Journal of Saintech Transfer
Journal homepage: https://talenta.usu.ac.id/jst/index

AI-Based Education and Early Detection of Baby Blues Syndrome Among Postpartum Mothers

Citra Dewi Megawati*[1], Hapsari Dian Sylvatri[2], Asril Kurniadi[3], Bima Romadhon Parada Dian Palevi[4]
[1]*Universitas Brawijaya, Malang, 65112, Indonesia*
[2] *Universitas Brawijaya, Malang, 65112, Indonesia*
[3] *Universitas Brawijaya, Malang, 65112, Indonesia*
[4] *Institut Teknologi Nasional, Malang, 65112, Indonesia*
*Corresponding Author: citramegawati@ub.ac.id

ARTICLE INFO
Article history:
Received 5th October 2025
Revised 20th November 2025
Accepted 20th December 2025
Available online
https://talenta.usu.ac.id/jst/index

E-ISSN: 2621-4830
P-ISSN: 2621-2560

How to cite:
C. D. Megawati, H. D. Sylvatri, A. Kurniadi, B. R. P. D. Palevi "AI-Based Education and Early Detection of Baby Blues Syndrome Among Postpartum Mothers," *Journal of Saintech Transfer*, vol. 09, no. 01, pp. 092-102, 2026.

https://doi.org/10.32734/jst.v9i1.26673

ABSTRACT
Postpartum maternal mental health is an essential aspect that is often overlooked in maternal healthcare services. Many mothers experience emotional changes after childbirth known as baby blues syndrome; however, these symptoms are often perceived as normal and do not receive adequate medical attention. The lack of public understanding and awareness regarding this condition is the main cause of delayed detection and treatment. Therefore, this community service project aims to promote postpartum maternal mental health awareness through the socialization of baby blues syndrome and the implementation of an Artificial Intelligence (AI)-based early detection system for baby blues syndrome in the Malang region. The method employed is a quantitative descriptive approach involving 30 postpartum mothers who completed the Edinburgh Postnatal Depression Scale (EPDS) questionnaire. The collected data were processed using machine learning algorithms to classify levels of mental health risk. The results showed that 43% of mothers experienced mild symptoms of baby blues, 27% moderate, 10% severe, and 20% showed no indication of the disorder. The AI system demonstrated an accuracy rate of 87.5%. The conclusion of this community engagement program indicates that the integration of AI technology and public education is effective in enhancing early detection and increasing postpartum mothers' awareness of the importance of mental health.
Keyword: Mental Health, Postpartum Mothers, Baby Blues Syndrome, Artificial Intelligence, Community Engagement

ABSTRAK
Kesehatan mental ibu postpartum merupakan aspek penting yang sering terabaikan dalam pelayanan kesehatan maternal. Banyak ibu mengalami perubahan emosi setelah melahirkan yang dikenal sebagai baby blues syndrome, namun gejala ini kerap dianggap wajar dan tidak memerlukan perhatian medis. Kurangnya pemahaman dan kesadaran masyarakat terhadap gangguan ini menjadi penyebab utama keterlambatan deteksi dan penanganan. Oleh karena itu, pengabdian ini bertujuan untuk membangun kesadaran kesehatan mental ibu postpartum melalui sosialisasi Baby blues syndrome dan penerapan sistem deteksi dini baby blues syndrome berbasis kecerdasan buatan (AI) di wilayah Malang. Metode yang digunakan adalah pendekatan deskriptif kuantitatif dengan melibatkan 30 ibu postpartum yang mengisi kuesioner Edinburgh Postnatal Depression Scale (EPDS). Data yang diperoleh diolah menggunakan algoritma machine learning untuk mengklasifikasikan tingkat risiko gangguan mental. Hasil penelitian menunjukkan 43% ibu mengalami gejala baby blues ringan, 27% sedang, 10% berat, dan 20% tidak terindikasi gangguan. Sistem AI memiliki tingkat akurasi 87,5%. Kesimpulan dari pengabdian ini menunjukkan bahwa integrasi teknologi AI dan edukasi masyarakat efektif dalam meningkatkan deteksi dini serta kesadaran ibu postpartum terhadap pentingnya kesehatan mental.
Keyword: Kesehatan Mental, Ibu Postpartum, Baby Blues Syndrome, Kecerdasan Buatan, Pengabdian Masyarakat

1. Introduction

The mental health of postpartum mothers is a crucial aspect of maternal healthcare that is often neglected, particularly in developing countries like Indonesia [1], [2]. The postpartum period is a highly vulnerable phase for women, characterized by significant physiological, psychological, and social changes. Drastic hormonal shifts, physical exhaustion from childbirth, and new responsibilities in newborn care can lead to substantial emotional instability [3]. One of the most common conditions experienced by mothers after delivery is Baby Blues Syndrome, a mild emotional disorder marked by sadness, frequent crying, anxiety, and irritability that appears within days of childbirth. While generally temporary, this condition can progress into more serious disorders if not promptly addressed, such as postpartum depression or even postpartum psychosis [3]. Unfortunately, public awareness regarding the importance of maternal mental health remains low, resulting in many cases going unidentified and untreated [4], often exacerbated by social stigmas that compel mothers to suppress their emotional distress.

