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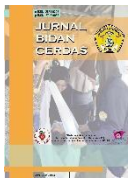

Feasibility Study of Web-Based Application Pronalin as an Educational Media to Prevent Complications in Pregnant Women

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ABSTRACT

Introduction: The percentage of obstetric complication handling in Indonesia in 2018 reached 94.16%, West Java reached 91.7% and Tasikmalaya reached 116.9%. Data from the Puspahiang Health Center shows that 90 pregnant women experience complications. Efforts to minimize the incidence of complications in pregnant women can be made through the utilization of the birth planning and complication prevention (P4K) program through education based on the pronalin web-based application. **Objective:** This study aims to analyze the feasibility of the Pronalin Web-based application as a P4K education media for pregnant women. **Method:** This study uses the research and development (R&D) method, which passes material testing and application feasibility testing. **Results:** The validation assessment by material experts showed a score of 53 (feasible) and the results of the suitability test for use by pregnant women obtained a percentage of 79.4%, which means that the pronalin web-based application is "Feasible" for use by pregnant women**.** **Conclusion:** The Pronalin web-based application is very feasible and needed according to the expectations of pregnant women in preparing for childbirth. It is recommended that Health Institutions such as Health centers improve obstetric services through socialization and use Pronalin in educational programs for pregnant women.

INTRODUCTION

The current condition of maternal and child health in Indonesia is still very important to improve and receive special attention, considering the still high Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) both in the world and in Indonesia (Manuaba, 2015). According to data from the World Health Organization (WHO), the MMR in 2022 will reach 207 per 100,000 live births, which is above the Strategic Plan target of 190 per 100,000 live births. According to the results of the National Health Demographic Survey, the maternal mortality rate during childbirth is still high until in 2019, almost every hour, two mothers giving birth die, namely 305/100,000, while the IMR reached 32 per 1000 live births (Kemenkes, 2020).

Various factors cause maternal death, both direct and indirect. The causes of maternal death in Indonesia in 2019 were mostly bleeding (1,280 cases), hypertension in pregnancy (1,066 cases), and infection (207 cases) (Ida, 2021). The causes of MMR

in West Java Province include bleeding in 226 cases, hypertension in pregnancy in 218 cases, infection in 23 cases, circulatory system disorders in 65 cases, metabolic disorders in 12 cases, and others in 140 cases. Indirect causes of death include high-risk pregnancies, namely 4 too (too young, too old, too close, too much) and three too late, Chronic Energy Deficiency (CED) in pregnancy 37% and anemia in pregnancy 40% (Hamdani, 2023). Efforts to prevent and treat obstetric complications can be made if the mother or family is aware of changes that deviate or the occurrence of danger signs during pregnancy (Davis, 2020). These efforts are the "Delivery Planning and Complication Prevention Program" or P4K (Himalaya, 2020). This is by the Circular of the Minister of Health No. 295 of 2008 concerning the Acceleration of the Implementation of the Childbirth Planning and Complication Prevention Program (P4K) with Stickers, through the implementation of this program, the condition of pregnant women can be monitored intensively so that they can undergo childbirth safely and safely and give birth to healthy babies and prevent obstetric complications (Dinkes, 2020; Kemenkes, 2021).

P4K education has been widely carried out but is still not optimal and there are still many pregnant women who do not understand the function of P4K (Wiknjosastro, 2017). Usually, P4K education is carried out face-to-face (offline), but currently not many have carried out education online (online) because no P4K education service can be used online or digitally (Arikunto, 2017). Seeing the current developments, the number of Android-based mobile phone users (smartphones) is increasing, even people in their daily lives can no longer be separated from smartphones and this can be used as a tool to convey information (Dartiwen, 2016).

Puspahiang Health Center is one of the Health Centers in Tasikmalaya Regency which obtained the number of pregnant women in 2022 as many as 570 people, from that number the percentage of coverage for handling obstetric complications in 2022 reached 83.87%, the discovery of high-risk pregnant women by the community reached 54.5% and by health workers reached 64.33%. This has not yet reached the target set at 100%. The obstetric complications that occur in pregnant women include abortion, hyperemesis gravidarum (HEG), bleeding, anemia, Chronic Energy Deficiency (KEK), and hypertension.

