Education Using Website-Based Electronic Modules Increasing Pregnant Women's Intentions in Birth Prevention Low Birth Weight Babies in Indonesia

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Abstract: Low Birth Weight (LBW) Babies are one of the most significant contributors to infant mortality. Reducing the incidence of LBW can be done starting from the mother's pregnancy. Education using website-based electronic modules is an effort to increase mothers' intention to carry out prevention to reduce the risk of LBW births. This study aims to determine the effect of education using electronic modules on pregnant women's intentions to prevent LBW. This study used a quasi-experimental, non-equivalent control group design. The sample was selected using a purposive sampling technique. The sample size that met the inclusion criteria was 73 pregnant women in the first and second trimesters who lived in the working areas of the Nanggulan Health Center, Lendah II Health Center, and Pengasih II Health Center. The total sample was 35 respondents in the experimental group and 38 in the control group. The intervention group was given education using a website-based electronic module, and the control group used a printed module. The research instrument used a socio-demographic questionnaire to prevent LBW. The data normality test used the Shapiro-Wilk test, and the data analysis used the t-test. The research results show that the intention before education using website- based electronic modules had an average of 58.49, and after being given education, there was an average increase of 64.83. In the results of the mean intention after being given education, there were differences in the two groups with sig value results. (2-tailed) 0.000 ($p<0.05$) means that providing education using website- based electronic modules increases mothers' intention to prevent LBW. Health promotion regarding the prevention of LBW is essential for pregnant women, and education using website-based electronic modules is a good choice of educational media in efforts to prevent the incidence of LBW.

1 INTRODUCTION

The infant mortality rate (IMR) is an indicator for assessing a country's success in improving public health (Rachmadiani *et al.*, 2018). Low birth weight (LBW) babies have a baby's birth weight of less than 2,500 grams regardless of gestational age (Maryunani, 2013). LBW births can experience health problems both in the short and long term, including growth and development, which is at greater risk of experiencing problems. Health problems that LBW can experience include cardiovascular and respiratory diseases, cerebral palsy, respiratory problems, vision problems, and

intellectual disorders (Pollock *et al*., 2021). Factors that can lead to an increase in LBW, such as intrauterine growth restriction, are related to low socio-economic status (Andegiorgish *et al*., 2020). Babies with a lower birth weight are relatively 200 times more at risk of neonatal death compared to babies with sufficient birth weight (Vilanova *et al.*, 2019).

One form of effort to prevent LBW births is ante-natal care (ANC) examinations at least six times during pregnancy (Lestari & Winarsih, 2022). Ruindungan *et al*. (2021) show that pregnant women whose ANC examination is not good are three times more likely to give birth to LBW. Another effort that the government has made is a class for pregnant women, which contains activities providing health education regarding the health of pregnancy, childbirth, and the postpartum period (Baroroh *et al*., 2017).

However, this has not been able to reduce the number of LBW births. In Kulon Progo Regency, the LBW birth rate is 7.25%; this figure is lower than the national LBW birth rate of 8.8%. This is because there are still many pregnant women who are indifferent to LBW, so pregnant women do not take early prevention during their pregnancy (Yogyakarta Health Department, 2021).

Health education using website-based electronic modules is one of the efforts that can be made to increase maternal knowledge so that mothers are expected to try to carry out healthy behaviors for pregnancy and the health of their fetus (Rachmawati, 2019). Providing health education can also increase a person's intention to carry out a behavior.

According to the Theory of Planned Behavior (TPB), intentions are influenced by three factors, namely attitudes, subjective norms or support from the surrounding environment, and perceptions of self-control, which come from individual information about a behavior (Anggraini & Nurul, 2017). According to Ajzen, behavioral intentions to act are based on the influence of positive behavioral attitudes, perceived social pressure, and perceived behavioral ability. Family-based health education increases pregnant women's intention to optimize nutrition in the first 1000 days of birth (Han *et al*., 2020; Naim *et al*., 2017).

