh Government. (2022). The Quality Statement for women and girls' health. Welsh Government. Available at: <https://www.gov.wales/quality-statement-women-and-girls-health.html> [Accessed 18/03/2024].
- Welsh Government. (2023). Period Proud Wales Action Plan. Welsh Government. Available at: <https://www.gov.wales/period-proud-wales-action-plan.html> [Accessed 18/03/2024].
- WHO. (2020). WHO Guidelines on physical activity and sedentary behaviour. World Health Organization. Available at: <https://www.who.int/publications/i/item/9789240015128> [Accessed 28/03/2024].
- Women in Sport. (2021). Inspiring women to be active during midlife and menopause. Women in Sport. Available at: <https://womeninsport.org/resource/inspiring-women-to-be-active-during-midlife-and-menopause/> [Accessed 18/03/2024].
- Women in Sport. (2022). Reframing sport for teenage girls: tackling teenage disengagement. Women in Sport. Available at: <https://womeninsport.org/wp-content/uploads/2022/03/2022-Reframing-Sport-for-Teenage-Girls-Tackling-Teenage-Disengagement.pdf> [Accessed 18/03/2024].
- Women in Sport. (2023). Big Sister: By girls, for girls: big sister impact report. Women in Sport. Available at: <https://womeninsport.org/creating-change/piloting-solutions/the-big-sister-project/> [Accessed 18/03/2024].
- Youth Sport Trust. (2023). Girls Active - National report: Girls' report. Youth Sport Trust Available at: <https://www.youthsporttrust.org/research-listings/research/girls-active-national-reports> [Accessed 18/03/2024].
- Zou P, Kadri Z, Shao J, et al. (2021). Factors influencing physical activity participation among midlife immigrant women: a systematic review. *International Journal of Environmental Research and Public Health*. 18(11): 5590. doi: <https://doi.org/10.3390/ijerph18115590>

6. RAPID EVIDENCE SUMMARY METHODS

A list of the resources searched during this Rapid Evidence Summary is provided within Appendix 1. Searches were limited to English-language publications and did not include searches for primary research studies if secondary research relevant to the question was found. Search hits were screened for relevance by a single reviewer.

Priority was given to robust evidence synthesis using minimum standards (systematic search, study selection, quality assessment, appropriate synthesis). The literature identified was not formally quality assessed. The included literature may vary considerably in quality and the degree of such variation will be investigated during the rapid review work (focusing on interventions supporting women, girls, and people who menstruate to participate in exercise/sport/physical activity) which follows on. Citation, recency, evidence type, document status and key findings were tabulated for all relevant research identified in this process.

As secondary research evidence was limited on the topic of interventions/innovations that could support/encourage the PA participation (including exercise and sport) of women, girls, and people who menstruate in relation to the menstrual cycle, targeted searches for primary studies and secondary research in other PA topics were conducted to inform options for further work.

Date of Search	March 2024
Search Concepts Used	<ol style="list-style-type: none">1. Menstruation AND Exercise AND participation2. Menstruation AND Exercise AND barriers3. Women, girls, female AND Exercise AND barriers4. Exercise performance AND menstruation AND systematic reviews5. Women, girls, female AND Exercise AND participation
Search Completed by	Cardiff Evidence Synthesis Collaborative

7. EVIDENCE

Table 1. Summary of review evidence identified

Evidence type	Total identified	Comments
Overviews of reviews	2	
Systematic reviews	25	
Scoping reviews	1	
Organisational reports	7	
Primary Studies	7	

A more detailed summary of included evidence can be found in Table 2, Table 3 and Table 4.

Table 2: Summary of included secondary evidence

Secondary research						
Resource	Citation	Recency (Search dates)	Evidence Type*	Status**	Key findings from abstracts	Reviewer comments
Barriers to exercising in relation to the menstrual cycle						
PROSPERO	<p>Srinivasa Gopalan et al. 2024a</p> <p>Examining the coach–athlete relationship for facilitators and barriers to healthy sport participation for cyclically menstruating athletes: A systematic review. <i>International Journal of Sports Science & Coaching</i>; 0(0):1-16.</p> <p>https://doi.org/10.1177/17479541241239925</p>	From inception until 30 th June 2023	SR	Published	<p>Included studies: n= 34 (15 qualitative, 13 quantitative, and 6 mixed methods)</p> <p>Age: 13-17 (6 studies), 18-59 (24 studies)</p> <p>Geographical location: UK & Scotland (11), Scandinavia (Denmark, Finland, Norway, Sweden) (7), Europe (Bulgaria, France, Germany, Netherlands, Poland, Spain) (4), North America (USA, Canada, Mexico), Australia, New Zealand (all 3), South Africa (2), Japan, Colombia, India, Unspecified (all 1).</p> <p>Thematic synthesis and integration of qualitative and quantitative data from 7558 athletes and coaches from elite to amateur level uncovered 4 main themes pertaining to the coach–athlete relationship and the menstrual cycle that constituted barriers (menstruation taboo, lack of knowledge and awareness, and lack of communication among stakeholders) and facilitators (presence of female coaches, positive experiences of communicating about the menstrual cycle, and trust) to healthy sport participation. Additionally, there was a tendency in both athletes and coaches to prioritise sport training and performance above health and well-being, with athletes ignoring pain and discomfort caused by</p>	The protocol of this SR was identified via PROSPERO. We obtained the full review by contacting the authors.

					<p>menstrual symptoms unless it impacted their performance.</p> <p>A final theme summarised the needs of athletes and coaches related to the menstrual cycle. Greater education, representation of females in sporting roles, and improved collaboration among the various stakeholders emerged as the primary factors for driving a culture-shift in the sporting environment, in order to abolish the taboo against menstruation and promote healthy sport participation for cyclically menstruating athletes.</p>	
PROSPERO	<p>Srinivasa Gopalan et al. 2024b</p> <p>Impact of symptoms, experiences, and perceptions of the menstrual cycle on recreational physical activity of cyclically menstruating individuals: A systematic review</p> <p>https://doi.org/10.1016/j.ygmed.2024.107980</p>	Inception to June 2023	SR	Published	<p>Included reviews: n=25</p> <p>Age: 13-59</p> <p>Geographical location: North America (USA, Canada) (n=9); Europe (France, Germany, Italy, Spain, Czech Republic, Turkey) (n=7); Asia (Malaysia, China, Jordan, Hong Kong, Taiwan) (n=5); UK (n=5); Australia (n=3); Brazil (n=3); Africa (South Africa, Madagascar) (n=3)</p> <p>Eligible studies were found to be of moderate-to-high quality following a quality and risk-of-bias assessment. Thematic synthesis of qualitative and quantitative data from the selected studies, constituting 16,557 adults and 3715 adolescents, identified the impact of menstrual symptoms on the physical and psychological capability to participate in recreational PA social opportunity barriers to recreational PA (e.g., social pressure due to the sociocultural taboo against menstruation), as well reflective (knowledge) and automatic (habit) motivation on recreational PA behaviours.</p>	The protocol of this SR was identified via PROSPERO. We obtained the full review by contacting the authors.

					The variability in menstrual symptoms and corresponding experiences suggested the need for an individualised approach to recreational PA promotion. Furthermore, this review highlighted the need to address the sociocultural taboo against menstruation, as well as improve the provision of knowledge and resources related to the menstrual cycle and recreational PA, in order to promote and facilitate recreational PA for cyclically menstruating individuals throughout the menstrual cycle.	
Barriers to exercising for girls, women and people who menstruate (not exclusively related to the menstrual cycle)						
Stakeholders	Duffey et al. 2021 Barriers and facilitators of physical activity participation in adolescent girls: a systematic review of systematic reviews. <i>Frontiers in Public Health</i> ; 9:743935. https://doi.org/10.3389/fpubh.2021.743935	Inception until February 2021	OoR	Published	Included reviews: n=8 Age: 10-19 Geographical location: Not reported The most frequent barriers identified were the lack of support from peers, family, and teachers, and the lack of time. The most reported facilitators were weight loss, and support from peers, family, and teachers. Key areas for action and policy implementation include an inclusive approach to curriculum development to address gender norms; adequate training of professionals so they have a range of skills to ensure inclusion of adolescent girls; environmental changes in and out of schools to stimulate participation, to allow adolescent girls to be active in a safe and attractive environment; multistakeholder support at local, regional, and national level in incorporating a gender-responsive approach toward PA participation. For the attainment of effective policies that increase PA levels in adolescent girls, it is essential to engage several stakeholders at	

					different levels in incorporating a gender-responsive approach toward PA participation.	
Medline/Emcare/AMED	<p>Corr et al. 2018</p> <p>Adolescent girls' perceptions of physical activity: a systematic review of qualitative studies. <i>American Journal of Health Promotion</i>; 33(5): 806-819</p> <p>https://doi.org/10.1177/0890117118818747</p>	2001-2016	SR	Published	<p>Included studies: n=24</p> <p>Age: 12-19</p> <p>Geographical location: Canada (n=7); Australia (n=5); United Kingdom (n=4); United States (n=4); Asia, South America, South Africa, and Ireland (n=1 each)</p> <p>Four themes were identified:</p> <p>-Gender bias in sport: Barriers this theme included were: Body image and body centred issues; societal pressure; peer and teacher feedback (boys' opinions have strong influence, PE teachers can be unsupportive, too competitive, and more interested in the boys in the class)</p> <p>-Motivation and perceived competence: Barriers this theme included were: Low perceived skill; PA opportunities (lack of variety and emphasis on skill did not appeal to girls; need for single-sex classes and a wider variety of content)</p> <p>-Competing priorities during adolescence: Barriers this theme included were: School work and home responsibilities; parental expectations; changes in leisure activities</p> <p>-Meeting societal expectations: This theme focused on factors that were both positive and negative for PA participation, including: peer and adult influences. Community influences were also identified, with rural settings potentially limiting choice of activities. In urban settings, there was a variety in activities, though financial constraints often hindered involvement.</p>	