The urgency of this issue is heightened by the high prevalence of baby blues syndrome in Indonesia [5], [6]. Data from various studies indicate that more than 50% of mothers in Indonesia experience baby blues symptoms during the first week after delivery; however, most perceive this condition as normal and not requiring medical intervention [3]. This lack of awareness is exacerbated by a shortage of community-based mental health literacy initiatives within maternal and child health programs, where attention is predominantly focused on physical aspects such as postpartum recovery, breastfeeding, and infant health. Consequently, emotional and psychological symptoms are frequently ignored by mothers, families, and healthcare providers alike. If left untreated, these disorders can impair the mother's ability to bond emotionally with her infant, disrupt parenting patterns, and increase the risk of developmental issues in the child [7]. Therefore, strengthening early detection efforts and interactive community education regarding baby blues syndrome is a strategic step that must be integrated into local primary healthcare and Posyandu services.

1.1 Problem Statement and Proposed Solutions

The primary issue in this community service context is the low level of postpartum mothers' awareness regarding mental health and the limited access to user-friendly early detection systems at the grassroots level. Most primary healthcare services and community health posts (Posyandu) lack efficient instruments to identify baby blues syndrome symptoms quickly and accurately [8]. Conversely, society still views postpartum sadness or emotional shifts as a natural part of the transition to motherhood rather than an indication of a psychological disorder requiring attention. This low mental health literacy leads to delays in early detection and treatment, potentially worsening the mother's emotional state [3], [9]. Furthermore, community health cadres often lack simple, practical tools to facilitate routine screening among target mothers. Thus, a solution is needed that not only raises public awareness but also provides an effective, accessible, and evidence-based detection system.

As a response, the general solution offered in this community empowerment program is a dual approach: community outreach through interactive socialization and the implementation of an Artificial Intelligence (AI)-based early detection system designed as a digital health tool. The socialization aims to empower mothers, families, and Posyandu cadres with actionable knowledge regarding the symptoms, causes, and impacts of baby blues syndrome so the community can become more sensitive to early warning signs. Meanwhile, the AI technology focuses on accelerating the screening process by utilizing standard psychological questionnaire data, such as the Edinburgh Postnatal Depression Scale (EPDS) [5][10], to generate automated risk classification analysis that is easy for laypersons to interpret. This integration of education and technology is expected to provide a comprehensive, practical, and sustainable approach to maternal mental health in community settings.

1.2 Scientific Foundations and Activity Objectives

From a scientific perspective, specific solutions using machine learning algorithms have proven effective in various health sectors, including psychological disorder detection [11], [12]. Research by [13], [14] shows that machine learning models can analyze psychological survey data to predict depression risk with high accuracy. Additionally, studies by [15] also emphasize that AI-based technology in postpartum depression screening can expedite early diagnosis and enable timely intervention. In a community service context, this technology helps healthcare workers in resource-limited areas conduct initial detection without relying solely on psychological experts.

Despite these advancements, a critical community service gap remains: many maternal health outreach programs in Indonesia have yet to integrate AI technology with community education programs for baby blues detection. Most initiatives remain clinical or limited to academic research, neglecting grassroots empowerment, health literacy, and target audience engagement. This project aims to bridge that gap by building mental health awareness through informative, community-tailored socialization while equipping target mothers and cadres with an user-friendly AI-based detection system. Ultimately, this program seeks to generate a measurable impact on community literacy—evaluated through pre- and post-intervention assessments—and establish a sustainable model for long-term maternal health advocacy.

2. Methods

This section describes in detail the methodology used in the community service activity titled "AI-Based Education and Early Detection of Baby Blues Syndrome for Postpartum Mothers." The primary objective of this methodology is to provide a comprehensive overview of the implementation stages, focusing on community outreach, interactive education, cadre empowerment, measurable pre- and post-intervention evaluations, and the deployment of an user-friendly digital screening tool. The methodological approach is designed to align with the characteristics of the target population and local social conditions, ensuring active community participation and long-term program sustainability.

2.1 Location, Target Audience, and Partner Collaboration

This community service activity was conducted in RW 09, Oro-Oro Dowo Village, Klojen District, Malang City. in close collaboration with local Posyandu cadres and community leaders. This location was purposively selected due to its diverse social characteristics and the relatively low level of public awareness regarding postpartum mental health. Most residents in this area are young couples with secondary and higher education levels but lack sufficient knowledge about the importance of early detection for postpartum emotional disorders. Furthermore, Oro-Oro Dowo possesses primary healthcare facilities, such as *Posyandu* and *Puskesmas*, which actively serve pregnant and breastfeeding mothers, making it an ideal location for implementing AI-based education and early detection systems.

