



Android-Based Adolescent Reproductive Health Application (*Kepo Remaja*) as an Educational Media for Preventing Early-Age Pregnancy

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ABSTRACT

Adolescent pregnancy remains a reproductive health issue faced by many countries, including Indonesia. It is often associated with various health problems that may endanger the mother and the baby. Pregnancy at a young age poses significant health risks, highlighting the need for efforts to reduce adolescent pregnancy rates and mitigate its impacts through reproductive health education and improved access to adolescent-friendly health services. This study aimed to develop an Android-based reproductive health application, “Kepo Remaja,” as an educational tool for preventing early-age pregnancy. The research employed a Research and Development (R&D) design using the ADDIE model. This study was conducted in Central Maluku Regency. Validation or feasibility testing of the Kepo Remaja reproductive health application was carried out by material experts and media experts. During the application development stage, a needs analysis was performed to determine required features, including a pretest survey, self-diagnosis, health checks, a health consultation service, reading materials, and health information. The application was then developed and validated by experts. Material experts provided an average score of 94.26%, and media experts gave an average score of 94.31%, both falling into the “excellent” category. In conclusion, the Kepo Remaja Adolescent Reproductive Health Application is engaging, easy to understand, and has been proven feasible for use as an educational medium for preventing adolescent pregnancy.

Keywords: Adolescent Reproductive Health, Application, Early Pregnancy

INTRODUCTION

Adolescent pregnancy is one of the factors that increases medical risks and complications, potentially endangering the lives of both mother and baby. Although adolescent birth rates declined from 64.5 births per 1.000 girls aged 15-19 in 2000 to approximately 41.3 per 1.000 in the early 2020 (Gyabaa et al., 2025; Varmaghani et al., 2024). Global data from 2023 indicate that pregnancy at a very young age continues to be a serious concern. Approximately 13% of adolescent girls and young women worldwide are known to have given birth before the age of 18. This figure suggests that nearly one in six young women experience pregnancy and childbirth during adolescence, a condition with profound implications for health, education, and social well-being (UNICEF, 2024)

Based on data from the Adolescent Care Health Services (PKPR) of the Central Maluku District Health Office in 2022, there were 73 adolescents who gave birth and 12 adolescents who experienced abortion at the ages of 10–19 years. Central Maluku District faces numerous challenges in delivering reproductive health promotion to adolescents. These challenges stem from its archipelagic

geography and limited supporting infrastructure. The dissemination of reproductive health information in the Maluku islands, particularly in Central Maluku, remains suboptimal and has not reached all segments of the population, especially communities in remote areas. Limited health human resources are a major factor hindering the implementation of reproductive health promotion, particularly efforts to prevent adolescent pregnancy (Afifa et al., 2025). The number of health workers is not proportional to the vast geographic area and the large adolescent population, making educational programs difficult to implement effectively.

Access to health services in archipelagic regions often encounters obstacles such as long distances between islands, limited transportation options, and inadequate health facilities (Leosari et al., 2023). These conditions result in an uneven distribution of reproductive health information, especially for adolescents. Furthermore, the lack of educational media or visual aids presents another challenge in conducting reproductive health promotion (Hardianti et al., 2025). Many health facilities lack adequate teaching materials, either due to budget constraints or because reproductive health education has not been

prioritized within reproductive health programs. Counseling activities often rely solely on verbal communication, which can reduce the effectiveness of delivering content, particularly topics requiring visual explanation. Therefore, there is a need for health promotion media capable of reaching archipelagic areas effectively while also engaging adolescents, so that reproductive health information can be communicated more optimally (Anggraini et al., 2025; Qosim et al., 2025).

The use of health promotion media presents an opportunity to strengthen information delivery and health promotion efforts (Ferretti et al., 2023; Sholihah et al., 2025). Advances in digital technology, especially Android-based applications accessed through smartphones, have opened new avenues for improving adolescent reproductive health. Various studies show that Android-based applications can serve as highly effective tools for delivering reproductive health information through features such as short reminders, routine notifications, and easily accessible educational materials (Angesti et al., 2025; Dinç et al., 2025). Digital health technology has grown rapidly in recent years, marked by the increasing number of smartphone-based health applications designed to meet diverse user needs, including reproductive health. Currently, more than 325,000 Android-

based health applications are available globally, reflecting users' strong interest in and need for digital health services (Wanni et al., 2024). In response to these challenges, this study aims to develop an Android-based reproductive health application named Kepo Remaja as an educational medium for preventing early-age pregnancy.

