



GESTATION CARE INNOVATION: A DIGITAL SOLUTION TO REDUCE THE RISK OF MATERNAL MORTALITY

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ABSTRACT

The maternal mortality rate (MMR) in Indonesia remains high at 305 per 100,000 live births, far from the national target of 183 per 100,000 live births by 2024. Pregnancy complications such as preeclampsia, gestational diabetes, and preterm labor are the main causes of high maternal morbidity and mortality. One contributing factor is the delay in early detection due to limited access and resources of health workers in primary care facilities. This research aims to develop Gestasi Care, a web-based digital application designed to support early detection of pregnancy complications, monitor antenatal care (ANC) schedules, and provide education to pregnant women. Method: The research method used was Research and Development (R&D) with a waterfall System Development Life Cycle (SDLC) approach. The research stages included needs analysis, prototype design, initial data collection through a survey at the Sidodadi Community Health Center, and initial application trials with midwives and doctors. A prototype application has been developed with key features including pregnancy risk screening (low, medium, and high categories), ANC and ultrasound schedule reminders, digital medical records, teleconsultation, and trimester-based education. The application is currently undergoing content validation and preparation for a limited field trial to assess feasibility and user acceptance. Gestation Care has the potential to be an innovative digital-based solution to strengthen maternal health services in primary care facilities, increase the effectiveness of early detection of pregnancy complications, and support efforts to reduce maternal mortality in Indonesia.

Keywords: antenatal care; digital health; gestational care; maternal health; risk of complications; telemedicine

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INTRODUCTION

Maternal and child health remains a top priority for health development in Indonesia. The Maternal Mortality Rate (MMR) in Indonesia is recorded at 305 per 100,000 live births, far from the national target of 183 per 100,000 live births by 2024 (Ministry of Health of the Republic of Indonesia, 2023; WHO, 2019). Pregnancy complications such as preeclampsia, gestational diabetes, and premature birth remain the leading causes of maternal and newborn morbidity and mortality (Prawirohardjo, 2020; Manuaba, 2019). Early detection of pregnancy complications is crucial for reducing maternal morbidity and mortality, but its implementation is often hampered by limited health workers and primary care facilities (Ministry of Health of the Republic of Indonesia, 2020). Advances in digital technology offer new opportunities to support maternal healthcare services. The use of telemedicine and web-based applications has been shown to improve access to healthcare services, expedite communication with medical personnel, and facilitate ongoing pregnancy monitoring (Nugroho & Sari, 2021; Wulandari & Andayani, 2022). However, the implementation of digital innovation in obstetrics in Indonesia remains limited, particularly in primary healthcare facilities, which play a crucial role in the early detection of pregnancy complications.

In response to these challenges, this research developed a web-based digital application called Gestasi Care. This application is designed to support health workers in screening pregnancy risks, provide reminders for antenatal care (ANC) and ultrasound visits according to Ministry of Health standards, and provide educational and teleconsultation services that can be accessed directly by

pregnant women. With this application, it is hoped that obstetric services will be more effective, access to maternal health services will increase, and the risk of pregnancy complications can be detected early. The aim of this study is to develop the Gestation Care application as a digital innovation that supports early detection of pregnancy complications, and to assess its potential effectiveness in improving the quality of maternal health services at the Sidodadi Community Health Center, Asahan Regency.

METHOD

The Research methods used is Research and Development (R&D) method with System Development Life Cycle (SDLC) waterfall model approach . This method used For produce product in the form of application Gestation Care that can help detection early risk complications pregnancy at a time test its effectiveness in support primary care (Sugiyono,2019).

Products This expected capable do screening risk pregnancy, monitoring health mother and fetus as well as education (Ministry of Health of the Republic of Indonesia,2023). Study has reach stage design prototype application together IT team based on results analysis need users from power health and mothers pregnant. Stages furthermore is complete the data and materials to be entered to in application, including detection form early risks, ANC schedule, and USG, as well as content education pregnancy in accordance Ministry of Health standards (Ministry of Health of the Republic of Indonesia, 2020). After prototype repaired based on input expert midwifery, application will tested try it in the field with involving power health health center and mother pregnant users service (Nugroho, A & Sari D, 2021). Trial done in a way gradually for evaluate convenience use application, accuracy detection risks, as well as level reception user. Next done evaluation and improvement system based on trial results, with notice aspect patient data security, synchronization with the national program (6 ANC and 2 USG), as well as ethics study.