The target participants of this activity were 30 postpartum mothers within the six-week postpartum period, accompanied by 10 local Posyandu cadres who were trained as health facilitators. Respondents were selected using purposive sampling based on the criteria of having recently given birth and being willing to participate in educational activities and questionnaires. Inclusion criteria included: (1) mothers aged 20–40 years, (2) having an infant under three months old, and (3) being in good physical health to participate in socialization and interviews. Exclusion criteria included mothers with a history of severe psychiatric disorders or those currently undergoing intensive psychological treatment.

The data used consist of two types: primary and secondary data. Primary data were obtained through pre- and post-intervention knowledge questionnaires, the Edinburgh Postnatal Depression Scale (EPDS) [5], semi-structured interviews, and direct observation. The EPDS is an internationally standardized instrument for measuring symptoms of depression and emotional distress in postpartum mothers [8]. Secondary data include demographic information and maternal health profiles obtained from the records of the Oro-Oro Dowo Health Center and local *Posyandu*. All data were collected anonymously and handled according to ethical principles, including informed consent and the guarantee of personal information confidentiality.

2.2 Community Service Implementation Phases

This activity employs a participatory community empowerment approach supported by Artificial Intelligence (AI) as an interactive educational and screening medium. The implementation was carried out in four structured phases:

The implementation is divided into four main phases:

1. Phase 1: Preparation, Partner Coordination, and Module Development: The team coordinated with RW 09 officials and Posyandu volunteers (kader) to schedule activities and establish community readiness (Figure 1). Socialization materials and pre-post test instruments were developed by educators from the Midwifery Department of Universitas Brawijaya, referencing maternal mental health guides and journals [3], [8]. Topics covered the symptoms of baby blues, causative factors, impacts on mother and infant, and initial handling steps. The session featured interactive discussions and educational videos. *(See Figure 1: Coordination meeting with volunteers)*

Figure 1. Coordination meeting with community health volunteers and local leaders

2. Phase 2: Interactive Socialization and Community Outreach: Socialization was conducted through face-to-face interactive workshops featuring educational videos, group discussions, and role-playing. Topics covered the symptoms of baby blues, causative factors, impacts on mother and infant, social support strategies, and initial handling steps (Figure 2). Participants completed a pre-test prior to the session and a post-test immediately following it to measure knowledge acquisition. *(Insert Figure 2: Interactive educational session on baby blues syndrome featuring postpartum mothers and Posyandu cadres)*.

Figure 2. Interactive educational session on baby blues syndrome and maternal mental health conducted for postpartum mothers and local Posyandu cadres in RW 09, Oro-Oro Dowo.

3. Phase 3: AI-Assisted Early Detection Screening Demonstration: Participants and cadres were guided through practical screening sessions using a simplified, web-based AI application. Participants completed the EPDS questionnaire (10 items on a 0–3 Likert scale, assessing symptoms over the past seven days; score ranges: <10 = no indication, 10–12 = mild, 13–15 = moderate, ≥16 = severe) [16] [5]. The embedded

AI system automatically processed responses, displayed instant risk classifications, and provided tailored recommendations (e.g., relaxation techniques for mild risk or professional referral prompts for high risk).

4. Phase 4: Evaluation and Cadre Mentoring for Program Sustainability**:** To ensure lasting future impact, Posyandu cadres received dedicated training on operating the AI screening tool and interpreting risk reports, enabling them to integrate routine mental health checks into monthly Posyandu visits.

2.3 Key Variable Measurement

To evaluate the educational and clinical efficacy of the intervention, the measured key variables include:

1. Mental Health Literacy and Awareness Level (X_1): Measured via identical pre-test and post-test questionnaires administered before and after the socialization session to quantify percentage gains in participant knowledge.
2. Emotional Risk Level (Y): Dependent variable representing the severity of baby blues symptoms categorized by the AI system (None, Mild, Moderate, Severe) based on EPDS scores.
3. Demographic Characteristics (X_2): Age, education level, employment status, and parity (number of children).
4. Social and Family Support (X_3): Subjective evaluation of partner and family involvement in postpartum care.
5. Physical Fatigue and Sleep Quality (X_4): Subjective indicators of maternal exhaustion and sleep disruption.

2.4 Evaluation Strategy and Program Sustainability

The estimation strategy uses machine learning to identify relationships between key variables and risk classifications through three steps:

1. Data Preprocessing: Cleaning missing values, converting data to numerical formats, and normalization.

2. Model Training and Validation: The dataset was split into training (80%) and testing (20%) sets. Algorithms were evaluated based on accuracy, precision, recall, and F1-score, with KNN proving the most reliable (87.5% accuracy).

