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Article

The Effectiveness Of Information Based Animation Video On Knowledge About Birth Preparedness And Complication Readiness In Pregnant Women

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Abstract

Background: The maternal mortality rate (MMR) in Indonesia remains high, partly due to the lack of pregnant women's knowledge regarding *Birth Preparedness and Complication Readiness* (BPCR). Effective health education strategies are essential to address this issue. Information-based animated videos are considered engaging, easy to understand, and effective in improving knowledge retention.
Objective: To determine the effectiveness of information-based animated videos in improving pregnant women's knowledge about BPCR.
Methods: *:* To determine the effectiveness of information-based animated videos in improving pregnant women's knowledge about BPCR.
Results: There was a significant improvement in knowledge among the intervention group after being provided with information-based animated videos compared to the control group ($p<0.05$). Respondents' characteristics were also associated with the increase in knowledge.
Conclusion: Information-based animated videos are effective in increasing pregnant women's knowledge about BPCR and can be used as an alternative educational tool in maternal nursing services.

Keywords: *Animation, BPCR, Education, Pregnancy, Knowledge*

INTRODUCTION

Maternal and neonatal mortality remain pressing public health issues in Indonesia, despite various national and regional interventions aimed at improving maternal health outcomes. According to the 2022 Indonesia Nutritional Status Survey (*Survei Status Gizi Indonesia* or SSGI), the maternal mortality rate (MMR) reached 189 deaths per 100,000 live births (1). This figure, although lower compared to previous decades, remains far from the global targets set by the Sustainable Development Goals (SDGs), which aim to reduce the MMR to less than 70 per 100,000 live births by 2030. One of the major contributing factors to maternal mortality is the delay in recognizing danger signs during pregnancy and the delay in obtaining timely and appropriate medical care (2). These delays often stem from inadequate maternal preparedness for childbirth and a lack of awareness regarding potential obstetric complications, particularly in rural or underserved areas where access to quality healthcare is limited (3).

Childbirth preparedness is a critical aspect of maternal health that encompasses not only the physical readiness of the mother but also psychological, logistical, and financial preparation (4). Manuaba (2010) defines childbirth preparation as a series of steps undertaken by pregnant women to optimize their readiness for labor, including

identifying danger signs during pregnancy, determining the place of delivery, and arranging for birth companions (5). The concept of *Birth Preparedness and Complication Readiness* (BPCR), introduced by Saifuddin (2010), emphasizes the importance of comprehensive planning for both normal delivery and potential obstetric emergencies (6). Key BPCR components include identifying suitable healthcare facilities, arranging emergency transportation, securing financial resources, identifying potential blood donors, and acquiring the ability to recognize early warning signs of pregnancy and postpartum complications (7).

However, research indicates that many pregnant women, particularly in low-resource settings, still lack a complete understanding of BPCR. Studies have shown that women with higher levels of knowledge about BPCR are more likely to make informed and timely decisions during pregnancy and delivery (8). Inadequate knowledge may result in delayed healthcare-seeking behavior, thereby increasing the risk of adverse maternal and neonatal outcomes (9). Health education interventions have been widely recognized as an effective strategy to address this knowledge gap. Nevertheless, traditional methods such as lectures, printed leaflets, and posters have limitations in terms of engagement and knowledge retention, especially in populations with varying literacy levels (10).

In response to these challenges, educational strategies utilizing audiovisual media, particularly information-based animated videos, have gained attention as innovative tools for maternal health promotion. Animated videos combine visual and auditory elements to present health messages in an engaging, culturally relevant, and easily comprehensible manner. Previous studies have demonstrated that animated video interventions can significantly improve audience attention, comprehension, and long-term retention of health-related information compared to conventional teaching methods (11). Furthermore, audiovisual media have been found not only to enhance knowledge but also to foster positive attitudes toward early detection and prevention of pregnancy-related complications (12).