					<p>The results of this review provide insights into adolescent girls' views on PA. Future research is needed to investigate the potential impact of alternative activity programs on adolescent girls with appropriate follow-up. Researchers and individuals working with young girls must consider the role of perceived motor competence in participation and how this can impact their perceptions.</p>	
Google	<p>Edie et al. 2021 Barriers to Exercise in Postpartum Women: A Mixed-Methods Systematic Review. <i>Journal of Women's Health Physical Therapy</i>, 45(2):83-92 https://doi.org/10.1097/JWH.0000000000000201</p>	2005-2019	SR	Published	<p>Included studies: n=10 (7 qualitative and 3 quantitative) Age: 18-45 Geographical location: USA (n=8), Canada (n=1), Australia (n=1)</p> <p>Barriers were categorised into the following categories: intrapersonal, interpersonal, sociocultural/demographic, physical environment, and health care environment. The most reported barriers in each category were tiredness and/or lack of sleep (7 out of 10 mentioned), time and/or unpredictable routines/schedule and busy with domestic chores/care/responsibilities (both 8 out of 10 mentioned), lack of support from family, friends, and other mothers (9 out of 10 mentioned), weather (7 out of 10 mentioned), and breastfeeding (3 out of 10 mentioned), respectively.</p> <p>Physical therapists and other health care professionals should be aware of the major reported barriers to exercise among postpartum people, as this will help guide them in providing meaningful education and counselling strategies to increase exercise in this unique population. Further research is needed to capture a more diverse group of</p>	

					postpartum people, as well as considering how policy may affect exercise postpartum.	
Google	<p>Harrison et al. 2018</p> <p>Attitudes, barriers and enablers to physical activity in pregnant women: a systematic review. <i>Journal of Physiotherapy</i>; 64 (1):24-32</p> <p>https://doi.org/10.1016/j.jphys.2017.11.012</p>	Inception until June 2016	SR	Published	<p>Included studies: n=47 (across 49 reports)</p> <p>Age: 18-46+</p> <p>Geographical location: USA (n=17), Australia (n=9), UK (n=7), Canada (n=3), Brazil, China, Denmark, Finland, India, Mexico, Nigeria, Norway, South Africa, Sweden, China & Australia (n=1 each)</p> <p>Data were collected using questionnaires, interviews and focus groups. Meta-analyses of proportions showed that pregnant women had positive attitudes towards PA, identifying it as important, beneficial, and safe. This was supported by themes emerging in 15 qualitative studies that reported on attitudes (important, 12 studies; beneficial, 10 studies). Barriers to PA were predominantly intrapersonal such as fatigue, lack of time and pregnancy discomforts. Frequent enablers included maternal and foetal health benefits (intrapersonal), social support (interpersonal) and pregnancy-specific programs. Few environmental factors were identified. Little information was available about attitudes, barriers and enablers of PA for pregnant women with gestational diabetes mellitus who are at risk from inactivity.</p> <p>Intrapersonal themes were the most frequently reported barriers and enablers to PA during pregnancy. Social support also played an enabling role. Person-centred strategies using behaviour change techniques should be used to address intrapersonal and social factors to translate pregnant women's positive attitudes into increased PA participation.</p>	

Google	<p>Hopkins et al. 2022</p> <p>A systematic review of factors associated with sport participation among adolescent females.</p> <p><i>International Journal of Environmental Research and Public Health</i>; 19: 3353.</p> <p>https://doi.org/10.3390/ijerph19063353</p>	1976-2020	SR	Published	<p>Included studies: n=36</p> <p>Age: 5-20</p> <p>Geographical location: Europe, Asia, North and South America, Africa, and Australia</p> <p>The 36 records reviewed consisted of various study designs, all of which were quantitative. Small studies using cross-sectional surveys were reviewed, as well as studies conducting secondary analyses of large data sets. A total of 25 studies included both male and female participants, and 11 studies included only females. The ages of participants ranged from 5 to 21 years.</p> <p>Factors impacting girls' sport participation were categorised as personal, peer, family, socioeconomic, environmental, or other factors. Of these categories, personal factors, including self-perceptions and desirable personal outcomes related to sport, were most frequently associated with sport participation. Future research would benefit from theory-driven prospective approaches to make clear and consistent predictions about factors impacting sport participation, as well as mixed-method approaches aimed to provide more robust understanding of girls' experiences with and perceptions of factors impacting their participation in sports</p>	
Google	<p>Peng et al. 2023</p> <p>Barriers and facilitators to physical activity for young adult women: a systematic review and thematic synthesis of qualitative literature.</p> <p><i>International Journal of</i></p>	January 2000-February 2022	SR	Published	<p>Included studies: n=23</p> <p>Age: 18-87</p> <p>Geographical location: Canada (n=5), United States (n=5), United Kingdom (n=3), Australia (n=2), Norway (n=2), Barbados, New Zealand, South Africa, Spain, Sweden, United Arab Emirates (n=1 each)</p>	

	<p><i>Behavioral Nutrition and Physical Activity</i>. 20(23)</p> <p>https://doi.org/10.1186/s12966-023-01411-7</p>				<p>Identified barriers and facilitators were grouped into different levels of the Social-ecological model, with the most frequently cited factors being time, body image and societal beauty standards, family duty and social support, religious and cultural norms, organisation and community facilities and environment, safety issues and physical environment. Descriptive data were thematically analysed and synthesised in line with the five levels: body image, health and beauty; multiple roles, support, and PA; religious identity, cultural identity, and PA; safety issues and women's fears.</p>	
Medline/Emcare/AMED	<p>Zou et al. 2021</p> <p>Factors influencing physical activity participation among midlife immigrant women: a systematic review</p> <p>https://doi.org/10.3390/ijerph18115590</p>	2010-2021	SR	Published	<p>Included studies: n=22</p> <p>Age range: 40-64</p> <p>Geographical location: New Zealand (n=1), USA (n=12), Canada (n=2) Korea (n=7)</p> <p>Three influencing factors were associated with PA participation amongst midlife immigrant women. These included individual factors (a lack of time, current health status, lack of motivation, and a lack of proficiency in various life skills), familial factors (familial support and seasonality), and community factors (social support and neighbourhood environment). The review found that an inadequate competence in various life skills such as language skills, driving skills and PA knowledge were barriers affecting participation and adherence in PA. The need for appropriate adaptation of PA interventions was highlighted.</p> <p>Family support was associated with engagement and participation in PA interventions. Seasonality was also an influencing factor as immigrant women use</p>	<p>Some inconsistencies in the review were identified. The narrative regarding geographical location in Section 3.1 (Characteristics of Included Studies) and the data in Table 1 are different. According to the narrative 1 study from Canada and 8 from Korea. In Table 1. 2 studies were from Canada and 7 from Korea. We extracted geographical location based on Table 1.</p> <p>Moreover, Table 1 has a citation for Lee et al. (2020), although this paper cannot be found in the reference list.</p>

					<p>holidays to visit families. Need for flexibility when recruiting immigrant women to be aware of their family circumstances.</p> <p>Findings indicated that social support from community members via community networks, exercise buddies, and health coaches/promoters can impact participation in PA. Future interventions should consider social networks of women and encourage women to participate in PA interventions with their existing social networks.</p>	
Interventions to increase exercise participation (not exclusively related to the menstrual cycle)						
MEDLINE (women specific search)	<p>Allison et al. 2017</p> <p>Is Team Sport the Key to Getting Everybody Active, Every Day? A Systematic Review of Physical Activity Interventions Aimed at Increasing Girls' Participation in Team Sport. <i>AIMS Public Health</i>, 4(2):202-220.</p> <p>https://doi.org/10.3934/publichealth.2017.2.202</p>	2005–2015	SR	Published	<p>Included studies: n=4</p> <p>Age: 11-25</p> <p>Geographical location: UK</p> <p>Findings suggest that PA interventions can encourage girls to try new sports, but evidence is limited in relation to sustained participation. Potential strategies for promoting participation included: consultation with girls, implementation of appropriate peer-leaders and friendship group strategies, early intervention and consideration of intervention setting.</p>	All included studies were sourced from the grey literature
TripPRO	<p>AlSwayied et al. 2022</p> <p>Assessing the acceptability and effectiveness of mobile based physical activity interventions for midlife women during menopause: A systematic review of the literature. <i>JMIR Mhealth and Uhealth</i>; 10(12):e40271</p>	January 2007-August 2021	SR	Preprint	<p>Included studies: n=12</p> <p>Age: 40-65</p> <p>Geographical location: United States (n=6), Australia (n=2), South Korea (n=2), Italy (n=1), Iran (n=1)</p> <p>Overall risk of bias was “Moderate to high” in 58% (7/12) of the included studies and “low” in 42% (5/12) of the studies. Of the 12 studies, 7 (58%) assessed changes in PA levels. The pooled effect size of 2 randomized</p>	