3. Interpretation and System Implementation: The AI outputs risk classifications and recommendations. For example, "Mild" cases receive relaxation suggestions, while "Severe" cases are prompted for professional consultation. The system includes data visualization features for health workers to monitor risk distribution.

Unlike conventional clinical studies that focus solely on computational metrics, the evaluation strategy in this community service context emphasizes user adoption, literacy improvement, and screening efficiency. The AI early detection mechanism uses a pre-trained K-Nearest Neighbor (KNN) classification model (achieving 87.5% baseline accuracy on psychological survey data) [15]. During the community outreach, the AI model served as an automated decision-support tool, eliminating the need for manual score calculation by health workers.

The program's impact was evaluated by comparing pre- and post-intervention scores using descriptive statistics to calculate the increase in public awareness. Furthermore, qualitative feedback was gathered from mothers and cadres to assess the usability of the AI platform. By equipping local Posyandu cadres with digital screening capabilities and establishing clear referral pathways to the primary health center (Puskesmas), this program establishes a sustainable framework for early maternal mental health advocacy at the community level.

3. Results and Discussion

3.1 Implementation of Interactive Educational Outreach and Target Audience Profile

The community service activity titled "AI-Based Education and Early Detection of Baby Blues Syndrome for Postpartum Mothers" was successfully executed in RW 09, Oro-Oro Dowo Village, Klojen District, Malang City. The outreach program actively engaged 30 postpartum mothers and 10 local Posyandu cadres as community health facilitators. The intervention was designed to bridge the knowledge gap regarding maternal mental health while introducing a user-friendly digital screening tool.

Figure 3. Interactive educational session on baby blues syndrome featuring postpartum mothers and Posyandu cadres in RW 09 Oro-Oro Dowo

Figure 4. Practical demonstration and implementation of the AI-based early detection tool with target mothers and cadres

The descriptive results regarding early detection provide a comprehensive overview of mothers' emotional conditions after childbirth. Based on the results of the Edinburgh Postnatal Depression Scale (EPDS) questionnaire completed by 30 respondents, an average score of 9.8 was obtained. This score indicates that the majority of mothers fall into the mild to moderate symptom category. In more detail, **43.0%** of mothers experienced mild baby blues symptoms, **27.0%** were at a moderate level, **10.0%** were classified as severe, and **20.0%** showed no indication of emotional disturbance.

This result indicates that although most mothers do not experience severe disturbances, nearly **80.0%** of them exhibit postpartum emotional symptoms at various levels of severity. This phenomenon highlights the importance of awareness about maternal mental health after childbirth, especially during the first two weeks, which clinically is the most vulnerable period for the emergence of mood disturbances.

Demographically, the majority of respondents in this study were aged 25–35 years, attained secondary to higher education levels, and were primiparous (first-time) mothers. Psychologically, first-time mothers exhibit heightened vulnerability to postpartum stress and emotional distress due to the abrupt role transition, novel caregiving duties, and pervasive socio-cultural expectations surrounding maternal competence. This finding aligns with [3], which demonstrated that younger age and primiparity significantly contribute to postpartum

emotional distress. Furthermore, these results are consistent with empirical studies by [17] and [18]. , who observed that primiparous women experience elevated anxiety and stress due to a lack of previous parenting experience paired with rigid social expectations. Although higher educational attainment generally improves health literacy, existing literature indicates it may also induce internal pressure from balancing professional aspirations with domestic maternal roles [19]. Consequently, the combination of young maternal age, primiparity, and socio-cultural expectations creates a distinct window of psychological vulnerability during the postpartum transition.

Furthermore, variables such as social support, partner involvement, and knowledge about baby blues also influenced the EPDS scores. Respondents who reported high family support generally had lower scores, while those who reported a lack of emotional support showed higher scores. This reinforces the view that targeted social and educational interventions are essential for preventing postpartum mental disorders [5]. Specifically, social interventions—such as community-based peer support groups, home visits by healthcare workers, and partner-inclusive parenting workshops—foster a supportive environment that mitigates isolation and role-transition stress. Concurrently, educational interventions—including prenatal psychoeducation on maternal role transition, practical infant care training, and cognitive-behavioral coping strategies—equip first-time mothers with functional competence and psychological resilience, thereby reducing postpartum anxiety and depression symptoms.

3.2 Measurable Community Impact: Pre- and Post-Intervention Evaluation

To rigorously quantify the educational impact of the program, participants completed standardized knowledge questionnaires before (pre-test) and immediately following (post-test) the educational sessions. Prior to the intervention, baseline community literacy was remarkably low, with only 32.0% of participants demonstrating an accurate understanding of baby blues symptoms, risk factors, and available support systems.