METHOD

This study was conducted in Central Maluku Regency from July 2024 to February 2025 employing a research and development design based on the ADDIE model (analysis, design, development, implementation, and evaluation) (Creswell, 2023). The subjects included five material experts and two media experts. Each validator possessed diverse expertise aligned with their educational background and professional field. Their participation in the validation process ensured the accuracy and quality of the product being developed. Validators specializing in midwifery, reproductive health, and obstetrics and gynecology assessed the accuracy of the medical information. Validators from the education field evaluated whether the material matched adolescents' cognitive development stages. Meanwhile, validators representing religious and cultural perspectives examined the extent to which

the content and methods of reproductive health education aligned with prevailing social values and norms. Media experts assessed whether the media design was sufficiently attractive to adolescents so that the delivered messages could be effectively received. The object of this study was the Android-based adolescent reproductive health application named *Keпо Remaja*. The aspects evaluated by material experts included material relevance, presentation quality, and user aspects. The aspects evaluated by media experts included theme design, interface, typography, and software engineering components. Qualitative data were collected through in-depth interviews to explore needs analysis, while quantitative data were obtained through questionnaires used to assess the application.

This study received ethical approval from the Health Research Ethics Committee of Dr. Moewardi General Hospital under approval number: 1.617/VI/HREC/2024.

RESULTS AND DISCUSSIONS

Result

1. Analysis Stage

The outcome of this research and development process is an Android-based reproductive health application designed to help prevent teenage pregnancy. The development process involved three main stages: analysis, design, and development.

During the analysis stage, the researcher identified needs related to reproductive health promotion for teenage pregnancy prevention by examining conditions at the program and service levels. Data obtained from program managers of PKPR at the Central Maluku District Health Office and midwives at community health centers (*Puskesmas*) indicated that multiple barriers affected the effectiveness of teenage pregnancy prevention efforts in Central Maluku.

The findings showed that geographical characteristics and limited supporting infrastructure posed significant challenges in delivering reproductive health promotion to adolescents. The archipelagic nature of the region, combined with minimal infrastructure, long distances to health facilities, and shortages of healthcare personnel, reduced adolescents' access to reproductive health information and essential health services, particularly in remote areas.

In addition to structural and geographical constraints, the analysis also revealed informational limitations as an important contributing factor to teenage pregnancy. Limited access to comprehensive and accurate sexual and reproductive health education caused adolescents, especially those living in remote areas, to rely on peers and their surrounding social environment as primary sources of information, which increased the risk of misinformation.

2. Design Stage

After completing the analysis, the researcher proceeded to the design stage. At this stage, the concept was developed based on the identified needs and described clearly and in detail. The designed product was still conceptual and served as the foundation for subsequent development. The researcher created a prototype model for reproductive health promotion. This stage involved preparing the product design prior to its development. The design was based on the needs identified earlier. The researcher planned an adolescent reproductive health application to serve as a medium for health promotion. The purpose of this design phase was to produce a standardized blueprint that would guide the development of the promotional media aimed at preventing teenage pregnancy.

The planned application consists of several main features: a pretest survey (36 items), self-diagnosis, health check tools (menstrual calendar, iron-tablet intake monitor), a health Q&A service (covering health, religious, educational, and general topics), reading materials (leaflets and a

teenage pregnancy prevention handbook), and health information.

- a. Pretest Survey (36 items): Contains questions on knowledge about teenage pregnancy, its influencing factors, and its consequences.
- b. Self-diagnosis: Allows users to assess their physical conditions and personal habits to build self-awareness.
- c. Health Check: Includes a menstrual calendar to track normal and abnormal cycles, and an iron-tablet intake monitor to schedule or remind users about consumption.
- d. Health Q&A Service: Provides a forum for questions related to reproductive health and teenage pregnancy across health, religious, educational, and general service topics.
- e. Reading Materials: Includes leaflets (“recognize, understand, and prevent teenage pregnancy”) and a teenage pregnancy prevention booklet.
- f. Health Information: Contains additional information relevant to teenage pregnancy prevention.