Efforts made by health workers at the Puspahiang Health Center to prevent obstetric complications include providing offline health education when conducting pregnancy checks, conducting pregnancy class programs, and empowering health cadres in Posyandu activities. However, in reality, there are still 90 pregnant women out of 570 who suddenly experience complications and must be referred to the hospital. Efforts to minimize such incidents are deemed necessary to monitor the development of pregnant women's health by providing web-based education (Lestari, 2019; Alessi, 2015). Seeing the current developments, the number of mobile phone users is increasing, even people in their daily lives can no longer be separated from smartphones and this can be used as a tool to convey information (Abejirinde, 2018; Kiato, 2023).

The educational media developed in this study is a web-based application called LED ProNalin Check. This application provides information on childbirth planning and prevention of complications which include components of childbirth preparation, danger signs of childbirth, antenatal care schedules, and early detection of pregnancy complications. By using Pronalin educational media, pregnant women can access and obtain knowledge about their pregnancy via smartphones. The superior features of this application provide safe birth planning including the use of postpartum contraception and can determine the midwife to be contacted if the pregnant woman experiences

signs of labor.

The innovation of the Pronalin application educational media is expected to help pregnant women facing childbirth and prevent complications. Thus, maternal mortality cases can be reduced. Based on the description, the author conducted a study aimed at analyzing the feasibility of the web-based application pronalin as a P4K educational media for pregnant women in Puspasari Village, Puspahiang District, Tasikmalaya.

METHODS

The method used in this study is Research and Development. The development research conducted by the researcher is to conduct a preliminary field testing of the LED ProNalin Check based on a web-based application. The design of the Pronalin educational media based on this website goes through several stages including analysis of potential problems, data collection, product design, design validation, design revision, product trial, and product revision.

The stages of product design carried out are: Determining the topic of educational material or content that will be developed and adjusted to the needs of pregnant women, designing a script regarding the birth planning and complication prevention (P4K) program to compile android-based educational media, designing the appearance of the content to be displayed, creating an application according to the design results that have been prepared.

After the product is finished, the next stage is the validity test for the expert team. Criteria for determining the expert are having a minimum education of magister, having experience, and being an expert in their field according to their knowledge. The aspects of the material studied are in the form of content quality, ease of understanding of the content, accuracy of coverage, and language. The media aspects studied are in the form of graphics, presentation, and suitability of the P4K educational service media based on Android.

Field testing was conducted in Puspasari Village, Puspahiang District in July 2023 on a population of 42 pregnant women, the sampling technique used total sampling, namely every mother who was pregnant at the time of the study was used as a sample. Data collection was carried out using the interview method and filling out questionnaires. This study uses descriptive analysis of the development procedures carried out. Data analysis uses a Likert scale with details: score 5 strongly agree, score 4 agree, score 3 sufficient, score 2 less agree, and score 1 disagree (Sugiyono, 2019).

The results of the assessment scores from each material expert and media expert validator were then averaged and converted into a statement to determine the validity and feasibility of the Pronalin web app, with the following categories: very unfeasible score range $15 > x \leq 30$, less feasible $15 > x \leq 30$, Quite Feasible $40 < x \leq 50$, Feasible $50 < x \leq 60$, and Very Feasible $X > 60$ (Sugiyono, 2019).

All relevant data presented in this research is in the form of tables and narrated. This research has passed an ethical review and was published by the research ethics commission KEPK (Health Research Ethics Commission) with No. 238/E.01/KEPK-BTH/IX/2023.