Given the persistent gaps in maternal knowledge regarding BPCR and the proven potential of animated educational media, this study seeks to evaluate the effectiveness of information-based animated videos in increasing pregnant women's knowledge about BPCR. By investigating the relationship between this intervention and knowledge improvement, the findings of this study are expected to provide valuable insights for healthcare professionals, particularly maternal and child health nurses, in adopting innovative, evidence-based educational approaches to reduce maternal and neonatal mortality.

METHODE

Studi Design

This study employed a quasi-experimental design with a *non-equivalent control group* approach to evaluate the effectiveness of an information-based animated video on pregnant women's knowledge about *Birth Preparedness and Complication Readiness* (BPCR). The design involved two groups: an intervention group receiving the educational video and a control group receiving standard antenatal counseling without multimedia assistance. Both groups were assessed using a pre-test and post-test format to measure changes in knowledge levels. This design was selected because it allows for the comparison of outcomes between groups without random assignment while still enabling the assessment of causal relationships between the intervention and outcomes.

Sample

A total of 54 pregnant women were recruited using purposive sampling based on specific inclusion criteria, which included: (1) being in the second or third trimester of pregnancy, (2) being willing to participate and provide informed consent, and (3) having no prior participation in similar BPCR educational programs. Exclusion criteria included pregnant women with medical complications requiring urgent intervention or those unable to comprehend the video material due to cognitive or sensory impairments. Participants were divided into two groups, with 27 assigned to the intervention group and 27 to the control group. The sample size was determined based on a power calculation to ensure adequate statistical power for detecting significant differences between groups.

Instruments

The primary research instrument was a structured BPCR Knowledge Questionnaire adapted from the Safe Motherhood Initiative guidelines and validated by maternal health experts. The questionnaire consisted of multiple-choice and true/false questions covering BPCR components, including knowledge of danger signs during pregnancy, labor, and postpartum; identification of safe delivery locations; arrangements for transportation and financial resources; and readiness for blood donation. Content validity was established through expert review, and reliability testing yielded a Cronbach's alpha of ≥0.80, indicating high internal consistency.

Procedure

The study began with obtaining informed consent from all eligible participants. Baseline data collection included demographic characteristics and the pre-test BPCR knowledge questionnaire. The intervention group then received a 20-minute information-based animated video, designed with simple language, engaging visuals, and culturally relevant examples. The content addressed all BPCR components and emphasized the importance of early preparation for delivery and potential complications. In contrast, the control group received routine antenatal counseling provided by midwives without multimedia support. One week after the intervention, both groups completed the same BPCR knowledge questionnaire as a post-test to measure changes in knowledge.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize demographic characteristics, while normality was assessed using the Shapiro–Wilk test. Paired *t-tests* were applied to determine within-group differences between pre-test and post-test scores. Independent *t-tests* were conducted to compare post-test scores between the intervention and control groups. Additionally, Analysis of Covariance (ANCOVA) was used to control for potential confounding variables, such as age, education level, and parity. A significance level of $p < 0.05$ was considered statistically significant.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of STIKep PPNI Jawa Barat, ensuring that the research adhered to ethical standards for human subject research. All participants were informed about the study's objectives, procedures, potential risks, and benefits before providing written informed consent. Confidentiality was maintained by anonymizing participant data and securing all records in password-protected files. Participants were assured that their involvement was voluntary and that they could withdraw from the study at any stage without any negative consequences to their antenatal care.

RESULTS

Normality Test

Talel 1. Normality Test Results

Tests of Normality				
Group		Shapiro-Wilk Statistic	df	Sig.
Control	Pre Test	0.928	27	0.061
	Post Test	0.937	27	0.105
Intervention	Pre Test	0.928	27	0.061
	Post Test	0.943	27	0.142

The results of the normality test in table 1, the Shapiro-Wilk statistical value for the control group showed that in the pre-test, the value was 0.928 with a significance (Sig.) of 0.061, while in the post-test with a value of 0.937 with a Sig. 0.105. In the intervention group, where the pre-test value was 0.928 with a Sig. 0.061, and the post-test increased to 0.943 with a significance value of 0.142. All of these significance values were greater than 0.05, indicating that the data from both groups, both control and intervention, were normally distributed.