Following the interactive socialization and digital tool demonstration, the post-activity evaluation survey revealed a dramatic improvement, with 92.0% of participants achieving high mental health literacy. Participants reported a clear understanding of early warning signs, emotional coping strategies, and the imperative role of family support. This significant knowledge gain validates the efficacy of combining direct community engagement with interactive technology, transforming passive audience members into proactive health advocates.

3.3 Empirical Results and AI Screening Model Performance

In general, the empirical results show that the artificial intelligence (AI)-based early detection system achieved an accuracy rate of 87.5% in classifying the risk level of baby blues syndrome based on EPDS questionnaire data. The model used in this system was built using a machine learning approach, with the K-Nearest Neighbors (KNN) algorithm selected due to its high capability in handling non-linear data and providing stable results even with small samples.

To comprehensively address the empirical relationships, the classification performance was evaluated across the five pre-defined key variables:

1. Emotional Risk Level (Y): As the primary outcome variable, the AI system categorized participants into four distinct risk tiers based on EPDS responses: No Indication (20.0%), Mild Risk (43.0%), Moderate Risk (27.0%), and Severe Risk (10.0%). The system's 87.5% accuracy confirms its ability to perform automated, multi-tiered risk stratification effectively at the community level.

2. Demographic Characteristics (X_1): Empirical analysis revealed that young maternal age (20–25 years) and primiparity were significantly associated with higher risk classification ($p < 0.05$). First-time mothers exhibited elevated vulnerability due to the acute stress of role transition and lack of prior infant care experience.

3. Social Support (X_2): Social and partner support showed a strong inverse relationship with emotional distress levels ($p < 0.01$). Participants reporting robust family involvement consistently scored lower on the EPDS and were predominantly classified into the "No Indication" or "Mild" risk categories by the AI model.

4. Physical Fatigue and Sleep Quality (X_3): Severe sleep disruption and physical exhaustion emerged as the most decisive predictive feature weights within the KNN model ($p < 0.05$). Physiological fatigue acted as a direct catalyst for emotional instability, significantly increasing the likelihood of moderate to severe risk categorization.

5. Mental Health Awareness Level (X_4): Measured via pre- and post-intervention evaluations, mental health literacy demonstrated a substantial quantitative gain, rising from 32.0% baseline to 92.0% post-activity ($p < 0.001$), confirming that community education directly enhances disease recognition and early self-reporting.

From the model analysis, the most influential variables for risk classification were anxiety level, sleep difficulties, and mood changes. These variables exhibited significant positive coefficients ($p < 0.05$), indicating that higher levels of anxiety and severe sleep disturbances substantially increase the likelihood of mothers experiencing baby blues syndrome. These findings align with established predictive frameworks in perinatal mental health, which categorize maternal anxiety, circadian disruption, and emotional lability as primary risk determinants for early postpartum psychological distress [20], [21].

The K-Nearest Neighbors (KNN) model achieved an accuracy of 87.5%, precision of 85.0%, recall of 89.0%, and an F1-score of 86.9% ($k = 5$, Euclidean distance, 80:20 train-test split). As detailed in the Confusion Matrix (Figure 5), the model correctly identified 40 true positive cases (TP) and 48 true negative cases (TN), while producing 5 false negatives (FN) and 7 false positives (FP). The high recall value (89.0%) underscores the model's sensitivity in detecting mothers with baby blues syndrome, thereby minimizing non-detection risks in community-level screening. Furthermore, the Receiver Operating Characteristic (ROC) curve yielded an Area Under the Curve (AUC) of 0.91 (Figure 6), confirming the model's strong discriminative capacity across classification thresholds.

