

# The effectiveness of mental health mobile application on postpartum depression in postpartum mothers: A systematic review

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## ABSTRACT

Significant mental health issues in postpartum mothers have an impact on both mothers and child development. Limited access to services and social stigma hinder treatment. Mental health-based mobile applications have emerged as a potential alternative intervention. The objective of the research was to analyze the effectiveness of mobile applications in reducing postpartum depression symptoms and the factors contributing to their success. A systematic review following the PRISMA 2020 guidelines was conducted, searching PubMed, Wiley, ProQuest, and Google Scholar for articles published between 2020 and 2025. Ten quantitative and qualitative articles were analyzed. Apps using cognitive behavioral therapy (CBT), mindfulness, and telecounseling approaches were effective in reducing postpartum depression symptoms. Success was influenced by user-friendly design, social support, cultural sensitivity, and integration with healthcare services. Barriers included low digital literacy, stigma, and privacy concerns. Mobile apps have the potential to be an effective and affordable solution. In Indonesia, development should prioritize scientific evidence, ease of use, and integration with primary healthcare services.

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## 1. Introduction

Postpartum depression (PPD) is one of the most prevalent and serious mental health disorders affecting women after childbirth. Globally, about one in five women experience mental health problems during pregnancy or within one year after delivery, with higher rates occurring in low- and middle-income countries (WHO, 2022). Depression and anxiety are the two most common disorders, and their prevalence continues to rise as mothers face increasing psychological, social, and economic pressures during the transition to parenthood (Zhao et al., 2021).

In Indonesia, the prevalence of postpartum depression is estimated to range from 19.9% to 26.2%, based on studies using the Edinburgh Postnatal Depression Scale (EPDS) instrument (Hong & Buntup, 2023). This figure demonstrates that postpartum mental disorders are common but still receive insufficient attention within the maternal health care system. The consequences of untreated postpartum depression are far-reaching, it can impair maternal functioning, disrupt the mother-infant bond, and negatively affect the child's emotional, social, and cognitive development (Lewkowitz et al., 2024).



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Despite its impact, many postpartum mothers still struggle to access appropriate mental health support due to limited health services, social stigma, lack of time, and geographic barriers (Zhao et al., 2021). The need for accessible, confidential, and flexible mental health support has therefore become increasingly urgent.

With the advancement of digital technology, mobile-based mental health interventions have emerged as a promising alternative to traditional face-to-face services. The use of digital health (mHealth) applications allows mothers to access emotional support and psychological interventions anytime and anywhere. Governments and international organizations are also promoting digital innovation to reach vulnerable populations of postpartum women (Daehn et al., 2025; Kamarudin et al., 2025). Compared to web-based platforms, mobile applications are considered more practical and effective in delivering real-time interventions, offering features such as reminders, mood tracking, location-based assistance, and interactive communication (Barrionuevo & Ticona, 2025).

Mobile applications have become a key pillar of digital mental health interventions due to their ability to enhance user engagement and promote self-management. Several applications, including Smart-e-Moms, LoVE4MUM, and Moment for Parents, have demonstrated positive outcomes in reducing postpartum depression symptoms through cognitive behavioral therapy (CBT), mindfulness, education, and telecounseling approaches (Daehn et al., 2025; Kamarudin et al., 2024; Mcalister et al., 2025).

Considering the high prevalence of postpartum depression and the barriers faced by mothers in accessing conventional care, digital mental health applications present a potential solution that warrants systematic evaluation (Hong & Buntup, 2023; Osman et al., 2025; Seo et al., 2022). Therefore, this study aims to analyze the effectiveness of mental health mobile applications in reducing postpartum depression symptoms and to identify the factors influencing their successful implementation.

## 2. Method

The method used was a systematic review, which was compiled based on the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency, completeness, and accuracy in reporting the methods and results of the study, in accordance with international standards. The steps used were: formulating the research question, identifying search keywords, searching relevant databases, extracting articles according to selection criteria, and reviewing the quality of the papers based on a checklist (Page et al., 2021).

This systematic review protocol has been registered in the International Prospective Register of Systematic Reviews (PROSPERO) with registration number CRD420251106930. The protocol was developed following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines.

### Formulating Review Questions

The research questions in this systematic review were formulated using the PICO framework, as the PICO framework reinforces Evidence-Based Practice (EBP) through the systematic and structured formulation of clinical questions. In the context of clinical education, the PICO model has proven effective for medical students in analyzing cases in a reflective and systematic manner, thereby strengthening the process of searching for and evaluating scientific evidence. Additionally, the use of PICO helps clarify clinical questions, identify keywords, and develop more efficient literature search strategies. (Based et al., 2018; Zhang et al., 2020)

Based on PICO, P (Population) refers to postpartum mothers, I (Intervention) refers to mental health mobile applications, C (Comparison) refers to non-digital services, and O (Outcome) refers to improved mental health and reduced depression. Therefore, the review questions are: How effective is the use of a mobile mental health app in managing postpartum depression in postpartum women? And what factors influence the use of a mobile mental health app in managing postpartum depression in postpartum women?