The initial screen displays the first view seen when the application is opened.



Figure 1. Initial Application Interface

The main menu provides six options: pretest survey, self-diagnosis, health

check, health Q&A service, reading materials, and health information.

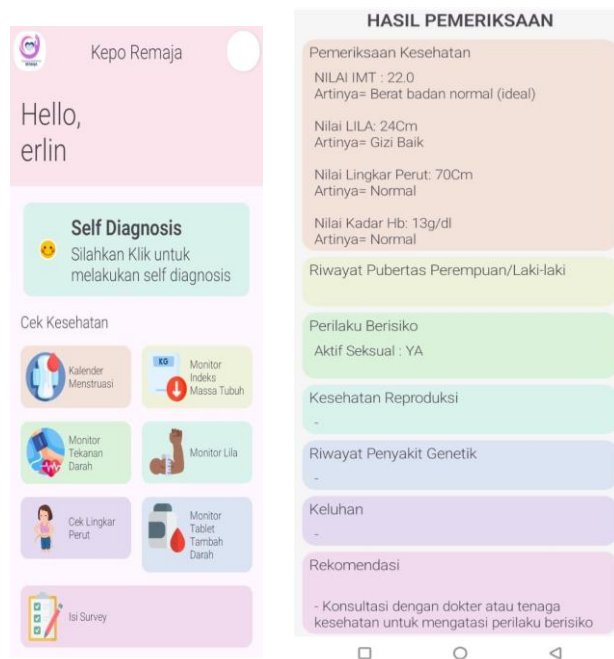


Figure 2. Main Menu of the Kepo Remaja Application

3. Development Stage

The development stage is the continuation of the earlier design stage. In this regard, the conceptual design was transformed into a functional product ready for implementation. The researcher collaborated with experts and conducted validation processes according to their areas of expertise. Experts were selected based on their competence and interest in

the subject matter. The experts involved as validators were as follows.

a. Material Experts

Material experts for the Kepo Remaja reproductive health application included specialists in obstetrics and gynecology, reproductive health, midwifery, socio-cultural studies, and religious studies. They were selected for their relevant competencies in both reproductive health and religious perspectives.

Table 1. Summary of Material Exper Validation

Item	Validator Scores					Total
	1	2	3	4	5	
Material Relevance Aspect						
Alignment of content with reproductive health concepts	4	4	4	3	3	18
The material presented is easy to understand	4	4	4	4	4	20
The material is presented clearly	4	4	3	4	3	18
Sufficiency of content/material to achieve objectives	4	4	4	3	4	19
Language used is easy to understand	4	4	4	4	4	20
Appropriateness of language for adolescents' cognitive level	3	4	3	4	4	18
Politeness in language use	4	4	4	4	4	20
Accuracy of text in relation to the material	4	4	4	3	4	19
Appropriateness and accuracy of terminology	4	4	4	3	3	18
Completeness of the material presented	3	3	4	3	4	17
Presentation Aspect						
Application's design appearance is attractive	4	4	4	4	3	19
Neatness of menu layout in the application	3	3	4	4	4	18
Neat arrangement of text, images, and content	4	3	4	3	4	18
Appropriate and appealing color selection	4	4	4	4	4	20
Appropriateness of font type used	4	3	3	4	3	17
Text readability	4	3	4	4	3	18
Images presented support the content	4	4	4	3	4	19
Usability Aspect						
Clarity of usage instructions	4	4	4	4	4	20
Ease of application use	4	4	4	4	4	20
The application runs smoothly	4	4	4	4	4	20
The application broadens adolescents' knowledge	4	4	4	4	4	20
Total	81	79	81	77	78	
Percentage	96.42%	94.04%	96.42%	91.66%	92.85%	
Final Average Score						94.26
Category						Excellent

b. Media Experts

The media experts involved in this development were specialists in instructional media. Their selection was

based on their expertise in educational technology.

