



UNIVERSITAS
GADJAH MADA



October 25th-26th, 2022 (Fully Virtual)

PROGRAM AND ABSTRACT BOOK

THE 4TH INTERNATIONAL JOINT CONFERENCE ON NURSING SCIENCE (IJCNS)

**“Bringing Innovation to Strengthen Society
for Resilient and Sustainable Healthcare System”**

WEB-BASED APPLICATION DEVELOPMENT TO PREDICT MATERNAL RISK FACTORS DURING PREGNANCY

Milkhatun¹, Zulmah Astuti¹, Tri Wahyuni¹, Alfi Ari Fahrur Rizal¹

¹Faculty of Nursing, Universitas Muhammadiyah Kalimantan Timur, Samarinda, Indonesia,
mil668@umkt.ac.id, za874@umkt.ac.id, tw879@umkt.ac.id, aafr597@umkt.ac.id

Corresponding author : Zulmah Astuti, Universitas Muhammadiyah Kalimantan Timur, Samarinda, Indonesia (za874@umkt.ac.id)

Background: The efforts to reduce maternal mortality in the current COVID-19 pandemic situation are a challenge due to restrictions on activities outside the home for everyone. Likewise, pregnant women cannot check their condition directly to health services for fear of being affected by COVID 19. An application needs to be developed to help mothers identify risk factors in their pregnancy and help provide recommendations according to their condition.

Methods: is a Research & Development research using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) stages to design an application called the AFRIKOT Application (Integrated Recommendation Maternal Risk Factor Analysis). This web-based application contains data filled in by the mother regarding her previous medical history and current pregnancy data. This application provides information to mothers about the degree of risk factors that mothers currently have and also recommendations for mothers.

Result: are applications that display wife and husband data, pregnant women's health data, previous pregnancy history, current pregnancy history, pregnancy examination data and interpretation data, namely the degree of risk to the mother, the current BMI index value of the mother's body, and estimated data. delivery time.

Conclusion: The application that has been developed displays data about the current condition of the mother based on information that has been filled in by pregnant women.

Keyword: Application; COVID-19 Pandemic; Maternal mortality; Pregnancy; Risk factor

Web-Based Application Development To Predict Maternal Risk Factors During Pregnancy

Milkhatun¹, Zulmah Astuti*¹., Tri Wahyuni¹., Alfi Ari Fahrur Rizal¹

¹Universitas Muhammadiyah Kalimantan Timur

*Corresponding Author

ABSTRACT

Background: The current decline in maternal mortality is still an indicator of the success of achieving the SDGs in all countries, including Indonesia. Efforts to reduce maternal mortality in the current COVID-19 pandemic situation are a challenge due to restrictions on activities outside the home for everyone. This also has an impact on the health of pregnant women who are also unable to check their condition directly to health services. Based on this, it is necessary to develop an application that can help mothers to find out the risk factors in pregnancy that they may be experiencing at this time and which can provide initial information about what the mother should do if she experiences it so that the mother can decide to immediately be able to check her condition. **This research method** has been a Research & Development research using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) stages to design an application called the AFRIKOT Application (Analisis Faktor Resiko Ibu Rekomendasi Terpadu/Integrated Recommendation Maternal Risk Factor Analysis). This web-based application contains data that can be filled in by the mother regarding previous health history and data during the current pregnancy. Based on these data, this application provides information to mothers about the degree of risk factors that mothers currently have and also displays recommendations regarding the results of the analysis of these risk factors. **The results of the research** are the application that is formed consists of wife and husband data, pregnant women's health data, previous pregnancy history, current pregnancy history, pregnancy examination data and data display Interpretation or results include the current mother's risk degree and recommendations, Mass Index Value Current maternal body BMI, as well as data on estimated time of delivery.

Keyword : Maternal Mortality ; Application ; COVID-19 pandemic ; Pregnant Women

Background

Sustainable Development Goals (SDGs) which are improvements to the Millennium Development Goals (MDGs) are development that maintains sustainable improvement in the economic welfare of the community, development that maintains sustainable social life of the community, development that maintains environmental quality and development that ensures justice and the implementation of governance that is able to maintain an increase in the quality of life from one generation to the next. which is more comprehensive which involves developed countries and developing countries including Indonesia (Kementrian PPN/Bappenas, 2020). Some of the MDGs