## 2.1.Keywords

**Table 1.** Keywords

Database / Search Engine	Keyword
PubMed	(Postpartum mother) OR (Postnatal mother) OR (Puerperal woman)) OR (Women after childbirth)) OR (Postpartum women)) OR (Postnatal women)) AND (Mobile mental health)) OR (Mobile health application)) OR (mHealth for mental health)) OR (Digital mental health)) OR (Mobile application for mental health)) OR (Smartphone mental health app)) OR (telecounseling)) AND (Postpartum mental health)) OR (Maternal mental health)) OR (Postnatal mental health)) OR (Postpartum depression)) OR (Postpartum anxiety)) OR (Postpartum stress)) OR (Postpartum psychosis)
Wiley Online Library	(postpartum* OR postnatal* OR puerperal* OR "women after childbirth") AND ("mobile mental health" OR "mobile health app*" OR mHealth OR "digital mental health" OR "smartphone app*" OR telecounsel*) AND ("mental health" OR "postpartum depression" OR "postpartum anxiet*" OR "postpartum stress" OR "postpartum psychosis" OR "maternal mental health" OR psycholog*)
ProQuest	(postpartum* OR postnatal* OR puerperal* OR "women after childbirth") AND ("mobile mental health" OR "mobile health app*" OR mHealth OR "digital mental health" OR "smartphone app*" OR telecounsel*) AND ("mental health" OR "postpartum depression" OR "postpartum anxiet*" OR "postpartum stress" OR "postpartum psychosis" OR "maternal mental health" OR psycholog*)
Google Scholar	("Postpartum mother" OR "Postnatal mother" OR "Puerperal woman" OR "Women after childbirth" OR "Postpartum women" OR "Postnatal women") AND ("Mobile mental health" OR "Mobile health application" OR "mHealth for mental health" OR "Digital mental health" OR "Mobile application for mental health" OR "Smartphone mental health app" OR "telecounseling") AND ("Postpartum mental health" OR "Maternal mental health" OR "Postnatal mental health" OR "Postpartum depression" OR "Postpartum anxiety" OR "Postpartum stress" OR "Postpartum psychosis")

## 2.2.Database Search

A comprehensive literature search was conducted on June 19, 2025, using four major electronic databases: PubMed, Wiley Online Library, ProQuest, and Google Scholar, with a predefined search strategy.