Figure 1. Research Flow

Target achievement study This is produce application Valid and ready gestation care used in primary services at Community Health Centers, as well as publication results research in journals national accredited. In addition, research This will produce recommendations policy for utilization digital technology in effort decline number death Mother.

RESULT

At the moment study Already until stage design prototype. In research this, indicator targeted achievement is application can do detection early risk complications pregnancy with minimum accuracy of 85% according to validation power health, as well as increase regularity ANC visits to mothers pregnant. Trial will done in a way gradually at the Community Health Center Sidodadi as location study with notice aspect ethics research, patient data security, and synchronization with the national program of the Ministry of Health. In addition, the prototype application Gestation Care has tested try in a way limited For evaluate accuracy detection early complications pregnancy and ease use applicati. Trial beginning This involving health workers at the Community Health Center Sidodadi as a validator, with compare results screening application to evaluation clinical evaluation conducted by midwives and doctors . Evaluation results show that application capable give results adequate screening accurate as well as easy used by respondents. Display interface application

presented in Figure 2, which consists of from login page, main dashboard, and features screening risk pregnancy.

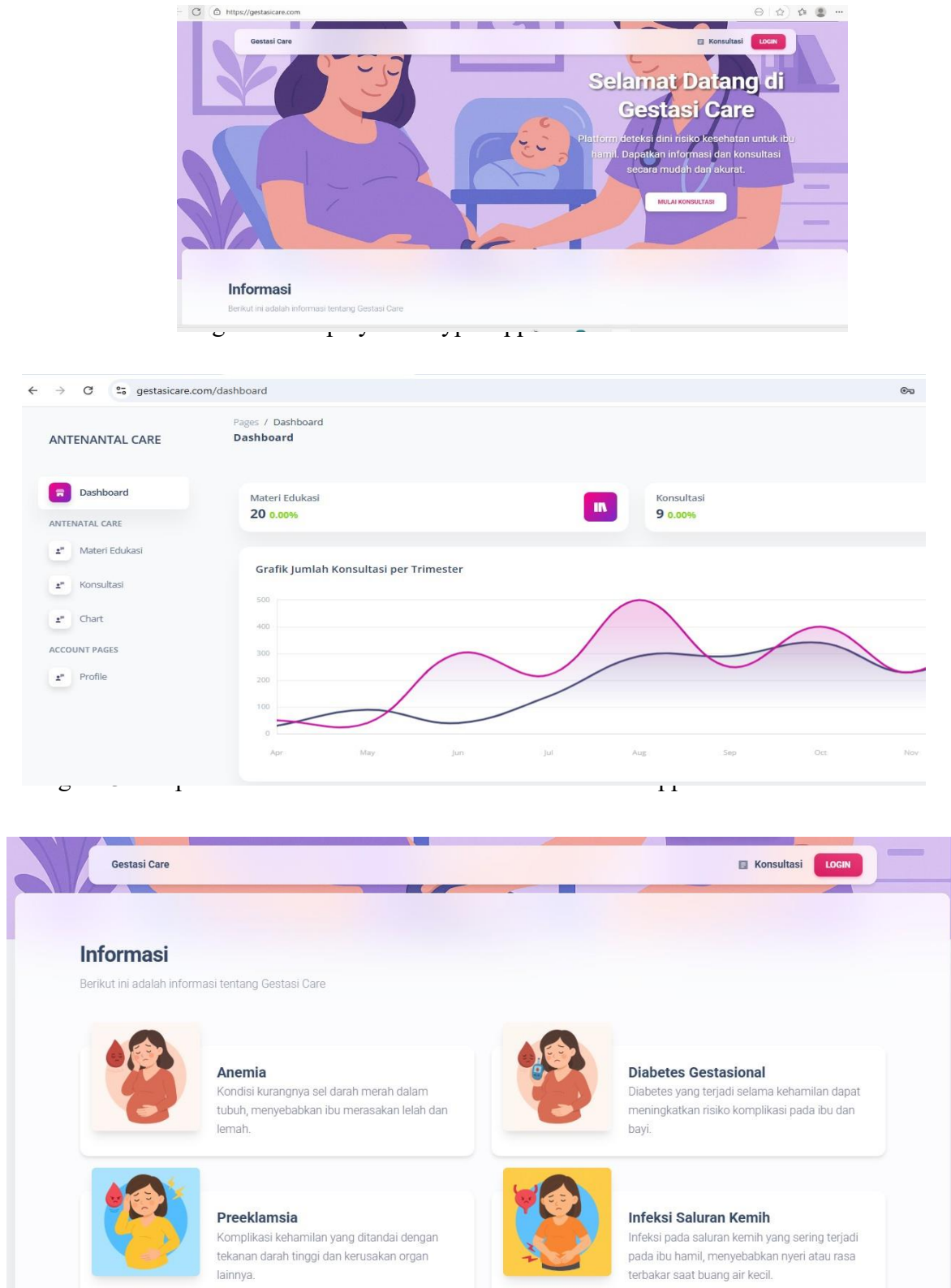


Figure 4. Information Dashboard View Application Gestation Care

For clarify research indicator achievements, as follows served distribution frequency trial results beginning related system accuracy and ease use application.

Table 1.

Frequency Distribution of Accuracy Indicator Achievement of the Gestation Care System in Initial Trials (n=50 cases)

Screening Results Applications vs. Healthcare Professionals	f	%
Appropriate (accuracy) Correct	45	90.0
Not suitable (accuracy is wrong)	5	10.0

In the initial trial phase, using 50 pregnancy data sets, the Gestasi Care app demonstrated 90% accuracy. This means that out of 50 data sets entered, 45 of the app's screening results matched the healthcare provider's assessment, while 5 (10%) still had discrepancies. This achievement exceeds the established minimum indicator of 85%.

Table 2.

Frequency Distribution of Achievement of Ease of Use Indicators of the Gestation Care Application (n=20 respondents)

Ease Level Use	f	%
Very easy	8	40.0
Easy	9	45.0
Enough	3	15.0
Difficult	0	0.0

Based on an initial trial of 20 healthcare workers, the majority rated the Gestation Care app as easy to use, with 45% stating "Easy" and 40% stating "Very Easy." A further 15% of respondents found the app difficult to use.

DISCUSSION

