Female athletes likelier to get injured at certain points in their menstrual cycle, finds study

May 1 2024

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Soccer players in England's top-tier WSL were six times more likely to experience a muscle injury in the days leading up to their period

compared to when they were on their period, according to new research from UCL, the University of Bath and St. Mary's University.

The study, published in *Medicine & Science in Sports & Exercise*, is the first prospective longitudinal study monitoring menstrual cycles alongside injuries in female soccer players. The findings suggest there could be increased injury risk windows at particular times in the cycle.

Despite being a relatively small sample size, the data demonstrates the need to consider the menstrual cycle in elite sports, to reduce injury risk and to support the well-being of athletes.

Menstrual cycle symptoms are common and around two thirds of elite athletes feel that these can have negative impacts on their performance.

There has been little previous research tracking injuries alongside the menstrual cycle in female sport, despite much speculation and anecdotal evidence suggesting that there may be some key times for increased injury risk. Given the increased professionalism, interest, growth, and investment in women's sport, the authors say further research in this area is needed.

In this study, researchers at UCL and the University of Bath recorded time-loss injuries and menstrual cycle data for elite female soccer players across three seasons. All of the players were based at one Women's Super League (WSL) club, the top tier of women's soccer in England. During the study they tracked 593 cycles across 13,390 days, in which time 26 players experienced 74 injuries.

The authors divided each cycle into four main phases in their study. Each phase comes with assumed hormonal changes that have the potential to influence different aspects of a woman's health and well-being.

- Menstruation: when reproductive hormones are low.
- Mid-to late follicular phase: when estrogen is assumed to be increasing
- Early-mid luteal phase: after ovulation when both estrogen and progesterone are assumed to increase and remain high
- Pre-menstrual phase: where estrogen and progesterone decrease to bring about the onset of menstruation.

Ally Barlow, first author of the study from the University of Bath and a physiotherapist at the WSL club, said, "We have been tracking player's menstrual cycles for a number of seasons to observe trends in terms of symptoms and cycle characteristics.

"We were interested to learn more about the potential association between injury risk across the menstrual cycle. This study set out to collect specific scientific data so that we could learn more about the menstrual cycle and player's injury risk."

Analysis of the data found that players were six times more likely in the pre-menstrual phase and five times more likely in the early-mid luteal phase to experience a muscle injury, compared to when they were in the menstrual phase.

Dr. Georgie Bruinvels, senior author of the study from UCL Surgery & Interventional Science and the Institute of Sport, Exercise & Health (ISEH), said, "While these results must be viewed with caution, this data highlights a need to investigate this area further.

"Given the growth of women's sport it's an exciting time to be working in female physiology, but there are a number of known challenges when conducting research with female athletes, in part explaining why there is such a significant sex data gap.

"Conducting large-scale research is complex but must be prioritized to best support female athletes, and we hope studies like this will pave the way for this. Every woman has their own unique physiology, so it's crucial to support and empower them in the right ways. If future research demonstrates that there are risk windows for certain injury types, we should be proactive in mitigating these risks to enable female athletes to exercise and compete on any given day."

The authors emphasize that further data collected in a standardized manner is needed before the sports science community can start to look for biological explanations for this increased injury risk.

Dr. Jo Blodgett, an author of the study from UCL Surgery & Interventional Science and the Institute of Sport, Exercise & Health (ISEH), said, "Though our sample size for this research was relatively small, we observed clear links between cycle phase and injury prevalence, and the size of the association—six times higher in the premenstrual phase and five times higher in the early-mid luteal phase for muscular injuries—was quite large.

"To better understand the variability in injury risk across the cycle we need more players and teams to continually track injury incidence, menstrual cycle and symptoms in a standardized manner.

"At the elite level, injuries to your squad can mean the difference between winning and losing, the difference between being crowned champions and runners-up. But perhaps more importantly, it means pain and suffering for players that could perhaps be avoided with better player-centered support."

More information: Ally Barlow et al, Injury Incidence, Severity and

Type across the Menstrual Cycle in Female Footballers: A Prospective Three Season Cohort Study, *Medicine & Science in Sports & Exercise* (2024). DOI: 10.1249/MSS.0000000000003391