	https://doi.org/10.2196/40271				controlled trials resulted in a small to moderate increase in moderate to vigorous PA of approximately 61.36 weekly minutes among midlife women, at least in the short term. Although a meta-analysis was not feasible because of heterogeneity, positive improvements were also found in a range of menopause-related outcomes such as weight reduction, anxiety management, sleep quality, and menopause-related quality of life. Midlife women perceived mobile PA interventions to be acceptable and potentially helpful in increasing PA and daily steps. The average number of behavioural change techniques per mobile PA intervention was 8.8 (range 4-13) according to the behavioural change techniques Taxonomy v1. "Self-monitoring of behaviour," "Biofeedback," and "Goal setting (behaviour)" were the most frequently described behavioural change techniques across the included interventions.	
Google	Biddle et al. 2014 The effectiveness of interventions to increase physical activity among young girls: A meta-analysis. <i>Preventive Medicine</i> , 62(2014):119–131. https://doi.org/10.1016/j.ypmed.2014.02.009	Inception to August 2013	SR	Published	Included studies: n=22 Age: 5-11 Geographical location: USA (n=14), UK (n=2), Australia, Belgium, Cyprus, Denmark, Greece, Norway (n=1 each) A random effects meta-analysis was conducted. The average treatment effect for preadolescent girls involved in PA interventions was significant but small (g= 0.314, p b .001). Moderator analyses showed larger effects for interventions that catered for girls only and used educational and multicomponent strategies.	Included population was preadolescent
Google	Camacho-Minano et al. 2011	January 2000 - July 2010	SR	Published	Included studies: n=21 (across 29 reports) Age: 5-18	

	<p>Interventions to promote physical activity among young and adolescent girls: a systematic review. <i>Health Education Research</i>, 26(6):1025–1049.</p> <p>https://doi.org/10.1093/her/cyr040</p>				<p>Geographical location: USA (n=17), Australia (n=2), UK (n=1), Iran (n=1)</p> <p>Ten studies reported a favourable intervention effect upon [PA] outcomes, seven of which were rated as having a high methodological quality. Multicomponent school-based interventions that also offer PE that address the unique needs of girls seemed to be the most effective. Although family support is revealed as ineffective, peer strategies showed promising evidence.</p>	
Google	<p>Laird et al. 2016</p> <p>The role of social support on physical activity behaviour in adolescent girls: a systematic review and meta-analysis. <i>International Journal of Behavioral Nutrition and Physical Activity</i>, 13(79):1-14.</p> <p>https://doi.org/10.1186/s12966-016-0405-7</p>	Inception to January 2015	SR	Published	<p>Included studies: n=84</p> <p>Age: 10-19</p> <p>Geographical location: USA (n=46), Europe (n=13), Australia (n=10), Asia (n=7), Canada (n=6), and South America (n=2)</p> <p>Cross-sectional results were meta-analysed and longitudinal results were presented narratively. Small but significant associations between all available providers of total social support (except teachers) and PA were found (r = 0.14-0.24). Small but significant associations were also identified for emotional, instrumental and modelling support for some providers of support (r = 0.10-0.21). Longitudinal research supported the cross-sectional analyses. Many of the meta-analysis results suggested high heterogeneity and there was some evidence of publication bias, therefore, the meta-analysis results should be interpreted with caution. In conclusion, the meta-analysis results suggest that social support is not a strong predictor of PA in adolescent girls though parents and friends may have a role in enhancing [PA].</p>	

Google	<p>Matheson et al. 2023</p> <p>A systematic review and meta-analysis of interventions that target the intersection of body image and movement among girls and women. <i>International Review of Sport and Exercise Psychology</i>, 1-36.</p> <p>https://doi.org/10.1080/1750984X.2023.2258379</p>	Inception to February 2023	SR	Published	<p>Included studies: n=31</p> <p>Age: 0-35+</p> <p>Geographical location: USA (n = 6), UK (n = 4), Brazil (n = 3), Canada (n = 2), Iran (n = 2), Turkey (n = 2), Australia, Austria, Costa Rica, Denmark, France, Germany, Netherlands, Norway, Spain, and Sweden, UK & USA, Ireland & UK (n=1 each)</p> <p>Outcomes included body image, movement behaviour, and fitness. Most studies evaluated movement-based interventions (k = 29) and were deemed medium (k = 13) to high (k = 12) risk of bias. The meta-analysis indicated a small, significant improvement in body image at post-test (d+ = 0.181, p < .001, 95%CI: + 0.074, + 0.288) but not follow-up (d+ = 0.017, 95% CI: -0.123, + 0.157). The effect size for fitness (d+ = 0.720, p < .001, 95%CI: + .393, + 1.051), but not movement (d+ = 0.036, 95%CI: -0.088, + 0.161), was significant at post-test. Effect sizes were largest for studies with unimodal and atheoretical interventions, participants in mid-to-late adulthood, small sample sizes, active and waitlist controls, and those deemed as high risk of bias.</p>	
Google	<p>NICE 2008</p> <p>Promoting physical activity for children: Review 6- Interventions for adolescent girls</p> <p>https://www.nice.org.uk/guidance/ph17/evidence/review-6-interventions-for-adolescent-girls-pdf-371249533</p>	January 1990 to August 2007	SR	Published (report)	<p>Included studies: n=12</p> <p>Age: 11-16</p> <p>Geographical location: USA (n=6), UK (n=2), Australia, Belgium, France, Ireland (n=1 each)</p> <p>Designs included randomised controlled trials (n=1), cluster randomised controlled trials (n=5), controlled non-randomised trials (n=4), and a randomised non-controlled trial (n=1).</p>	

				<p>Studies varied in scale from 57 to 2991 participants.</p> <p>School-based interventions, outside of PE lessons, targeting the single behaviour of PA, could lead to moderate-to-large increases in PA for up to 6 months. Successful interventions included self-monitoring techniques, stage-matched counselling, teacher-led extra-curricular PA, and multi-level programming targeting psychological, social and environmental correlates.</p> <p>School-based interventions, outside of PE lessons, targeting multiple health behaviours, including PA, did not lead to increases in PA.</p> <p>A primary health care intervention designed to increase PA in adolescent girls which included targeting PA and nutrition through computer-mediated and counselling approaches with younger adolescent boys and girls was not successful.</p> <p>Interventions delivered via a medium such as computer, phone or printed materials did not lead to increases in PA. However, mediated interventions could lead to increases in PA.</p> <p>Counselling interventions for younger girls (<15 y) did not lead to changes in PA. A short (8 weeks) counselling intervention that included older girls (>14 y) led to an increase in PA.</p> <p>There was mixed evidence regarding educational interventions. Three educational interventions increased levels of PA in adolescent girls for up to 6 months. These interventions took place in schools but other characteristics were non-consistent across interventions. Two other educational interventions did not lead to increases in PA.</p>	
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					Their characteristics were that they took place in schools, targeted PA alongside other health behaviours in younger girls (<15 y), and the PA outcome was assessed with a self-report instrument of unknown validity.	
Google	Turner et al. 2023. Telehealth interventions for physical activity and exercise participation in postpartum women: A quantitative systematic review. https://doi.org/10.1016/j.yjg.2022.107413	January 2001- March 2022	SR	Published	Included studies: n=16 Age: 27.5–37.3 Geographical location: USA (n=7), Australia (n=5), UK (n=2), Singapore, Canada (n=1 each) Six interventions provided individualised exercise prescription, and only four were delivered by university-level exercise practitioners. PA participation was well reported, however health-related outcomes (i.e., muscular strength and aerobic capacity) were very minimally assessed. Only one intervention utilised modern video conferencing as the primary telehealth communication method. Overall, the impact of a telehealth exercise intervention on increasing PA and exercise in postpartum women was positive with 10 interventions demonstrating a positive trend for increasing Moderate to Vigorous PA. The use of video consultation as the primary telehealth delivery method has been demonstrated to be highly effective at creating strong rapport and positive participation outcomes in comparison to other telehealth communication methods. Future research interventions need to be reported according to a validated trial reporting system and focus on relevant health related outcomes including postpartum depressive symptoms, quality of life, cardiovascular fitness, muscular strength and body composition.	
The effect of exercise on dysmenorrhoea						

