



International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

2734 17 Avenue SW,
Calgary, Alberta, T3E0A7,
Canada
+15878858911
editorial-office@sciformat.ca

ARTICLE TITLE	MOBILE HEALTH AND PEER SUPPORT NETWORKS IN PCOS SELF-MANAGEMENT: A NARRATIVE REVIEW
----------------------	---

DOI	https://doi.org/10.31435/ijitss.3(51).2026.6217
------------	---

RECEIVED	14 July 2026
-----------------	--------------

ACCEPTED	09 September 2026
-----------------	-------------------

PUBLISHED	18 September 2026
------------------	-------------------

LICENSE	 The article is licensed under a Creative Commons Attribution 4.0 International License .
----------------	--

© The author(s) 2026.

This article is published as open access under the Creative Commons Attribution 4.0 International License (CC BY 4.0), allowing the author to retain copyright. The CC BY 4.0 License permits the content to be copied, adapted, displayed, distributed, republished, or reused for any purpose, including adaptation and commercial use, as long as proper attribution is provided.

MOBILE HEALTH AND PEER SUPPORT NETWORKS IN PCOS SELF-MANAGEMENT: A NARRATIVE REVIEW

Weronika Kępa (Corresponding Author, Email: kepaw4@gmail.com)
Independent Researcher, Poland
ORCID ID: 0009-0000-8378-9681

Joanna Kadluczka
Ludwik Rydygier Specialist Hospital in Cracow, Kraków, Poland
ORCID ID: 0009-0002-9347-0767

Aleksandra Papuga
Independent Public Health Care Facility in Myślenice, Poland
ORCID ID: 0009-0003-6851-7102

Magdalena Grzymek
The University Hospital in Krakow, Kraków, Poland
ORCID ID: 0009-0000-4337-0261

Aleksandra Pawluczka
St. John Grande Hospital of the Brothers Hospitallers of Saint John of God, Kraków, Poland
ORCID ID: 0009-0005-6765-9314

Katarzyna Pawluczka
Jagiellonian University Medical College, Krakow, Poland
ORCID ID: 0009-0001-4273-6599

Justyna Bury
Medical University of Silesia in Katowice, Poland
ORCID ID: 0009-0001-4778-2375

Katarzyna Kraska
Medical Center in Łańcut Sp. z o.o., Łańcut, Poland
ORCID ID: 0009-0004-0464-6826

Jan Potoniec
Gabriel Narutowicz Municipal Specialist Hospital in Krakow, Krakow, Poland
ORCID ID: 0009-0000-5282-7833

Aneta Sobek
Medical Center in Łańcut Sp. z o.o., Łańcut, Poland
ORCID ID: 0009-0002-6759-5419

Martyna Więclawek
The University Hospital in Krakow, Kraków, Poland
ORCID ID: 0009-0006-7956-9962

ABSTRACT

Polycystic ovary syndrome (PCOS) is a common, lifelong endocrine condition with interlinking reproductive, metabolic and psychological features. International guidelines make lifestyle modification, including weight management, a core first-line strategy. Yet women must sustain these changes amidst insulin resistance, appetite dysregulation and psychological distress, while facing weight stigma and a healthcare system that offers only brief, episodic care. The distance between what guidelines ask of patients and what clinics can realistically provide is the "care gap" this review takes as its starting point. The review considers whether mobile health (mHealth) applications and peer-led online communities can act as complementary "digital scaffolds" that extend self-management support between clinic visits. Drawing on PCOS-specific studies and the wider digital-health literature, it argues that mHealth tools supply behavioural scaffolding through symptom tracking, goal setting, personalised feedback, nudges and gamified prompts, and that these features are associated with short- to medium-term improvements in weight-related and psychological outcomes. Peer communities offer psychological scaffolding through validation, shared experiential knowledge and reduced isolation. Neither alone is sufficient; the most promising model combines both. These benefits are constrained by a quality gap between commercial wellness apps and evidence-based tools, the risk of reinforcing weight stigma, misinformation in poorly moderated communities, and digital inequities that may exclude the women who would benefit most. The review concludes that future digital PCOS interventions should prioritise clinical co-design, equitable access, psychological safety, robust moderation and long-term evaluation.

KEYWORDS

Polycystic Ovary Syndrome, Mobile Health, Peer Support, Self-management, Weight Stigma, Digital Health Equity

CITATION

Kępa, W., Kadłuczka, J., Papuga, A., Grzymek, M., Pawluczka, A., Pawluczka, K., Bury, J., Kraska, K., Potoniec, J., Sobek, A., & Więclawek, M. (2026). Mobile health and peer support networks in PCOS self-management: A narrative review. *International Journal of Innovative Technologies in Social Science*, 3(51). [https://doi.org/10.31435/ijitss.3\(51\).2026.6217](https://doi.org/10.31435/ijitss.3(51).2026.6217)

COPYRIGHT

© The author(s) 2026. This article is published as open access under the Creative Commons Attribution 4.0 International License (CC BY 4.0), allowing the author to retain copyright. The CC BY 4.0 License permits the content to be copied, adapted, displayed, distributed, republished, or reused for any purpose, including adaptation and commercial use, as long as proper attribution is provided.

Introduction

Polycystic ovary syndrome (PCOS) was first described in 1935 by American gynaecologists Irving F. Stein and Michael Leventhal. It is one of the most common endocrine conditions in reproductive-aged women, affecting an estimated 8–13%, with many cases undiagnosed (Bozdag et al., 2016; Teede et al., 2023a). Its pathophysiology is multifactorial, involving genetic, environmental and lifestyle-related influences that contribute to hormonal disturbance, insulin resistance and hyperandrogenism (Stener-Victorin et al., 2024; Teede et al., 2023a). Diagnosis still rests largely on the Rotterdam Criteria, which require two of three features to be present: oligo- or anovulation, clinical or biochemical hyperandrogenism, and polycystic ovarian morphology on ultrasound, after excluding other conditions (Christ & Cedars, 2023).

PCOS is lifelong and multisystem, carrying reproductive, metabolic, dermatological and psychological consequences. It is linked to insulin resistance, metabolic dysfunction, obesity, type 2 diabetes and elevated cardiovascular risk (Naeem et al., 2025; Stener-Victorin et al., 2024; Tay et al., 2023; Teede et al., 2023b). International evidence-based guidelines recommend lifestyle interventions aimed at achieving and maintaining a healthy weight as first-line treatment for the syndrome's metabolic and psychological features (Teede et al., 2023b). In women with excess weight, even a modest 5% reduction in bodyweight was shown to have a positive impact, especially in relation to ovulation and insulin resistance (Scragg et al., 2024; Teede et al., 2023b). As a result, women with PCOS are frequently advised to lose weight during initial management.

