

Android-based "MamaKIA" Educational Media Development Application for Pregnancy Midwifery Care

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ABSTRACT

An Android-based pregnancy care application designed and adapted to the needs of pregnant women is part of efforts to encourage sustainable midwifery care, which is expected to make it easier to convey, understand, and apply because it is in accordance with current client needs. This research aims to develop android-based educational media for midwifery care. The development of Android-based Midwifery Care Education Media was carried out using a research and development approach consisting of a preliminary study stage consisting of a literature study and field study (two respondents), and product development consisting of product design and media expert validation testing. (one respondent), material experts (one respondent), and application trials by community health center midwives in the work area of the Konawe District Health Service (35 respondents) who were selected using purposive sampling. Research data were collected using questionnaires, and quantitative and qualitative analyses were conducted. The validation results from media experts obtained a score of 69.47% in the feasible category and 98.33% from material experts in the very appropriate category, and the test results from 35 respondents obtained a score of 92.86%, including the very appropriate category. The Android-based educational media application developed for midwifery care is very suitable for use and needs to be tested for its effectiveness in midwifery care during pregnancy. The "Mama KIA" application is very feasible in terms of materials, media, and testing and meets the requirements for midwifery care by midwives.

Keywords: *Pregnancy Care, Educational Media, Android, Mama KIA, Application Development*

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INTRODUCTION

Currently, Internet technology is widely available on smartphones. Currently, smartphones are equipped with social media sites and application software applications ¹. Android is a form of current technological development, and it is estimated that in 2021, Android users will reach 1.5 billion ². Everyone uses the Internet to obtain the necessary information. This information can be found on

the Internet by anyone who accesses it. Pregnant women are motivated to obtain the information they need during pregnancy ³. Midwifery documentation is very important for midwives to provide services because midwifery services provided to clients require recording and reporting that can be used as a reference to claim responsibility and accountability for various problems that may be experienced by clients related to the services provided ⁴. Documentation refers to authentic

notes or original documents that can be used as evidence in legal matters⁵. Documentation in midwifery is evidence of recording and reporting that midwives have in carrying out care records that are beneficial not only for the interests of clients but also for midwives and the health team in providing health services based on accurate and complete written communication⁶. Apart from being a recording and reporting system, midwifery documentation is also used as information about the patient's health status as a whole in midwifery care activities carried out by the midwife. Documentation also plays a role in the collection, storage, and dissemination of information to maintain a number of important facts continuously at the same time as a number of events⁷.

Danger signs of pregnancy are those that mothers encounter during pregnancy and are used as warning signs. These danger signs are used by mothers and healthcare providers to indicate that pregnancy complications occur immediately. One of the main factors causing maternal death is the mother's lack of knowledge and insight into the dangerous signs of pregnancy⁸. Every woman needs to be aware of the danger signs during pregnancy due to unpredictable complications. The dangerous signs during pregnancy include bleeding, blurred vision, seizures, dizziness, swollen feet and hands, and fever^{9,10,11}.

There are several factors that cause maternal death, one of which is a lack of knowledge among women, families, and medical personnel about the dangerous signs of pregnancy. The most common cause of maternal death is delays in decision-making and delays in receiving appropriate action^{12,13}. Knowledge about the danger signs of pregnancy will help mothers and families make the right decisions to get fast and appropriate treatment, reducing maternal mortality¹⁰. Providing education to pregnant women is one way to reduce the MMR. However, only 54% of pregnant women received appropriate and efficient health education. The average satisfaction level of the pregnant women who received ANC services from health workers was 67.38%. The average dissatisfaction rate of the pregnant women was 48.20%. This figure shows that the quality of service and management of ANC services in Indonesia remains a critical issue^{14,15,16}.

Maternal Mortality Rate is an indicator

of the success of maternal health efforts and the level of public health¹⁷. In Indonesia, the maternal mortality rate increased from 265 per 100,000 live births in 2000 to 126 per 100,000 live births in 2015¹⁸. However, this figure does not meet the MDGs target of 102 per 1,000 live births¹⁹. In contrast, neonatal and under-five deaths decreased respectively from 22.3 per 1,000 live births and 52.3 per 1,000 live births in 2000 to 13.7 per 1,000 live births and 26.0 per 1,000 live births, respectively¹⁸. Indonesia, as part of the global community, will face even greater challenges through the joint commitment contained in the Sustainable Development Goals (SDGs), namely, reducing the global maternal mortality rate to less than 70 per 100,000 live births and the newborn mortality rate to less than 12 per 1,000 live births, and the maternal mortality rate in each country is no more than 140 per 100,000 live births in 2030²⁰. To achieve this, efforts are needed to provide access to maternal and child health services as well as family planning services as part of efforts to accelerate the reduction in maternal mortality¹⁷.