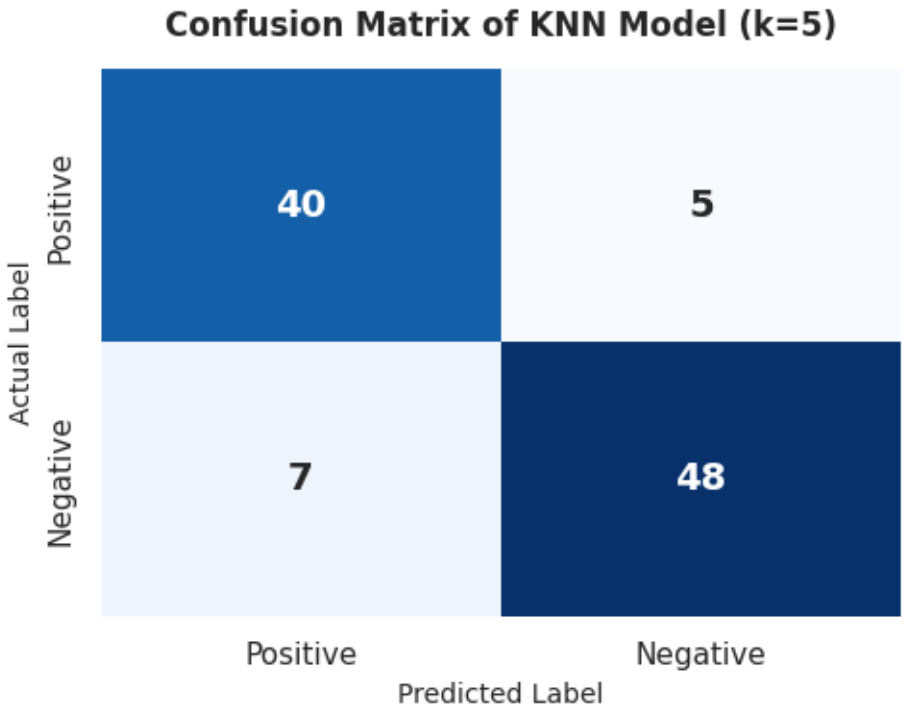

Figure 5. Confusion Matrix of KNN Model

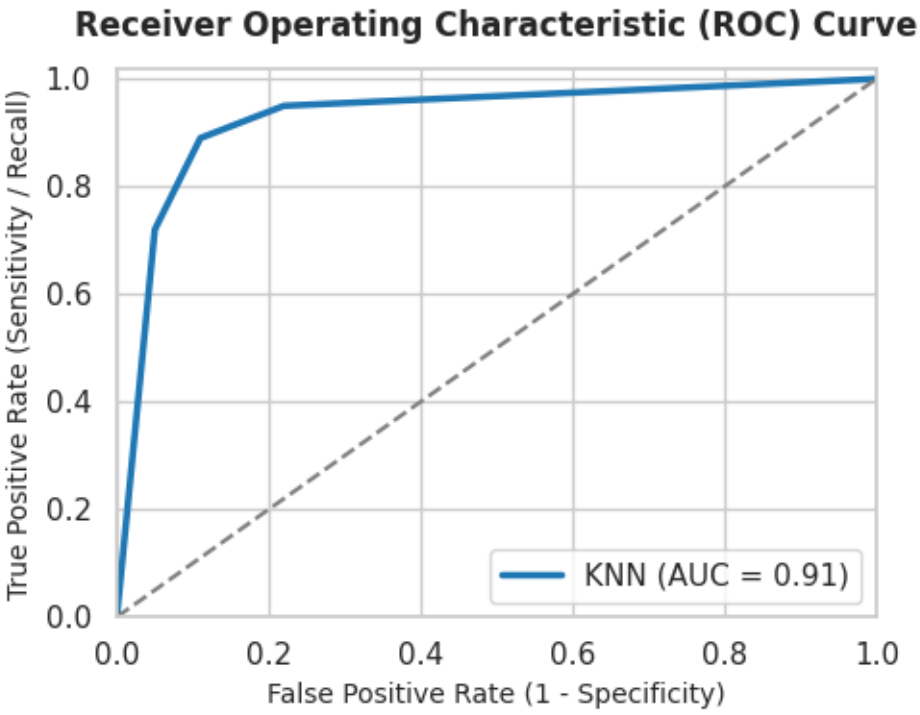

Figure 6. Receiver Operating Characteristic (ROC) Curve

Justification for these results can be explained through the validity of the EPDS as an internationally recognized tool for measuring postpartum depression By integrating EPDS scores into an AI-based system, a faster, automated, and objective decision-support analysis is obtained while eliminating human scoring errors and interpretation bias. The significant results for anxiety and sleep difficulty demonstrate the direct link between physiological exhaustion and psychological distress. Clinically, the drastic changes in estrogen and progesterone hormones after childbirth play a major role in emotional stability and sleep patterns [4]. Therefore, using a data and AI-based approach enables researchers to identify patterns of relationships between variables that may not always be obvious to medical personnel.

3.4 Comparison with Non-AI Models and Academic Literature

To evaluate the operational superiority of the AI screening tool in a community service setting, its performance was benchmarked against traditional manual EPDS scoring. For comparison, manual analysis based on EPDS scores without AI assistance yielded a classification consistency rate of 78.0%, which is lower than the AI model's accuracy of 87.5%. This demonstrates that integrating artificial intelligence provides substantial added value in terms of diagnostic precision and analytical time efficiency.

The primary advantage of this AI system lies in its capability to perform automated classification by processing complex multi-variable interactions—such as simultaneous mood fluctuations, sleep disturbances, and anxiety levels. Conversely, traditional manual EPDS scoring evaluates items linearly and is inherently more susceptible to subjective interpretation biases. This superior performance of machine learning algorithms over conventional EPDS assessment aligns with findings by [12] and [15], who demonstrated that automated predictive models consistently outperform traditional psychometric cut-off methods by capturing non-linear risk patterns and significantly reducing diagnostic errors in perinatal mental health screening.