Because this management occurs almost entirely outside clinical settings, implementing these guideline recommendations fundamentally depends on self-management. This is defined as the active, daily work through which a patient maintains symptom awareness, sustains dietary and physical activity changes, mitigates long-term cardiometabolic risk, and uses coping strategies to deal with the psychosocial burden of the condition (Ee et al., 2021; Teede et al., 2023b).

Translating intensive, daily self-management into practice is difficult. PCOS itself may contribute to weight gain and impaired weight regulation through multiple mechanisms such as insulin resistance, altered metabolism, and appetite dysregulation (Barber et al., 2019; Zhao et al., 2023). Moreover, excess weight in

PCOS is associated with higher rates of anxiety, depression and dissatisfaction with body image, each a further obstacle to change (Dokras, 2022; Grogan, 2006; Stener-Victorin et al., 2024). The 2023 International PCOS guideline therefore recommends that weight-related discussions are structured, person-centred and free from weight stigma (Teede et al., 2023b). In practice, however, women repeatedly struggle to lose weight and prevent regain (Lau et al., 2022; Lim et al., 2019). They report receiving minimal education and insufficient practical advice while also encountering weight-related stigma within clinical settings (Ee et al., 2021; Gibson-Helm et al., 2017; Lau et al., 2022; McGowan et al., 2025).

This mismatch is what defines the **care gap** in PCOS: a structural deficit between the high-effort, continuous lifestyle change demanded of patients and the brief, episodic consultations available to support them. It is the central problem this review addresses, defined here and revisited throughout. The *Results* explain why the gap exists, and the *Discussion* and *Conclusion* show how digital tools might respond to it.

Interest has grown in **digital approaches** that could extend support beyond the clinic. mHealth interventions and peer-led online groups offer more continuous, accessible forms of help, and can act as **digital scaffolds**. These are systems that help women access education, monitor symptoms, set goals, receive personalised prompts and connect with others who understand the condition, thereby supporting self-efficacy, psychological wellbeing and sustained behaviour change. This review critically examines mHealth and peer-led interventions as digital scaffolds for self-management in PCOS, with particular attention paid to lifestyle change, weight management and psychological health. Its central argument is that mHealth tools and peer-support networks help close the PCOS 'care gap' by providing continuous behavioural and psychological support between clinic visits, and that this combined support can drive more sustainable weight management and lifestyle change. However, success relies on integrating both approaches within a design that places evidence-based content, safety and equity at the forefront.

Methodology

This article adopts a narrative literature review approach to examine whether mobile health (mHealth) applications and peer-led online communities can support self-management in polycystic ovary syndrome (PCOS), particularly in relation to weight management. A narrative review was appropriate because the topic sits across several intersecting fields including digital health, behavioural science, women's health, peer support, and online community governance, and draws on a diverse body of evidence. This includes PCOS-specific intervention studies, qualitative research, reviews, and wider literature on digital health and online health communities.

The review was guided by the question of whether mHealth tools and peer-led online communities can act as complementary forms of support for women managing PCOS beyond the clinic. In addressing this question, the review considered not only behavioural and clinical outcomes, but also psychological wellbeing, peer validation, moderation, misinformation, stigma, and digital inequality. Because the PCOS-specific evidence base remains limited in some of these areas, relevant literature from the wider digital health field was also included where it helped to contextualise issues that are not yet well developed in PCOS research.

Sources were selected based on their relevance to the central themes of the article: lifestyle and weight-related self-management in PCOS, behavioural support through mHealth, psychosocial support through peer communities, and the design, safety, and equity challenges associated with digital interventions. The literature was then synthesised thematically and interpretively rather than statistically. Particular attention was paid to the distinction between behavioural support and psychosocial support, which informs the article's central argument that mHealth applications and peer communities are not interchangeable, but may be most effective when understood as complementary digital scaffolds.

As a narrative review, this article does not aim to provide the comprehensiveness of a formal systematic review. Its conclusions are therefore interpretive and should be understood as considering an evidence base that is emerging, uneven, and in some areas indirect. However, this approach is well suited to the aims of the article, which are not to rank interventions narrowly, but to synthesise what current evidence suggests about how digital tools may support long-term PCOS self-management and where their limits remain.

Results

PCOS, self-management and the care gap

Because PCOS has no cure, much of the responsibility for symptom control and reducing long-term risks, including type 2 diabetes and cardiovascular disease, is placed on patients through sustained lifestyle change (Ee et al., 2021; Teede et al., 2023b). This is made harder still because the syndrome's hormonal disturbance, weight fluctuation and psychological distress interact, compounding symptom burden and impacting the ability to self-manage (Ee et al., 2021; Khan et al., 2026). Ongoing, multifaceted support for these women is therefore needed across reproductive, metabolic and psychological domains.

The complex reality of PCOS care stands in sharp contrast to conventional healthcare delivery, which is based on intermittent, time-limited outpatient appointments. The traditional clinical model, which is typically restricted to an initial diagnostic visit and brief follow-ups, leaves little room to address the many behavioural changes required for long-term lifestyle management (Ee et al., 2021; Teede et al., 2023b). Because symptom profiles and metabolic risks shift across the lifespan, infrequent appointments may also struggle to track a changing clinical picture (Bozdag et al., 2016; Christ & Cedars, 2023; Teede et al., 2023b).

These systemic limitations are further exacerbated by a lack of patient-centred care; women report diagnostic delays, inadequate information, and a clinical environment in which their lived experience and personal priorities are overlooked (Gibson-Helm et al., 2017; Lau et al., 2022). Their symptoms are often minimised, dismissed or trivialised by healthcare professionals, contributing to dissatisfaction and reduced trust in clinical services (Gibson-Helm et al., 2017; Hillman et al., 2020; Ismayilova & Yaya, 2022; Tomlinson et al., 2017).

This gap, therefore, is structural rather than incidental. Patients are asked to self-manage rigorously, with little support to make that possible. Digital interventions are of interest precisely because they translate clinical recommendations into continuous, real-time support inside the patient's daily life.

mHealth as behavioural support for lifestyle change

Mobile health (mHealth) is the use of mobile devices and wireless technology to support health promotion, care delivery and chronic disease self-management outside of clinical appointments. In PCOS, mHealth includes symptom-tracking platforms, online lifestyle and weight programmes and psychoeducational resources. Evidence-based tools such as AskPCOS have emerged in response to clear demand from women seeking digital help to manage the condition (Boyle et al., 2018; Xie et al., 2018).