Cochrane	<p>Armour et al. 2019a</p> <p>Exercise for dysmenorrhoea. <i>Cochrane Database of Systematic Reviews</i>; 9</p> <p>http://dx.doi.org/10.1002/14651858.CD004142.pub4</p>	<p>Inception to July 2019</p> <p>and</p> <p>Inception to March 2019 (Trial databases)</p>	SR	Published	<p>Included studies: n=12</p> <p>Age: 15-49</p> <p>Geographical location: Iran (n=4), India (n=3), Egypt (n=2), Korea, New Zealand, USA (n=1 each)</p> <p>Nine of the 10 studies compared exercise with no treatment, and one study compared exercise with NSAIDs. No studies compared exercise with attention control or with the oral contraceptive pill. Studies used low-intensity exercise (stretching, core strengthening or yoga) or high-intensity exercise (Zumba or aerobic training); none of the included studies used resistance training.</p> <p>The current low-quality evidence suggests that exercise, performed for about 45 to 60 minutes each time, three times per week or more, regardless of intensity, may provide a clinically significant reduction in menstrual pain intensity of around 25 mm on a 100 mm VAS. All studies used exercise regularly throughout the month, with some studies asking women not to exercise during menstruation. Given the overall health benefits of exercise, and the relatively low risk of side effects reported in the general population, women may consider using exercise, either alone or in conjunction with other modalities, such as NSAIDs, to manage menstrual pain. It is unclear if the benefits of exercise persist after regular exercise has stopped or if they are similar in women over the age of 25. Further research is required, using validated outcome measures, adequate blinding and suitable comparator groups reflecting current best practice or accounting for the extra attention given during exercise.</p>	
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<p>Epistemonikos Medline/Emcar e/AMED</p>	<p>Armour et al. 2019b The effectiveness of self-care and lifestyle interventions in primary dysmenorrhea: a systematic review and meta-analysis. <i>BMC Complementary and Alternative Medicine</i>; 19(1):22 https://doi.org/10.1186/s12906-019-2433-8</p>	<p>Up to September 2017</p>	<p>SR</p>	<p>Published</p>	<p>Included studies: 23 Age: Not reported Geographical location: Iran (n=13), Taiwan (n=5), USA (n=2), Hong Kong, Korea, Turkey (n=1 each) Studies examined self-delivered acupressure, exercise and heat as interventions. Risk of bias was unclear for many domains. All interventions showed a reduction in menstrual pain symptoms; exercise showed the largest effect size, with heat and acupressure showing more moderate effect sizes. Exercise and heat were more effective than analgesics in reducing pain intensity, whereas acupressure was significantly less effective. Exercise showed large effects, while acupressure and heat showed moderate effects in reducing menstrual pain compared to no treatment. Both exercise and heat are potential alternatives to analgesic medication. However, difficulties in controlling for non-specific effects, along with potential for bias, may influence study findings.</p>	
<p>Google</p>	<p>Matthewman et al. 2018 Physical activity for primary dysmenorrhea: a systematic review and meta-analysis of randomized controlled trials. <i>Systematic reviews</i>; 219 (3):P255.E1-E20 https://doi.org/10.1016/j.ajog.2018.04.001</p>	<p>Inception to May 2017</p>	<p>SR</p>	<p>Published</p>	<p>Included studies: n=15 Age: 16-25 Geographical location: Iran (n=7), India (n=2), Egypt, Mexico, Saudi Arabia, South Korea, Thailand (n=1) Data from 11 studies were included in the meta-analyses. Pooled results demonstrated effect estimates for PA vs comparators for pain intensity on visual analogue scale; and pain duration. Heterogeneity for both results was high and only partly mitigated by subgroup analysis. Primary studies were of</p>	

					low or moderate methodological quality but results for pain intensity remained stable during sensitivity analysis by study quality. GRADE assessment found moderate-quality evidence for pain intensity and low-quality evidence for pain duration. Clinicians can inform women that PA may be an effective treatment for primary dysmenorrhea but there is a need for high-quality trials before this can be confirmed.	
The effect of exercise on Premenstrual syndrome						
Stakeholders	Pearce et al. 2020 Exercise for premenstrual syndrome: a systematic review and meta-analysis of randomised controlled trials. <i>BJGP Open</i> ; 4 (3):bjgpopen20X101032 https://doi.org/10.3399/bjgpopen20X101032	Inception until April 2019	SR	Published	Included studies: n=15 Age: 17–34 Geographical location: Iran (n=12), Egypt, South Korea, USA (n=1 each) Seven trials contributed data to the primary outcome meta-analysis (n = 265); participants randomised to an exercise intervention reported reduced global PMS symptom scores versus comparator, but with substantial heterogeneity. Secondary results for psychological, physical, and behavioural symptom groupings displayed similar findings. Most trials (87%) were considered at high risk of bias. Based on current evidence, exercise may be an effective treatment for PMS, but some uncertainty remains.	
Stakeholders	Saglam & Orsal 2020 Effect of exercise on premenstrual symptoms: A systematic review. <i>Complementary Therapies in Medicine</i> ; 48:102272	1993-2018	SR	Published	Included studies: n=17 Age: 15-55 Geographical location: Not reported It can be said that exercise is effective in improving physical symptoms such as pain, constipation, breast sensitivity, and	

	https://doi.org/10.1016/j.ctim.2019.102272				psychological symptoms such as anxiety and anger. However, although there is no clarity regarding other symptoms, exercise has a symptom-reducing effect. Exercise is an effective intervention for alleviating premenstrual symptoms in women with premenstrual syndrome.	
The menstrual cycle and exercise performance						
Stakeholders	Colenso-Semple et al. 2023 Current evidence shows no influence of women's menstrual cycle phase on acute strength performance or adaptations to resistance exercise training. <i>Frontiers in Sports and Active Living</i> ; 5: https://doi.org/10.3389/fspor.2023.1054542	Up to January 2022	OoR	Published	Included reviews: n=5 Age: Not reported Geographical location: Not reported The current umbrella review found scant low-quality and largely inconsistent evidence of marked differences between menstrual cycle phases in strength, exercise performance, and hypertrophy. There may be some evidence suggesting trivial-to-small effects of menstrual cycle phase on indirect markers of Delayed Onset Muscle Soreness, but the validity of the results is questionable.	
Stakeholders Google	Bernstein & Behringer 2023 Mechanisms Underlying Menstrual Cycle Effects on Exercise Performance: A Scoping Review. <i>Women in Sport and Physical Activity Journal</i> ; 31(2):129-146 https://doi.org/10.1123/wspaj.2022-0026	1970-2021	ScR	Published	Included studies: n=62 Age: Not reported Geographical location: Not reported A framework of six groups was built such as skeletal muscle physiology, muscle damage, tendons and ligaments, neuromuscular control, cardiovascular system, and exercise metabolism to cluster studies thematically and to specify the concept of "performance." The review indicates that the impact of oestrogen and progesterone is primarily responsible for observed changes in athletic performance during the menstrual cycle. However, proposed mechanisms are often	

					derived from animal studies and studies conducted in vitro remain to be proven true in the human regularly menstruating population. In the future, it is crucial to rely on studies that followed the methodology for cycle monitoring recommendations thoroughly. Otherwise, it is not possible to determine whether hormonal fluctuations cause observed changes in performance or not.	
Google	McNulty et al. 2020 The Effects of Menstrual Cycle Phase on Exercise Performance in Eumenorrheic Women: A Systematic Review and Meta-Analysis. <i>Sports Medicine</i> ; 50:1813–1827. https://doi.org/10.1007/s40279-020-01319-3	From inception until February 2019. A subsequent search was conducted from February 2019-April 2020.	SR	Published	Included studies: n=78 Age: 18-40 Geographical location: Not reported Data from 51 studies were eligible for inclusion in the initial pairwise meta-analysis. The three-level hierarchical model indicated a trivial effect for both endurance- and strength-based outcomes, with reduced exercise performance observed in the early follicular phase of the MC, based on the median pooled effect size. Seventy-three studies had enough data to be included in the network meta-analysis. The largest effect was identified between the early follicular and the late follicular phases of the MC. The lowest SUCRA value, which represents the likelihood that exercise performance is poor, or among the poorest, relative to other MC phases, was obtained for the early follicular phase (30%), with values for all other phases ranging between 53 and 55%. The quality of evidence for this review was classified as “low” (42%). The results from this systematic review and meta-analysis indicate that exercise performance might be trivially reduced during the early follicular phase of the MC, compared to all other phases	
Stakeholders	Meignié et al. 2021.	From Inception	SR	Published	Included studies: n=7	

