

DESIGN OF THE ANDROID-BASED MALARIA-MAPPING APPLICATION MOBFABRIA

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ABSTRACT

Malaria represents one of the tropical diseases and a health problem in the East Nusa Tenggara (NTT) Province. Malaria cases are still high in some districts in NTT, including East Sumba, Central Sumba, West Sumba, and Southwest Sumba. Infants, children, and pregnant women are the high-risk groups to suffer from malaria. The highest number of cases was recorded in Southwest Sumba district with 4,273 cases in November 2022. This situation requires preventive and curative actions to address malaria cases in NTT. These actions include health education and malaria data mapping for high-risk groups in malaria-endemic areas. It is expected that these measures will assist in healthcare services, especially in malaria-endemic areas. Considering the current phenomenon of digital era development, the researchers have designed an Android-based mapping and education application for malaria called “mobfabria”. To develop a prototype of the mobfabria applicatio. This is research and development study. The research was conducted in 2023, where the application test took place from March to April 2023 at the Oemasi Health Center in Kupang District. The research subjects consisted of 5 individuals during the development stage and 15 pregnant women during the evaluation stage. The application created by the researchers can be downloaded from the Play Store: <https://play.google.com/store/apps/details?id=com.mobfabria.apps>. The research stages are approval, ethical test, instrument test, and application test. The application is developed according to the needs analysis, system design, and database. It was built using Android tools. The assessment by experts in health promotion, media, and malaria practitioners was considered good enough, leading to changes in the application's interface design and data storage units. The data was analyzed descriptively. Mapping and data collection of pregnant women with malaria can be accurately obtained. This application is expected to be used for healthcare services and facilities in malaria-endemic areas.

Keywords: application; malaria; mobfabria; mapping

INTRODUCTION

Malaria is one of the tropical diseases and a health problem in the East Nusa Tenggara (NTT) Province. Malaria cases are still high in several districts in NTT, namely East Sumba, Central Sumba, West Sumba, and Southwest Sumba. Infants, children, and pregnant women are the high-risk groups to suffer from malaria. The highest number of cases was recorded in Southwest Sumba district with 4,273 cases in November 2022. Data shows that 80 percent of malaria cases in the NTT Province are from Sumba Island, with the highest incidence among children (33%), toddlers (14%), and pregnant women (1.7%) (Bureau of Communication and Public Services, 2021). This situation requires preventive and curative actions to address malaria cases in NTT. These actions include health education and malaria data mapping for high-risk groups in malaria-endemic areas. It is expected that these measures will assist in healthcare services, especially in malaria-endemic areas. Considering the current phenomenon of digital era development, the researchers have designed an Android-based mapping and education application for malaria called “mobfabria”.

METHOD

The methodology used is research and development. The research was conducted in 2023, with the application test taking place from March to April 2023 at the Oemasi Health Center in Kupang District. The research subjects consisted of 5 individuals during the development stage and 15 pregnant women during the evaluation stage. The application created by the researchers can be downloaded from the Play Store: <https://play.google.com/store/apps/details?id=com.mobfabria.apps>

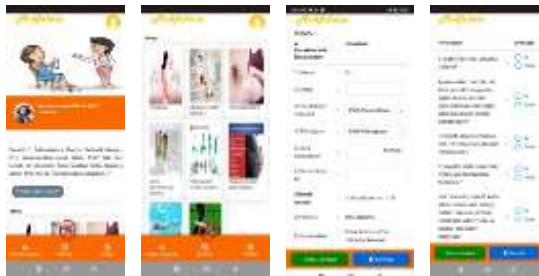


Figure 1. Application Mobfabria from playstore

This research went through the stages of approval, ethical test, instrument test, and application test.

RESULTS AND DISCUSSION

The researchers conducted the research stages according to Dick et al. (2005) in (Maydiantoro, 2019), using the ADDIE model which consists of five development stages including Analysis, Design, Development or Production, Implementation or Delivery, and Evaluation. The description of these five stages is provided below.

1. Analysis Stage

The researchers conducted research development based on a previous study, which focused on malaria and pregnancy prevention education through the Malaria and Pregnancy application in Southwest Sumba in 2022, which had its limitations as it only provided information on malaria detection and prevention. Its use was restricted to increasing knowledge and behavior change (Kapitan, 2022) (Kapitan et al., 2023). Based on the data mentioned above, the researchers developed an application model that can be used by healthcare professionals and patients for mapping the risk factors for pregnant women in areas with high, moderate, or low endemicity. The application is called “mobfabria”, which stands for “mother and baby free malaria”.