Website-based electronic modules are information technology-based media innovations that are more modern and more attractive because they display images, text, animation, audio, and video (Imansari & Sunaryantiningsih, 2017). Information technology-based educational media in the current era is more popular and needed, seeing as the use of smartphones has become embedded in everyday life. It is hoped that website-based electronic modules will become an alternative educational media that is effective, efficient, and interactive (Rochmadi *et al*., 2017). This can increase pregnant women's intention to carry out LBW prevention behavior.

Based on the first survey by researchers at the Kulon Progo District Health Office in 2022, 327 live birth babies with LBW were 327 out of 4,490 KH. Kulon Progo Regency is ranked first as the largest contributor to LBW births in Yogyakarta, with a percentage of 7.25%. Based on surveys at Nanggulan Health Center, Lendah II Health Center, and Pengasih II Health Center; seven out of nine pregnant women (77.78%) had not received education on preventing LBW during their pregnancy and wanted educational media assisted by information technology.

Overall, the research above shows that health education can increase pregnant women's intentions to change behavior. This research uses website-based electronic module media, which includes material related to pregnancy and LBW prevention. The aim of this research is to determine the effectiveness of website-based electronic modules in increasing pregnant women's LBW prevention intentions.

2 MATERIALS AND METHOD

2.1 Study Design

This study used a quasi-experimental, non- equivalent control group design. In research with this design, respondents will be given a pre-test, and the experimental group will be given treatment in the form of education using website-based electronic modules. In contrast, the control group will use printed educational media modules with the same content. After giving the treatment, a post-test was held for both the treatment group and the control group.

2.2 Sample

Pregnant women in the first trimester and second trimester in the working areas of the Nanggulan Health Center, Lendah II Health Center, and Pengasih II Health Center in 2022 numbered 1,054 pregnant women. The sample size that met the inclusion criteria was 73 pregnant women. The research sample was women with junior high school education in the first and second trimesters of pregnancy who had a smartphone and a strong network, were willing to take part in the research, and signed an informed consent form. The sampling technique uses a target sampling technique, namely taking samples from the population by paying attention to the criteria established in the research. The resulting sample size was 31 respondents and was calculated using the Lemeshow sample size formula.

Based on this formula, the minimum number was increased by 10% to 35 to predict whether there were respondents who would drop out. Therefore, the

sample size was 35 respondents for each control and intervention group. However, this research collected samples of 73 people during field collection.The control group consisted of 38 respondents and the intervention group consisted of 35 respondents.

2.3 Instruments

The media used in the research is a website-based electronic module for preventing LBW. This module was created by a research team based on relevant sources and has been tested by experts in the fields of nursing, nutrition and midwifery. The module assessment consists of aspects of design, content, language and typography with a good module validation score (validation score: 82.62), which means that the website-based electronic module is ready to be used as an educational medium for research. The instrument used was a questionnaire to assess intentions to prevent LBW from Sujarwati's (2021) research which had been tested for validity and reliability with a Crombach Alpha of 0.761.

2.4 Intervention

Research activities were carried out for four days in both the intervention and control groups. On the first day, respondents were explained about the objectives and technical stages of the research and then filled out informed consent for the research. Respondents filled out a pre-test intention questionnaire and were guided to open the electronic module website link and get a complete explanation of the module contents. From the second to the fourth day, respondents were given time to study independently with assistance via the WhatsApp group. The research team accompanied them during the discussion process. Independent learning material is planned every day according to the content of the module with a study duration contract from morning to evening (8 AM to 16 PM), 16 PM to 17 PM, respondents discuss with the facilitator, and one hour later, they are given a link to evaluate the material using Google form to find out if respondents participated in the activities and content of the earning material. For respondents who work, independent learning and discussions will take place in the evening, and filling in the evaluation link will be limited until the contract time the following day. Researchers will remind respondents who have not filled in the evaluation link via private chat via WhatsApp. On the fifth day, respondents will be given a post-test questionnaire regarding intentions to prevent LBW.