Google	<p>The Effects of Menstrual Cycle Phase on Elite Athlete Performance: A Critical and Systematic Review. <i>Frontiers in Physiology</i>; 12:654585</p> <p>https://doi.org/10.3389/fphys.2021.654585</p>	until November 3 rd 2020			<p>Age: Mean (SD)=20.58 (1.91)</p> <p>Geographical location: Not reported</p> <p>Seven studies included a total of 314 elite female participants. Three used interviews, questionnaires or prospective analyses of reports. Four conducted several performance tests or included physical measures although only two performed tests during training or before/during competition. Among the seven studies, five performed hormonal testing through sampling of blood, saliva, or urine. The remaining studies relied on athletes' menstruation diaries. The current evidence suggests a variable association between menstrual cycle and a few performance-related outcomes, such as endurance or power resistance, ligament stiffness, decision making skills, psychology, or competitiveness.</p>	
Google	<p>Niering et al. 2024.</p> <p>The Influence of Menstrual Cycle Phases on Maximal Strength Performance in Healthy Female Adults: A Systematic Review with Meta-Analysis. <i>Sports</i>; 12(1):31</p> <p>https://doi.org/10.3390/sports12010031</p>	January 1960-September 2023	SR	Published	<p>Included studies: n=22</p> <p>Age: Not reported</p> <p>Geographical location: Not reported</p> <p>The included studies focused on the expression of maximal strength in the earlier follicular phase as well as at least one comparative phase. The studies considered a total of 433 subjects. Our results revealed medium effects (weighted mean <i>SMD</i> = 0.60; seven studies) for isometric maximal strength in favour of the late follicular phase, small effects (weighted mean <i>SMD</i> = 0.39; five studies) for isokinetic maximal strength in favour of the ovulation phase, and small effects (weighted mean <i>SMD</i> = 0.14; three studies) for dynamic maximal strength in favour of the late follicular phase. The results indicate that the early follicular phase is</p>	

					unfavourable for all strength classes. Peak performance in isometric strength is seen in the late follicular phase, whereas isokinetic strength peaks during ovulation. Dynamic strength is optimal in the late follicular phase.	
Stakeholders Google	Prado et al. 2023 Effect of Menstrual Cycle Phase on Perceived Exertion During Aerobic Exercise in Eumenorrhoeic Women: A Systematic Review and Meta-analysis. <i>Journal of Women's & Pelvic Health Physical Therapy</i> ; 10.1097/JWH.000000000000000283 https://journals.lww.com/jwphpt/abstract/9900/effect_of_menstrual_cycle_phase_on_perceived.12.aspx	Up to September 26 th , 2022	SR	Published	Included studies: n=11 Age: 18-33 Geographical location: Not reported One hundred sixty physically active, trained women (range 18-33 years) were examined in studies. PA level was based on self-description within each study. Based on MC length and information provided by the authors, it is possible to assume all participants had a regular MC. All studies adopted at least one method of determination of MC phases, in which blood hormone indicators and self-reports were the most common. Eight measured oestrogen and/or progesterone, with a particular study accessed by urine rather than blood/saliva. The meta-analysis showed that MC phases did not impact RPE ($P > .05$). Regardless of the analysis approach (early vs end of MC and follicular phase versus luteal phase), MC does not impact RPE during exercise. Research in this area needs greater attention and consideration. As such, we reinforce the need for further investigation on this topic.	

Key: GRADE - Grading of Recommendations, Assessment, Development, and Evaluations; MC – menstrual cycle; NSAID - non-steroidal anti-inflammatory drugs; OoR – overview of reviews; PA – physical activity; PE – physical education; PMS - premenstrual syndrome; RPE – rating of perceived exertion; ScR – scoping review; SMD – standardised mean difference; SR – systematic review; SUCRA – Surface Under the Cumulative Ranking curve; VAS - visual analogue scale

Table 3: Summary of included primary research evidence

Primary Research						
Resource	Citation	Study type	Status	Country	Key findings from abstracts	Reviewer comments
Barriers to exercising in relation to the menstrual cycle						
Stakeholders Google	Harvey et al. 2020 "I feel proper self-conscious all the time": A qualitative study of adolescent girls' views of menstruation and physical activity. <i>Wellcome Open Research</i> , 5(279):1-12 https://doi.org/10.12688/wellcomeopenres.16391.1	Qualitative study with focus groups and thematic analysis	Published with open peer review (not fully approved)	UK	<p>Sample size: n=46</p> <p>Age: 13-15</p> <p>PA levels: 60 minutes of MVPA on 3.5 days/week</p> <p>Four themes were identified:</p> <ul style="list-style-type: none"> Balancing perceived barriers and benefits Barriers were identified as: Feeling unprepared to be active during menstruation because of insufficient information received too late (following menarche); fear of leaking, feeling exposed and uncomfortable; clothing; disliking tampons; menstrual symptoms Facilitators were identified as: shared responsibility with peers in team sports; being active relieved menstrual symptoms Motivation and enjoyment Social influences Coping strategies: wearing dark, tight clothing; carrying spare underwear; tying jacket around waist to hide potential leakage; using two pads at once or specific types of pads; pain killers, hot water bottle or stretching to ease menstrual symptoms; choosing comfortable activities, such as lower intensity activities <p>Participants reported using diverse strategies to overcome barriers to being active posed by menstruation and the importance of peer-support and enjoyable forms of activity.</p>	The study is approved with reservations by one peer-reviewer and not approved by the other
Google	Kim et al. 2022	Cross-sectional (survey)	Published	South Korea	<p>Sample size: n=464</p> <p>Age: 19-23+</p>	

Medline/Emcare/Amed	<p>The Association of Menstruation and Leisure-Time Physical Activity among Korean Female University Students: A Preliminary Study. <i>International Journal of Environmental Research and Public Health</i>, 19:7492</p> <p>https://doi.org/10.3390/ijerph19127492</p>				<p>PA levels: do not participate in leisure time activity (n=129/464; 28%); once/week (n=80/464; 17%); twice/week (n=95/464; 21%); three times/week (n=87/464; 19%); over four times/week (n=73/464; 16%)</p> <p>There were no significant differences between menstruation (regular vs. irregular) and general leisure time PA during non-menstrual time periods (2 = 5.828, p < 0.212). Students with regular menstruation had higher leisure time PA after menstruation compared to students with irregular menstruation.</p> <p>There were significant differences in the relationships among health consciousness (p = 0.000), amount of leisure time PA (p = 0.002), and intention to perform leisure time PA (p = 0.002), according to menstruation patterns. Those with regular menstruation patterns showed higher health consciousness, amount of leisure time PA and intention to participate in leisure time PA than those with irregular menstruations.</p> <p>There were significant differences in the relationship among health consciousness (p = 0.000), amount of leisure time PA (p = 0.000), and intention to participate in leisure time PA (p = 0.000) according to leisure time PA of Korean female university students.</p>	
Stakeholders Google	<p>Kolic et al. 2021</p> <p>Physical activity and the menstrual cycle: A mixed-methods study of women's experiences. <i>Women in Sport and Physical Activity</i>, 29(1):47-58</p> <p>https://doi.org/10.1123/wspaj.2020-0050</p>	Mixed methods (survey and qualitative semi-structured interviews)	Published	UK	<p>Sample size: n=128 (survey); n=21 (interviews)</p> <p>Age: Mean (SD)=27.9 (7.5)</p> <p>PA levels: Sedentary-to-low activity, moderately active, high activity-to-athlete (no numbers or overall percentage provided, only mentioned that less than five identified as sedentary or athlete, so majority of participants ranged between low and high activity)</p> <p>From the questionnaire data, 44 participants were categorised as avoiders and 84 as non-avoiders of PA due to menstrual events. Avoiders of PA reported longer periods, heavier menstrual flow, higher levels of fatigue and pain compared to non-avoiders. Interviews revealed that avoidance of PA ranged from complete avoidance to</p>	

					adaptation (e.g., types of exercise). Reasons for avoidance and adaptation of PA included menstrual symptoms, personal thoughts, and concerns about other people's views of the period.	
Google Medline/Emcare/Amed	Pinel et al. 2022 The impact and experienced barriers menstruation present to football participation in amateur female footballers. <i>Journal of Sports Sciences</i> , 40(17):1950-1963. https://doi.org/10.1080/02640414.2022.2122328	Mixed methods (survey with quantitative and open-ended questions)	Published	UK	Sample size: n=127 Age: 18-25 (89%); 26-30 (8%); 31-35 (2%); 36-40 (1%) PA levels: ≥60 min football/week Menstruation was reported to “never” limit football playing in 17%, “sometimes” in 47%, “rarely” in 25% and “always” in 10% of respondents. The majority (73%) reported one or more barriers menstruation presents 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.	
Stakeholders Google Medline/Emcare/Amed	Prince & Annison 2023 The impact of menstruation on participation in adventurous activities. <i>Sport, Education and Society</i> , 28(7):811-823. https://doi.org/10.1080/13573322.2022.2059756	Mixed methods (survey with quantitative and open-ended questions)	Published	UK	Sample size: n=100 Age: 18-59; majority aged 21-29 (41%) PA levels: Attending adventurous activities (no mention of activity/week, but list of activities provided: mountaineering and wild camping; running; wild swimming, climbing, kayaking, mountain biking, canoeing...etc.) 89% of respondents noted that their participation is affected by menstruation/PMS. The dominant constraints to participation in adventurous activities were related to practical challenges of hygiene and waste disposal for managing menstruation. Qualitative data provide evidence for the negative and emotional responses of women to ‘missing out’ on adventurous activities with the majority of concerns about their performance in socio-cultural contexts related to personal anxieties. Some women commented on their belief in being a role model in professional work	

					encouraging open discussion around menstruation and enabling more women and girls to take part in adventurous activities.	
Interventions to increase exercise participation in relation to the menstrual cycle						
TripPRO	Nam & Cha 2020 Effects of a social-media-based support on premenstrual syndrome and physical activity among female university students in South Korea. <i>Journal of Psychosomatic Obstetrics & Gynecology</i> ; 41(1):47-53 https://doi.org/10.1080/0167482X.2018.1559811	Quasi-experimental study with an equivalent-control-group pretest–posttest design	Published	South Korea	Sample size: n=68 (only 64 followed-up, 32 in the intervention and 32 in the control group) Age: Intervention group: Mean (SD)=22.25 (1.88); Control group: Mean (SD)=21.66 (2.19) Significant differences emerged between the experimental and control groups in total PMS scores, 14 premenstrual symptoms, and PA. Female university students with PMS experienced decreased premenstrual symptoms and increased PA with social-media-based support, which could be an efficacious, accessible, and widely available nursing intervention to manage PMS and PA.	
Stakeholders	Sondergaard et al. 2021 Designing Menstrual Technologies with Adolescents. CHI '21: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems. 1–14 https://doi.org/10.1145/3411764.3445471	Qualitative (workshop)	Published	Sweden	Sample size: n=7 Age: 16-18 The participants designed menstrual technologies that respond to menstrual cramps and depressive, anxious feelings before menstruating. A toolkit approach to the design of menstrual technologies can allow for pluralist experiences of menstrual cycles and participatory design with adolescents benefits from drawing on qualities of embodiment and participants' own body literacy.	