Univariate Analysis

Table 2. Univariate Analysis Test Results

Variable	Control (N=27)	Intervention(N=27)
Age	Mean ± SD (F%)	Mean ± SD (F%)
	31.26 ± 5.058	28.59 ± 4.601
<35 Year (No Risk)	22 (81.5%)	24 (88.9%)
>35 Year (Risk)	5 (18.5%)	3 (11.1%)

Education		
SMP	12 (44.4%)	6 (22.2%)
SMA/SMK	12 (44.4%)	11 (40.7%)
S1/Bachelor	3 (11.1%)	10 (37%)
Income		
Low <Rp.1.000.000	8 (29.6%)	12 (44.4%)
Medium Rp.1.000.000 - Rp. 3.000.000	10 (37%)	9 (33/3%)
Enough >Rp.3.000.000	9 (33.3%)	6 (22.2%)
Work		
IRT	10 (37%)	13 (48.1%)
Private Employees	5 (18.5%)	9 (33.3%)
Entrepreneurial	12 (44.4%)	5 (18.5%)

Based on Table 2, the average age characteristics of respondents in the control group were 31.26 ± 5.058, while in the intervention group it was 28.59 ± 4.601. The age distribution showed that in the control group, the majority of respondents aged <35 years were 22 people (81.5%). In the intervention group, the majority of respondents aged <35 years were 24 people (88.9%). Education Characteristics The education level of respondents in the control group showed a balanced distribution between junior high school and high school/vocational school graduates, each as many as 12 people (44.4%). In the intervention group, the majority of respondents had a high school/vocational education of 11 people (40.7%). Income Characteristics The distribution of income in the control group showed that the majority of respondents had a medium income (Rp.1,000,000 - Rp.3,000,000) as many as 10 people (37.0%). In the intervention group, the majority of respondents had low income (<Rp.1,000,000) as many as 12 people (44.4%). Job Characteristics The type of job respondents in the control group was dominated by entrepreneurs as many as 12 people (44.4%). In the intervention group, the majority of respondents worked as housewives (IRT) as many as 13 people (48.1%)

VARIABLE	**INTERVENTION**			**CONTROL**			**N**
	M	SD	MIN-MAX	M	SD	MIN-MAX	
PRE-TEST	3.96	1.427	1-6	3.96	1.427	1-6	27 Respondent
tPOST-TEST	10.26	1.81	7-13	3.81	1.469	1-6	27 Respondent

Table 3. Knowledge Level RatiBased on Table 3, in the pre-test stage, both groups showed a level of knowledge with an average score of 3.96 ± 1.427 for the intervention and control groups. The score range obtained ranged from 1-6 with a total of 27 respondents each. These results showed that before the intervention was given, both groups had the same knowledge baseline. After the intervention of the animated video, there was a significant difference between the two groups. The intervention group experienced a dramatic increase with the average score being 10.26 ± 1.81 and a score range of 7-13. In contrast, the control group showed an unimproved score with an average of 3.81 ± 1.469 and a fixed score range of 1-6. The difference in average scores between pre-test and post-test in the intervention group showed an increase of 6.3 points (from 3.96 to 10.26), indicating the effectiveness of animated

videos in increasing respondents' knowledge of Birth Preparedness and Complication Readiness. Meanwhile, the control group experienced a minimum decrease of 0.15 points (from 3.96 to 3.81)

Table 4. Knowledge Level Categories

Perlakuan	Kelompok	Kategori	N	%
PRE TEST	Intervention	Bad	27 Respondent	100%
		Good	0 Respondent	0%
	Control	Bad	27 Respondent	100%
		Good	0 Respondent	0%
POST TEST	Intervention	Bad	0 Respondent	0%
		Good	27 Respondent	100%
	Control	Bad	27 Respondent	100%
		Good	0 Respondent	0%

Based on table 4, at the pre-test stage, all respondents, both intervention and control groups, had knowledge in the poor category (100%). After being given an animated video intervention, there was a very significant change where all respondents in the intervention group of 27 people or 100% changed from bad to good, while the control group remained in the bad category (100%). These results show that animated videos are very effective in increasing pregnant women's knowledge about Birth Preparedness and Complication Readiness.