## 2.3.Data Selection and Screening

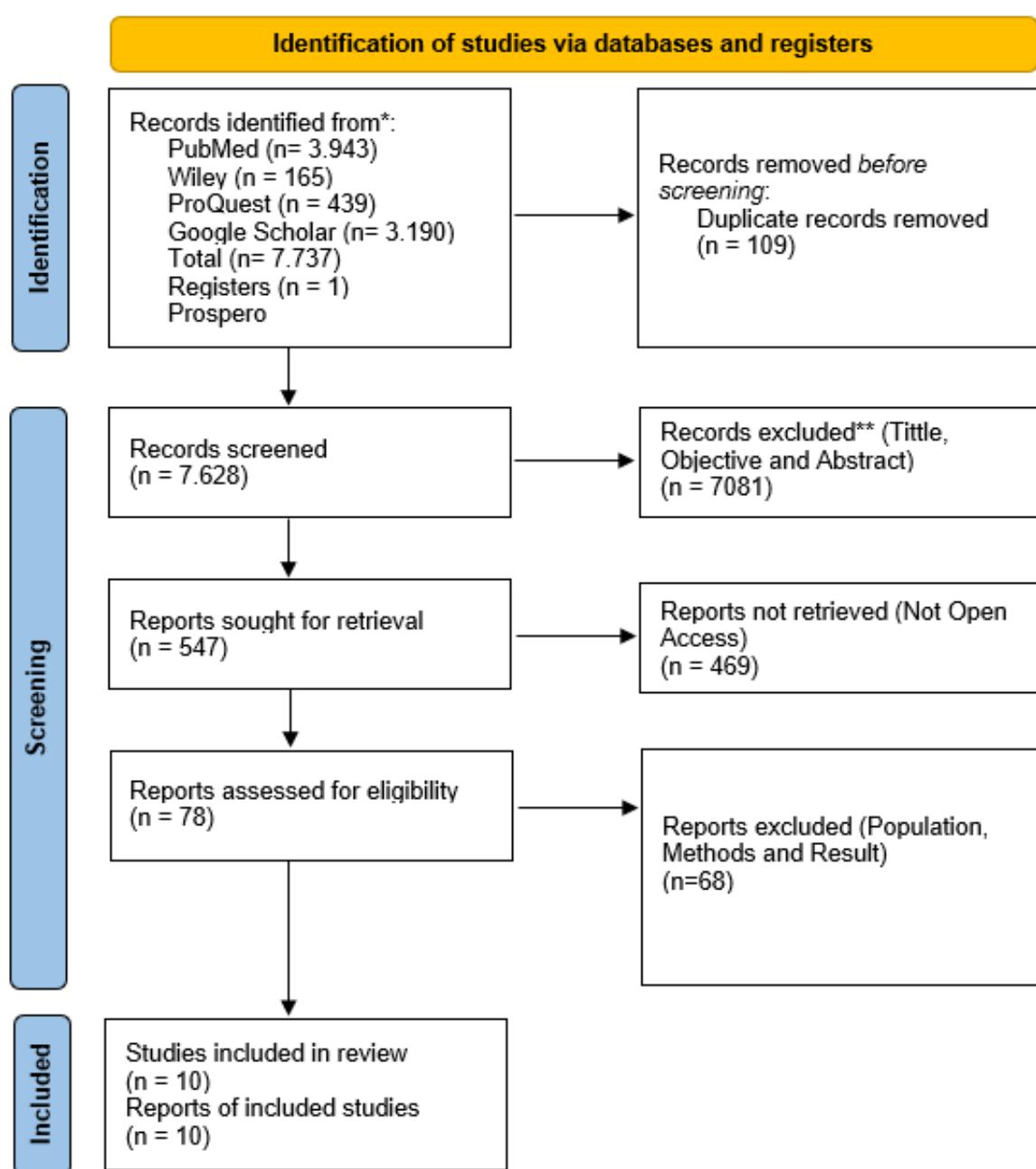
The selection of articles was carried out independently by six reviewers using predetermined inclusion and exclusion criteria. Disagreements were resolved through discussion. All relevant articles were extracted, and articles that did not meet the inclusion and exclusion criteria were excluded. The relevant data were examined by looking at the title, abstract, and full text. All results found were reviewed to identify and eliminate duplicate articles using Mendeley Reference Manager and Rayyan.

## 2.4.Inclusion and Exclusion Criteria

The inclusion criteria for article searches are: articles published between 2020 and 2025, in English, full text and accessible, published articles, original articles. The exclusion criteria are: paid articles and articles that are not relevant to the review topic.

## 2.5.Data Extraction

After the articles met the inclusion and exclusion criteria and passed the data screening process, data extraction was carried out, A total of 10 articles were obtained, which were then classified and reported in tabular form.

**Fig. 1.** PRISMA

The inclusion or exclusion criteria were applied independently by two assessors so that the selection results could be accounted for. The selection of articles was carried out independently by six reviewers applying the established inclusion and exclusion criteria. Differences of opinion were resolved through discussion.

**Table 2.** Data charting

No	Title/Author/Year	Objective	Design	Country	Population	Result
A1	The effect of telecounseling on depression in primiparous mothers during the postpartum period: A randomized controlled trial/ ( <a href="#">Koç et al., 2024</a> )	To determine the effect of telecounseling on postpartum depression levels in primiparous mothers	<i>Randomized Controlled Trial (RCT)</i>	Turkey	Primiparous women within 6 weeks of giving birth  Sample size: 100 people. 50 people in the intervention group, 50 people in the control group	Intervention group (received telecounseling): EPDS scores decreased from $7.12 \pm 3.96$ to $6.34 \pm 3.73$ . This indicates a reduction in depressive symptoms ( $p < 0.001$ )  Control group (no intervention): EPDS scores increased from $6.62 \pm 3.55$ to $7.90 \pm 4.65$ . There was an increase in depressive symptoms ( $p = 0.002$ )
A2	<i>Effectiveness of an app-based cognitive behavioral therapy program for postpartum depression in primary care: A randomized controlled trial/ (Jannati et al., 2020)</i>	To evaluate the effectiveness of app-based cognitive behavioral therapy (CBT) in reducing symptoms of postpartum depression (PPD) in mothers in primary health care se	<i>Randomized Controlled Trial (RCT)</i>	Iran	Total respondents: 75 postpartum mothers	Average EPDS score before intervention: Intervention: 17.42 Control: 17.39  Average EPDS score after intervention: Intervention: 8.18 Control: 15.05  A significant reduction in depressive symptoms occurred in the intervention group ( $p < 0.001$ ). There was no significant association between outcomes and demographic characteristics such as age, education, or income.
A3	Effectiveness of a Mobile Application for Postpartum Depression Self-Management: Evidence from a Randomised Controlled Trial in South Korea/ ( <a href="#">Seo et al., 2022</a> )	Evaluating the effectiveness of the Cognitive Behavioral Therapy (CBT)-based mobile application “Happy Mother” in self-management of postpartum depression	<i>Randomized Controlled Trial (RCT)</i>	South Korea	Final total: 73 mothers (experimental group = 37, control group = 36)	There was no significant difference between the intervention and control groups in terms of overall EPDS (postpartum depression) score reduction. However, there was a significant increase in health promotion behavior in the intervention group ( $p = 0.007$ ). Mood and sleep quality also improved significantly in the experimental group based on application data ( $p < 0.01$ ).  The “Happiness Diary” function was the most used and rated as helpful by participants.

