



Development of the Mobile-Based NAMISIKU Application for Early Detection of Postpartum Depression

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ABSTRACT

Psychological changes in pregnant women tend to be less apparent and often become more evident during the postpartum period. This study is a development research using a Research and Development (R&D) design with the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as the framework for designing and developing the product. The main features developed and integrated into the application include a depression assessment questionnaire based on a clinically recognized scale, namely the Edinburgh Postnatal Depression Scale (EPDS), mental health tips and information, as well as access to resources and professional support. This research was conducted in the working area of Sorawolio Public Health Center. The application testing involved 14 respondents, consisting of all midwives at Sorawolio Public Health Center in Baubau City. The results showed that the application performed excellently in terms of attractiveness, perspicuity, and novelty, thus providing a positive user experience. However, the low score in dependability indicates system reliability issues that need to be addressed before the application is widely launched.

Keywords: Postpartum Depression, Postpartum Mothers, NAMISIKU Application

ABSTRAK

Perubahan psikologis pada ibu hamil cenderung belum terlihat, hal ini akan terlihat secara signifikan setelah memasuki masa nifas. Penelitian ini merupakan penelitian pengembangan dengan desain research and development (R&D) dengan pendekatan model ADDIE (Analysis, Design, Development, Implementation, and Evaluation) sebagai kerangka acuan untuk merancang dan mengembangkan produk. Fitur utama yang akan dikembangkan dan ditambahkan dalam aplikasi meliputi kuesioner penilaian depresi berbasis skala yang diakui secara klinis yaitu EPDS, tips dan informasi kesehatan mental, serta akses ke sumber daya dan dukungan profesional. Penelitian ini dilaksanakan di wilayah kerja Puskesmas Srawolio. Sampel penelitian yang digunakan sebagai uji aplikasi akan diberikan pada 14 responden yaitu seluruh bidan yang ada di Puskesmas Sorawolio kota Baubau. Hasil penelitian diperoleh bahwa aplikasi menunjukkan performa yang sangat baik pada aspek attractiveness, perspicuity, dan novelty, sehingga memberikan pengalaman positif bagi pengguna. Namun, nilai rendah pada dependability menunjukkan adanya masalah pada keandalan sistem yang perlu diperbaiki sebelum aplikasi diluncurkan secara luas.

Kata kunci: Kata Kunci : Depresi Post Partum, Ibu Nifas, Aplikasi NAMISIKU

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INTRODUCTION

Postpartum Depression (PPD) is a medical term referring to psychological conditions experienced by mothers after childbirth. PPD is a pathological psychological change commonly characterized by feelings of anxiety, sadness, guilt, difficulty concentrating, and even the urge to harm the baby (Syarif, 2022). Generally, mothers experiencing depression rarely express their feelings and often refuse to acknowledge them. They tend to perceive such conditions merely as physical demands related to their roles as mothers and wives, which cause fatigue. Some mothers, particularly young primiparous mothers, may also feel afraid or ashamed to admit their condition due to societal assumptions that they are incapable of fulfilling their maternal role (Klabunde et al., 2017).

The causes of PPD are complex, with one of the primary factors being hormonal changes after childbirth, which are linked to depressive symptoms, while biological factors contribute minimally. This condition can be prevented if postpartum mothers are equipped with adequate knowledge on how to manage and prevent PPD (Pollock et al., 2020). Mothers with untreated risk factors for depression may develop symptoms of psychosis, including suicidal ideation or thoughts of harming their babies. They often feel overwhelmed and experience cognitive distortions related to a perceived loss of identity and unpreparedness for motherhood (Saragih et al., 2020). A study by Lai et al. (2021) found a significant correlation between maternal PPD and infant health as well as child development. Additionally, poor maternal-child bonding has been associated with cognitive delays and impaired socio-emotional development. These findings clearly indicate that PPD is a serious mental health issue that requires appropriate attention and intervention.

One preventive effort to minimize the occurrence of PPD is screening. The development of early detection tools for PPD can serve as an effective preventive measure. In Indonesia, one of the most widely used instruments for detecting PPD is the Edinburgh Postnatal Depression Scale (EPDS). However, in terms of psychometric properties, the Indonesian version of EPDS has yet to demonstrate reliable and valid measurement results. This indicates that no proper adaptation process has been conducted for the EPDS, nor have there been sufficient efforts to develop other PPD-specific instruments in Indonesia. PPD, as a maternal mental health issue, demands continuous attention (Fortin et al., 2021). Regular mental health monitoring after childbirth is essential, especially for mothers showing early symptoms of trauma (Ahmar et al., 2024).