2.5 Data Collection

The research was carried out from February to March 2023 in the working areas of the Nanglang Health Center, Pengasi II Health Center, and Lenda II Health Center in Kulon Progo Regency, Yogyakarta, Indonesia. Respondents received these instructions and agreed to sign the informed consent form. Primary data consists of sociodemographic data such as name, age, origin of health center, occupation, education level, monthly income, and a questionnaire about pregnant women's intentions to prevent LBW incidents. The secondary data for this study is data on the number of pregnant women who underwent ANC examinations from July to December 2022.

2.6 Data Analysis

Two data analysis tests, namely univariate tests were used in this research to determine the frequency distribution of respondents' age, education and occupation. Meanwhile, bivariate analysis tests were used to test the relationship between education using website-based electronic modules and intentions to prevent LBW. This research uses parametric tests because the data obtained is normally distributed (p-value > 0.05) using the Shapiro-Wilk test. Because the data is normally distributed, the t test is used for bivariate testing.

2.7 Ethical Consideration

This research received approval from the ethics commission of Yogyakarta Alma ata University on January 24, 2023, Number: KE/AA/1/101010/EC/2023.

3 RESULTS AND DISCUSSION

3.1 Result

The characteristics of research respondents in both groups are presented in Table 1.

Table 1: Respondent characteristics

Characteristics	Interventi on Group	Control Group
	N (%)	N (%)
Age (years):		
< 21	1 (2,9 %)	1 (2,6%)
21-35	32(91,4%)	33(86,8%)
> 35	2 (5,7%)	4 (10,5%)
Work:		
Housewife	21(60,0%)	21(55,3%)
Laborer	3(8,6%)	3(8,6%)
Private employees	7(20,0%)	12(31,6%)
Self-employed	1(2,8%)	3(7,9%)
Civil servant	3(8,6%)	0 (0,0%)
Education:		
Junior high school	7(20,0%)	3(7,9%)
Senior high school	21(60,0%)	27(71,1%)
Diploma	2(5,7%)	3(7,9%)
College	5(14,3%)	5(13,2%)

Table 1 shows that the majority of respondents were aged 21-35 years in the intervention group (91.4%) and control group (86.8%). The majority of respondents in the intervention group (60.0%) and control group (55.3%) were housewive. Most of the pretest and posttest data on group intentions. The experimental and control groups are norm-distributed.

Table 3: The average increase in intention to prevent LBW before and after being given education

Group		Mean	SD	p
Intervent ion	Pretest	58,49	5,243	0,000
	Posttest	64,83	2,802	
Control	Pretest	57,50	5,135	0,000
	Posttest	61,87	3,707	

Table 3 The research results show that the intention before education using website-based electronic modules had an average of 58.49, and after being given education, there was an average increase of 64.83. In the results of the mean intention after being given education, there were differences in the two groups with sig value results. (2-tailed) 0.000 (p<0.05) means that providing education using website-based electronic modules increases mothers' intention to prevent LBW.

Table 4: Difference in mean intention to prevent LBW before and after being given education

	Group	Mean Diference	Sig. (2-tailed)
Pretest	Intervention	0,986	0,420
	Control		
Posttest	Intervention	2,960	0,000
	Control		

Table 4 shows that before being given education, respondents' education was at the senior high school in the intervention group (60.0%) and the control group (71.1%).

Table 2. Data normality test

Data Normality Test	Saphiro-Wilk	
Intention Pretest (Experiment Group)	0,374	Normal
Intention Posttest (Experiment Group)	0,150	Normal
Intention Pretest (Control Group)	0,422	Normal
Intention Posttest (Control Group)	0,462	Normal

The data normality test uses the Shapiro-Wilk test due to the number of respondents <50 and is said to be normal if the sig. > 0.05. Based on Table 2 shows there was no significant difference in the mean intentions in the two groups, 0.420 (> 0.05). After being given education, it showed that there was a difference in the mean intentions of respondents in the two groups, 0.000 (< 0.05). This shows that the respondents have good intentions because before being given education, there was no difference in mean intentions. In contrast, after being given education, there was a difference in mean scores. So, it can be concluded that education using website-based electronic modules and printed modules increases pregnant women's intention to prevent LBW.