RESULTS

The Pronalin web-app feasibility test is carried out by going through the following 5 stages:

1. Formulation of the materials contained in the web-based Pronalin application. The materials included in the application include:

1) Definition of P4K, its objectives, and benefits accompanied by a picture of the P4K striker
2) Data collection on the health conditions of pregnant women
3) Fill in data from pregnancy examination results
4) Pregnancy Complications Material (Trimester I-III)
5) Other materials or articles about maternal and child health
6) Video about P4K

2. Pronalin web app prototype design and product design Check

Create a web-based application based on the needs of pregnant women. Pregnant women or families can access the Pronalin via pronalin.id web app. The Pronalin web app has a main page that contains a welcome display and an explanation of P4K, both in writing and the form of educational videos. Then, at the bottom of the main page, there is a display of maternal emergency education material based on pregnancy trimester categorization, a documentation gallery of research development activities, and a web app address.

Fifure 1. Frequency Distribution of Feasibility Test for ProNalin LED Check Application in Pregnant Women

3. Validate the Pronalin Check LED web app product design

The web app design is validated with assessments from experts, namely media experts who, in this case, are lecturers in the informatics engineering department. Material experts are carried out by Health Service officers who are experienced in maternal and child health.

Table 1. Media Expert Assessment Results

Number	Assessment Indicators	Score
1	Completeness of material (systematic sequence and arrangement)	3
2	Depth of material	3
3	Concept accuracy	3
4	Use sentences with good and correct Indonesian language rules	4
5	Selection and use of appropriate words	4
6	The language used is communicative	4
7	Simple, clear, uncomplicated information	4

Number	Assessment Indicators	Score
8	Information is easy to understand and read	4
9	Information according to service needs	4
10	The information conveyed is interconnected	5
11	The information presented supports the health program achievement targets	5
12	The information presented can increase knowledge and prevent complications	5
13	It can be used as an educational tool	5
14	Eligibility of this application	5
Total Score		**53**

Apart from that, experts were also asked to provide qualitative feedback through criticism and suggestions for improvement. The evaluation and expert assessment results can conclude that the CEK Pronalin LED web app is feasible and can be used with minor revisions. Several things that need to be revised are explained as follows:

1) There is no communication option feature between pregnant women and midwives, so it is necessary to add web app integration with the WhatsApp application
2) A birth reminder feature via email or WhatsApp notifications for midwives and pregnant women is necessary

4. Check the ProNalin LED web app product design revision
   Several things were added and corrected, including:
   1) Adding and integrating WebApp with WhatsApp. When a pregnant woman clicks on the WhatsApp logo, she will be directed to communicate with the midwife of her choice
   2) We have added a birth notification feature, which will automatically send notifications to pregnant women's WhatsApp numbers and email addresses and those of their midwives.

5. Check the ProNalin LED web app product feasibility test

Table 2. Media Expert Assessment Results Descriptive Statistics Feasibility Test of ProNalin Check LED web app on Pregnant Women

N	Min (%)	Max (%)	Mean (%)	SD (%)
42	33 (66%)	45 (90%)	40.7 (81.4%)	2.25 (4.49)

Based on the data in Table 2, it shows that pregnant women's assessment of the ProNalin Check web app has the lowest score of 33 points (66%), the highest is 45 points (90%), and the average feasibility test score is 40.7 points (81.4 %) with a standard deviation of 2.25 points (4.49%). If you look at the average value, the ProNalin Cek application is included in the "Very Eligible" category.

Furthermore, from the results of the recapitulation of the questionnaire distribution, it was found that the highest score was found in statement number 2, namely "ProNalin Check LED Application material according to the needs of pregnant women" with a score of 192 points. This is directly proportional to statement number 9, namely "The health information in the ProNalin Check LED application is as expected" with a score of 184 points. Furthermore, the percentage obtained from the feasibility test results was 79.4%, which means that the ProNalin

Cek application is "suitable" for use by pregnant women. For more details, see on the table 3.