A4	Effectiveness of mHealth consultation services for preventing postpartum depressive symptoms: a randomized clinical trial/ ( <a href="#">Arakawa et al., 2023</a> )	To assess the effectiveness of mHealth (mobile health) consultation services in preventing postpartum depression symptoms in women in Japan with access to free face-to-face perinatal services.	<i>Randomized Controlled Trial (RCT)</i>	Japan	Total of participants: 734 pregnant women (365 intervention, 369 control)	Postpartum depression symptoms were lower in the mHealth group: mHealth: 15.2%, Control: 22.8%, Risk Ratio (RR): 0.67 (95% CI: 0.48–0.93)  Average EPDS score: mHealth: 4.7, Control: 5.6, Statistically significant difference ( $p = 0.01$ )  mHealth consultation services are effective in preventing postpartum depression by reducing psychological and physical barriers to accessing healthcare services, even in countries with universal healthcare systems like Japan.
A5	Effectiveness of Smart Mama application on postpartum depression, anxiety, and maternal-infant bonding among women during the postnatal period: a randomized controlled trial/ ( <a href="#">Osman et al., 2025</a> )	The purpose of this study was to evaluate the effectiveness of the Smart Mama telenursing-based application in reducing anxiety and depression levels among postpartum	<i>Randomized Controlled Trial (RCT)</i>	Japan	Total: 148 postpartum mothers (n = 74 intervention group; n = 74 control group).	Depression Postpartum: Smart Mama significantly reduced EPDS scores (from 9.03 to 5.61) compared to the control group (from 9.01 to 7.16). ( $P = 0.043$ )  Anxiety: Significant reduction in state anxiety ( $P = 0.023$ ) and trait anxiety ( $P = 0.005$ ) in the intervention group.  Maternal-infant bonding: No significant difference between the intervention and control groups ( $P = 0.249$ ) despite a decrease in scores.
A6	Positive intervention effect of mobile health application based on mindfulness and social support theory on postpartum depression symptoms of puerperae / ( <a href="#">Liu et al., 2022</a> )	Testing the effects of mindfulness-based mHealth applications and social support on postpartum depression and maternal self-efficacy.	Two-group randomized experiment (App vs. control), pre-post test	China	130 pregnant women aged 25–40 years old.	Significantly reduced symptoms of postpartum depression (EPDS score decreased significantly in the App group).  Significantly increased parental self-efficacy and perceived social support.  Not significant in increasing mindfulness.
A7	From Idea to Implementation: Development of the Smart-e-Moms App to	The purpose of this study was to develop the Smart e Moms application, which is designed to reduce	Qualitative	Germany	Postpartum women in Germany who have had or currently have symptoms of depression. Total: 9+37+10	Stage 1: Identify postpartum issues such as stress, negative thoughts, lack of support, interest in self-care topics, and relationship with the baby.

