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MENSTRUAL CYCLE TRACKING APPLICATIONS: OPPORTUNITIES AND CHALLENGES FOR GYNECOLOGICAL PREVENTION. A NARRATIVE REVIEW

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ABSTRACT

Menstrual cycle tracking applications are increasingly used by women for a variety of purposes extending beyond reproductive planning. In addition to predicting menstrual cycles and fertile windows, these tools can assist in monitoring symptoms, increasing awareness of menstrual health, providing educational information, and facilitating communication with healthcare professionals. This narrative review examines the potential role of such applications in gynecological prevention, with particular attention to menstrual health awareness, early recognition of abnormal symptoms, and opportunities for preventive health monitoring. It also discusses important challenges associated with their use, including limitations of prediction algorithms, variability in accuracy, and concerns related to the collection and management of sensitive reproductive health data. The reviewed literature indicates that menstrual tracking applications may offer meaningful support for preventive care when used as complementary tools rather than as diagnostic systems. Nevertheless, their clinical usefulness remains constrained by the limited availability of validation studies, differences in app quality, and unresolved issues regarding data privacy and user protection.

KEYWORDS

Mobile Health, Menstrual Cycle Tracking, Gynecology, Women's Health, Digital Health, Prevention

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1. Introduction

The growing availability of smartphones has played a role in the growth of mobile health (mHealth) technologies over the last decade. As these devices have become an everyday part of life, health-related applications have become increasingly accessible. Many of these apps allow users to monitor different aspects of their health in real time, making preventive healthcare more practical and personalized than ever before (Fox & Epstein, 2020; Ford et al., 2021).

In recent years, menstrual health has increasingly been recognized as an important component of overall health and well-being. Changes in cycle regularity, abnormal bleeding patterns, or persistent menstrual symptoms may reflect underlying hormonal, metabolic, or gynecological conditions. For this reason, routine monitoring of menstrual characteristics has attracted growing interest from both researchers and healthcare professionals (Bull et al., 2019).

Modern menstrual tracking applications offer features that range beyond simple cycle recording. Besides symptom monitoring and fertility awareness, many platforms integrate predictive algorithms and personalized health information (Ko et al., 2023).

They are being increasingly adopted, but the scientific validity of these applications, the reliability of their predictions, and the protection of sensitive health information remain unanswered questions. Additionally, the impact of menstrual tracking platforms on gynecological prevention remains an open scientific question. This narrative review aims to provide an overview of existing evidence concerning menstrual cycle tracking applications as tools supporting gynecological prevention, health education, and engagement in reproductive healthcare.

2. Methodology

The goal of this narrative review was to assess the role of menstrual cycle tracking applications in supporting gynecological prevention and women's reproductive health. Literature searches were executed across PubMed, Scopus, Web of Science, and Google Scholar. Search terms included: "menstrual tracking applications", "period tracking apps", "mobile health", "mHealth", "reproductive health", "gynecological prevention", "digital health", and combinations thereof. Articles published in English between 2019 and 2026 were considered. The final search was conducted in May 2026. Studies were excluded that focused solely on contraceptive efficacy, without broader reproductive health outcomes. Titles and abstracts were screened for relevance. Studies addressing menstrual tracking applications in the context of reproductive health, prevention, health education, or privacy were included in the final narrative synthesis.

3. Benefits of Menstrual Tracking Applications in Gynecological Prevention

One of the main reasons for the growing interest in menstrual tracking applications is their ability to collect longitudinal health data that would otherwise be difficult to document consistently. By recording menstrual characteristics for an extended period, users can easily detect subtle changes that might be in some cases hard to recall correctly during routine clinical consultations. Early detection of irregular menstrual cycles, abnormal bleeding patterns, severe dysmenorrhea, or sudden changes in cycle duration may encourage timely medical consultation and facilitate earlier diagnosis of gynecological conditions (Bull et al., 2019; Broad et al., 2022).

Applications that track menstruation can assist with the recognition of symptoms associated with endometriosis. Endometriosis is a chronic gynecological condition characterized by pelvic pain, dysmenorrhea, and infertility, often resulting in significant diagnostic delays. Symptom-tracking features seen in many mobile applications allow users to identify recurring pain patterns and document symptom severity over time. However, available evidence is still mostly observational and based on self-reported outcomes (Broad et al., 2022; Apsey et al., 2024).

Beyond symptom monitoring, the applications could also enhance health literacy by making reproductive health information convenient for users. Educating users regarding menstrual physiology, reproductive health, fertility, and hormonal changes can help users improve their knowledge of their own health status. Improved menstrual health literacy has been linked to increased participation in preventive healthcare and knowledge of symptoms that require attention (Ford et al., 2021; Kelly & Habib, 2023).