2. Learning Design Stage

The researchers developed and designed educational materials that contain the general explanation of the "malaria and pregnancy" education model (objectives and benefits), malaria definition, signs and symptoms, complications of malaria in pregnant women, complications of malaria in the fetus, types of malaria detection tests, prevention and treatment of malaria during pregnancy according to WHO guidelines, and malaria distribution map in NTT. Additionally, a questionnaire is prepared, covering respondent characteristics, malaria history, and risk factors.

3. Development Stage

During this stage, the researchers consulted with experts in malaria content, graphic designers, application developers, and media promotion practitioners. After completing this stage, the application is ready to be published on the Play Store.

4. Implementation Stage

The Research Team conducted a test at the Oemasi Health Center in Kupang District, with a sample size of 15 pregnant women. During this implementation stage, the test was conducted with pregnant women as respondents and two nurses as healthcare professionals.

5. Evaluation Stage

In this stage, an evaluation was carried out on the use of the application and the data entered by the respondents. The selection of respondents as samples was based on inclusion criteria, willingness to participate, current pregnancy status, ability to read and write in Indonesian, owning an Android smartphone, absence of mental disorders, and residing in the Oemasi Health Center area of Kupang District. The data shows that the risk factors for the 15 pregnant women are categorized as 21% high risk, 38% moderate risk, and 41% low risk.

Mapping a research field can be done through survey activities to study various individuals from a population, which benefits and leads to conclusions, plans, and decisions. The survey method used by the researchers varies, usually through manual means such as distributing questionnaires and conducting direct interviews. In the era of globalization, survey activities have been facilitated by information technology and Android devices to help researchers carry out such activity. Research conducted by several researchers in the development of information systems for healthcare, particularly malaria, such as e-SISMAL, location-based service methods, and mapping of malaria-prone areas (Hasyim et al., 2020), (Razaq & Jananto, 2014), (Kodja et al., 2018), have had a positive impact on the advancement of scientific knowledge through healthcare service innovation. Through smartphones, the reach of survey activities has expanded with affordable costs. The previous research methods involved literature review, prototype development, and training. The research design carried out by the researchers involved the development of a prototype and direct test on the target group, using a pre-experimental research design. The mapping designed in this research specifically focuses on the information system mapping for detecting malaria in pregnant women, using maps combined with the eHealth application of the previous researchers that promotes malaria detection and prevention during pregnancy. This differs from previous research, which was limited to malaria data processing, identifying malaria-prone locations, and locating the nearest healthcare facilities.

Based on the results of the research in the evaluation stage, it is evident that the majority of respondents have never experienced malaria. This aligns with the malaria data in Kupang District, which indicates low malaria prevalence in the area. This research supports the healthcare services in the era of the industrial revolution and society 5.0. Healthcare or nursing services in the era of the industrial revolution 4.0 and society 5.0 can be seen as effective and efficient through promotive and preventive services. Promotive and preventive services provide opportunities for individuals to access health information not only at healthcare facilities such as community health centers, clinics, and hospitals, but also from home, office, and other locations. This provides convenience for people of all ages to learn and understand preventive measures, early detection of specific diseases, and what to do when experiencing signs and symptoms of illness. In line with the research

innovation in promoting and early detection of infectious diseases conducted by Kapitan (2022), the data on respondent characteristics, which mostly have higher education levels, employment, and fall within the healthy reproductive age group, strongly support health promotion programs in the prevention of malaria among pregnant women.

Health promotion encompasses activities aimed at modifying behavior, developing healthy lifestyles, and enhancing the ability to control one's health. To achieve the goals of health promotion, strategies such as biomedical (medicine, screening), behavior programs (education), social determinants (empowerment), and the digital era (digital health promotion) are needed. The most commonly used terminologies for health promotion in the current digital era are eHealth, mHealth, and connected health. Health promotion in the digital era can be applied to groups with higher education, good knowledge, and tends to be used by working mothers. Health promotion needs to be conducted continuously, not just once. The utilization of eHealth methods greatly assists respondents in learning about malaria, and its negative impacts on the health of pregnant women and the fetus they are carrying (Kapitan, 2022).

CONCLUSION

The mobfabria application is an educational and mapping application for identifying the risk factors of malaria in pregnant women in both high-risk and low-risk malaria areas. Mapping and data collection of pregnant women with malaria can be accurately obtained through this application. It is expected that this application can be used for healthcare services and facilities in malaria-endemic areas.

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