Based on these issues, the researcher aims to develop technological knowledge in the field of mobile-based artificial intelligence using an expert system approach. This expert system will be implemented in an application named "NAMISIKU," which is designed to address these problems using methods similar to those employed by human experts.

RESEARCH METHOD

This study is a development research project that focuses on the development of an Android-based Postpartum Depression Screening (PDS) questionnaire, aiming to facilitate postpartum mothers in identifying psychological changes at any time. The research design employed is Research and Development (R&D), which is used to produce specific products and test their effectiveness to ensure they function appropriately within the community. The ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) was used as the framework for designing and developing the product (Hanafi, 2017; Ichsan Raksa Gumilang, 2022). The questionnaire used to detect postpartum depression (PPD) was adapted from the Edinburgh Postnatal Depression Scale (EPDS).

The development of the PDS questionnaire followed a structured approach using the waterfall method within the software development life cycle (SDLC), including the following stages: requirements and analysis, design, system testing, implementation, and evaluation.

The EPDS has been validated in various countries such as the Netherlands, Sweden, Australia, Italy, and Indonesia. The questionnaire consists of ten (10) items, each offering four (4) response options with corresponding scores. Respondents are required to select one option that best reflects the intensity of their current feelings. The total score ranges from 0 to 30, with higher scores indicating more severe symptoms of depression (Sari et al., 2021).

This study was conducted in the working area of the Sorawolio Public Health Center. The application was tested on a sample of 14 respondents, consisting of all midwives working at the Sorawolio Public Health Center in Baubau City.

RESULTS OF STUDY

The evaluation of the NAMISIKU application was conducted using the User Experience Questionnaire (UEQ), which consists of 26 items and assesses six dimensions: attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty (Schrepp, 2023). An average score > 0.8 indicates a positive evaluation of the product/application, while a score < -0.8 indicates a negative evaluation. Scores between -0.8 and 0.8 represent a neutral evaluation.

Table 1
Mean and Variance Distribution of UEQ Components

UEQ Scala	Mean	Std. Dev.	Variance
Attractiveness	0.842	0.826	0.682
Perspicuity	0.768	0.643	0.414
Efficiency	0.832	0.583	0.34
Dependability	0.825	1.172	1.374
Stimulation	0.682	0.948	0.899
Novelty	0.649	0.398	0.158

Table 1 shows that three components of the NAMISIKU application received positive evaluations from respondents: Attractiveness, Efficiency, and Dependability. Meanwhile, Perspicuity, Stimulation, and Novelty received neutral evaluations.

Based on the mean distribution, benchmark data interpretation was then carried out. The benchmark test results indicated that the Dependability aspect falls under the Below Average category. The aspects of Efficiency and Stimulation are categorized as Good. Meanwhile, Attractiveness, Perspicuity, and Novelty are categorized as Excellent (Table 2 and Figure 1).

Table 2
Benchmark Test Results for NAMISIKU

Scale	Mean	Comparison to benchmark	Interpretation
Attractiveness	2.17	Excellent	In the range of the 10% best results
Perspicuity	2.25	Excellent	In the range of the 10% best results
Efficiency	1.58	Good	10% of results better, 75% of results worse
Dependability	1.00	Below Average	50% of results better, 25% of results worse
Stimulation	1.25	Good	10% of results better, 75% of results worse
Novelty	1.83	Excellent	In the range of the 10% best results