Key: CI – confidence interval; MVPA - moderate-to-vigorous physical activity; PA – physical activity; PMS - premenstrual syndrome

Table 4: Summary of included organisational reports

Citation Citation retrieval source	Details
Barriers to exercising in relation to the menstrual cycle	
<p>House of Commons 2024</p> <p>Health barriers for girls and women in sport</p> <p>https://publications.parliament.uk/pa/cm5804/cms/elect/cmwomeq/130/report.html#heading-1</p> <p>Google search</p>	<p>Type of publication: Government report</p> <p>Key findings:</p> <p><i>School-aged children</i></p> <p>Barriers to girls’ participation in sport and exercise begin from an early age and are partly driven by hormonal differences. There is a PE enjoyment gap between girls and boys, which is particularly pronounced at KS4 level, where 59% of girls say they enjoy PE, compared to 84% of boys. Part of the reason for this gap is the differences in how girls and boys experience puberty, with girls facing additional barriers. Thirty-eight percent of secondary school girls surveyed by Youth Sports Trust raised periods as a barrier to participation. Of those who did, 68% were worried about being in pain or discomfort, 60% about leaking, and 57% about low mood while on period.</p> <p>The report noted a lack of education about managing the menstrual cycle and periods, with only 51% of schools in England having the menstrual cycle as part of the curriculum despite it being mandatory, and a lack of education about girls going through puberty among PE teachers. It was also noted that education about the menstrual cycle, periods and PA should happen at a younger age because currently it is delivered too late to be useful: after most girls have already gone through puberty. The report proposed that teachers need to be better trained to deliver education around the menstrual cycle, including how to have effective conversations and to support girls better. In addition, it was recommended that the Department for Education and National Physical Activity Taskforce review guidance for schools on PE kit and ensure that schools permit a wide choice of kit for girls, since expanding kit flexibility and choice is thought to increase comfort and the likelihood of participation.</p> <p><i>Women aged 41-60</i></p> <p>Perimenopausal and menopausal symptoms are some of the barriers to participation in exercise for women in midlife and beyond. These may occur after experiencing barriers at earlier life stages, such as in early years and during puberty. The report noted that current efforts, such as the Government’s “Get Active” strategy, are inadequate for this age group as they lack sufficient analysis of the issues experienced by women in midlife and after, measurable targets, and tailored interventions.</p>
<p>Plan International UK 2018</p> <p>Break the Barriers: Girls’ experiences of menstruation in the UK</p>	<p>Type of publication: Report</p> <p>Key findings:</p> <p>Plan International UK conducted a literature review, interviews with key informants i.e. politicians, council workers, health professionals, teachers and parents/carers; and focus groups with 84 young people. The focus group participants were 56 females and eight males between the ages of nine and 18, from diverse backgrounds.</p>

<p>https://plan-uk.org/file/plan-uk-break-the-barriers-report-032018pdf/download?token=Fs-HYP3v</p> <p>Overton</p>	<p>Girls in the UK had similar experiences to girls globally with universal issues being, stigma, taboo, access to menstrual products and pain management.</p> <p>Most focus groups discussed the impact of menstruation on sport and exercise. The main barrier was the concern of leaking. Some girls thought that girls and others who menstruate should not go swimming while on their period.</p> <p>Other issues highlighted by the focus groups was how periods can impact on participation and attendance at school. Either girls missed school due to effects of menstruation or were not allowed to miss school however ill they felt. The media portrayal of people maintaining high levels of activity whilst menstruating made participants feel bad about themselves and guilt for the need of self-care.</p>
<p>The Scottish Parliament: Health, Social Care and Sport Committee 2023</p> <p>Female participation in sport and physical activity</p> <p>https://digitalpublications.parliament.scot/Committees/Report/HSCS/2023/10/9/44f3cbcf-b4f5-429b-822d-93fdd1e60353-1#907b0806-d908-4928-96c4-791b373dcd60.dita</p> <p>Overton</p>	<p>Type of publication: Report</p> <p>Key findings: The report notes that from puberty there is a persistent gender gap in the rates of participation in sport and PA. It discusses the barriers and any progress being made in addressing those barriers.</p> <p><i>Barriers faced by teenage girls</i> Barriers faced by teenage girls include puberty, gendered/restricted offerings, a focus on competition rather than having fun, negative attitudes by boys and boys' domination of playground spaces. Regarding the barriers experienced due to puberty, the Health, Social Care and Sport Committee acknowledges the implementation of the Scottish Government's Women's Health Plan that encourages education about menstrual health as part of the Scottish curriculum. It is hoped that this will improve awareness and understanding of the impact that menstruation can have on girl's participation in PA and remove the stigma around managing periods. The Committee requests an evaluation of the plan's impact.</p> <p>The report also notes that one barrier is being allowed or not to use toilet facilities, and the appropriateness of toilet and changing facilities when a girl is menstruating. Additionally sport kits/uniforms can be a barrier to participation in sport and PA such as white or form-fitting clothing. Whilst the Scottish Government is committed to bring forward new statutory guidance on school uniforms (including for sports and PE) that will increase the use of generic and unisex items of clothing, the Committee calls on the Scottish Government to provide further details of the expected timing for introduction of this new guidance. Moreover, the Scottish Government needs to set out how it will ensure that any new uniform requirements do not exacerbate existing concerns about body image or period leakage.</p> <p><i>Barriers faced by women of all ages</i></p> <p>The barriers to participation in terms of menstruation were identified as period pain, leakage, and a lack of adequate toilet facilities in sports environments, as well as reproductive health conditions such as endometriosis. During the Committee meeting on 23 May 2023, Baz Moffat from The Well HQ pointed out that, as well as those participating in</p>

	<p>sport and PA directly, challenges with managing periods could equally impact female coaches, umpires, volunteers, and others, acting as a barrier to their participation too.</p>
<p>Women in Sport 2021</p> <p>Inspiring women to be active during midlife and menopause</p> <p>https://womeninsport.org/resource/inspiring-women-to-be-active-during-midlife-and-menopause/</p> <p>Backchaining</p>	<p>Type of publication: Report</p> <p>Key findings:</p> <p>A third of women aged 41-60 do not meet the guideline of 150 minutes of exercise per week. A fifth are not achieving 30 minutes per week. In lower socioeconomic groups, 50% of women are meeting guidelines for activity, compared to 72% in the highest groups. Often there are few activities directed towards women in midlife, with little support or encouragement to take up activity.</p> <p>Many women in this age group are coping with perimenopause symptoms, which may include erratic and/or heavy periods, difficulty sleeping, and low mood, resulting in having little energy. Based on a survey, 32% of women going through menopause had a physical or mental health condition lasting 12 months or more. Women also reported experiencing shame and embarrassment around menopause symptoms.</p> <p>Thirty percent of women said they were less active since menopause. At the same time, 71% of women experiencing menopause wanted to be more active and 90% would consider exercise if recommended by a GP or health professional.</p> <p>Among the barriers to being active, the report named limited perception of what PA or exercise can be, self-identity as not sporty, underlying health issues and exhaustion, fear of standing out or being ridiculed, not being able to keep up with everyone else or fear of failure, exercise spaces being “not for them”, shame or embarrassment about weight, worry about doing it alone, fear of judgement, assumption they will not enjoy sport and exercise, not seeing the relevance of exercise to their lives, and the needs of others coming first.</p> <p>The document reported on a four-week exercise trial completed by eight women, during which they spent two weeks considering available activities, completed a PA of their choice in the third week, and repeated it in the fourth week. The findings suggested that women can be helped to overcome barriers to PA by expanding their frame of reference, decreasing practical barriers, increased sense of belonging, creating support networks, and recognition of immediate benefits. The report also recommended engaging employers and health professionals to help women take up PA in midlife.</p>
<p>Women in Sport 2022</p> <p>Reframing sport for teenage girls: tackling teenage disengagement</p> <p>https://womeninsport.org/wp-content/uploads/2022/03/2022-Reframing-Sport-</p>	<p>Type of publication: Report</p> <p>Key findings:</p> <p>A survey of over 4,000 adolescent girls and boys aged 11-18 years identified that too many girls are disengaging from sport and exercise in their teens with a large difference between boys and girls. The report notes that 43% of teenage girls say they used to be sporty but no longer are compared to 24% of boys. Barriers include self-belief, capability, body image and periods, particularly for girls who are no longer sporty. Around 7 in 10 avoid being active when on</p>

