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The Use of the Mattampu' Application to Improve Pregnant Women's Knowledge of Physiological Changes During Pregnancy

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ABSTRACT/ ABSTRAK

ABSTRACT. *Physiological changes during pregnancy often cause discomfort and anxiety in pregnant women, which, if not well understood, may increase the risk of pregnancy complications. This study aims to evaluate the effectiveness of the Mattampu' application, a locally developed Android-based educational media, in improving pregnant women's knowledge of physiological changes during pregnancy. A descriptive quantitative design with a one-group pretest–posttest approach was employed. The sample consisted of 90 pregnant women selected through accidental sampling at the Kassi-Kassi Public Health Center, Makassar. The intervention was conducted through the use of the Mattampu' application, and knowledge levels were measured before and after the intervention using a structured questionnaire. Analysis using the McNemar test revealed a significant increase in knowledge levels across all trimesters: from 26.7% to 73.3% in the first trimester (p=0.001), from 23.3% to 93.3% in the second trimester (p=0.000), and from 23.3% to 90.0% in the third trimester (p=0.000). This study concludes that the Mattampu' application is effective in enhancing pregnant women's knowledge of physiological changes during pregnancy and holds potential as an adaptive, contextual, and sustainable model of digital education in antenatal care services.*

Kata kunci:

Aplikasi Mobile, Pengetahuan Ibu Hamil, Perubahan Fisiologis, Edukasi Digital, Kehamilan

ABSTRAK. Perubahan fisiologis selama kehamilan sering kali menimbulkan ketidaknyamanan dan kecemasan pada ibu hamil, yang jika tidak dipahami dengan baik dapat meningkatkan risiko komplikasi kehamilan. Penelitian ini bertujuan untuk mengevaluasi efektivitas aplikasi *Mattampu'*, sebuah media edukatif berbasis Android yang dikembangkan secara lokal, dalam meningkatkan pengetahuan ibu hamil mengenai perubahan fisiologis selama kehamilan. Penelitian ini menggunakan desain deskriptif kuantitatif dengan pendekatan *pre–post test* tanpa kelompok kontrol. Sampel terdiri dari 90 ibu hamil yang dipilih melalui teknik *accidental sampling* di Puskesmas Kassi-Kassi, Makassar. Intervensi dilakukan melalui penggunaan aplikasi *Mattampu'*, dan tingkat pengetahuan diukur sebelum dan sesudah intervensi menggunakan kuesioner terstruktur. Hasil analisis dengan uji McNemar menunjukkan adanya peningkatan signifikan pada tingkat pengetahuan ibu hamil di semua trimester: trimester pertama dari 26,7% menjadi 73,3% (p=0,001), trimester kedua dari 23,3% menjadi 93,3% (p=0,000), dan trimester ketiga dari 23,3% menjadi 90,0% (p=0,000). Penelitian ini menyimpulkan bahwa aplikasi *Mattampu'* efektif dalam meningkatkan pengetahuan ibu hamil tentang perubahan fisiologis selama kehamilan, serta berpotensi menjadi model edukasi digital yang adaptif, kontekstual, dan berkelanjutan dalam pelayanan antenatal.

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INTRODUCTION

Pregnancy is a complex and multidimensional bio-psycho-social phenomenon, characterized by significant biological, psychological, and social changes. These changes may trigger discomfort, anxiety, and even stress, requiring pregnant women to adapt to the physiological and psychological transformations they experience (Bjelica et al., 2018; Jones, 2006). A lack of preparedness in understanding these changes may increase the risk of pregnancy complications for both the mother and the fetus.

According to the World Health Organization (WHO, 2025), nearly 300,000 women die each year due to pregnancy and childbirth complications, and more than 2 million babies die before reaching one month of age. This figure translates to one preventable death every seven seconds. If this trend continues, four out of five countries are projected to fall short of achieving global targets for improving maternal survival by 2030. These data underscore the urgency of improving the quality of maternity services and pregnancy education, particularly in understanding physiological changes during pregnancy.

One of the key pillars of antenatal care is health education provided by healthcare professionals, especially midwives. However, various studies indicate that the quality of education remains suboptimal, contributing to low levels of satisfaction among pregnant women regarding antenatal services. Surveys reveal that 48.20 percent of pregnant women express dissatisfaction with the health education component, and only 68.99 percent report overall satisfaction with antenatal services (Herliana, 2025; Ganji et al., 2025). The imbalance between the professionalism of healthcare providers and the limitations in communication and education is a major factor contributing to poor understanding of pregnancy-related changes among pregnant women (Panjarwanto et al., 2024; Almutairi et al., 2024).

With the advancement of technology, digital education media, particularly mobile applications, have emerged as strategic alternatives for delivering more effective health information. Applications such as Ebumil, JIHP, and MyBelle have been shown to significantly improve pregnant women's knowledge and attitudes regarding high-risk pregnancies (Nawir et al., 2025; Kartini et al., 2025; Babatunde et al., 2025). For instance, the MyBelle application increased users' knowledge of preeclampsia by up to 179 percent, demonstrating the substantial potential of mobile apps as accessible and evidence-based educational tools. Moreover, multimodal approaches such as hypnocomfort and the use of IoT in monitoring high-risk pregnancies have also shown promising results (Jannah et al., 2024; González et al., 2024).