Table 2. Summary of Media Expert Validation

Item	Validator Scores		Total
	1	2	
Theme Design Aspect			
The media uses an attractive theme design	4	4	8
The media incorporates multimedia elements	4	3	7
The media uses an integrated and consistent theme design	3	4	7
Interface Aspect			
The media uses a simple and non-confusing display	4	4	8
The media has consistent layouting	3	4	7
Typography Aspect			
The media uses suitable and readable text styles, types, and colors	4	4	8
Text placement is accurate and does not obstruct other elements	3	4	7
The design is orderly and consistent	4	4	8
Appropriateness of images with the material	3	4	7
Software Engineering Aspect Lunak			
Easy to operate	4	4	8

Can be used anytime and anywhere	4	4	8
Total		40	43
Percentage		90.90%	97.72%
Final Average Score		94.31	
Category		Excellent	

Discussion

The adolescent reproductive health application Kepo Remaja was developed through three stages: analysis, design, and development. The feasibility assessment conducted by material experts consisted of 21 items. The average score from five validators was 94.26%, categorized as excellent. Thus, it can be concluded that the Kepo Remaja application is highly suitable for use and implementation among adolescents. The feasibility assessment carried out by media experts consisted of 11 items. The average score from two validators was 94.31%, also falling into the excellent category. Therefore, it can likewise be concluded that the adolescent reproductive health application Kepo Remaja is highly feasible for adolescent users.

Recent advances in digital technology have brought forward various innovations in the health sector, including the ability to remotely monitor health parameters through Android-based applications (Byrne et al., 2025). In general, such applications are considered low-cost tools because they do not require special equipment beyond a smartphone, which

most users already own. Moreover, health applications offer the convenience of private use without the need to visit health facilities, thereby minimizing barriers such as embarrassment or concerns about stigma (Marciniak et al., 2025). These advantages position mobile health applications like Kepo Remaja as accessible, user-friendly, and scalable tools for adolescent health education, particularly in resource-limited settings where direct access to healthcare services may be constrained.

Reproductive health is not limited to pregnancy and childbirth but encompasses a range of life experiences encountered by both males and females across developmental stages. It relates to an individual's ability to achieve a healthy sexual life and to exercise control over reproductive decisions according to personal preferences (Galal et al., 2022; Weerasinghe et al., 2025). The development of the Kepo Remaja adolescent reproductive health application reflects the increasing use of digital technology to assist adolescent girls in managing their menstrual cycles. The application can be downloaded via Google

Play and provides information on preventing teenage pregnancy. In addition, Kepo Remaja offers predictions regarding possible menstrual delays, helping users understand their menstrual patterns more accurately (Muehlmann & Tomczyk, 2023; Supriyadi et al., 2024). With these features, digital reproductive health applications have become an innovation that enables girls and young women to access reproductive health information independently, conveniently, and sustainably (Hammond & Burdon, 2024). However, a limitation of the application lies in its reliance on user input accuracy and consistency, as incorrect or irregular data entry may affect the reliability of menstrual predictions and personalized information. In addition, the application may require periodic updates and sustained user engagement to remain effective and relevant over time.

Within the context of the public health system, the Kepo Remaja application plays a strategic role across multiple stages of health service delivery. This includes educational and preventive efforts, screening processes, diagnostic support, and monitoring activities (Moghaddambanaem et al., 2025). These findings indicate that user engagement with Android-based applications such as Kepo Remaja needs to be strengthened. Such support is essential to ensure that the

application provides optimal benefits, enhances user interaction, and facilitates the achievement of goals associated with mobile health technologies (Robertson et al., 2025). Despite its strengths in accessibility, educational value, and practical functionality, the application's effectiveness may still be limited by factors such as varying levels of digital literacy among users, unequal access to smartphones or internet connectivity, and the absence of direct professional supervision, which may be necessary for addressing complex reproductive health issues.

CONCLUSION

Based on evaluations across multiple aspects, the adolescent reproductive health application Kepo Remaja is deemed feasible for use. The assessment covered the material relevance, presentation quality, ease of use, theme design, interface, typography, and software engineering. The results indicate that the application meets the quality standards required for reproductive health education media for adolescents. Therefore, the utilization of Android-based applications among adolescents is an effective strategy for promoting reproductive health.

Practically, the application can serve as an independent learning tool for adolescents as well as a supplementary medium for

educators, health workers, and parents in delivering reproductive health education in a more accessible and private manner. From a policy perspective, the application highlights the potential for integrating digital health platforms into adolescent health programs, encouraging support from policymakers and collaboration among stakeholders to expand implementation, ensure content quality, and strengthen adolescent-friendly health services.

THANK YOU

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