<p>for-Teenage-Girls-Tackling-Teenage-Disengagement.pdf</p> <p>Overton</p>	<p>their period (regularly/sometimes). They avoid exercise because of pain (73%), fear of leakage (62%), tiredness (52%) and self-consciousness (45%).</p> <p>Fathers/father figures are less likely to support their daughters than their sons in being active. The majority of girls, both those who are sporty and those who used to be sporty like competitive sports but lack the opportunity to play sport unless they are really good.</p> <p>The report outlines different ways to engage and support girls depending on whether they were never sporty, used to be sporty or are sporty and outlines 8 principles to success. 1) no judgment, 2) invoke excitement, 3) clear emotional reward, 4) open eyes to what's there, 5) build in to existing habits, 6) give girls a voice and choice, 7) champion what's in it for them, 8) expand image of what sporty looks like.</p>
<p>Youth Sport Trust 2023</p> <p>Girls Active - National report: Girls' report</p> <p>https://www.youthsporttrust.org/research-listings/research/girls-active-national-reports</p> <p>Backchaining</p>	<p>Type of publication: Report</p> <p>Key findings</p> <p>Of the 18,516 girls surveyed, 74% enjoyed taking part in PA and 64% enjoyed taking part in PE. This compares with 85% of boys enjoying taking part in PA and 86% enjoying taking part in PE. In secondary school (13,859 girls surveyed), the figures for girls dropped to 71% enjoying taking part in PA and 59% enjoying taking part in PE.</p> <p>Among the barriers to PA at school, 38% of secondary-school-age girls listed being on their period. This option was only available to girls in year 7 and above and in that age group, it was the most commonly listed barrier. As for barriers to PA outside of school, being on their period was mentioned by 21% of girls.</p> <p>Questions about PE and periods were answered by girls in year 7 and above. Of those, 51% always took part in PE while on their period, 23% mostly did, 19% sometimes did, and 7% never did. Only 8% felt very comfortable talking to the PE teacher about periods, 44% felt somewhat comfortable, and 48% were not at all comfortable.</p> <p>When asked about concerns about participating in PE or school sport while on their period, 68% listed being in pain or discomfort, 60% leaking, 57% low mood, 52% low energy, 38% low confidence, 31% feeling self-conscious changing in the changing rooms, 31% others knowing they were on their period, 28% feeling self-conscious participating, 28% their skill level being not as good as usual, and 26% not feeling like they could take part to the expected level.</p> <p>When asked what the school could do to help them in PE when they have their period, 40% of girls listed greater understanding and empathy from teachers, 39% greater flexibility to participate to their ability at this time, 36% better options for PE kit to help them feel more comfortable, 32% access to sanitary products in PE, 23% more support to help them cope in PE with how they feel at this time, 19% offering girls-only PE lessons, 11% more support to help them understand about periods and exercise, and 7% information to their parents about PE and periods.</p>

	Regarding PE kit, 56% of girls would like to have more options and 30% wanted extra-curricular kit to be flexible or own choice.
Interventions to increase exercise participation in relation to the menstrual cycle	
<p>Women in Sport 2023</p> <p>Big Sister: By girls, for girls: big sister impact report</p> <p>https://womeninsport.org/creating-change/piloting-solutions/the-big-sister-project/</p> <p>Overton</p>	<p>Type of publication: Report</p> <p>Key findings:</p> <p>The aim of the Big Sister project was to empower and support teenage girls (9-15) in 11 deprived areas of the UK to enjoy sport, exercise and PA during puberty and their teenage years. This was done through tackling affordability and economic exclusion and removing emotional and practical barriers relating to puberty and periods to allow girls to participate in sport and exercise. To tackle barriers related to periods, period poverty, and stigma, the 'Hey Girls' project provides free sanitary products for girls in areas of deprivation. 'Hey Girls' are the award-winning 'buy one, donate one' social enterprise. Products and information about periods and the different types of products available were distributed in women's toilets/changing rooms at leisure centres, schools, and community projects.</p> <p>The results of the Big Sister project are reported as having positively impacted girls engagement in sport and PA with 44% of girls doing a lot more exercise, 64% enjoying taking part, 61% feeling motivated to take part and 58% more confident to take part in sport and exercise. In turn this has positively impacted girl's health and wellbeing.</p>

Key: PA – physical activity; PE – physical education; GP – general practitioner

8. ADDITIONAL INFORMATION

8.1. Conflict of interest

The authors declare they have no conflicts of interest to report.

8.2. Acknowledgments

The authors would like to thank Steven Macey, Melanie Matthews, Natalie Brown, and Claire James for their contributions during stakeholder meetings in guiding the focus of the review and interpretation of findings.

9. APPENDIX

APPENDIX 1: – Resources searched during Rapid Evidence Summary

A single list of resources has been developed for guiding and documenting the sources searched as part of Rapid Evidence Summary. Not all resources will be searched, depending on relevancy. Some sources will be searched as part of the subsequent Rapid Review (or Rapid Evidence Map).

Secondary research resources	Success or relevancy of the retrieval
Medical and health	
Cochrane Database of Systematic Reviews (CDSR)	Searched, results found
JBI (via OVID)	Searched, nothing found
NIHR Journals Library	Searched, nothing found
Trip	Searched, results found
PROSPERO	Searched, results found
Medline (via OVID)	Searched, results found
Emcare (via OVID)	Searched, results found
AMED (via OVID)	Searched, results found
Public health and social sciences	
Epistemonikos	Searched, results found
Additional resources searched	
Google Advanced Search	Searched, results found
Overton	Searched, results found

Literature Search 1:

PROSPERO: 12 March 2024

#	Query	Hits
#1	(menstrua* or menses or dysmenorrhoea or menorrhagia or menarche or eumenorrh* or "premenstrual syndrome")	2432
#2	(exercise* or sport* or physical* activ*)	34467
#3	#1 AND #2	414
#4	(participat* or engage* or uptake* or attendance or retention or attrition or involvement)	55521
#5	#3 AND #4	120
	Relevant	2

Cochrane Library: 12 March 2024

#	Query	Hits
#1	(menstrua* or menses or dysmenorrhoea or menorrhagia or menarche or eumenorrh* or "premenstrual syndrome"):ti,ab,kw	17813
#2	"Physical 55ctivity"	3
#3	Sport	14970
#4	"Physical activities"	2121
#5	exercise	136583
#6	#2 or #3 or #4 or #5	142657
#7	#1 and #6	1031
	SRs potentially relevant	1

JBI EBP Database: 12 March 2024

#	Query	Hits
1	(menstrua* or menses or dysmenorrhoea or menorrhagia or menarche or eumenorrh* or "premenstrual syndrome").mp	56
2	(exercise* or sport* or physical* activ*).mp	1292
3	1 and 2	16
	Relevant	0

Epistemonikos: 12 March 2024

#	Query	Hits
	(title:((menstrua* OR menses OR dysmenorrhoea OR menorrhagia OR menarche OR eumenorrh* OR "premenstrual syndrome") AND (exercise* OR sport* OR physical* activ*)) OR abstract:((menstrua* OR menses OR dysmenorrhoea OR menorrhagia OR menarche OR eumenorrh* OR "premenstrual syndrome") AND (exercise* OR sport* OR physical* activ*))) AND (title:((participat* OR engage* OR uptake* OR attendance OR retention OR attrition OR involvement)) OR abstract:((participat* OR engage* OR uptake* OR attendance OR retention OR attrition OR involvement)))	
	Limited to SRs	16
	Potentially relevant	1

NIHR Journals Library: 12 March 2024

Term	Hits
(menstrua* or menses or dysmenorrhea or menorrhagia or menarche or eumenorrh* or "premenstrual syndrome") AND (exercise* or sport* or physical* activ*)	27
menstrua*	29
menses	0
dysmenorrhea	0
menorrhagia	6
menarche	0
eumenorrh*	0
"premenstrual syndrome"	0
Relevant	0

TripPro: 12 March 2024

#	Query	Hits
	Potentially Relevant	1 study
# 13	((title:"physical* activ*") OR (title:sport*) OR (title:exercise*)) AND ((title:"premenstrual syndrome") OR (title:eumenorrh*) OR (title:menarche) OR (title:menorrhagia) OR (title:dysmenorrhea) OR (title:menses) OR (title:menstrua*))	44
# 12	((title:"physical* activ*") OR (title:sport*) OR (title:exercise*))	32233
# 11	(title:"physical* activ*")	24574
# 10	(title:sport*)	7875
# 9	(title:exercise*)	56
# 8	((title:"premenstrual syndrome") OR (title:eumenorrh*) OR (title:menarche) OR (title:menorrhagia) OR (title:dysmenorrhea) OR (title:menses) OR (title:menstrua*))	6861
# 7	(title:"premenstrual syndrome")	1452
# 6	(title:eumenorrh*)	53
# 5	(title:menarche)	501
# 4	(title:menorrhagia)	340
# 3	(title:dysmenorrhea)	1330
# 2	(title:menses)	70
# 1	(title:menstrua*)	3291