	Reduce Postpartum Depressive Symptoms/ ( <a href="#">Dachn et al., 2025</a> )	symptoms of postpartum depression.			participants in different stages.	Stage 2: Identify barriers and motivating factors for application design.  Stage 3: The initial version received positive reviews regarding content, design, and usability. The final application has 10 behavioral modules with psychological guidance, self-care exercises, and general postpartum information.
A8	Exploring Asian maternal experiences and mHealth needs for postpartum mental health care/ ( <a href="#">Kamarudin et al., 2024</a> )	This study aims to explore the postpartum experiences of Malaysian mothers with postpartum depression (PPD) symptoms and their perspectives on the use of mHealth technology to improve mental health care during the postpartum period.	Qualitative	Malaysia	Seven postpartum mothers with symptoms of depression from the outpatient psychiatric clinic of a general hospital in Malaysia.	Mothers want mHealth services that are Sensitive to local culture (language, religion, customs) and Supportive during the confinement period, therefore requiring educational mHealth applications that are appropriate for improving postpartum mental health care
A9	Acceptability of an mHealth App for Monitoring Perinatal and Postpartum Mental Health: Qualitative Study With Women and Providers/ ( <a href="#">Varma et al., 2023</a> )	This study aims to assess the acceptance of mHealth for monitoring and assessing perinatal and postpartum depression and anxiety.	Qualitative	United States	20 pregnant and postpartum women and 8 health care providers	The results of this study indicate that mHealth can be accepted by pregnant women and postpartum women for monitoring mood symptoms.
A10	Optimizing a Novel Smartphone App to Prevent Postpartum Depression Adapted From an Evidence-Based Cognitive Behavioral Therapy Program: Qualitative Study/ ( <a href="#">Lewkowitz et al., 2024</a> )	This research aims to create and optimize MBapp, a new application centered on the MB program using qualitative data from target end users.	Qualitative	United States	Recruitment of up to 36 participants and plans to stop recruitment when content saturation is reached, defined as 3 consecutive participants providing only positive feedback.	The results of this study indicate that integrating the user's perspective improves application optimization, making MBapp more attractive and promising for further testing on bilingual mothers at risk of postpartum depression.

### 3. Result

The results identified 7,737 articles as relevant. After removing duplicate articles and those not aligned with the review's objectives, the final result yielded 10 relevant articles that met the inclusion and exclusion criteria. These 10 articles consist of 6 quantitative studies, with 4 articles rated Grade A (Arakawa et al., 2023; Liu et al., 2022; Osman et al., 2025; Seo et al., 2022) and 2 Grade B articles (Jannati et al., 2020; Koç et al., 2024). Then 4 qualitative articles, all Grade A articles (Daehn et al., 2025; Kamarudin et al., 2025; Lewkowitz et al., 2024; Varma et al., 2023). All article assessments are evaluated according to JBI critical appraisal guidelines.

#### 3.1. Quantitative Findings

Various controlled trials have shown that mental health-based mobile applications are effective in reducing postpartum depression symptoms compared to conventional care or no intervention. Studies based on mindfulness theory and social support report a significant reduction in depression scores after eight weeks of using the application, accompanied by an increase in perceptions of social support and self-efficacy in parenting (Liu et al., 2022). Other studies show that mHealth-based professional counseling services also significantly reduce the risk of depression, increase self-efficacy, and reduce feelings of loneliness because mothers can access teleconsultations flexibly (Arakawa et al., 2023).

The effectiveness of digital interventions was also seen in the Smart Mama program, which significantly reduced postpartum depression and anxiety scores after 12 weeks of use compared to the control group, although it did not have a significant impact on mother-baby bonding (Osman et al., 2025). CBT-based applications also showed improvements in other psychological well-being indicators such as mood, health-promoting behavior, and sleep quality, although the decrease in depression scores was not always significant (Arakawa et al., 2023).

More clear quantitative findings were seen in the Iranian study, where the average EPDS score decreased from 15.05 to 8.18 in the intervention group, which was much greater than in the control group. (Jannati et al., 2020). A study in Turkey also found a decrease in EPDS scores from 7.12 to 6.34 ( $p < 0.001$ ) after six weeks of telecounseling, while the control group actually experienced an increase in depression scores ( $p = 0.002$ ) (Koç et al., 2024).

Overall, quantitative evidence shows that mobile mental health applications based on mindfulness, CBT, and professional consultation are effective, flexible, and affordable interventions. These applications help overcome the limitations of face-to-face services and are beneficial for mothers with limited time, physical access, or concerns about stigma.

#### 3.2. Qualitative Findings

Qualitative findings indicate that acceptance of mHealth applications for postpartum mental health is influenced by various factors. Qualitative studies report that postpartum women experience social pressure, stigma, and high expectations regarding motherhood, which exacerbate symptoms of postpartum depression. They require emotional validation, culturally appropriate education, and safe support in order to be willing to use the application (Daehn et al., 2025; Kamarudin et al., 2024). Some mothers admit that they are afraid of being seen as weak, incapable of being good mothers, or losing custody if they are open about their symptoms; cultural pressures such as the obligation to exclusively breastfeed also add to the emotional burden (Kamarudin et al., 2024).

Qualitative research shows that simple, easy-to-use app designs that are tailored to mothers' circumstances greatly influence their level of engagement. Features considered useful include scheduled notifications, mood monitoring, audio narration, gamification elements, and access to indirect interaction with healthcare professionals (Varma et al., 2023). Privacy concerns

also often arise, and mothers feel more comfortable when data confidentiality is guaranteed and they have complete control over who can access or receive notifications from the application. (Lewkowitz et al., 2024).