From a clinical communication standpoint, some authors report that symptom records collected through mobile applications can improve dialogue between patients and healthcare professionals. Digital symptom logs offer a well-structured way to provide information about cycle characteristics, symptom progression, and treatment outcomes. Objective symptom documentation reduces the incidence of recall bias and improves diagnostic accuracy (Broad et al., 2022).

In some menstrual tracking applications, recent changes in artificial intelligence have boosted their analytical capabilities. Preliminary studies suggest that algorithm-based systems may help in identifying deviations from typical menstrual patterns; however, their clinical utility remains insufficiently validated. Although preliminary studies indicate potential clinical utility, the currently available evidence remains insufficient to justify routine implementation of AI-supported menstrual assessment in gynecological practice (Li et al., 2022).

An important example is polycystic ovary syndrome (PCOS), for which the term polyendocrine metabolic ovarian syndrome (PMOS) has recently been proposed following an international consensus process. Although the terminology remains relatively new, the proposed name aims to better reflect the multisystem nature of the disorder. Because menstrual dysfunction is often one of the earliest observable symptoms, long-term cycle tracking may support earlier recognition of potential endocrine and metabolic abnormalities. Recent publications have emphasized the broader systemic nature of PMOS, further highlighting the potential value of menstrual health monitoring in a clinical setting (Teede et al., 2026).

Although the reviewed studies generally report positive outcomes associated with menstrual tracking applications, the overall strength of the evidence remains variable. Many reported benefits are based on self-reported user experiences rather than clinical outcome measures. Some authors argue that increased symptom awareness may not necessarily translate into improved clinical outcomes.

4. Limitations and Challenges of Menstrual Tracking Applications

Although menstrual tracking applications offer several potential benefits, they are not without limitations. Their increasing popularity has raised important questions about how reliable, accurate, and clinically useful these tools are. Understanding these challenges is essential before considering them as part of routine healthcare practice. One of the main concerns is the precision of cycle prediction and ovulation estimation. Most commercial applications rely on algorithm-based calculations based on previously recorded cycle data, which do not adequately account for natural cycle variability or underlying gynecological and endocrine conditions. Studies have demonstrated differences in prediction accuracy among commercially available applications, particularly regarding fertile window estimation and ovulation timing (Broad et al., 2022; Li et al., 2022).

The accuracy of predictions for fertility remains especially controversial. While advanced wearable technologies and artificial intelligence-based systems have shown promising results in fertility detection, many commonly used menstrual tracking applications lack sufficient clinical validation. Research has shown that ovulation prediction based solely on calendar calculations leads to inaccurate results, particularly in individuals with irregular menstrual cycles or reproductive disorders. As a result, menstrual monitoring applications should not be considered a substitute for professional medical evaluation or evidence-based contraceptive methods.

A further systemic challenge identified in the literature is the lack of standardized quality assessment and scientific oversight. Recent evaluations of menstrual health applications revealed substantial variation in functionality, educational content, inclusiveness, and healthcare professional involvement during app development. Many applications provide health-related recommendations despite limited scientific evidence supporting their algorithms or educational materials. This inconsistency can actively contribute to medical misinformation and unrealistic expectations among users (Bucher et al., 2025; Ko et al., 2023).

Privacy and data security represent additional areas of concern. Menstrual tracking applications collect highly sensitive information, including menstrual history, sexual activity, fertility intentions, contraceptive use, pregnancy-related data, and other personal health indicators. Recent reports have highlighted the potential commercial exploitation of such data through unauthorized sharing with third parties for advertising, consumer profiling, or other business purposes. Researchers have emphasized that lack of transparency regarding data management practices exposes users to significant privacy risks (Mohan & Jenkins, 2025; Zadushlivy et al., 2025).

Ethical concerns have become increasingly important within the rapidly expanding femtech industry. In some legal and social contexts, reproductive health data collected through mobile applications may potentially be used in ways that negatively affect users' autonomy, privacy, or access to healthcare services. Consequently, several authors have called for stronger regulatory frameworks, improved informed consent procedures, and greater transparency regarding data collection and storage practices (Hammond & Burdon, 2024; Kelly & Habib, 2023).

Finally, excessive reliance on digital self-monitoring tools can contribute to anxiety, obsessive health tracking behaviors, or misinterpretation of minor physiological symptoms. Users often overestimate the accuracy of algorithm-generated predictions and delay seeking professional medical advice when actual abnormalities occur. Therefore, menstrual tracking applications should be viewed as supportive tools within preventive healthcare rather than independent diagnostic instruments (Broad et al., 2022).