Improving education and midwifery services can reduce maternal and infant morbidity and mortality rates, improve psychosocial conditions, reduce medical interventions, improve public health, and improve outcomes from health services²¹. Health services are provided by midwives at home, in the community, and in health service facilities. Education and health promotion are efforts made by midwives to encourage clients to maintain and improve the quality of their health, pregnancy, and baby. The use of smartphone-based health applications is currently increasing along with the increasing use of smartphones. In general, people are interested in providing health information on their cell phones. The use of smartphone-based health applications has been proven to effectively support health promotion^{22,23}.

Currently, there has been an increase in the use of health platforms to obtain information that supports pregnancy²⁴. The provision of education is increasingly being developed through the availability of various educational applications, especially for pregnant women, which can be accessed online. Various applications have been developed to support maternal and child health, such as an Android-based pregnant women's health application²⁵, smartphone-based prenatal education for

parents with risk factors for preterm birth²⁶, and applications for early detection of high-risk pregnancies. Pregnant women use health applications more to obtain information that supports their pregnancy than face-to-face meetings or using pregnancy health books²⁴. If midwives provide education using an application that can be used during antenatal care, or when clients and families can access it themselves from home, it is hoped that it can be designed systematically and according to the mother's needs in each phase.

In an effort to increase promotive and preventive efforts to support sustainable midwifery care, the creation of online educational media for sustainable midwifery care is expected to support midwives and students as prospective midwives in providing comprehensive midwifery care that will support the empowerment of women and families, as well as supporting mothers and families to maintain and improve maternal and child health. Applications that are designed and adapted to the needs of mothers are part of efforts to encourage sustainable midwifery care, with the hope that they can make information easier to convey and be understood and applied because it suits the client's needs. This research aimed to provide an Android-based midwifery care educational application that can support the educational process provided by midwives in providing sustainable midwifery care.

METHOD

Android-based Midwifery Care Education Media was developed using a research and development approach. The Mama KIA application can be accessed via the website with the link <https://play.google.com/store/apps/details?id=com.mamakia>. This research consists of stages of preliminary studies, product development, and product testing²⁷. The preliminary study has several stages, namely, literature study and field survey, to prepare content drafts for educational media. Next, product development is carried out, including product design stages and product validation tests by 1 (one) media expert and 1 (one) material expert, followed by a product revision stage resulting from validation tests. The final stage was product testing on users of 35 midwives from 4 (four) community health centers in the work area of the North Konawe Health Service, who were selected

using purposive sampling, followed by final revision. The inclusion criteria for determining the sample were midwives who had actively worked for at least 5 years in their work area. Quantitative and qualitative data were used for data analysis. Quantitative data was obtained from the results of filling out validation questionnaires from material experts and media experts, as well as assessing the feasibility of the application by midwives, while qualitative data was obtained through suggestions/input provided by media experts and material experts during validation tests, and midwives during application trials.

RESULTS AND DISCUSSIONS

This application was developed through several stages, including preliminary studies, product/application design, validation tests, product revisions, trials, and revisions. The following is a display of the Mama Kia application on an Android smartphone:

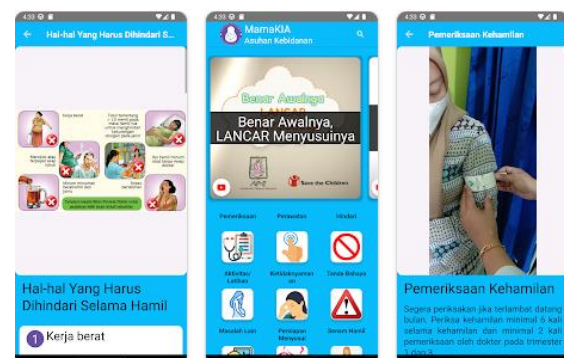


Figure 1. Display of the Mama Kia Application on an Android Smartphone

The stages carried out in the preliminary study included a literature review and field survey. A literature study was conducted to determine what education should be given to mothers during pregnancy care and 10 educational items were obtained, including: pregnancy checks, daily care during pregnancy, things to avoid during pregnancy, physical activity and exercise, discomfort during pregnancy and its management, lactation management, pregnancy exercises, danger signs of pregnancy, other problems in pregnancy, and preparation for childbirth.

Furthermore, the results of the study were compiled in a questionnaire containing

pregnancy education material, midwives' level of approval (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), and suggestions. The questionnaire was then used during a field survey involving 2 (two) midwives to determine the material needed by midwives to provide education to pregnant women via an android-based application. The results of the field survey showed that all respondents agreed with the ten educational items, with a range between agree and strongly agree. Some of the suggestions given include (1) pregnancy counseling, (2) fetal stimulation, (3) avoidance of foods/drinks during pregnancy, (4) contraindications for pregnancy exercise, and (5) use of postpartum contraception. At this stage, the content is obtained for application design, which is then used to prepare the initial product in the form of educational material concepts that will be included in the application to be developed.