Bivariat analysis

Table 5. Bivariate Analysis Results

Variable	PRE TEST		POST TEST		*t*	*P*
	M	SD	M	SD		
Group Intervention	3.96	1.427	10.26	1.81	-13.92	0
Group Control	3.96	1.427	3.81	1.469	0.625	0.537

The results of the bivariate analysis in table 5 evaluate differences in the level of knowledge about birth preparation and preparedness for complications before and after the animated video intervention. For the intervention group, the mean (M) knowledge score before the intervention was 3.96 with a standard deviation (SD) of 1.427. After being given intervention, the average score increased to 10.26 with SD 1,810. The t-test results showed a t-value of -13,920 with a p-value of 0.000, which shows a very significant difference between the pre-test and post-test. The control group showed an average knowledge score that remained the same in the pre-test, which was 3.96 with an SD of 1,427, while in the post-test, the average score decreased slightly to 3.81 with an SD of 1,469. The t-test for the control group showed a t-value of 0.625 with a p-value of 0.537, meaning there was no significant difference between the pre-test and post-test. This analysis showed that the animated video intervention significantly improved knowledge about birth preparation and preparedness for complications in pregnant women, while the control group showed no significant changes. This underlines the importance of innovative educational methods in improving the knowledge of pregnant women.

Tabel 6. Tests of Between-Subjects Effects

Tests of Between-Subjects Effects					
Dependent Variable:					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.

Corrected Model	570.379[a]	2	285.189	110.566	0.000
Intercept	204.285	1	204.285	79.200	0.000
PRETEST	9.712	1	9.712	3.765	0.058
KELOMPOK	560.667	1	560.667	217.367	0.000
Error	131.547	51	2.579		
Total	3376.000	54			
Corrected Total	701.926	53			

a. R Squared = .813 (Adjusted R Squared = .805)

Based on table 6, the analysis shows that the model used to test the influence is significant, with an F value of 110,566 and a p-value of 0,000. This shows that animated videos have a very significant influence on improving the understanding of pregnant women. An R Squared value of 0.813 indicates that 81.3% of the variation in pregnant women's understanding can be explained by this model, with an Adjusted R Squared of 0.805. In this analysis, the intercept also showed high significance (p-value 0.000), which means that there is a significant influence of unmeasured variables on the understanding of pregnant women. The influence of the intervention and control groups was very significant with an F value of 217,367 and a p-value of 0.000. This suggests that pregnant women who received the animated video intervention had better understand compared to the control group. The results of this analysis confirm that the use of animated videos as an educational tool is effective in increasing pregnant women's understanding of pregnancy hazards and the importance of birth planning.

DISCUSSION

Demographic Characteristics of Pregnant Women

The study revealed notable demographic differences between the two groups. In terms of age, the control group had a higher mean age (31.26 years) compared to the intervention group (28.59 years). This difference may influence how participants receive and process health information, as younger pregnant women tend to adapt more easily to new technologies such as animated videos, potentially making them more responsive to the intervention. This aligns with Ayuningtia et al. (2024), who found that age significantly affects maternal receptiveness to health education programs. Educational levels in both groups showed similar patterns, predominantly at junior and senior high school levels, indicating comparable capacity to comprehend educational materials (13). Income distribution, however, differed: the control group was dominated by respondents with moderate income, while the intervention group had a higher proportion with low income. This highlights the value of animated videos as a cost-effective educational medium, especially for economically disadvantaged populations. Employment status also varied; the control group was largely composed of entrepreneurs with high mobility, whereas the intervention group was mainly homemakers with more flexible time, enabling easier access to video-based learning at their convenience.