Nevertheless, most educational applications developed to date have yet to accommodate local needs, particularly in terms of cultural context and regional languages. In this regard, developing contextual and locally grounded pregnancy education applications is crucial to enhance communication effectiveness and community acceptance. Based on this background, the researchers developed Mattampu', an Android-based educational platform containing information on physiological changes during pregnancy. The word Mattampu' originates from the Bugis language and means "pregnant," reflecting a local approach to pregnancy education. This application is designed as an accessible educational tool aimed at bridging the information gap, improving pregnant women's knowledge, and supporting higher-quality antenatal care.

RESEARCH METHOD

This study employed a descriptive quantitative design with a pretest-posttest approach to evaluate the effectiveness of the Mattampu' application in improving pregnant women's knowledge of physiological changes during pregnancy. The Mattampu' application is an Android-based educational media developed by the researchers using a localized approach. The name Mattampu' is derived from the Bugis language, meaning "pregnant," which reflects the local wisdom and cultural background of the study area. The application contains educational information categorized according to the three trimesters of pregnancy: the first, second, and third trimesters. Each section describes the common physiological changes that occur during the respective stages. The content is systematically structured and easily accessible to users, aiming to support pregnant women's understanding of their physical condition throughout the pregnancy process.

The study was conducted at the Kassi-Kassi Public Health Center in Makassar City over a one-month period. The total sample consisted of 90 pregnant women selected using an accidental sampling technique, in which participants were chosen based on availability and eligibility at the time of data collection.

The instrument used to assess knowledge levels was a structured questionnaire administered twice, before (pretest) and after (posttest) the educational intervention using the Mattampu' application. This questionnaire was designed to evaluate pregnant women's understanding of physiological changes during pregnancy. The collected data were analyzed using an appropriate statistical test, namely the McNemar test, to determine the significance of changes in knowledge levels before and after the use of the application.

RESULTS

Table 1. Characteristics of Pregnant Women

Variable	Pregnant Women			p-value
	First Trimester	Second Trimester	Third Trimester	
Age (Mean, years)	25.00	27.00	25.53	0,22 [a]
Education n (%)				
Higher	8 (26.7)	6 (20.0)	10 (33.3)	0,50 [b]
Lower	22 (73.3)	24 (80.0)	20 (66.7)	
Occupation n (%)				
Employed	7 (23.3)	13 (43.3)	11 (36.7)	0,25 [b]
Unemployed	23 (76.7)	17 (56.7)	19 (63.3)	

Source: *[a] One-Way ANOVA, [b] Chi-Square Test*

Table 1 presents the distribution of respondent characteristics based on pregnancy trimesters: first, second, and third. The mean age of pregnant women in the first trimester was 25.00 years, 27.00 years in the second trimester, and 25.53 years in the third trimester. The One-Way ANOVA test showed no significant difference in age across the trimesters ($p = 0.22$). In terms of education, the majority of respondents in all trimesters had lower education levels: 73.3 percent in the first trimester, 80.0 percent in the second trimester, and 66.7 percent in the third trimester. Conversely, the proportion of pregnant women with higher education was relatively small. The Chi-Square test indicated no significant relationship between education level and pregnancy trimester ($p = 0.50$). Regarding occupation, most

respondents in the first trimester were unemployed (76.7 percent), followed by those in the third trimester (63.3 percent) and second trimester (56.7 percent). The highest proportion of employed pregnant women was found in the second trimester (43.3 percent). The Chi-Square test showed no significant difference in employment status across trimesters (p = 0.25).

Table 2. Changes in Knowledge of Pregnant Women in the First Trimester After Receiving Education Using the Mattampu' Application

Educational Intervention Using the Mattampu' Application	Knowledge Level		p-value
	Poor	Good	
	n (%)	n (%)	
Pretest	22 (73.3)	8 (26.7)	0,001[a]
Posttest	8 (26.7)	22 (73.3)	

Source: *[a]McNemar Test*

The data analysis showed a change in knowledge levels before and after the intervention. Before the intervention, 22 participants (73.3 percent) had poor knowledge and 8 participants (26.7 percent) had good knowledge. After the intervention, the number of pregnant women with poor knowledge decreased to 8 (26.7 percent), while those with good knowledge increased to 22 (73.3 percent). The result ($\rho = 0.001 < 0.05$) indicates a significant relationship between the use of the Mattampu' application and the improvement in pregnant women's knowledge.

Table 3. Changes in Knowledge of Pregnant Women in the Second Trimester After Receiving Education Using the Mattampu' Application

Educational Intervention Using the Mattampu' Application	Knowledge Level		p-value
	Poor	Good	
	n (%)	n (%)	
Pretest	23 (76.7)	7 (23.3)	0.000
Posttest	2 (6.7)	28 (93.3)	

Source: *McNemar Test*

The analysis showed a shift in frequency based on knowledge level. Before the intervention, 23 participants (76.7 percent) had poor knowledge, and only 7 participants (23.3 percent) had good knowledge. After the intervention, the number of pregnant women with poor knowledge decreased to 2 (6.7 percent), and those with good knowledge increased to 28 (93.3 percent). The result ($\rho = 0.001 < 0.05$) indicates a significant relationship between the use of the Mattampu' application and the improvement in pregnant women's knowledge.