Digital health platforms increasingly combine mHealth with peer support, offering both behavioural tools and psychosocial connection. In doing so, these interventions function as digital scaffolds—structures that help individuals build and sustain health-promoting behaviours without replacing clinical care (Khan et al., 2026; Lau et al., 2022; Wang et al., 2022). Their mechanism is well understood in behavioural science. Apps drive change through self-monitoring, goal setting, personalised feedback and reinforcement (Milne-Ives et al., 2023). These techniques can strengthen self-regulation and self-efficacy, improving adherence to lifestyle advice over time (Burke et al., 2011; Spring et al., 2021).

Beyond structured tracking, mHealth shapes behaviour through digital nudges: notifications, activity reminders, progress indicators and step-count prompts designed to steer choices gently while ultimately leaving them with the user (Thaler & Sunstein, 2008; Yoong et al., 2020). This matters in PCOS, where weight management depends on motivation, consistency and repeated daily decisions, and where fatigue, distress, low motivation and competing demands routinely undermine adherence (Cowan et al., 2023; Ee et al., 2021). Gamification is another app feature that uses rewards, challenges and achievement badges to enhance engagement and sustain motivation over time (Xu et al., 2022; Zhu et al., 2024).

Emerging PCOS-specific evidence suggests that app-based interventions may support engagement with lifestyle recommendations and improve weight- and mental health-related outcomes. Wang et al. (2022) evaluated a transtheoretical model-based mHealth app and found reductions in BMI, waist circumference, anxiety and depression, alongside better diet and exercise adherence. Lee and Lee (2023) tested a 12-week integrated lifestyle app covering diet, exercise, weight management, menstrual tracking, acne, hirsutism and mood monitoring. The intervention group achieved greater weight loss and had improvements in insulin levels, hirsutism and depressive symptoms. Dilimulati et al. (2024) compared a WeChat-based digital lifestyle intervention with metformin in women with PCOS and insulin resistance. The study found that the WeChat based programme produced similar improvements to metformin and helped women engage with diet and exercise recommendations. Despite these promising studies, the evidence base remains limited and of short duration, and sustained clinical benefit has yet to be established.

Peer support networks and psychological scaffolding

Faced with limited clinical empathy and insufficient guidance, many patients rely on online groups as a mechanism for self-advocacy (Ismayilova & Yaya, 2023). Thus, where mHealth tools address the practical side of self-management, peer-led communities address its emotional and relational side. Online groups offer validation, shared experiential knowledge and connection with others who understand PCOS first-hand (Avery et al., 2020; Holbrey & Coulson, 2013). Such spaces can reduce isolation and support the empowerment that comes from exchanging information and experience, an effect documented across chronic-condition communities more broadly (van Uden-Kraan et al., 2008).

Online spaces also help women establish a sense of "normal for me," allowing them to make sense of their symptoms and actively mitigate the self-blame often mistaken for personal failure (Gomula et al., 2024; Holbrey & Coulson, 2013). Through positive social comparison, peer validation may help women reframe symptoms like weight gain as biological features of PCOS rather than personal shortcomings (Alur-Gupta et al., 2019; Cooney et al., 2017). For a condition marked by diagnostic delay, self-blame and a sense of feeling unheard, this peer recognition is part of what makes sustained self-management achievable (Percy et al., 2009; Tomlinson et al., 2017).

Peer communities carry their own risks. Poorly moderated spaces can circulate misinformation, and well-meaning anecdote can crowd out evidence (Treadgold et al., 2025). These risks do not negate the value of peer support; they define the design problem of providing it safely, a question which is taken up in the Discussion.

The quality gap and the risk of reinforcing stigma

The potential for mHealth apps and peer communities to function as digital scaffolds for PCOS self-management is constrained by a gap in quality. The tools that women use differ in evidence, design and intent from the clinically validated tools that guidelines call for—many are commercial wellness products rather than rigorously developed clinical interventions. This concern is highly relevant to PCOS, as of the 199 PCOS-related apps identified in a recent content analysis, only a small proportion had been formally assessed for quality, credibility or evidence-based content (Arabkermani et al., 2025). A high-quality digital PCOS intervention should therefore meet several design standards: it should be co-designed, evidence-based, adaptable and safe (Kilfoy et al., 2024; National Institute for Health and Care Excellence (NICE), 2022; Yardley et al., 2015).

Bridging this quality gap requires that digital PCOS tools are built to a higher standard than most currently meet. Co-design matters because effective PCOS platforms require both professional expertise and lived experience. Clinicians and behavioural scientists can ensure that content is clinically accurate, guideline-aligned and informed by behaviour change theory, while women with PCOS can help create a platform that reflects real-world needs, emotional challenges and everyday barriers to self-management (Boyle et al., 2018; Xie et al., 2018). Evidence-based content is equally important, since poor-quality or commercially driven advice may increase confusion, anxiety or unsafe health choices in a condition that requires long-term management (NICE, 2022; Wright et al., 2025). Adaptability is the third marker: because PCOS is heterogeneous and priorities shift across the life course, a modular design lets users personalise features such as educational resources, goal setting, CBT-informed exercises and peer communities according to their symptoms, preferences and stage of care (Percy et al., 2009; Yardley et al., 2015). Finally, privacy and data governance is integral to quality because PCOS platforms may collect highly sensitive data relating to menstrual cycles, weight, mood, fertility and sexual or reproductive health (Alfawzan et al., 2022; Alhammad et al., 2024).

The quality gap is not only about accuracy, design or privacy; it is also about framing. Many women already feel their condition is reduced to weight-loss advice that overlooks its hormonal, psychological and social complexity (Lim et al., 2019). Commercial apps can reproduce that same stigma when they foreground calorie counts, weight targets and appearance-based "transformation," implying that progress is mainly a matter of personal discipline. This is particularly concerning in PCOS, where weight gain is often difficult to manage and closely linked to body-image distress, anxiety and disordered eating risk (Alur-Gupta et al., 2019; Cooney et al., 2024). In this context, such framing can deepen the shame women report in clinical settings rather than ease it. By contrast, better-designed tools support metabolic health, psychological wellbeing and self-efficacy without leaning on weight-centric messaging (Arabkermani et al., 2025).

Digital equity and socioeconomic barriers

Evaluating digital PCOS tools requires consideration of who can realistically access and use them. Smartphone ownership is widespread, but meaningful engagement also needs a capable device, reliable data, privacy and time. These conditions are not equally available to all women with PCOS, particularly those facing disadvantage. Lower socioeconomic groups may have limited access to data, rely on unstable broadband, or share devices with no private space to engage with an app that touches on sensitive issues such as weight (Davies et al., 2021; Hengst et al., 2023).