Other factors identified were lack of spousal support, household workload, and time constraints, making flexible access to the app preferable. The study also showed that acceptance increased when the app was integrated into clinical systems so that healthcare professionals could monitor symptoms and provide interventions (Lewkowitz et al., 2024; Varma et al., 2023). Other findings confirm that involving postpartum mothers in the development of applications using a user-centered design approach makes the content more relevant and improves the user experience (Daehn et al., 2025).

### 3.3 Theme Synthesis

**Table 3.** Theme Synthesis Results

Theme	Subtheme	Article Source
Intervention Effectiveness	Application-based interventions (CBT, mindfulness, self-care) reduce symptoms of postpartum depression (PPD)	A2, A3, A5, A6, A7, A9
	Digital counseling and education (telecounseling, mHealth) effectively reduce risk and prevent PPD.	A1, A4, A8, A9, A10
	Interventions improve sleep quality, healthy behavior, and mood in postnatal mothers	A3, A5, A6, A7
	Community based interventions and professional support yield statistically significant results	A4, A6, A9
	High validity and acceptance by users of digital interventions as a means of prevention	A7, A9, A10
Factors Affecting the Effectiveness of Interventions	Social support (husband, family, health workers) as a reinforcement for the success of the intervention	A1, A5, A6, A8
	Digital literacy and ease of access to applications influence acceptance and effectiveness.	A2, A3, A4, A7, A9
	Cultural context and local postpartum practices (abstinence, breastfeeding, traditional beliefs)	A6, A8, A10
	Flexible application design, personalized approach, and user-friendly features support maternal engagement.	A7, A9, A10
	Individual factors such as age, economic status, childbirth experience, and the mother's initial psychological condition	A1, A5, A6, A8
	Psychological barriers (stigma, fatigue, concerns about privacy and data security)	A4, A8, A10

Based on the results of the review, it was found that digital interventions for postpartum depression can be classified into several main types, namely cognitive behavioral therapy (CBT)-based applications, mindfulness and self-care applications, remote telecounseling, professional consultation services via mHealth, and applications with gamification and mood tracking features. The effectiveness of the interventions is assessed based on reductions in Edinburgh Postnatal Depression Scale (EPDS) scores, improvements in health-promoting behaviors, sleep quality, self-efficacy, and perceptions of social support. The success of implementation is influenced by various factors such as flexible application design tailored to user needs, social support from partners, family, and healthcare providers, digital literacy levels, technology access, cultural sensitivity, and barriers such as stigma, fatigue, and concerns about data privacy. Common intervention components include education about postpartum depression, mood tracking features, daily reminders, affirmation exercises, and content aligned with cultural and religious values. The primary target of the intervention is primiparous and multiparous mothers during the postpartum period, with implementation conducted in various settings such as primary care, hospitals, communities, or self-use at home via a mobile app.

## Intervention Effectiveness

### Application-based interventions (CBT, mindfulness, self-care) reduce symptoms of postpartum depression (PPD)

Article A2 shows that mobile-based CBT applications can significantly reduce PPD symptoms through a flexible self-directed approach. Article A3 confirms the effectiveness of applications with CBT modules in improving mothers' mood and self-care activities. Article A5 reinforces this with results showing a decrease in EPDS scores through the use of the Smart Mama app. Article A6 demonstrates that the mindfulness-based approach and social support within the app successfully enhance self-efficacy and reduce depressive symptoms. Meanwhile, Articles A7 and A9 also support the effectiveness of digital CBT interventions and self-care for postpartum maternal mental health (Daehn et al., 2025; Jannati et al., 2020; Liu et al., 2022; Seo et al., 2022; Varma et al., 2023).

### Digital counseling and education (telecounseling, mHealth) effectively reduce risk and prevent PPD

Article A1 shows that telecounseling can reduce the risk of postpartum depression in mothers by providing emotional support and health information. Article A4 reinforces this by demonstrating that professional app-based consultations (mHealth) statistically reduce the prevalence of postpartum depression symptoms. Article A8 highlights the importance of digital education tailored to local culture. Articles A9 and A10 also state that digital-based education plays a preventive role against early symptoms of PPD (Arakawa et al., 2023; Kamarudin et al., 2024; Koç et al., 2024; Lewkowitz et al., 2024; Varma et al., 2023).