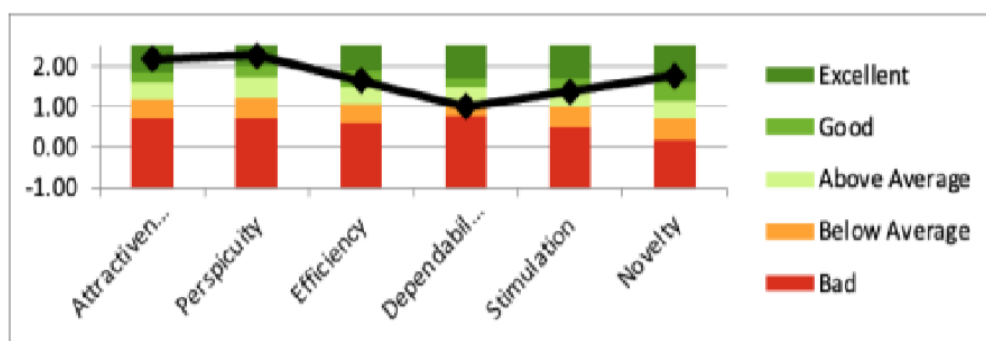
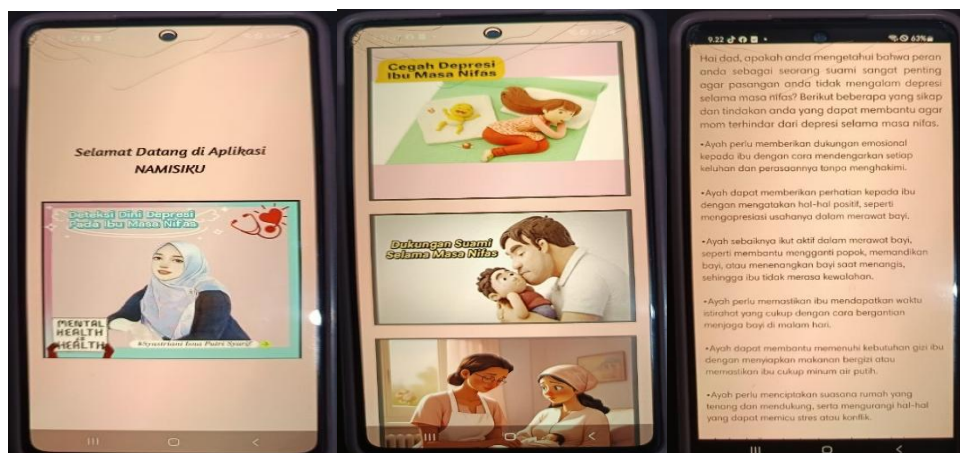


Figure 1. Benchmark Data Interpretation Standard



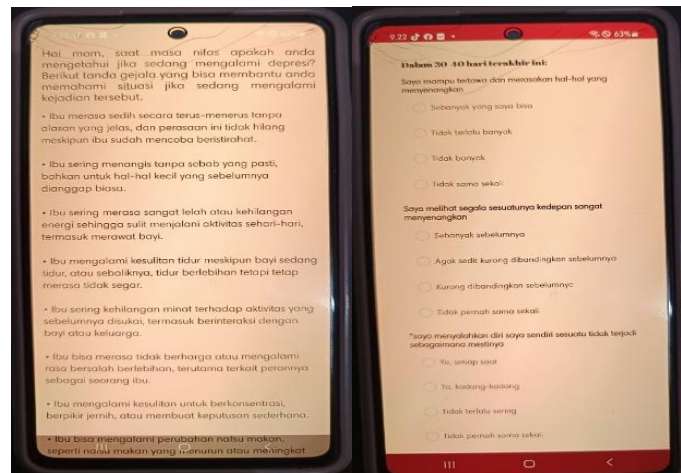


Figure 2. NAMISIKU Application Interface

Based on the assessment results derived from 30 respondents for each evaluation component of the NAMISIKU application, the interpretations for each aspect are as follows:

Attractiveness

This aspect received a mean score of 2.17, categorized as Excellent. This indicates that the attractiveness of the system ranks within the top 10% of results compared to other systems. With this score, the system is perceived as highly appealing by users and provides an overall positive user experience.

Perspiciuity

The perspicuity aspect attained a mean score of 2.25, also categorized as Excellent. This means the system is very easy to understand and use, both in terms of navigation and interface interaction.

Efficiency

The efficiency aspect obtained a mean score of 1.63, falling under the Good category. Although 10% of other systems performed better, 75% scored lower. This indicates that the system is sufficiently efficient during use.

Dependability

This aspect scored a mean of 1.00, classified as Below Average. Approximately 50% of other systems performed better, while 25% scored lower. This suggests that the system is considered less reliable by users, both in terms of performance consistency and trustworthiness.

Stimulation

This aspect received a mean score of 1.38, placing it in the Good category. With this result, the system is considered fairly effective in providing emotional stimulation or motivation to users, although some other systems offer a better experience in this regard.

Novelty

The novelty aspect achieved a mean score of 1.75, categorized as Excellent. The system is considered highly innovative and ranks within the top 10% of benchmarked systems. This indicates that users perceive the system as offering a novel and fresh experience.

Overall, the system demonstrates excellent performance in terms of attractiveness, ease of understanding, and novelty. However, the aspect of dependability received the lowest score and indicates an area in need of improvement. Enhancing this component should be a primary focus for future development in order to optimize the overall user experience.