Digital and health literacy matter just as much. An app's features only help users who can read and understand the language, judge information credibility, navigate the interface and translate advice into realistic action. Thus, users with lower literacy may struggle with permissions, graphs, tracking tools and privacy settings (Good Things Foundation, 2024). Affordability adds a further layer: even free downloads require a capable phone, storage and data, while "freemium" models place richer features behind paid tiers (Good Things Foundation, 2024; Health Innovation Network & DigitalHealth.London, 2021). A two-tiered model can therefore develop in which higher-income users receive more comprehensive digital support, thus widening health inequalities.

Most importantly, the tools may not reach those carrying the heaviest burden of disease. Studies suggest that PCOS is not experienced uniformly across ethnic and socioeconomic groups. South Asian women show higher rates of central obesity and metabolic syndrome (Wijeyaratne et al., 2011), while a Danish registry study links PCOS to lower income, unemployment and welfare dependence (Rubin et al., 2019). Yet a scoping review across the WHO European region found digital-health access and use skewed toward White, English-speaking, younger, more educated and higher-socioeconomic groups (Woolley et al., 2023). This creates a serious equity concern: without deliberate attention to inclusion, PCOS mHealth tools risk benefiting women who are already advantaged and excluding those who need them most. Future research should assess not only whether these tools work for engaged users, but whether they reach and benefit those most at risk of exclusion.

Discussion

Evidence suggests that mHealth interventions and peer support networks are complementary, not interchangeable, forms of PCOS self-management, and it is their combination that responds most fully to the care gap. mHealth apps are suited to structured behavioural support: goal setting, symptom and lifestyle tracking, reminders, feedback and motivation. Wang et al. (2022) found that a PCOS-specific app reduced BMI, waist circumference and mental-health symptoms while improving adherence, which is consistent with wider evidence that apps change behaviour through tracking, prompts and feedback (Milne-Ives et al., 2023). In contrast, peer support addresses what apps cannot: the emotional and interpersonal dimension, which it does through validation, shared experience and connection (Avery et al., 2020; Holbrey & Coulson, 2013). Each supports a different part of care, and a hybrid model therefore better fits the behavioural and psychological complexity of PCOS.

This complementary model is particularly relevant when it comes to weight. Weight loss is recommended but hard to sustain because insulin resistance, metabolic dysfunction, psychological distress and stigma all work against it. mHealth can support the practical mechanics of guidance, tracking, goals, reminders, progress. However, it may fall short by reducing a complex condition to narrow weight-loss messaging that leaves users feeling blamed when progress stalls. Peer support can absorb that emotional load through encouragement from people who understand the difficulty first-hand. PCOS apps should therefore pair behavioural tools with peer-support features so they answer both the practical demands of lifestyle change and the emotional reality of living with the condition.

A related risk is over-medicalising PCOS by reducing a lived experience to data points. While mHealth tools can help users track diet, exercise, weight, symptoms, and progress, they may fail to acknowledge that PCOS-related weight gain is shaped by multiple interlinking factors rather than being a simple lifestyle issue. If weight loss is framed only through data points, users may feel blamed or demoralised when progress is slow, reinforcing the frustration with their weight that many women with PCOS already experience. Evidence from PCOS users directly supports this concern: Karpova (2025) found that women with PCOS used apps and social media for different forms of care, with social media partly compensating for the inability of self-tracking apps to capture the complexity of PCOS. Wider work on menstrual and fertility tracking adds that self-tracking can itself produce distress, fatigue and disengagement (Levy & Romo-Aviles, 2019). This strengthens the case for

a complementary model, where peer support counterbalances the data-driven focus of mHealth by re-humanising aspects of PCOS self-management.

Another tension is whether the focus on weight-management apps risks reinforcing the very stigma that PCOS guidelines seek to avoid. International PCOS guidance recognises lifestyle and weight management as part of care, but also emphasises emotional wellbeing, quality of life, shared decision-making and awareness of weight stigma (Teede et al., 2023b). Apps should do the same, situating weight within the hormonal, metabolic, psychological and social context of PCOS rather than presenting progress as a measure of discipline. Educational content that explains these interacting factors can reduce self-blame, and peer functions can further normalise difficulty and counter isolation.

This concern is intensified when digital self-management becomes blurred with commercialised wellness marketing. Some PCOS apps and online platforms promote supplements, "natural cures" or hormone-balancing claims without clear evidence or clinician oversight. Online PCOS misinformation studies show that cure narratives, herbal remedies and non-evidence-based treatments are common in digital platforms (Horvath et al., 2024; Malhotra & Kempegowda, 2023). Such messaging is problematic because it may delay evidence-based care, encourage spending on ineffective or potentially harmful products, and reinforce false hope or self-blame when promised symptom improvements do not occur.

Online PCOS peer spaces may also propagate anecdotal health claims that lack rigorous scientific backing (Cowan et al., 2023; Malhotra & Kempegowda, 2023). This becomes a significant problem if these areas are fully unmoderated, and recent literature emphasises the importance of moderation in minimising the risk of misinformation (Jones et al., 2026; Treadgold et al., 2025). An additional design question therefore is whether PCOS peer communities should be peer-moderated, algorithm-moderated or professionally overseen. Algorithmic moderation could help at scale by flagging spam, hostility and possible misinformation. However, health misinformation is often embedded in personal anecdote or ambiguous wellness claims that rule-based systems detect poorly (Baker et al., 2020; Warner et al., 2024). For this reason, algorithms may be most effective as an initial screening tool rather than a standalone solution, and human oversight would likely remain essential for maintaining content quality (Treadgold et al., 2025). A human-in-the-loop model, where trained peer moderators or health professionals oversee community standards, misinformation and escalation pathways, might offer the best balance between safety, trust and authenticity.

The commercial dynamics behind this quality gap explain why it persists. Commercial PCOS apps may reach users more rapidly than research-backed tools because they are easily downloadable, visually appealing and marketed directly to consumers (IQVIA, 2021), but widespread reach does not mean clinical reliability (Akbar et al., 2020). Of the many health apps on the market, only a small proportion have been evaluated in robust trials or integrated into clinical pathways (Byambasuren et al., 2018; IQVIA, 2021). This is because validated platforms scale more slowly: they require co-design, evaluation, governance, privacy safeguards and integration into healthcare systems (Akbar et al., 2020; Gordon et al., 2020). The practical implication for PCOS is that future digital interventions must combine the scalability and usability of commercial platforms with the safety, transparency and evidence base of validated tools.