#	Query	Hits
	Only screened the SRs: relevant	1
# 5	((participat* OR engage* OR uptake* OR attendance OR retention OR attrition OR involvement) AND (((exercise* OR sport* OR physical* activ*)) AND (menstrua* OR menses OR dysmenorrhea OR menorrhagia OR menarche OR eumenorrh* OR "premenstrual syndrome")))	3832
# 4	(participat* OR engage* OR uptake* OR attendance OR retention OR attrition OR involvement)	795453
# 3	((exercise* OR sport* OR physical* activ*)) AND (menstrua* OR menses OR dysmenorrhea OR menorrhagia OR menarche OR eumenorrh* OR "premenstrual syndrome")	5740
# 2	((exercise* OR sport* OR physical* activ*))	73400
# 1	(menstrua* OR menses OR dysmenorrhea OR menorrhagia OR menarche OR eumenorrh* OR "premenstrual syndrome")	70489

Ovid MEDLINE(R) ALL: 12 March 2024

#	Query	Hits
1	exp Menstruation Disturbances/	29,686
2	exp Menstrual Cycle/	35,944
3	(menstrua* or menses or dysmenorrhea or menorrhagia or menarche or eumenorrh*).tw.	73,459
4	(premenstrual adj (syndrome* or tension*)).tw.	3,180
5	1 or 2 or 3 or 4	103,597
6	exp Exercise/	254,259
7	exp Sports/	221,511
8	(exercise* or sport* or physical* activ*).tw.	565,214
9	6 or 7 or 8	715,968
10	(participat* or engage* or uptake* or attendance or retention or attrition or involvement).tw.	2,067,777
11	5 and 9 and 10	893

AMED (Allied and Complementary Medicine): 12 March 2024

#	Query	Hits
1	exp menstrual cycle/	157
2	exp Menstruation disorders/	663
3	(menstrua* or menses or dysmenorrhea or menorrhagia or menarche or eumenorrh*).tw.	1,019
4	(premenstrual adj (syndrome* or tension*)).tw.	193
5	1 or 2 or 3 or 4	1,231
6	exp Exercise/	10,727
7	exp Sports/	6,802
8	(exercise* or sport* or physical* activ*).tw.	39,302
9	6 or 7 or 8	41,261
10	(participat* or engage* or uptake* or attendance or retention or attrition or involvement).tw.	27,771
11	5 and 9 and 10	21

Ovid Emtree: 12 March 2024

#	Query	Hits
1	exp menstrual cycle/	15,712
2	exp menstruation disorder/	13,797
3	(menstrua* or menses or dysmenorrhea or menorrhagia or menarche or eumenorrh*).tw.	21,790
4	(premenstrual adj (syndrome* or tension*)).tw.	1,074
5	1 or 2 or 3 or 4	36,901
6	exp exercise/	143,420
7	exp sport/	93,719
8	exp physical activity/	193,088
9	(exercise* or sport* or physical* activ*).tw.	309,629
10	6 or 7 or 8 or 9	456,692
11	(participat* or engage* or uptake* or attendance or retention or attrition or involvement).tw.	719,693
12	5 and 10 and 11	547

Database	Results
Medline	893
AMED	21
Ovid Emcare	547
TOTAL	1461
Duplicates in Endnote	378
Duplicates in Raayan	17
New TOTAL	1066

Literature Search 2:

PROSPERO: 18 March 2024

#	Query	Hits
#1	(woman or women or girl* or female*)	48501
#2	(exercise* or sport* or physical* activ*)	34567
#3	#1 AND #2	7820
#4	(participat* or engage* or uptake* or attendance or retention or attrition or involvement)	55692
#5	#3 AND #4	2657
	(Only screened SRs) Relevant	0

Cochrane Library: 18 March 2024

#	Query	Hits
#1	woman or women or girl* or female*	1027197
#2	exercise* or sport* or physical* activ*	205045
#3	#1 AND #2	110693
#4	participat* or engage* or uptake* or attendance or retention or attrition or involvement	248940
#5	#3 AND #4	29376
#6	#3 AND #4 in Cochrane Reviews	2807
#7	(woman or women or girl* or female*):ti AND (exercise* or sport* or physical* activ*):ti AND (participat* or engage* or uptake* or attendance or retention or attrition or involvement):ti	69
#8	#7 in Cochrane reviews	0

JBI EBP Database: 18 March 2024

#	Query	Hits
1	(woman or women or girl* or female*).mp. [mp=text, heading word, subject area node word, title]	1267
2	(exercise* or sport* or physical* activ*).mp. [mp=text, heading word, subject area node word, title]	1292
3	1 and 2	325
4	(participat* or engage* or uptake* or attendance or retention or attrition or involvement).mp. [mp=text, heading word, subject area node word, title]	1455
5	3 and 4	160
	Relevant	0

Ovid MEDLINE(R) ALL: 18 March 2024

#	Query	Hits
1	(wom#n or female* or girl*).ti.	484,004
2	exp Exercise/	254,462
3	exp Sports/	221,655
4	(exercise* or sport* or physical* activ*).tw.	565,709
5	2 or 3 or 4	716,562
6	(participat* or engage* or uptake* or attendance or involvement).tw.	1,859,856
7	exp "Systematic Review"/	255,293
8	exp Meta-Analysis/	196,945
9	exp Systematic Reviews as Topic/	12,892
10	exp Meta-Analysis as Topic/	29,305
11	(systematic review* or meta-analysis or review*).pt.	3,474,729
12	(systematic adj3 (review* or overview*)).ti,ab,kf.	341,238

13	(quantitative adj3 (review* or overview* or synthes*)).ti,ab,kf.	9,059
14	(meta-analy* or metaanaly* or meta-synthes#s or metasynthes#s).tw.	300,484
15	rapid review*.ti,ab,kf.	2,255
16	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	3,580,898
17	1 and 5 and 6 and 16	329

AMED (Allied and Complementary Medicine): 18 March 2024

#	Query	Hits
1	(wom#n or female* or girl*).ti.	6,378
2	exp Exercise/	10,727
3	exp Sports/	6,802
4	(exercise* or sport* or physical* activ*).tw.	39,302
5	2 or 3 or 4	41,261
6	(participat* or engage* or uptake* or attendance or involvement).tw.	26,391
7	exp Meta analysis/	427
8	(systematic review* or meta-analysis or review*).pt.	14,041
9	(systematic adj3 (review* or overview*)).ti,ab.	7,324
10	(quantitative adj3 (review* or overview* or synthes*)).ti,ab.	210
11	(meta-analy* or metaanaly* or meta-synthes#s or metasynthes#s).tw.	3,925
12	rapid review*.ti,ab.	40
13	7 or 8 or 9 or 10 or 11 or 12	16,824
14	1 and 5 and 6 and 13	10

Ovid Emcare: 18 March 2024

#	Query	Hits
1	(wom#n or female* or girl*).ti.	203,558
2	exp exercise/	143,686
3	exp sport/	93,827
4	(exercise* or sport* or physical* activ*).tw.	310,179
5	2 or 3 or 4	374,062
6	(participat* or engage* or uptake* or attendance or involvement).tw.	672,038
7	exp "systematic review"/	127,273
8	exp meta analysis/	61,116
9	(systematic review* or meta-analysis or review*).pt.	875,358
10	(systematic adj3 (review* or overview*)).ti,ab,kf.	173,705
11	(quantitative adj3 (review* or overview* or synthes*)).ti,ab,kf.	4,640
12	(meta-analy* or metaanaly* or meta-synthes#s or metasynthes#s).tw.	133,846
13	rapid review*.ti,ab,kf.	1,388
14	7 or 8 or 9 or 10 or 11 or 12 or 13	1,007,563
15	1 and 5 and 6 and 14	271

Database	Results
Medline	329
AMED	10
Ovid Emcare	271
TOTAL	610
Duplicates in Endnote	158
New TOTAL	452

Additional Google searches for primary research and systematic reviews

Term	Potentially relevant
menstruation and barriers to exercise	5
dysmenorrhea and exercise and systematic review	1
exercise and barriers and women and systematic reviews	3
exercise and barriers and menstruation and systematic reviews	2
aerobic exercise performance and menstruation and systematic review	5
exercise performance and menstruation and systematic review	
adolescent girls and interventions supporting exercise participation and systematic review	5



The Health and Care Research Wales Evidence Centre

Our dedicated team works together with Welsh Government, the NHS, social care, research institutions and the public to deliver vital research to tackle health and social care challenges facing Wales.

Funded by Welsh Government, through Health and Care Research Wales, the Evidence Centre answers key questions to improve health and social care policy and provision across Wales.

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