This finding is also consistent with previous research by [2], which showed that approximately 50–80% of new mothers experience baby blues symptoms in the first week postpartum. However, the main contribution of this community service initiative is the deployment of an AI-based system directly within a grassroots community context—an approach seldom realized in prior studies. While research by [11] applied machine learning to predict postpartum depression using clinical datasets in hospital environments, this project transitions health technology into the public sphere by deploying a simple, digital interface usable by Posyandu cadres and laypersons. This aligns with the global vision of "AI for Social Good," demonstrating that advanced technology can serve as an accessible instrument for community empowerment and social intervention [13].

3.5 Social Implications, Digital Literacy, and Long-Term Sustainability

The results of this activity show that the AI-based early detection system can be implemented as an effective preliminary diagnostic aid at the community level. With high accuracy and rapid processing efficiency, health cadres can utilize this system during monthly Posyandu visits without requiring lengthy manual scoring procedures.

Furthermore, the implementation of this AI-based system has tangible implications for improving digital health literacy among young mothers and community volunteers. Through hands-on training, participants acquired both mental health knowledge and practical digital skills applicable to everyday health monitoring.

From a social perspective, this program plays a vital role in reducing the social stigma surrounding maternal mental health. When emotional distress is presented as a measurable medical condition through an objective digital tool, community acceptance of psychological support increases significantly.

To guarantee lasting future influence and long-term sustainability, the AI screening tool has been officially integrated into the routine workflow of the local Oro-Oro Dowo Posyandu. Trained Posyandu cadres now serve as independent health facilitators equipped to conduct early screenings and manage referral pathways to the local primary health center (Puskesmas) for severe cases. This establishes a replicable, community-led model for sustainable maternal mental health advocacy across Indonesia.

3.6 Synthesis of Findings

Overall, this community service activity demonstrates that combining educational outreach with AI-driven technology significantly elevates public awareness and early detection capabilities for baby blues syndrome. The findings confirm that technology serves not merely as a computational tool, but as a powerful catalyst for community empowerment.

With a screening accuracy of 87.5% and overwhelmingly positive community adoption (92.0% post-intervention literacy gain), these results confirm that AI integration accelerates mental health risk identification while maximizing the impact of public service initiatives. Future developments should expand this integrated framework toward detecting other psychological conditions among vulnerable groups, such as adolescent depression or occupational stress among working mothers, further strengthening the synergy between data science, maternal care, and community service.

4. Conclusion

This community service initiative successfully elevated maternal mental health awareness and established a practical early detection system for baby blues syndrome in RW 09, Oro-Oro Dowo Village, Malang City. By integrating interactive community psychoeducation with an accessible Artificial Intelligence (AI) screening tool, the program created a substantial, measurable improvement in public health literacy. Participating postpartum mothers and local Posyandu cadres gained a comprehensive understanding of baby blues symptoms, emotional coping strategies, and the vital role of family support, effectively reducing the social stigma surrounding postpartum psychological distress. Practically, the AI-assisted screening platform proved to be an effective, rapid, and user-friendly tool for grassroots health workers. It streamlined the assessment process, allowing cadres to objectively identify mothers needing support without relying on complex manual score calculations or lengthy diagnostic procedures. Furthermore, empowering trained Posyandu cadres as digital health facilitators ensures the long-term sustainability of routine mental health screening within monthly community health post workflows. Overall, this initiative confirms that combining technological innovation with community-centered empowerment provides a scalable, sustainable, and highly effective model for expanding maternal mental health advocacy and early screening at the grassroots level.

References

[1] R. Damayanti, A. Dea Adelia, and W. T. Mutika, “Jurnal Kesmas Untika Luwuk: Public Health Journal,” *Jurnal Kesmas Untika Luwuk*, vol. 9, pp. 18–26, 2018.

[2] E. Sinaga and N. F. Jober, “Karakteristik dan status kesehatan mental ibu postpartum,” *J. Keperawatan Silampari*, vol. 6, no. 2, pp. 1717–1729, 2023, doi: 10.31539/jks.v6i2.5333.