A major gap in the literature is the limited number of long-term longitudinal RCTs evaluating digital PCOS interventions. Existing studies suggest that mHealth tools can improve short- to medium-term outcomes including lifestyle adherence, BMI, waist circumference, and symptoms of depression and anxiety (Lee & Lee, 2023; Wang et al., 2022). However, because PCOS is a lifelong condition, it remains unclear whether app-based improvements are sustained beyond the active intervention period. Studies have been conducted over relatively short timeframes, with some lasting only 12 weeks and others reporting follow-up at 6 or 12 months, leaving longer-term effectiveness underexplored (Lee & Lee, 2023; Wang et al., 2022). This limitation is significant because digital interventions may be effective during periods of active tracking, reminders or structured app engagement, but it is less clear whether users need to continue engaging with these tools to maintain benefits, or whether positive effects persist once the intervention ends. Recent reviews also suggest that PCOS digital health remains an emerging evidence base, with more research needed on engagement, inclusivity, long-term effectiveness and outcomes beyond weight loss alone (Wright et al., 2025). Future studies should therefore include longer, multicentre RCTs with extended follow-up, real-world engagement data and broader outcome indicators such as quality of life, stigma, digital exclusion and sustained self-management.

Two further gaps stand out. Firstly, diverse and underserved populations are understudied. Despite PCOS affecting women across ethnic and socioeconomic groups, digital research pays little attention to whether tools are accessible and effective for minority-ethnic, lower-income, rural or lower-literacy users. This

is a serious omission given how socially patterned digital-health uptake is (Woolley et al., 2023). Future PCOS mHealth studies should recruit more diverse samples and evaluate whether interventions are effective for these groups. Secondly, moderation models within PCOS peer communities are largely untested. Evidence from other online health communities shows moderation can curb hostility, spam and misinformation (Deng et al., 2023; Huh et al., 2016). However, PCOS-specific evidence remains limited, particularly regarding how peer-led, professional, algorithmic, and unmoderated models shape user experience and community quality. Future research should investigate which approaches best balance authenticity with safety, informational reliability, and emotional support.

Conclusions

This review set out to examine whether mobile health applications and peer-led online communities can function as complementary forms of digital support for self-management in PCOS, with particular attention paid to weight management. Taken together, the evidence suggests that they can, provided their distinct limitations are addressed. Weight management in PCOS cannot be understood simply in terms of individual motivation or adherence to behavioural advice. Although lifestyle change is recommended as first-line care, sustaining it is often complicated by insulin resistance, metabolic dysfunction, psychological distress, and weight stigma, all within the context of episodic and time-limited clinical care. From this perspective, digital interventions are most usefully understood not as substitutes for healthcare, but as tools that help bridge the gap between the demands placed on patients and the limited support that routine services are often able to offer.

Two main findings emerge from this review. Firstly, mHealth tools and peer support do different jobs and are most useful in combination. mHealth apps can help with the practical side of behaviour change through features such as tracking, goal setting, reminders, personalised feedback, and sometimes gamified encouragement. Peer communities, by contrast, can offer something more emotional and relational: validation, shared experience, reassurance, and a sense of not being alone. Second, because each addresses different aspects of care, the most promising direction is a hybrid model that combines structured behavioural support with safely moderated peer connection.

At the same time, this potential should not be overstated. The evidence for behavioural benefit is still limited, with only a small number of trials and mostly short-term outcomes. Commercial wellness apps have expanded far more quickly than evidence-based, co-designed tools. There is a further risk that approaches framed too heavily around appearance or weight may reproduce the same stigma that clinical guidance increasingly seeks to avoid. Unmoderated peer spaces can also expose users to misinformation or distressing content, while digital inequalities may mean that the people most likely to benefit are not always those most able to access or use these interventions.

The conclusions of this review are therefore provisional, reflecting both its narrative scope and an evidence base that is still emerging. Even so, the priorities for future research are clear: longer-term, multicentre randomised trials with real-world engagement data and outcomes that go beyond weight alone; more deliberate recruitment of ethnically and socioeconomically diverse populations; and direct comparison of different moderation models in peer communities. If hybrid digital approaches are developed with women with PCOS, alongside clinicians and behavioural scientists, and designed with safety, privacy, and inclusivity in mind, they could become a meaningful complement to care. Rather than adding another layer of stigma or exclusion, they may help provide the kind of ongoing, psychologically supportive, and clinically grounded support that is often missing in the long-term management of PCOS.

Author's contribution: All authors contributed to the article.

Conflict of interest: The authors declare no conflict of interest.

Funding statement: No external funding was received for this review.

Declaration of the use of generative AI and AI-assisted technologies in the writing process: In preparing this review, the authors used Claude AI for the purpose of grammar checking and language editing. After using this tool, the authors reviewed and edited the content as needed and accept full responsibility for the content of the publication.