5. Discussion

Over the past decade, menstrual tracking applications have expanded in scope and functionality. They were originally created for cycle monitoring and fertility awareness, but they are increasingly used for symptom tracking, health education, and self-management. Evidence supporting their direct impact on clinical outcomes remains limited.

Many concerns associated with menstrual tracking applications are not limited to the technological performance aspects. Data governance, user trust, privacy protection, and regulatory oversight issues seem equally important when considering their broader role in healthcare systems. On the one hand, these applications give users unprecedented access to personal health information. On the other hand, concerns regarding data privacy, algorithm transparency, and clinical validity remain unresolved.

As commercial menstrual tracking applications continue to expand their functionalities through artificial intelligence, predictive analytics, and wearable device integration, relatively few studies have evaluated their

long-term clinical impact to date. This gap suggests that technological advancement is currently progressing faster than the evidence base required to support widespread clinical integration.

In practice, the greatest benefits appear to occur when information recorded in the application is discussed with a healthcare professional and used to support clinical decision-making. Most available studies only assess user satisfaction, symptom awareness, or usability rather than clinically measurable outcomes such as earlier diagnosis or reduced disease burden. In this context, the question is not whether menstrual tracking applications can replace clinical assessment, but whether they can help users recognize when professional consultation is needed.

Based on the reviewed evidence, menstrual tracking applications seem to be beneficial as behavioral and educational tools rather than diagnostic technologies. Their clinical utility appears to depend largely on how effectively recorded information is integrated into professional healthcare rather than on the predictive performance of the applications themselves.

This review is not without limitations. As a narrative review, it cannot form a more comprehensive assessment of the quality of studies and might be affected by selection bias. Moreover, the rapid progression of digital health technologies brings with it the potential risk for some conclusions to need to be revisited as new evidence is presented.

6. Future Perspectives

The future role of menstrual tracking applications will likely depend less on their ability to predict cycle dates and more on their integration into a broader digital health environment. Recent advances in artificial intelligence, wearable technologies, and personalized medicine may mean that they will progressively become more like self-monitoring tools that could eventually become part of preventive health systems.

Future research should examine whether machine learning can improve the accuracy and clinical relevance of menstrual health assessments compared with traditional calendar-based prediction models. Conventional cycle-tracking tools are based on historical user-entered data, but new generation AI-based systems can analyze complex patterns and identify subtle physiological changes over time. Recent studies suggest that machine learning models improve prediction accuracy, particularly when combined with continuous physiological monitoring (Li et al., 2022).

Wearable technologies might also improve the usefulness of menstrual tracking applications by providing continuous physiological measurements. These devices can continuously monitor physiological parameters such as skin temperature, heart rate variability, respiratory rate, sleep quality, and physical activity. These biomarkers offer objective data for ovulation, hormonal fluctuations, and menstrual cycle dynamics. Research indicates that combining menstrual tracking applications with wearable sensor data may significantly improve reproductive health monitoring and fertility prediction (Li et al., 2022; Bull et al., 2019).

The growing availability of longitudinal menstrual health data may create opportunities for more individualized approaches to reproductive healthcare. Such approaches may support earlier identification of reproductive disorders and facilitate more personalized preventive strategies (Apsey et al., 2024).

The integration of menstrual health data with electronic health records (EHRs) has been suggested by several authors. Integration of menstrual health data into healthcare records could improve diagnostic processes, maintain the continuity of care, and encourage population-oriented research on women's health. Despite these opportunities, technological development should be accompanied by stronger regulatory frameworks, transparent algorithm validation, and enhanced data protection measures. Ethical implementation of AI systems and security of confidential reproductive health related information will remain essential challenges in the digital gynecological care sector.

From a public health perspective, it is possible that menstrual tracking applications' greatest benefits exist in earlier engagement with healthcare services, rather than in independent disease detection.

7. Conclusions

Menstrual cycle tracking applications have become an important part of the rapidly expanding field of mobile health technologies dedicated to women's health. The available literature suggests that these digital tools may support gynecological prevention by promoting menstrual health awareness, facilitating symptom monitoring, encouraging patient involvement, and improving communication with healthcare professionals. The ability to continuously record menstrual patterns and associated symptoms may help to promote the earlier detection of reproductive, endocrine, and metabolic disorders, including polyendocrine metabolic ovarian syndrome (PMOS) and endometriosis.

Despite these benefits, important limitations remain. Issues with prediction accuracy, lack of clinical validation, data privacy, and ethical management of sensitive reproductive health information remain major problems. Therefore, menstrual tracking applications are more likely supportive tools and less so diagnostic ones. The future integration of menstrual tracking applications into routine gynecological care will require stronger clinical validation, more transparent data governance, and improved regulatory oversight.

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