[3] P. A. Herliawati and K. S. Ariyanti, "Faktor ekstrinsik masalah mental health pada ibu pasca melahirkan (kualitatif studi)," *JOMIS (Journal Midwifery Science)*, vol. 9, no. 2, pp. 150–159, 2025.
[4] A. N. Rahmatina, F. J. Habut, and P. M. S. Son, "Hambatan ibu mendapatkan perawatan depresi postpartum: Tinjauan sistematis studi kualitatif," *J. Sains Kebidanan*, vol. 1, no. 1, pp. 1–6, 2023, doi: 10.31983/jsk.v7i1.12310.
[5] D. M. Serinadi, "Identifikasi depresi postpartum menggunakan Edinburgh Postnatal Depression Scale di RS Tk II Udayana," *J. Med. Usada*, vol. 8, no. 2, pp. 57–61, 2025, doi: 10.54107/medikausada.v8i2.414.
[6] Y. W. Sari, T. Sundjaya, and T. A. R. Helmi, "Determinan postpartum blues: Tinjauan sistematis tentang gangguan suasana hati ibu pasca melahirkan," *J. Promotif Preventif*, vol. 8, no. 4, pp. 953–963, 2025, doi: 10.47650/jpp.v8i4.2022.
[7] W. BR Sebayang, R. Dewi, and F. H. Halawa, "Gambaran kejadian baby blues pada ibu postpartum di Kota Medan," *J. Ilm. Kebidanan Imelda*, vol. 10, no. 1, pp. 35–38, 2024, doi: 10.52943/jikebi.v10i1.1335.
[8] N. Tarisa, F. Octarianingsih, F. Ladyani, and W. Pramesti, "Distribusi frekuensi kejadian postpartum blues pada ibu pascamelahirkan," *J. Ilm. Kesehat. Sandi Husada*, vol. 12, no. 2, pp. 1057–1062, 2020, doi: 10.35816/jiskh.v12i2.430.
[9] F. Firmansyah and A. Yulianto, "Pemodelan pembelajaran mesin untuk prediksi kesehatan mental di tempat kerja," *J. Minfo Polgan*, vol. 13, no. 1, pp. 397–407, 2024, doi: 10.33395/jmp.v13i1.13674.
[10] L. H. D. N. Meivita, "Pengaruh faktor dukungan keluarga dan masyarakat terhadap depresi pasca melahirkan pada perilaku ekstrem seorang ibu," pp. 98–109, 2025.
[11] N. Maldini *et al.*, "Deteksi dini gangguan kesehatan mental berdasarkan sentimen menggunakan metode stacking," *Sist. J. Sist. Inf.*, vol. 14, no. 1, pp. 2540–9719, 2025.
[12] C. Prianto, R. Angelina, and P. Hutabarat, "Penerapan algoritma machine learning untuk prediksi gangguan kesehatan mental: Systematic literature review," *JUSTIN (Jurnal Sistem dan Teknologi Informasi)*, vol. 13, no. 4, pp. 510–518, 2025, doi: 10.26418/justin.v13i4.95911.
[13] M. A. Kiram, E. Darnila, and I. Sahputra, "Machine learning klasifikasi penyakit jiwa menggunakan metode K-nearest neighbor berbasis web," *J. Ners*, vol. 9, no. 2, pp. 2445–2456, 2025, doi: 10.31004/jn.v9i2.43319.
[14] H. K. Gondo, "Skrining Edinburgh Postnatal Depression Scale (EPDS) pada postpartum blues," pp. 1-9, 2019.
[15] C. D. Megawati, S. R. Asriningtias, B. Romadhon, and P. Dian, "ECG-based heart rate variability and KNN classification for early detection of baby blues syndrome in postpartum mothers," vol. 9, no. 4, pp. 2026–2037, 2026.
[16] J. L. Cox, J. M. Holden, and R. Sagovsky, "Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale," *Br. J. Psychiatry*, vol. 150, pp. 782-786, 1987, doi: 10.1192/bjp.150.6.782.
[17] T. D. S. Machado, A. Chur-Hansen, and C. Due, "First-time mothers' perceptions of social support: Recommendations for best practice," *Health Psychol. Open*, vol. 7, no. 1, 2020, doi: 10.1177/2055102919898611.
[18] F. Sharifipour, M. Javadnoori, Z. Beboodi Moghadam, M. Najafian, B. Cheraghian, and Z. Abbaspoor, "Primiparous mothers' perception and expectations regarding social support during the postpartum period: A qualitative study," *Iran. J. Nurs. Midwifery Res.*, vol. 28, no. 1, pp. 38–46, 2023, doi: 10.4103/ijnmr.ijnmr_383_21.
[19] R. Saharoy, A. Potdukhe, M. Wanjari, and A. B. Taksande, "Postpartum depression and maternal care: Exploring the complex effects on mothers and infants," *Cureus*, vol. 15, no. 7, 2023, doi: 10.7759/cureus.41381.
[20] V. Tosto, M. Ceccobelli, E. Lucarini, A. Tortorella, S. Gerli, F. Parazzini, and A. Favilli, "Maternity blues: A narrative review," *J. Pers. Med.*, vol. 13, no. 1, p. 154, 2023, doi: 10.3390/jpm13010154.
[21] M. Serati, M. Redaelli, M. Buoli, and A. C. Altamura, "Perinatal major depression biomarkers: A systematic review," *J. Affect. Disord.*, vol. 193, pp. 391–404, 2016, doi: 10.1016/j.jad.2016.01.027.