REFERENCES

1. Akbar, S., Coiera, E., & Magrabi, F. (2020). Safety concerns with consumer-facing mobile health applications and their consequences: A scoping review. *J Am Med Inform Assoc*, 27(2), 330–340. <https://doi.org/10.1093/jamia/ocz175>
2. Alfawzan, N., Christen, M., Spitale, G., & Biller-Andorno, N. (2022). Privacy, data sharing, and data security policies of women's mHealth apps: Scoping review and content analysis. *JMIR Mhealth Uhealth*, 10(5), e33735. <https://doi.org/10.2196/33735>
3. Alhammad, N., Alajlani, M., Abd-Alrazaq, A., Epiphaniou, G., & Arvanitis, T. (2024). Patients' perspectives on the data confidentiality, privacy, and security of mHealth apps: Systematic review. *J Med Internet Res*, 26, e50715. <https://doi.org/10.2196/50715>
4. Alur-Gupta, S., Chemerinski, A., Liu, C., Lipson, J., Allison, K., Sammel, M. D., & Dokras, A. (2019). Body-image distress is increased in women with polycystic ovary syndrome and mediates depression and anxiety. *Fertil Steril*, 112(5), 930–938 e931. <https://doi.org/10.1016/j.fertnstert.2019.06.018>
5. Arabkermani, Z., Barzegari, S., Rouhani, A., Nahavandi, N., Gibreel, O., & Arpaci, I. (2025). Mobile apps designed for patients with polycystic ovary syndrome: Content analysis using the Mobile App Rating Scale. *J Med Internet Res*, 27, e71118. <https://doi.org/10.2196/71118>
6. Avery, J., Ottey, S., Morman, R., Cree-Green, M., & Gibson-Helm, M. (2020). Polycystic ovary syndrome support groups and their role in awareness, advocacy and peer support: A systematic search and narrative review. *Current Opinion in Endocrine and Metabolic Research*, 12, 98–104. <https://doi.org/10.1016/j.coemr.2020.04.008>
7. Baker, S. A., Wade, M., & Walsh, M. J. (2020). The challenges of responding to misinformation during a pandemic: Content moderation and the limitations of the concept of harm. *Media International Australia*, 177(1), 103–107. <https://doi.org/10.1177/1329878X20951301>
8. Barber, T. M., Hanson, P., Weickert, M. O., & Franks, S. (2019). Obesity and polycystic ovary syndrome: Implications for pathogenesis and novel management strategies. *Clin Med Insights Reprod Health*, 13, 1179558119874042. <https://doi.org/10.1177/1179558119874042>
9. Boyle, J. A., Xu, R., Gilbert, E., Kuczynska-Burggraf, M., Tan, B., Teede, H., Vincent, A., & Gibson-Helm, M. (2018). Ask PCOS: Identifying need to inform evidence-based app development for polycystic ovary syndrome. *Semin Reprod Med*, 36(1), 59–65. <https://doi.org/10.1055/s-0038-1667187>
10. Bozdag, G., Mumusoglu, S., Zengin, D., Karabulut, E., & Yildiz, B. O. (2016). The prevalence and phenotypic features of polycystic ovary syndrome: A systematic review and meta-analysis. *Hum Reprod*, 31(12), 2841–2855. <https://doi.org/10.1093/humrep/dew218>
11. Burke, L. E., Wang, J., & Sevvick, M. A. (2011). Self-monitoring in weight loss: A systematic review of the literature. *J Am Diet Assoc*, 111(1), 92–102. <https://doi.org/10.1016/j.jada.2010.10.008>
12. Byambasuren, O., Sanders, S., Beller, E., & Glasziou, P. (2018). Prescribable mHealth apps identified from an overview of systematic reviews. *NPJ Digit Med*, 1, 12. <https://doi.org/10.1038/s41746-018-0021-9>
13. Christ, J. P., & Cedars, M. I. (2023). Current guidelines for diagnosing PCOS. *Diagnostics (Basel)*, 13(6). <https://doi.org/10.3390/diagnostics13061113>
14. Cooney, L. G., Gyorfi, K., Sanneh, A., Bui, L. M., Mousa, A., Tay, C. T., Teede, H., Stener-Victorin, E., & Brennan, L. (2024). Increased prevalence of binge eating disorder and bulimia nervosa in women with polycystic ovary syndrome: A systematic review and meta-analysis. *J Clin Endocrinol Metab*, 109(12), 3293–3305. <https://doi.org/10.1210/clinem/dgae462>
15. Cooney, L. G., Lee, I., Sammel, M. D., & Dokras, A. (2017). High prevalence of moderate and severe depressive and anxiety symptoms in polycystic ovary syndrome: A systematic review and meta-analysis. *Hum Reprod*, 32(5), 1075–1091. <https://doi.org/10.1093/humrep/dex044>
16. Cowan, S., Lim, S., Alycia, C., Pirota, S., Thomson, R., Gibson-Helm, M., Blackmore, R., Naderpoor, N., Bennett, C., Ee, C., Rao, V., Mousa, A., Alesi, S., & Moran, L. (2023). Lifestyle management in polycystic ovary syndrome - beyond diet and physical activity. *BMC Endocr Disord*, 23(1), 14. <https://doi.org/10.1186/s12902-022-01208-y>
17. Davies, A. R., Honeyman, M., & Gann, B. (2021). Addressing the digital inverse care law in the time of COVID-19: Potential for digital technology to exacerbate or mitigate health inequalities. *J Med Internet Res*, 23(4), e21726. <https://doi.org/10.2196/21726>
18. Deng, D., Rogers, T., & Naslund, J. A. (2023). The role of moderators in facilitating and encouraging peer-to-peer support in an online mental health community: A qualitative exploratory study. *J Technol Behav Sci*, 8(2), 128–139. <https://doi.org/10.1007/s41347-023-00302-9>
19. Dilimulati, D., Shao, X., Wang, L., Cai, M., Zhang, Y., Lu, J., Wang, Y., Liu, H., Kuang, M., Chen, H., Zhang, M., & Qu, S. (2024). Efficacy of WeChat-based digital intervention versus metformin in women with polycystic ovary syndrome: Randomized controlled trial. *J Med Internet Res*, 26, e55883. <https://doi.org/10.2196/55883>
20. Dokras, A. (2022). Mood disorders in polycystic ovary syndrome. In L. Pal & D. Shah (Eds.), *Polycystic ovary syndrome* (3 ed., pp. 162–169). Cambridge University Press. <https://doi.org/10.1017/9781108989831.017>
21. Ee, C., Pirota, S., Mousa, A., Moran, L., & Lim, S. (2021). Providing lifestyle advice to women with PCOS: An overview of practical issues affecting success. *BMC Endocr Disord*, 21(1), 234. <https://doi.org/10.1186/s12902-021-00890-8>
22. Gibson-Helm, M., Teede, H., Dunaif, A., & Dokras, A. (2017). Delayed diagnosis and a lack of information associated with dissatisfaction in women with polycystic ovary syndrome. *J Clin Endocrinol Metab*, 102(2), 604–612. <https://doi.org/10.1210/jc.2016-2963>