### Interventions to Improve Sleep Quality, Healthy Behavior, and Mood in Postnatal Mothers

Article A3 shows an improvement in sleep quality and mood scores after using the CBT app. Article A5 reports that app-based interventions have a positive impact on mothers' mood and anxiety. Article A6 states that mindfulness interventions enhance healthy activities and sleep among mothers. Article A7 emphasizes that apps with a self-care approach can encourage self-care practices and emotional well-being (Daehn et al., 2025; Liu et al., 2022; Osman et al., 2025; Seo et al., 2022).

### Community based interventions and professional support yield statistically significant results

Article A4 states that interventions with direct access to professional counselors have a significant effect on reducing depression. Article A6 emphasizes the importance of a collaborative community approach. Article A9 shows how collaboration with professionals and user-based development increase effectiveness (Arakawa et al., 2023; Liu et al., 2022; Varma et al., 2023).

### High validity and acceptance by users of digital interventions as a means of prevention

Article A7 shows user evaluation results stating that the application is very easy to use and suits the needs of mothers. Article A9 also shows that designs tailored to user feedback increase engagement. Article A10 reveals that the mood monitoring application is well received by mothers and health workers as a preventive tool (Daehn et al., 2025; Lewkowitz et al., 2024; Varma et al., 2023).

### Factors Affecting the Effectiveness of Interventions

#### Social Support (Husband, Family, Health Workers) as a Strengthening Factor of Intervention Success

Article A1 states that mothers with family support are better able to participate in telecounseling programs. Article A5 reinforces that the role of the husband is very important in reducing anxiety. Article A6 shows that social support strengthens the positive effects of mindfulness applications. Article A8 highlights that the involvement of partners in the use of applications increases the motivation of mothers (Kamarudin et al., 2024; Koç et al., 2024; Liu et al., 2022; Osman et al., 2025).

## Digital Literacy and Ease of Access to Applications Influence Acceptance and Effectiveness

Article A2 and A3 show that mothers' understanding and comfort in using the application are key to its success. Article A4 reveals that mothers with limited internet access tend to benefit less. Articles A7 and A9 state that a simple interface design greatly helps users maintain engagement (Arakawa et al., 2023; Daehn et al., 2025; Jannati et al., 2020; Seo et al., 2022; Varma et al., 2023).

## Cultural Context and Local Postpartum Practices (Restrictions, Breastfeeding, Traditional Beliefs)

Article A6 reveals that integrating cultural values into content increases acceptance. Article A8 emphasizes that local norms such as the period of abstinence and breastfeeding practices influence the utilization of interventions. Article A10 highlights the need for content personalization to align with local and religious contexts (Kamarudin et al., 2025; Lewkowitz et al., 2024; Liu et al., 2022).

## Flexible Application Design, Personalized Approach, and User-Friendly Features Support Mother Involvement

Article A7 shows that applications that can be customized to user preferences increase engagement. Article A9 reinforces the importance of interactive design and personalization of CBT modules. Article A10 emphasizes that features such as flexible reminders and simple displays play an important role in maintaining user participation (Daehn et al., 2025; Lewkowitz et al., 2024; Varma et al., 2023).

## Psychological Barriers (Stigma, Fatigue, Concerns About Privacy and Data Security)

Article A4 identifies fatigue and hesitation to open up as barriers to participation. Article A8 highlights the social stigma surrounding depression, which makes mothers reluctant to use digital services. Article A10 shows that mothers tend to be concerned about data privacy and require security guarantees before they are willing to participate in digital programs (Kamarudin et al., 2024; Lewkowitz et al., 2024).

## 4. Discussion

Based on the results of this systematic review, mobile mental health applications effectively help postpartum mothers through several mechanisms of action that are consistently demonstrated in the included studies. First, applications with cognitive behavioral therapy (CBT) modules work by helping mothers identify negative thoughts, restructure maladaptive beliefs, and practice behavioral activation, which directly contributes to a reduction in depressive symptoms, as supported by various studies (Jannati et al., 2020; Seo et al., 2022), who reported significant improvements in mood, sleep quality, and health-promoting behaviors after mothers interacted with CBT-based features. Second, mindfulness-based applications reduce stress reactivity by teaching relaxation, breathing exercises, and self-awareness practices, and evidence shows that these modules can increase maternal self-efficacy and lower EPDS scores after several weeks of use (Liu et al., 2022). Third, telecounseling and professional consultation features facilitate real-time emotional support and problem-solving, helping mothers overcome barriers to accessing face-to-face services, and this flexible teleconsultation approach has been shown to effectively lower postpartum depressive symptoms by reducing feelings of isolation and enhancing social connectedness (Arakawa et al., 2023; Koç et al., 2024).