Table 4. Changes in Knowledge of Pregnant Women in the Third Trimester After Receiving Education Using the Mattampu' Application

Educational Intervention Using the Mattampu' Application	Knowledge Level		p-value
	Poor	Good	
	n (%)	n (%)	
Pretest	23 (76.7)	7 (23.3)	0.000
Posttest	3 (10.0)	27 (90.0)	

Source: *McNemar Test*

The analysis showed a change in frequency based on knowledge level. Before the intervention, 23 participants (76.7 percent) had poor knowledge, and only 7 participants (23.3 percent) had good knowledge. After the intervention, the number of pregnant women with

poor knowledge decreased to 3 (10.0 percent), while those with good knowledge increased to 27 (90.0 percent). The result ($\rho = 0.000 < 0.05$) indicates a significant relationship between the use of the Mattampu' application and the improvement in pregnant women's knowledge.

DISCUSSION

The findings of this study demonstrate that the use of the Mattampu' application significantly improved pregnant women's knowledge of physiological changes during pregnancy. This result reinforces existing evidence that digital education media hold great potential in addressing the challenges of limited maternal health education, particularly in areas with restricted access to face-to-face services. The meaningful increase in knowledge observed among respondents after the intervention highlights the effectiveness of systematically structured educational content based on pregnancy trimesters. This strategy proved effective in delivering information tailored to the developmental stages of pregnancy and strengthening pregnant women's understanding of the bodily changes they experience.

These findings align with previous studies, such as those by Nawir et al. (2025) and Kartini et al. (2025), which reported that digital applications like JIHP and Ebumil significantly improved knowledge scores. Babatunde et al. (2025) similarly found that educational content structured according to pregnancy stages, as in the MyBelle application in Nigeria, effectively enhanced users' understanding of preeclampsia by up to 179 percent. The Mattampu' application, developed using a cultural approach through the incorporation of local language, further strengthens the reach and relevance of digital educational interventions. This study also reflects the alignment with health promotion-based empowerment approaches, as described by Rezaei et al. (2024), which emphasize the importance of technology in enhancing self-efficacy and empowering pregnant women.

This research also confirms that antenatal education developed through a technological approach can make a meaningful contribution to improving health literacy, as noted by Pushpa et al. (2024). The Mattampu' application not only facilitates information access but also supports self-directed learning, enabling pregnant women to understand complex changes in a more flexible and contextualized manner. Active user engagement with locally based digital media represents an achievement that is not only educational but also socio-cultural in nature, as outlined by Nawir et al. (2025) and Ermiati et al. (2024).

However, several limitations of this study should be acknowledged. This research only measured knowledge improvement, without directly assessing its impact on attitudes and health-related behaviors. Moreover, the absence of a control group limits the inferential power to establish causality. External factors such as the frequency of application use, understanding of its features, and the digital literacy level of respondents were not explored in depth. These variables may have influenced the results and should be considered in future studies.

The findings also reflect broader challenges in implementing technology in communities, especially in regions with limited infrastructure, low digital literacy, and device access gaps. Literature presented by Jibrin et al. (2024) and Malik et al. (2024) emphasizes the importance of continuous support, application use training, and systemic integration to ensure that digital education innovations have a broad and sustainable impact. Therefore, the

use of the Mattampu' application can serve as a replicable educational intervention model, although it requires adaptation to the cultural and social context of the target area.

The implications of this study suggest that the integration of technology into maternal health education should be planned, adaptive, and sustainable. Future studies are recommended to adopt a longitudinal and experimental design with a control group to evaluate the long-term impacts on attitudes, behaviors, and clinical pregnancy outcomes. Additionally, it is important to examine the feasibility of integrating Mattampu' into primary health care systems and national pregnancy education programs. A multidisciplinary approach may further enrich the findings and strengthen evidence-based policy efforts to improve maternal and child health comprehensively.

CONCLUSION

The findings of this study indicate that the use of the Mattampu' application significantly improves pregnant women's knowledge of physiological changes during pregnancy. This application-based intervention has proven effective in delivering relevant and easily understood educational information, particularly across the different pregnancy trimesters. These results suggest that the utilization of locally based digital technology can serve as an innovative and effective alternative for antenatal education.

Although the Mattampu' application has shown a positive impact on knowledge enhancement, several educational features within the application have not yet been thoroughly evaluated. Therefore, further research is needed to explore all available features of the application, including their effectiveness in other dimensions of maternal preparedness such as attitudes, preventive behaviors, and utilization of health services.

The implementation of educational applications such as Mattampu' in primary health care facilities also requires further investigation in terms of feasibility, acceptability, and long-term impact. Collaboration among technology developers, healthcare providers, and end users is essential to ensure the development of applications that are adaptive, responsive, and sustainable.

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