Table 3 Recapitulation of Answers from ProNalin LED web app feasibility test results for checking pregnant women

Number	Statement	Evaluation					Score	Target score
		1	2	3	4	5		
1.	The display of applications and information on the ProNalin Cek LED is very attractive	0	0	11	22	9	166	210
2.	The ProNalin Cek LED application is suitable for the needs of pregnant women	0	0	1	16	25	192	210
3.	The ProNalin Cek LED application is very easy to use	0	0	6	31	5	167	210
4.	The writing on the Pronalin Check LED can be read clearly	0	0	10	28	4	162	210
5.	The health information contained in the ProNalin Check LED is easy to understand	0	0	11	21	10	167	210
6.	The presentation of information in the ProNalin Cek LED application is easy to learn	0	0	11	23	8	165	210
7.	The color choices in the Pronalin Check LED application image vary	0	0	6	27	9	171	210
8.	This application made me interested in reading the health information on the ProNalin Cek LED	0	0	7	29	6	167	210
9.	The health information in the ProNalin Cek LED application is as I expected	0	0	3	20	19	184	210
10.	The health information in the ProNalin Cek LED application uses language that is easy to understand	0	0	7	28	7	168	210
Total							1709	2100
Percentage (score/target score x 100)							81,4	
Category							Very Worthy	

DISCUSSION

Based on the results of the feasibility test of the Pronalin web-based application, show that Pronalin as an educational media in Childbirth Planning and Prevention of Complications has an attractive application display, information, and features that meet the needs and facilitate pregnant women, clear and concise writing, varied images, so that they attract the interest of pregnant women in reading the information, the health information available is by what is expected by pregnant women, the language presented is light and easy to understand by all groups.

Educational media needs to attract the interest of its users, therefore the appearance greatly affects the feasibility of a media. With a varied appearance and images, pregnant women will feel comfortable and not bored every time they open the application (Saifuddin, 2015; Notoatmodjo, 2018).

Several studies have explored the use of web-based tools to deliver educational content to pregnant women. These tools have been shown to positively

influence treatment-seeking intentions and actual behavior for depression among postpartum adolescents (Wuu. J.JY, 2021; Tsal Y. J, 2018). Furthermore, mobile web-based educational programs are effective in increasing pregnant women's engagement and satisfaction with educational content (Kim H.J, 2019; Chang. C.W, 2015).

The features of the Pronalin web-based application include childbirth planning, prevention of complications and self-assessment of midwives can help communication between midwives and patients so that they can detect pregnancy complications early. Data filled in by pregnant women in the Pronalin application is recorded and can be accessed by health workers, Health Centers, and Health Services. The features available in information media are a benchmark for the media's suitability to users' needs and expectations. Complete and appropriate features can give information media a high chance of being liked and used by the public (Yang S, 2021; Huang X, 2022). Furthermore, web-based prenatal education has been successful in addressing various pregnancy-related problems and providing valuable information for mothers at risk of premature birth (Chae. J, 2021; Walker M.G, 2013).

The Pronalin web-based application can be accessed via smartphones and other internet-connected devices, helping pregnant women access information anywhere and anytime they want, making it easier for pregnant women to understand their pregnancy conditions and prepare for childbirth. The advantage of internet-based information media is that it helps the process of delivering information to pregnant women, users can interact with each other, so even though they are in various places, the two-way communication process still occurs (Hasliani A, 2018).

The Pronalin web-based application is a breakthrough in educational media in implementing childbirth planning and P4K programs. The use of previous educational media that used stickers has been shown to have several shortcomings that make pregnant women unable to carry out the program and its components. Almost all pregnant women do not attach and fill in P4K stickers because the stickers are lost or torn. Therefore, the development of the LED Pronalin Check is an effective solution to overcome the P4K program that has not been implemented comprehensively and can increase the prevention of complications in pregnancy (Media, 2014). The constraints of using the Web-based application Pronalin require application users to access the Internet so that when the signal is inadequate it can hinder educational activities. It is highly recommended to prepare a good internet network before using this application, to overcome this, Pronalin is being further developed so that it can be used offline.

CONCLUSION

It can be concluded that the Pronalin application is very suitable to be used as an educational media for childbirth planning and complication prevention (P4K) programs for pregnant women. It is expected that the existence of the web-based application Pronalin can improve the knowledge and readiness of pregnant women in facing childbirth, thereby reducing the number of complications in pregnant women, so it is recommended that Health Institutions such as Health Centern improve obstetric services through socialization and use of Pronalin in educational programs for pregnant women.

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CONFLICT OF INTEREST

The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interests in the subject matter or materials discussed in this manuscript.

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