The reviewed studies also showed that the duration of app use plays a significant role in its effectiveness. Most interventions were conducted over 6–12 weeks, and meaningful improvements in mental health were generally observed within this period. For example, Smart Mama showed significant reductions in EPDS and anxiety scores after 12 weeks (Osman et al., 2025), while telecounseling interventions in Turkey demonstrated improvement within 6 weeks (Koç et al., 2024). CBT-based apps in Iran and South Korea were also implemented for 6–8 weeks, during which notable progress was detected through repeated assessments. These findings suggest that mobile applications tend to be effective within short-term to medium-term intervention periods, although long-term sustainability remains insufficiently explored.

Mental health outcomes in the included studies were measured using standardized and validated psychological instruments. The Edinburgh Postnatal Depression Scale (EPDS) was the most frequently used tool across the quantitative studies to assess changes in depressive symptoms. Several studies also used additional measures such as self-efficacy scales, anxiety inventories, mood trackers, or sleep and behavior logs integrated within the applications. These tools allowed researchers to monitor symptom progression objectively, enabling consistent evaluation of intervention impact. The widespread use of EPDS strengthens the comparability of results across studies and highlights the reliability of the observed improvement patterns.

However, there are several important differences between foreign and Indonesian applications. Foreign applications more often include direct psychological intervention, while applications in Indonesia still function more as educational media. Local applications tend to be used as a means of supporting cadres or health workers to provide information, rather than being fully utilized directly by postpartum mothers. In addition, local applications place more emphasis on counseling regarding the role of motherhood.

Overall, this systematic review indicates that mobile applications are effective because they offer evidence-based psychological strategies, flexible access, and continuous support that postpartum mothers may not receive from conventional services. These mechanisms, combined with real-time interaction, user-friendly features, and the ability to track mental health status independently, make mobile applications a practical and accessible tool for postpartum mental health management.

### Strength

The strength of this systematic review lies in the use of the internationally recognized PRISMA 2020 method, with a protocol registered in PROSPERO (CRD420251106930) to enhance credibility. Article selection was performed by six independent reviewers, minimizing bias and strengthening the reliability of the results. This review combines quantitative and qualitative data and analyzes literature from reputable international databases such as PubMed, Wiley, ProQuest, and Google Scholar, ensuring a broad and diverse scope. Most studies used the globally validated Edinburgh Postnatal Depression Scale (EPDS), reinforcing the reliability of the findings. The results consistently demonstrate the effectiveness of digital interventions based on CBT, mindfulness, and telecounseling in reducing postpartum depression in postpartum mothers.

### Limitation

This review has several important limitations. All studies were conducted in an international context, so the findings may not be entirely relevant to postpartum mothers in Indonesia. The duration of the interventions was generally short (6–12 weeks), so their long-term effectiveness is unclear. There were variations in app design, measurement methods, and types of intervention, which limited the generalizability of the results. Article A3 shows that despite being a CBT-based application, the reduction in depression scores was not significant due to low user engagement in utilizing core features. These findings emphasize that the success of the application is influenced not only by the intervention theory but also by user engagement as well as psychosocial and cultural factors ([Seo et al., 2022](#)). Implicitly, application development needs to be carried out holistically, taking into account user experience, socio-cultural context, and sustainable engagement strategies. Further research is recommended to test long-term effectiveness using a mixed approach and actively involving users in the design process.

## 5. Conclusion

Based on the differences and findings analyzed, it can be concluded that there are still several gaps in the development of mental health applications for postpartum mothers in Indonesia. First, most local applications have not adopted evidence-based psychological intervention approaches such as cognitive behavioral therapy or mindfulness, despite the proven effectiveness of these approaches internationally. Second, the available applications have not been optimally designed for self-use by postpartum mothers, even though the ability to access and use interventions independently is an important aspect of empowering mothers to maintain their mental health. Third, most studies have not used standardized psychological measurement tools on a regular basis, making it difficult to

objectively evaluate the impact of the applications on mothers' mental health. Fourth, there has been no integration of the applications into primary healthcare systems such as community health centers (Puskesmas) or village health posts (Posyandu), which could potentially serve as effective distribution and monitoring channels for widespread and sustainable app-based interventions. Considering these findings and gaps, it is recommended that mental health applications for postpartum mothers in Indonesia be developed more comprehensively. First, the application should be equipped with psychological intervention features such as relaxation exercises, meditation, or stress management that mothers can use on their own. Second, the application's display and language should be simple, user-friendly, and appropriate to the local cultural context. Third, the impact of the application should be evaluated using standard clinical measurement tools that can record changes in the psychological condition of mothers over time. Fourth, the application should be integrated with health service systems such as community health centers (Puskesmas) to ensure its use is more targeted and sustainable. Finally, government support is crucial, whether in the form of regulations, funding, or integrating this application into national maternal and child health programs.

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