Indicators have been achieved by Indonesia before, but there are several things that need to be continued in the SDGs until 2030, including reducing the Maternal Mortality Rate (MMR) (Kementrian PPN/Bappenas, 2020). Maternal Mortality Rate (MMR) is one of the indicators to see the success of maternal health efforts, namely the ratio of maternal mortality during pregnancy, childbirth and the postpartum period caused by pregnancy, childbirth and postpartum or its management but is not due to other causes such as accidents or incidentals in every country 100,000 live births (Kemenkes Kesehatan Republik Indonesia, 2020). The maternal mortality rate in Indonesia in 2015 was 305 people per 100,000 live births, and in 2020 the mortality rate decreased to 230. This maternal mortality rate, although declining, has not met the SDGs target of 70 per 100,000 live births (Kemenkes Kesehatan Republik Indonesia, 2020). The maternal mortality rate in East Kalimantan in 2019 was 79 people. Some of the causes of high AKI cases in several areas of East Kalimantan are due to the lack of awareness of pregnant women to check their pregnancies so that early detection of risky pregnant women cannot be carried out (Dinas Kesehatan Provinsi Kalimantan Timur, 2020). This condition is also exacerbated by the presence of COVID-19 which has caused 50% of pregnant women to choose not to go to check their health conditions to health facilities for fear of being exposed to the Corona Virus (Aydin & Aktaş, 2021). Therefore, pregnant women need application assistance in order to know the risk factors during pregnancy (Widiasih et al., 2021a).

In general, maternal mortality is caused by bleeding and hypertension in pregnancy and also infection which is often referred to as the Classical Triassic. While the indirect cause is one of them is anemia in pregnant women (Kemenkes Kesehatan Republik Indonesia, 2020; Simanjuntak, 2021). The incidence of anemia in pregnant women is more than 20% and can have a negative impact on pregnant women and their fetuses (Garzon et al., 2020). In addition, a decrease in hemoglobin in anemia conditions that occurs in the first trimester of pregnancy is associated with a high risk of hypertension due to pregnancy (Gajjar et al., 2020). A mother needs to know whether her pregnancy is a high-risk pregnancy or not. There are several risk factors including maternal age < 20 years and > 35 years, young primi, primipara (Simanjuntak, 2021). Hypertension and anemia during pregnancy require early detection in order to get the right treatment. Support and motivation from the government, health workers for pregnant women so that they can take advantage of health facilities to check their health are needed to prevent worsening of conditions in pregnant women (Puspitasari et al., 2020). Based on this, the researcher will conduct a research "Development of AFRIKOT Application (Analysis of Maternal Risk Factors and Integrated Recommendations)/(Analisis faktor resiko Ibu Hamil dan Rekomendasi Terpadu) Web-Based as an Effort to Reduce Maternal Mortality Rates".

Method

The procedure for research adapts the ADDIE development model which consists of five stages, namely Analysis, Design, Development, Implementation and Evaluation. In this study, it will be used up to the implementation stage with the following description:

1. Analysis stage

At this stage, an analysis of the maternal mortality rate in Indonesia (national data) and data in East Kalimantan will be carried out. The next analysis is related to the history of antenatal care carried out by pregnant women during their pregnancy

2. Design stage

At this stage, a product design will be carried out, namely the design of a flowchart which is a chart consisting of certain symbols that show the steps of a procedure or program, the design of a story board.

3. Development stage

Is the stage of making the media that is making the interface (interface), coding (coding), testing (testing) and deploying.

4. Implementation stage

At this stage, a field trial was conducted, namely the application of the application to pregnant women. 1) Data on pregnant women who will be respondents are obtained from puskesmas, maternity clinics and independent midwife practices. 2) An explanation to the respondent regarding filling out the application. 3) Implementation of filling out the application online (not face to face) by sending an application link to be filled out by the respondent. 4) Evaluate the results of filling out the application.