Research result This show that application Gestation Care is capable reach accuracy detection early complications pregnancy by 90% in the trial the beginning, which has been exceeding the minimum achievement indicator of 85%. This show that the system developed can give results adequate screening comparable with evaluation clinical by personnel health. Achievements This in line with research by Nugroho & Sari (2021) and Wulandari (2022) which states that utilization digital applications in maternal health services can increase effectiveness detection early and accelerated intervention medical. Besides accuracy, other aspects convenience Usage is also an important factor in adoption technology. Trial early on 20 health workers showed majority respondents evaluate application easy or very easy used . This is support the Technology Acceptance Model (ATM) theory which confirms that perception convenience use is one of the determinant main success implementation technology in the health sector (Venkatesh, 2003). With Thus, Gestation Care has the potential accepted in a way widely by health workers in primary care.

Novelty study This lies in integration feature screening risks, and education trimester in one customized platform with Ministry of Health standards. Previously, research about application midwifery in Indonesia is still limited to education or recording simple, without include detection system comprehensive early childhood. Therefore that, Gestation Care provides mark plus with presenting a more holistic digital solution for service midwifery in primary facilities. Although results study This Enough promising, there is a number of limitations. First, the trial beginning Still done with amount limited respondents, so that generalization results need done with be careful. Second, education in application Still need validation more continue to suit with local and cultural needs society. Third, research This Not yet to the stage evaluation effectiveness long term in lower number maternal complications and death. Study furthermore need conduct a trial field with involving more Lots respondents Mother pregnant and energetic health, as well as evaluate impact implementation application to regularity ANC visits, compliance Mother pregnant, and external maternal health.

CONCLUSION

Study This succeed develop prototype application Gestation Care as digital innovation for support

detection early complications pregnancy in primary health care. Trial results beginning show that application have a level of accuracy detection by 90% exceeding the minimum target of 85%, and assessed easy used by the majority health workers. This show that Gestation Care has the potential accepted as a digital solution that supports improvement regularity ANC visits, monitoring condition pregnancy, and education Mother pregnant. Novelty study This lies in integration feature screening risk, and education trimester -based in One customized applications with the national program of the Ministry of Health. With Thus, Gestation Care can become a model for implementation digital technology in midwifery in line with efforts to reduce number pain and death mothers in Indonesia. However Thus, research This Still own limitations in amount respondents and trial coverage. Therefore that, is necessary study advanced with larger scale big For evaluate effectiveness application in long term and ensure suitability content with local needs.

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