23. Gomula, J., Warner, M., & Blandford, A. (2024). Women's use of online health and social media resources to make sense of their polycystic ovary syndrome (PCOS) diagnosis: A qualitative study. *BMC Womens Health*, 24(1), 157. <https://doi.org/10.1186/s12905-024-02993-5>
24. Good Things Foundation. (2024). *Mitigating risks of digital exclusion in health systems*. <https://www.goodthingsfoundation.org/policy-and-research/research-and-evidence/research-2024/health-inequalities-digital-exclusion>
25. Gordon, W. J., Landman, A., Zhang, H., & Bates, D. W. (2020). Beyond validation: Getting health apps into clinical practice. *NPJ Digit Med*, 3, 14. <https://doi.org/10.1038/s41746-019-0212-z>
26. Grogan, S. (2006). Body image and health: Contemporary perspectives. *J Health Psychol*, 11(4), 523–530. <https://doi.org/10.1177/1359105306065013>
27. Health Innovation Network, & DigitalHealth.London. (2021). *Revolutionising the payment for digital solutions for patients: Urgent need for new payment models to realise the significant potential of digital tools*. <https://healthinnovationnetwork.com/wp-content/uploads/2021/05/Health-Innovation-Network-Revolutionising-the-payment-for-digital-solutions-for-patients-May-2021-1.pdf>
28. Hengst, T. M., Lechner, L., Dohmen, D., & Bolman, C. A. (2023). The facilitators and barriers of mHealth adoption and use among people with a low socio-economic position: A scoping review. *Digit Health*, 9, 20552076231198702. <https://doi.org/10.1177/20552076231198702>
29. Hillman, S. C., Bryce, C., Caleyachetty, R., & Dale, J. (2020). Women's experiences of diagnosis and management of polycystic ovary syndrome: A mixed-methods study in general practice. *Br J Gen Pract*, 70(694), e322–e329. <https://doi.org/10.3399/bjgp20X708881>
30. Holbrey, S., & Coulson, N. S. (2013). A qualitative investigation of the impact of peer to peer online support for women living with polycystic ovary syndrome. *BMC Womens Health*, 13, 51. <https://doi.org/10.1186/1472-6874-13-51>
31. Horvath, A., Chaffin, K., Ahmad, S., Goel, V. S., Netski, D. M., Ahad, R., Batra, K., & Lee, R. (2024). The discourse surrounding polycystic ovary syndrome on TikTok: A social media analysis. *Healthcare (Basel)*, 12(22). <https://doi.org/10.3390/healthcare1222253>
32. Huh, J., Marmor, R., & Jiang, X. (2016). Lessons learned for online health community moderator roles: A mixed-methods study of moderators resigning from WebMD communities. *J Med Internet Res*, 18(9), e247. <https://doi.org/10.2196/jmir.6331>
33. IQVIA. (2021). *Consumer health apps and digital health tools proliferate, improving quality and health outcomes for patients, says new report from iqvia institute*. <https://www.iqvia.com/newsroom/2021/07/consumer-health-apps-and-digital-health-tools-proliferate-improving-quality-and-health-outcomes-for>
34. Ismayilova, M., & Yaya, S. (2022). "I felt like she didn't take me seriously": A multi-methods study examining patient satisfaction and experiences with polycystic ovary syndrome (PCOS) in Canada. *BMC Womens Health*, 22(1), 47. <https://doi.org/10.1186/s12905-022-01630-3>
35. Ismayilova, M., & Yaya, S. (2023). 'I'm usually being my own doctor': Women's experiences of managing polycystic ovary syndrome in Canada. *Int Health*, 15(1), 56–66. <https://doi.org/10.1093/inthealth/ihac028>
36. Jones, H. G., Lavelle, G., Aylwin-Foster, E., Regan, C., Simpson, A., Carr, E., Hotopf, M., & Lawrence, V. (2026). Insights and recommendations from moderators and community members for keeping online peer support safe: Thematic analysis. *J Med Internet Res*, 28, e81943. <https://doi.org/10.2196/81943>
37. Karpova, J. (2025). 'This feeling of multidimensional disease': How women with PCOS narrate their experience with self-tracking apps and social media. *Gender a výzkum / Gender and Research*, 26(1), 12–34. <https://doi.org/10.13060/gav.2025.005>
38. Khan, F., Govender, N., Mitha, S. B., & Thandar, Y. (2026). The lived experiences of women with polycystic ovary syndrome and its psychological challenges: A systematic review and meta-synthesis. *Arch Womens Ment Health*, 29(1), 39. <https://doi.org/10.1007/s00737-025-01636-4>
39. Kilfoy, A., Hsu, T. C., Stockton-Powdrell, C., Whelan, P., Chu, C. H., & Jibb, L. (2024). An umbrella review on how digital health intervention co-design is conducted and described. *NPJ Digit Med*, 7(1), 374. <https://doi.org/10.1038/s41746-024-01385-1>
40. Lau, G. M., Elghobashy, M., Thanki, M., Ibegbulam, S., Latthe, P., Gillett, C. D. T., O'Reilly, M. W., Arlt, W., Lindenmeyer, A., Kempegowda, P., & Group, P. S. W. (2022). A systematic review of lived experiences of people with polycystic ovary syndrome highlights the need for holistic care and co-creation of educational resources. *Front Endocrinol (Lausanne)*, 13, 1064937. <https://doi.org/10.3389/fendo.2022.1064937>
41. Lee, H., & Lee, S. H. (2023). Effectiveness of an integrated mobile application for lifestyle modifications in overweight women with polycystic ovarian syndrome: A randomized controlled trial. *Life (Basel)*, 13(7). <https://doi.org/10.3390/life13071533>
42. Levy, J., & Romo-Aviles, N. (2019). "A good little tool to get to know yourself a bit better": A qualitative study on users' experiences of app-supported menstrual tracking in Europe. *BMC Public Health*, 19(1), 1213. <https://doi.org/10.1186/s12889-019-7549-8>
43. Lim, S., Smith, C. A., Costello, M. F., MacMillan, F., Moran, L., & Ee, C. (2019). Barriers and facilitators to weight management in overweight and obese women living in australia with PCOS: A qualitative study. *BMC Endocr Disord*, 19(1), 106. <https://doi.org/10.1186/s12902-019-0434-8>
44. Malhotra, K., & Kempegowda, P. (2023). Appraising unmet needs and misinformation spread about polycystic ovary syndrome in 85,872 YouTube comments over 12 years: Big data infodemiology study. *J Med Internet Res*, 25, e49220. <https://doi.org/10.2196/49220>