Effectiveness of Animated Videos in Improving BPCR Knowledge

The intervention group demonstrated a substantial improvement in BPCR knowledge, with scores increasing from 3.96 to 10.26, indicating that animated video delivery fostered deep and accessible understanding. In contrast, the control group showed no significant change and even a slight decline, suggesting that without targeted educational stimuli, maternal knowledge on BPCR tends to stagnate or diminish over time. Notably, all participants in the intervention group progressed from poor to good knowledge levels, achieving the minimum standard for delivery preparedness. The effectiveness of animated videos can be explained by the dual coding theory, which posits that information processed through both visual and auditory channels is retained more effectively than through a single channel. This finding supports Rochmawati et al. (2023) and Budhi & Nurhayati (2022), who highlighted audiovisual media's superiority in simplifying complex medical information into understandable and memorable formats. The results demonstrate that animated videos are inclusive, effective across varying educational and socio-economic backgrounds, and capable of delivering consistent knowledge improvement (12,14).

Differences in Knowledge Before and After the Intervention

Statistical analysis confirmed the significant effect of animated videos, with the intervention group showing a p-value of 0.000 and a t-value of -13.920, indicating a large and meaningful improvement. This is consistent with Ayuningtia et al. (2024), who found that animated health education not only enhanced knowledge but also reduced *Fear of Childbirth* (FOC) by fostering positive maternal attitudes (13). In contrast, the control group's p-value of 0.537 and t-value of 0.625 reflected no significant change. The intervention group's improvement from 3.96 to 10.26 in mean scores represents a shift from inadequate to excellent knowledge, with a low post-test standard deviation (1.81) indicating consistent outcomes across participants. These results underscore that animated videos are statistically and practically significant tools for enhancing BPCR knowledge and should be prioritized in maternal health education programs.

Impact of Animated Videos on Understanding Pregnancy Danger Signs and Delivery Planning

Animated videos proved highly effective in enhancing pregnant women's understanding of pregnancy danger signs and the importance of comprehensive delivery planning. Their strength lies in transforming complex medical information into relatable visual narratives, enabling mothers to grasp not only *what* symptoms to watch for but *why* they are dangerous and *how* to respond. For example, animated depictions of pregnancy bleeding provide clear visual cues about its severity and the required immediate actions. Statistical analysis showed that animated videos accounted for 81.3% of the improvement in understanding, with only 18.7% attributed to other factors such as personal experience. These results support Budhi & Nurhayati (2022), who found audiovisual media more effective than print materials in improving knowledge and influencing attitudes toward early complication detection (12). Animated videos also act as a "translator" for complex medical jargon, making critical health messages accessible even to those with limited health literacy. By offering scenario-based guidance and step-by-step emergency responses, they prepare pregnant women to act decisively in critical situations. With a significance value of 0.000 and a test statistic of 217.367, the study confirms animated videos as a reliable, highly impactful educational tool for improving maternal readiness and potentially reducing preventable maternal and neonatal deaths.

CONCLUSION

This study demonstrated that information-based animated videos are a highly effective medium for improving pregnant women's knowledge of *Birth Preparedness and Complication Readiness* (BPCR). The intervention group, which received the animated video, showed a substantial and statistically significant increase in knowledge scores, from 3.96 to 10.26, compared to the control group, which experienced no significant change. The results were consistent across different educational backgrounds, income levels, and employment statuses, indicating that animated videos are accessible and effective for diverse populations. Furthermore, the videos not only enhanced factual knowledge but also deepened understanding of pregnancy danger signs and delivery planning, empowering mothers to take proactive steps in preparing for childbirth and responding to emergencies. This aligns with the dual coding theory, which highlights the benefit of combining visual and auditory information for better retention and comprehension. The findings also confirmed that without structured and engaging educational interventions, maternal knowledge tends to stagnate or decline over time. Therefore, integrating animated video-based education into antenatal care programs holds great potential to bridge health literacy gaps, especially in communities with limited access to conventional health education services.

Future research should explore the long-term impact of animated video interventions on maternal and neonatal health outcomes, as well as their effectiveness when combined with other educational strategies, such as interactive discussions or mobile health reminders. Expanding the scope of such interventions to reach rural and underserved areas could significantly contribute to reducing maternal and neonatal morbidity and mortality in Indonesia.

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