The next stage of research is to design an Android-based midwifery care educational media application. The product developed in this study is an Android-based application that can be accessed offline. This application consists of information in the form of articles and videos, an educational menu (examination, treatment, avoidance, activities/exercises, discomfort, danger signs, other problems, preparation for breastfeeding, pregnancy exercise, preparation for childbirth, and postpartum contraception), and an item search (item education, articles, videos). After product development was completed, an Android-based midwifery care application media was obtained with the application name "MamaKIA" which was taken from the acronym "Teaching Media for Understanding Maternal and Child Health" as the initial application product.

Next, the research carried out feasibility tests were conducted for the applications that were created, including media expert validation

tests, material expert validation tests, and application trials. This feasibility test uses statements on a Likert scale, namely, 5 (strongly agree), 4 (agree), 3 (so-so), 2 (disagree), and 1 (strongly disagree)²⁸. Criteria for interpreting media suitability include: 0% - 20% = very unfit, 21% - 40% = Not worth it, 41% - 60% = Quite Decent, 61% - 80% = Decent, 81% - 100% = Very Decent²⁹.

At the media expert validation stage, the researcher provided a media expert validation questionnaire sheet that contained statements about the suitability of the display (seven statement items), ease of use (four statement items), and consistency and graphic presentation (eight statement items). Media experts provide recommendations that the application is suitable for use with revisions with several inputs regarding the use of color and type as well as font size in the application. At the material expert validation stage, the researcher conducted a feasibility test of the application from the aspects of appropriateness of content (five statements), language (five statements), and presentation (two statements) using material experts from a midwife professional organization. The trial stage for using the application was carried out with 35 midwives from 4 (four) Community Health Centers in the work area of the Konawe District Health Service. Trial use of the application was carried out with pregnant women, where midwives provided pregnancy education using the application to pregnant women and then filled out a questionnaire containing a statement regarding the suitability of using the application. The trial questionnaire consisted of 14 statement items, with statements related to perceived ease of use (three statement items), perceived usefulness (three statement items), attitude toward (three statement items), behavioral intention (three statement items), and actual usage (two statement items).

Table 1. Validation Results of Media Experts and Material Experts

| Variable | Media Expert Validation | Material Expert Validation | Test Results |
|------------------|-------------------------|----------------------------|--------------|
| Total Score | 66 | 59 | 2450 |
| Score Percentage | 69,47 | 98,33 | 92,86 |
| Score Intervals | 61%<X<80% | 81%<X<100% | 81%<X<100% |
| Category | Worthy | very worthy | very worthy |

Design revisions are carried out to make improvements to applications that have been designed based on assessments carried out by media and material experts, so that the application is suitable for testing on users. Based on the results of the product feasibility assessment, this Android-based midwifery care educational media application was found to be highly feasible. At this final stage, few changes have been made. The changes made are aimed at improving the product, namely, adding the appearance of the application in the form of images and materials.

With the increase in smartphone users and easy access to information through mobile applications, it is concluded that these interventions influence knowledge and individual gain and can help mothers maintain health, manage individual conditions, and take preventive measures³⁰. According to³¹, Android is an open mobile operating system based on Linux. Android can be used by anyone who wants to use it on their device. The factor causing the popularity of Android applications is the speed factor, which is the efficiency of the application in providing data according to the user's wishes³². Health information, especially regarding the dangerous signs of pregnancy, is easy to obtain, not only from the health sector. However, currently, there are many mass media that facilitate and provide detailed educational information about pregnancy^{33,34}. However, web-based systems are highly dependent on the availability of a good and stable internet network to access a project that will be created³⁵. In addition, a web system also requires a good network security system so that the work created will be better and last for a certain period of time; therefore, additional costs are needed for hosting and cyber security services³⁶.

Switching a system from a conventional to an android-based application requires further work and complete rebuilding of the system^{37,38,39}. Some of the advantages that can be achieved if the system is upgraded to Android applications include increased practicality, web hosting is no longer needed, and users can avoid Internet access when using the system because it requires only one installation^{40,41}.

CONCLUSION

This midwifery care educational media application contains material related to adolescent reproductive health, including pregnancy checks, daily care during pregnancy, things to avoid during pregnancy, physical activity and exercise, discomfort during pregnancy and its management, and lactation management., pregnancy exercises, dangerous signs of pregnancy, other problems during pregnancy, preparation for childbirth, and postpartum contraception. The application validation stage was carried out by media experts, with a score of 69.47% in the feasible category and 98.33% from material experts in the very feasible category. The test results from 35 respondents, including the very feasible category, obtained a score of 92.86 %. The "Mama KIA" application developed is very feasible in terms of materials, media and testing and meets the requirements for use during midwifery care by midwives.

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