45. McGowan, M., Garad, R., Wadhwani, G., Torkel, S., Rao, V., Maunder, A., Osei-Safo, E. K., Moran, L. J., & Cowan, S. (2025). Understanding barriers and facilitators to lifestyle management in people with polycystic ovary syndrome: A mixed method systematic review. *Obes Rev*, 26(2), e13854. <https://doi.org/10.1111/obr.13854>
46. Milne-Ives, M., Homer, S. R., Andrade, J., & Meinert, E. (2023). Potential associations between behavior change techniques and engagement with mobile health apps: A systematic review. *Front Psychol*, 14, 1227443. <https://doi.org/10.3389/fpsyg.2023.1227443>
47. Naeem, I., Zehra, A., Rehman, F., Hussain, A., Hussain, A., Hussain, N., Waseem, M., Alqahtani, R. M., Shamlan, G., Ahmed, I. A. M., Manzoor, M. F., & Abdullahi, M. A. (2025). Polycystic ovarian syndrome a risk factor for non-communicable diseases: Insights into recent research and prevention approaches. *J Ovarian Res*, 18(1), 219. <https://doi.org/10.1186/s13048-025-01741-z>
48. National Institute for Health and Care Excellence (NICE). (2022). *Evidence standards framework (ESF) for digital health technologies*. <https://www.nice.org.uk/what-nice-does/digital-health/evidence-standards-framework-esf-for-digital-health-technologies>
49. Percy, C. A., Gibbs, T., Potter, L., & Boardman, S. (2009). Nurse-led peer support group: Experiences of women with polycystic ovary syndrome. *J Adv Nurs*, 65(10), 2046–2055. <https://doi.org/10.1111/j.1365-2648.2009.05061.x>
50. Rubin, K. H., Andersen, M. S., Abrahamsen, B., & Grintborg, D. (2019). Socioeconomic status in Danish women with polycystic ovary syndrome: A register-based cohort study. *Acta Obstet Gynecol Scand*, 98(4), 440–450. <https://doi.org/10.1111/aogs.13514>
51. Scragg, J., Hobson, A., Willis, L., Taylor, K. S., Dixon, S., & Jebb, S. A. (2024). Effect of weight loss interventions on the symptomatic burden and biomarkers of polycystic ovary syndrome : A systematic review of randomized controlled trials. *Ann Intern Med*, 177(12), 1664–1674. <https://doi.org/10.7326/M23-3179>
52. Spring, B., Champion, K. E., Acabchuk, R., & Hennessy, E. A. (2021). Self-regulatory behaviour change techniques in interventions to promote healthy eating, physical activity, or weight loss: A meta-review. *Health Psychol Rev*, 15(4), 508–539. <https://doi.org/10.1080/17437199.2020.1721310>
53. Stener-Victorin, E., Teede, H., Norman, R. J., Legro, R., Goodarzi, M. O., Dokras, A., Laven, J., Hoeger, K., & Piltonen, T. T. (2024). Polycystic ovary syndrome. *Nat Rev Dis Primers*, 10(1), 27. <https://doi.org/10.1038/s41572-024-00511-3>
54. Tay, C. T., Mousa, A., Vyas, A., Pattuwage, L., Tehrani, F. R., & Teede, H. (2023). 2023 international evidence-based polycystic ovary syndrome guideline update: Insights from a systematic review and meta-analysis on elevated clinical cardiovascular disease in polycystic ovary syndrome. *J Am Heart Assoc*, 13(16), e033572. <https://doi.org/10.1161/JAHA.123.033572>
55. Teede, H. J., Tay, C. T., Laven, J. J. E., Dokras, A., Moran, L. J., Piltonen, T. T., Costello, M. F., Boivin, J., Redman, L. M., Boyle, J. A., Norman, R. J., Mousa, A., & Joham, A. E. (2023a). Recommendations from the 2023 international evidence-based guideline for the assessment and management of polycystic ovary syndrome. *J Clin Endocrinol Metab*, 108(10), 2447–2469. <https://doi.org/10.1210/clinem/dgad463>
56. Teede, H. J., Tay, C. T., Laven, J. S. E., Dokras, A., Moran, L. J., Piltonen, T., Costello, M. F., Boivin, J., Redman, L., Boyle, J., Norman, R., Mousa, A., & Joham, A. (2023b). *International evidence-based guideline for the assessment and management of polycystic ovary syndrome 2023*. M. University. <https://doi.org/10.26180/24003834>
57. Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.
58. Tomlinson, J., Pinkney, J., Adams, L., Stenhouse, E., Bendall, A., Corrigan, O., & Letherby, G. (2017). The diagnosis and lived experience of polycystic ovary syndrome: A qualitative study. *J Adv Nurs*, 73(10), 2318–2326. <https://doi.org/10.1111/jan.13300>
59. Treadgold, B. M., Coulson, N. S., Campbell, J. L., Lambert, J., & Pitchforth, E. (2025). Quality and misinformation about health conditions in online peer support groups: Scoping review. *J Med Internet Res*, 27, e71140. <https://doi.org/10.2196/71140>
60. van Uden-Kraan, C. F., Drossaert, C. H., Taal, E., Shaw, B. R., Seydel, E. R., & van de Laar, M. A. (2008). Empowering processes and outcomes of participation in online support groups for patients with breast cancer, arthritis, or fibromyalgia. *Qual Health Res*, 18(3), 405–417. <https://doi.org/10.1177/1049732307313429>
61. Wang, L., Liu, Y., Tan, H., & Huang, S. (2022). Translational model-based mobile health application for PCOS. *Reprod Health*, 19(1), 117. <https://doi.org/10.1186/s12978-022-01422-w>
62. Warner, M., Strohmayr, A., Higgs, M., & Coventry, L. (2024). *A critical reflection on the use of toxicity detection algorithms in proactive content moderation systems*. <https://arxiv.org/abs/2401.10629>
63. Wijeyaratne, C. N., Seneviratne Rde, A., Dahanayake, S., Kumarapeli, V., Palipane, E., Kuruppu, N., Yapa, C., Seneviratne Rde, A., & Balen, A. H. (2011). Phenotype and metabolic profile of South Asian women with polycystic ovary syndrome (PCOS): Results of a large database from a specialist endocrine clinic. *Hum Reprod*, 26(1), 202–213. <https://doi.org/10.1093/humrep/deq310>
64. Woolley, K. E., Bright, D., Ayres, T., Morgan, F., Little, K., & Davies, A. R. (2023). Mapping inequities in digital health technology within the World Health Organization's European region using PROGRESS PLUS: Scoping review. *J Med Internet Res*, 25, e44181. <https://doi.org/10.2196/44181>
65. Wright, P. J., Burts, C., Harmon, C., & Corbett, C. F. (2025). Availability and use of digital technology among women with polycystic ovary syndrome: Scoping review. *JMIR Infodemiology*, 5, e68469. <https://doi.org/10.2196/68469>
66. Xie, J., Burstein, F., Garad, R., Teede, H. J., & Boyle, J. A. (2018). Personalized mobile tool AskPCOS delivering evidence-based quality information about polycystic ovary syndrome. *Semin Reprod Med*, 36(1), 66–72. <https://doi.org/10.1055/s-0038-1667156>

67. Xu, L., Shi, H., Shen, M., Ni, Y., Zhang, X., Pang, Y., Yu, T., Lian, X., Yu, T., Yang, X., & Li, F. (2022). The effects of mHealth-Based gamification interventions on participation in physical activity: Systematic review. *JMIR Mhealth Uhealth*, 10(2), e27794. <https://doi.org/10.2196/27794>
68. Yardley, L., Morrison, L., Bradbury, K., & Muller, I. (2015). The person-based approach to intervention development: Application to digital health-related behavior change interventions. *J Med Internet Res*, 17(1), e30. <https://doi.org/10.2196/jmir.4055>
69. Yoong, S. L., Hall, A., Stacey, F., Grady, A., Sutherland, R., Wyse, R., Anderson, A., Nathan, N., & Wolfenden, L. (2020). Nudge strategies to improve healthcare providers' implementation of evidence-based guidelines, policies and practices: A systematic review of trials included within Cochrane systematic reviews. *Implement Sci*, 15(1), 50. <https://doi.org/10.1186/s13012-020-01011-0>
70. Zhao, H., Zhang, J., Cheng, X., Nie, X., & He, B. (2023). Insulin resistance in polycystic ovary syndrome across various tissues: An updated review of pathogenesis, evaluation, and treatment. *J Ovarian Res*, 16(1), 9. <https://doi.org/10.1186/s13048-022-01091-0>
71. Zhu, Y., Long, Y., Wang, H., Lee, K. P., Zhang, L., & Wang, S. J. (2024). Digital behavior change intervention designs for habit formation: Systematic review. *J Med Internet Res*, 26, e54375. <https://doi.org/10.2196/54375>