Result

1. Analysis stage

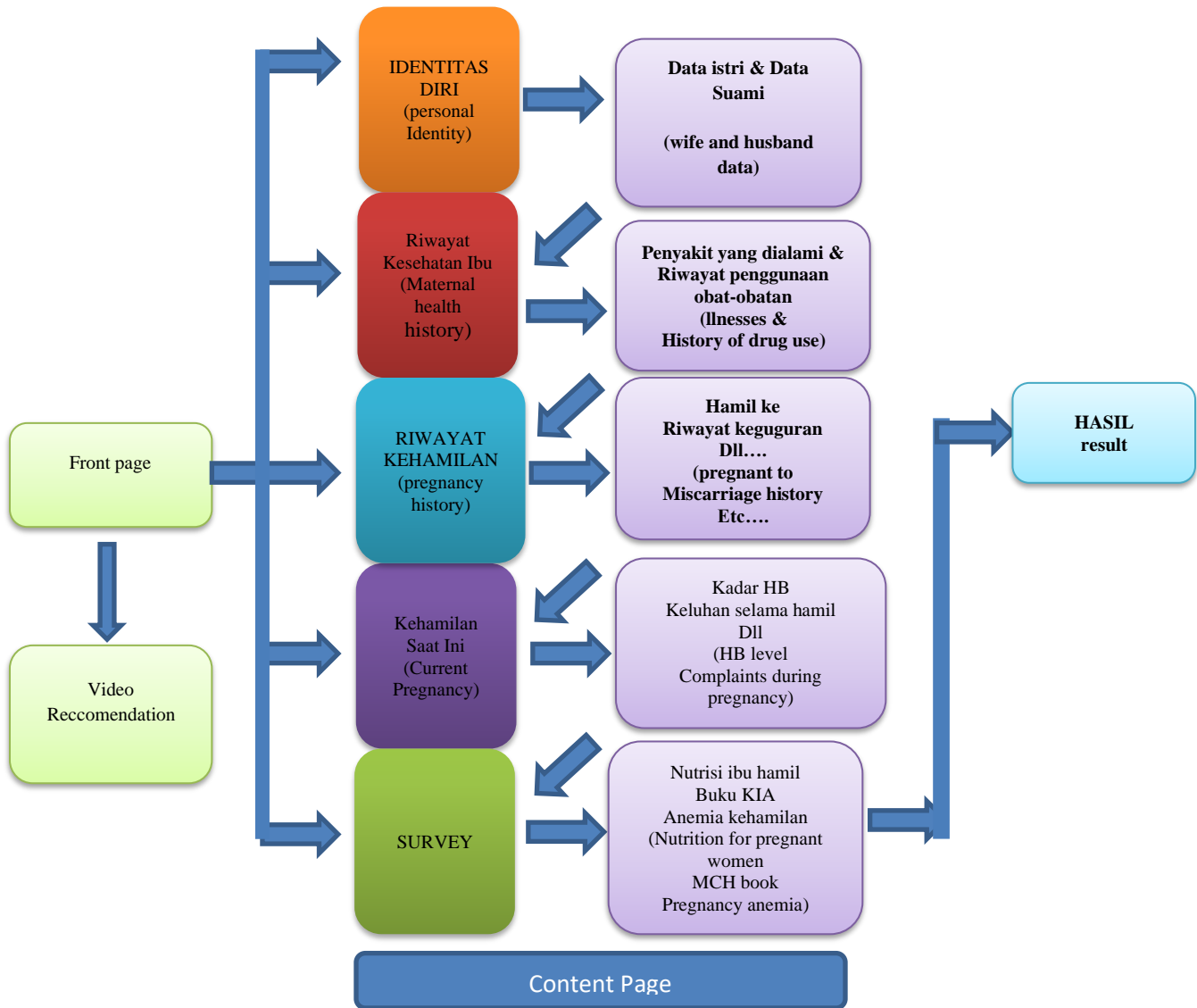
At this stage an analysis is carried out on several reference sources to be used as a basis in developing applications including:

a. The research of (Arasu et al., 2020) and (Lowdermilk et al., 2019) as reference material in compiling risk factors for pregnant women which include risk factors in pregnancy, antenatal care factors and social factors.

b. The MCH book (Mother Child Health)/KIA book of the Ministry of Health of the Republic of Indonesia (2021) as a reference material for recommendations which includes graphic data on weight gain, eating portions of pregnant women, physical activity of pregnant women

2. Design stage

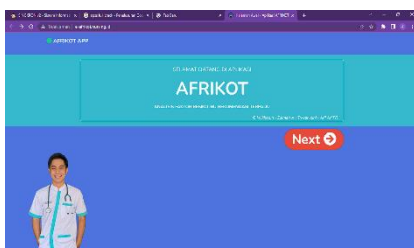
At this stage, the product design is carried out, namely the design of a flowchart which is a chart consisting of certain symbols that show the steps of a procedure or program, designing a story board as follows:



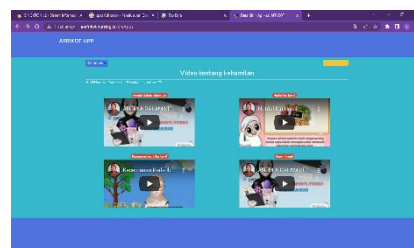
3. Development stage

The media creation stage is creating the interface, coding, testing and deploying. the application display is as follows:

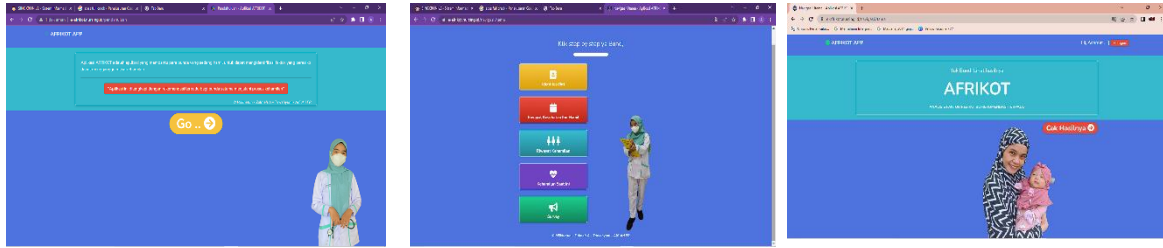
Front page view



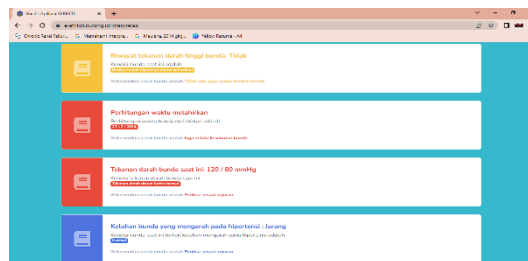
Pages for recommended videos



Contents page



results & recommendation page view



4. Implementation stage

At this stage, a field trial was conducted to pregnant women. A total of 54 people . Data on pregnant women who will be respondents were obtained from puskesmas, maternity clinics and independent midwife practices. Explanation to respondents regarding filling out the application. The implementation of filling out the application online (not face to face) by sending an application link to be filled out by the respondent.

Discussion

Antenatal care services during a pandemic require innovations that utilize technology to be able to assist mothers in knowing risk factors during pregnancy, especially in the final trimester. In addition, the use of technology can provide health education for mothers at home through recommendations (Widiasih et al., 2021) Several assessments of maternal risk factors during pregnancy have been widely studied, including those who developed a tool to assess risk factors to predict the final condition of the mother and fetus using the Rotterdam Reproductive Risk Reduction (R4U) scorecard ((Arasu et al., 2020; van Veen et al., 2015). Research on antenatal risk assessment tools to predict adverse maternal and perinatal outcomes, there are several factors that are predictive factors such as : 1) Demographic factors (Maternal demographic factors are related to age at marriage and age at first pregnancy, educational background and economic status, single mother status, working or housewives. 2) Current pregnancy risk factors (Included in the current pregnancy risk include: primigravida, unwanted pregnancy, unplanned pregnancy, age of the

pregnant woman is a teenager <19 years, maternal age> 35 years, grand multipara, anemia during pregnancy (<11g%), gestational diabetes, hypertensive disorder, antepartum haemorrhage, hypo/hyperthyroidism, STI/RTI, TORCH infection, heart disease in pregnancy, Tuberculosis in pregnancy, acute psychiatric illness, height < 140 cm, weight gain > 500 g/week, mal presentation of the fetus, self medication in the 1st trimester, multiple gestation, small for gestational age checked by scan, structural abnormality, organ abnormality, polyhydramion or oligohydramion.3) Antenatal care factors (Included in the risk of antenatal care include mothers who do not have an MCP card (Mother and child protection), pregnancy registration > 12 weeks, no pre-conceptional folic acid taken, ANC < 4 times, consumption of IFAs in pregnancy < 100, TT < 2 doses / no booster, blood draw for non-routine examination, no ultrasound examination. 4) Previous obstetric history. (Included in the previous obstetric history include the birth of the last child less than 3 years ago, repeated miscarriages (≥ 2), children who previously suffered from congenital anomalies, history of premature birth (< 37 weeks), history of birth with asphyxia, history of heavy baby birth low birth weight, history of infant death in utero, history of cesarean section, history of gestational diabetes, history of pregnancy with PIH/pre-eclampsia/HELLP, history of antepartum hemorrhage, history of MRP/PPH, rhesus incompatibility and history of puerperal sepsis. 5) Social factors. Includes single mother, teenage marriage, marriage with close family, domestic violence, husband consumes alcohol, no personal income, works with standing labor, continues to work when gestational age > 32 weeks, low socioeconomic status, family has debt, husband does not work, does not go to school. 6) Lifestyle factors (Includes chewing tobacco during pregnancy, smoking during pregnancy, passive smoking during pregnancy, alcohol consumption during pregnancy. Total sleep time < 8 hours per day, BMI < 18 kg/M² At the first visit, BMI > 30 kg/m² At the first visit, more than 1 sexual partner) (Arasu et al., 2020)

Conclusion

Research on screening for risk factors during pregnancy is urgently needed to prevent worsening of outcomes for both mother and baby. Prediction tools or assessment of risk factors during pregnancy can be made in the form of an application so that it can reach the majority of pregnant women, especially during a pandemic. This application allows pregnant women to know the risks during pregnancy and also recommendations according to the degree of risk they have.

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