AI in Perinatal Mental Health

Leveraging Artificial Intelligence for Depression and Anxiety Prediction, Diagnosis and Treatment in Low- and Middle-Income Countries

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Introduction

Perinatal depression and anxiety (PDA) affects 16-20% of women globally, with higher rates in LMICs. Despite technological advances, limited research exists on AI applications for PDA in resource-limited settings where PDA is prevalent:

- **High prevalence: Up to 34% in some LMICs**
- **Underdiagnosed due to stigma and limited resources**
- **AI presents promising solutions for prediction, diagnosis, and treatment**

Methods

Systematic review following PRISMA guidelines with patient and public involvement approach. Searched 7 databases for studies published January 2010-July 2024.

- **PICOS framework for eligibility criteria**
- **Covidence software for screening and extraction**
- **Narrative synthesis due to study heterogeneity**
- **Risk assessment using Joanna Briggs Institute tools**

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Initial Studies
Retrieved from database searches

19
Final Studies
Included after screening across 8 countries

8
Countries
China, Nepal, Brazil, India, Pakistan, Sri Lanka, Türkiye, Kenya

74.6%
Agreement Rate
Mean percentage agreement during screening

Key Results

Supervised Machine Learning Dominance

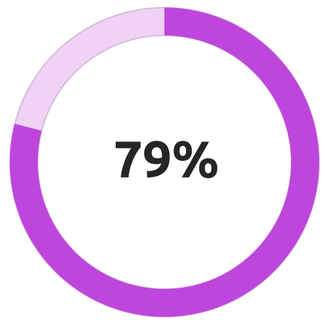
15 of 19 studies used supervised ML methods, primarily for risk factor identification and early detection rather than treatment.

Postpartum Depression Focus

14 studies (68.4%) investigated postpartum depression. Edinburgh Postpartum Depression Scale-10 was most common screening tool (42%).

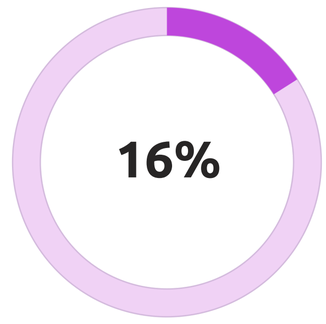
Limited Treatment Applications

Only 3 conversational agents/chatbots identified for delivering psychological treatment and support.



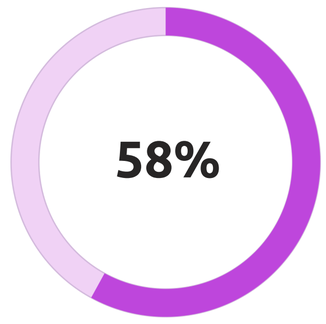
Prediction Focus

Studies using AI for risk factor identification and early detection



Treatment Focus

Studiesusing AI-based interventions for psychological treatment



Recent Research

Studies published since 2022, showing growing interest

Most Common Risk Factors Identified

Socioeconomic Status

Income levelsand financial management capabilities consistently identified as primary risk factors.

Social Support

Familyrelationships and community support networks significantly impact maternal mental health.

Physical Health

BMI, previous medical conditions, and intimate partner violence are contributing factors.

Conclusions

Promising potential: AI-based methods show effectiveness in identifying risk factors for PDA

Research gap: Limited studies on AI-powered
treatment interventions compared to prediction models

Ethical considerations: Many studies lacked detailed
ethical frameworks for LMIC contexts

Future directions: Need for investigation into
chatbot effectiveness and long-term impact assessment

Clinical and Policy Implications

Early intervention: AI tools can enhance early detection in resource-limited settings

Scalable solutions: Potential to address healthcare
professional shortages

Culturally appropriate: Foundation for developing
context-specific AI interventions

Policy development: Evidence base for LMIC-specific
AI guidelines in maternal mental health

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