3.2 Discussion

Based on this research, the majority of pregnant women are adults with an age range of 21-35 years. The age of 20-35 years is the age guideline for physical readiness and is ideal for pregnancy. At this age, the reproductive organs are ripe for fertilization. They are ready for pregnancy, childbirth, and breastfeeding. From a psychological perspective, they are ready so that pregnant women will try to look for things related to pregnancy health until the breastfeeding period (Effendi & Makhfudli, 2009). Views on carrying out behavior will be different for each individual; this is motivated by the individual's age (Yusrina & Devy, 2017), the chance of LBW is

higher in teenage mothers (<20 years) and lower in mothers over 30 years old (Mohammed *et al.*, 2019). As pregnant women get older, they will have more experience and knowledge, so they will be better prepared to carry out a behavior (Ernawati *et al.*, 2016).

The majority of respondents' occupations are housewives. Work is one of the important things in fulfilling an individual's daily needs, experiencing social relationships, and providing information (Perry, 2009). This is in line with research by (Ernawati *et al.*, 2016), that the work environment will provide experience and knowledge directly or indirectly; good experiences will form positive attitudes in life, and bad experiences will encourage individuals to forget them.

The majority of respondents' educational background is at an advanced level. The level of maternal education plays a role in shaping behavior and explaining maternal knowledge. Mothers with a high level of education will find it easier to obtain health information than mothers with a low level of education. Mothers with lower education can hinder an individual's perception of newly introduced values (Nuryani & Rahmawati, 2017). Previous research on neonatal care states that the higher the mother's education and knowledge, the better the actions taken will be. Knowledge and education can also broaden the view and scope of carrying out an action or behavior (Yuliyanti *et al.*, 2020)

Intention is a cognitive representation of a person's readiness and measure to carry out a behavior or action. Strong intentions in behavior are influenced by the better the attitudes and subjective norms and the greater the perceived behavioral control (Rachmawati, 2019). Individual intentions will be strong if the information they have is strong enough to convince them that it is worth doing (Kusumaningrum *et al.*, 2019). In line with this research, education using website-based electronic modules has the effect of increasing pregnant women's intention to prevent LBW.

This is also in line with research by Naim *et al.*, (2017), stated that there was a significant difference in the mean scores before and after the 1000 HPK intention nutritional optimization test in pregnant women who underwent TPB-based family training. Fadhilah *et al.*, (2020), also stated that in their research, there was an increase in the intention scores of teenage mothers to provide exclusive breastfeeding after being given education using leaflets, booklets, and educational videos.

There is speculation that health education has an effect on LBW, and pre-pregnancy support can help pregnant women develop a healthy lifestyle and increase the use of health services (Liu *et al.*, 2019). Providing education using website-based electronic modules is an educational media choice that can be used to increase the knowledge of pregnant women. Similarly, to this research, Dermawan and Fahmi (2020), explained that learning using website-based electronic module media can improve individuals' reading, this is because website-based electronic modules are more practical to use, more efficient, and more interactive than print media. Education using website-based electronic speaking modules has a significant influence on improving students' speaking skills. Other research states that health promotion using electronic modules is more effective in improving hand-washing skills with soap than health promotion using posters (Setyawan & Nawangsari, 2021; Razi & Surayah, 2023).

This research has limitations in the process of collecting respondents at one time because several respondents work, so the researcher conducted a home visit. During follow-up, respondents could not follow everything according to the time determined by the researcher. Several respondents complained of difficulty accessing website-based electronic modules due to the internet network sometimes being lost at certain times.

4 CONCLUSIONS

In the intervention and control groups, the average intention to prevent LBW increased before and after being given education. There was a significant difference in the mean value of intention to prevent LBW before and after being given education between the intervention group and the control group. Provide education using website-based electronic modules is more effective in increasing LBW prevention intentions than printed modules. Health promotion regarding the prevention of LBW is very important for pregnant women, and education using website-based electronic modules is a good choice of educational media in efforts to prevent LBW incidents. For further research, website-based electronic modules can be made more interactive because respondents learn more independently. It can make it easier for respondents to learn it.

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