DISCUSSION

Postpartum Depression (PPD) is a serious mental health disorder that may develop in women after childbirth and is marked by persistent sadness, anxiety, fatigue, feelings of guilt, difficulty concentrating, and in severe cases, thoughts of harming oneself or the baby (Syarif, 2022; Saragih et al., 2020; Rahmandani et al., 2017). Unlike baby blues, which is transient and typically resolves within the first two weeks postpartum (Wang et al., 2021; Chen et al., 2023), PPD is more severe, often lasting for several months, and may hinder mother-infant bonding, potentially leading to cognitive and socio-emotional developmental delays in the child (Lai et al., 2021).

Despite the prevalence and severity of PPD, many affected mothers remain undiagnosed due to stigma, fear, and a lack of screening tools tailored to their context (Klabunde et al., 2017). The development of the mobile-based NAMISIKU application aims to fill this gap by providing an accessible tool for early detection of postpartum depression. Grounded in the ADDIE framework—Analysis, Design, Development, Implementation, and Evaluation—the design and structure of the application focused on user needs, clinical relevance, and systematic development (Hanafi, 2017; Ichsan Raksa Gumilang, 2022). The screening component was built using the Edinburgh Postnatal Depression Scale (EPDS), a clinically validated instrument used worldwide and proven to be sensitive and specific in detecting symptoms of PPD, including in the Indonesian context (Sari et al., 2021; Syarif, 2022).

The results from the evaluation of the NAMISIKU application using the User Experience Questionnaire (UEQ)—covering six key dimensions: attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty—show that the application was rated excellent in three aspects: attractiveness (mean 2.17), perspicuity (mean 2.25), and novelty (mean 1.83), all of which fell within the top 10% of benchmarked applications. These findings indicate that the application is visually appealing, easy to understand, and offers a fresh and innovative user experience, which is crucial in engaging postpartum users who may be physically and emotionally exhausted.

The efficiency and stimulation aspects were rated as good, with mean scores of 1.58 and 1.25 respectively, suggesting that the application was practical to use and moderately motivating, although there is room for enhancement. However, the dependability dimension scored a mean of 1.00 and was classified as below average, meaning that about 50% of other benchmarked systems were perceived as more reliable. This indicates that users encountered issues related to system stability, consistency, or predictability—critical concerns in a health-related application where user trust is paramount.

These results are consistent with previous research asserting the importance of reliable and user-friendly digital interventions in maternal mental health care (Fortin et al., 2021). Although the application's strength lies in its appeal and usability, its current limitations in dependability present a barrier to broader implementation. System dependability encompasses not only technical robustness but also user perception of trustworthiness and data accuracy (Schrepp, 2023).

Moreover, addressing postpartum psychological distress through mobile health (mHealth) interventions such as NAMISIKU represents a strategic move, especially in settings where mental health support is limited or underutilized. This aligns with global trends toward digitizing early screening for mental health to reduce long-term psychiatric complications such as postpartum psychosis, a rare but severe condition that may involve hallucinations, delusions, and erratic behavior, often requiring immediate psychiatric intervention (Bento et al., 2018; Ikada et al., 2020).

Based on the results of the study and discussion, the researcher assumes that NAMISIKU is a highly potential digital tool for the early detection of postpartum depression. The application's strengths lie in its visual appeal, clarity of use, and high level of novelty. However, further development efforts should focus on improving the system's dependability in order to build user trust and ensure the application is truly ready for broad public deployment.

LIMITATION OF THE STUDY

This study was limited by the small sample size of respondents, consisting only of midwives at a single health center, which may affect the generalizability of the findings. Future studies involving a more diverse and larger user population are recommended to validate the broader applicability and effectiveness of the application.

CONCLUSION

Based on the evaluation results, the application demonstrates excellent performance in the aspects of attractiveness, perspicuity, and novelty, thereby providing a positive user experience. However, the low score in dependability indicates reliability issues that need to be addressed before the application is widely released.

To ensure readiness for launch, improvements should be made to the dependability aspect, along with optimization of efficiency and stimulation. Subsequently, a re-evaluation should be conducted to ensure that all aspects meet quality standards. If the re-evaluation results show significant improvement, the application may be considered for release.

ETHICAL CONSIDERATIONS

Funding Statement.

The authors did not receive any financial support from any institution or organization for the submitted article. There was no funding was received for the preparation until completion of this manuscript.

Conflict of Interest Statement

No conflict of interest that is directly or indirectly related to the current article was found.

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