The Effect of Preeclampsia Prevention Videos on Knowledge, Attitudes and Self-Efficacy of Pregnant Women in Semarang City Indonesia

Ratna Anjelika✉[1)], Bagoes Widjanarko[1)], Ayun Sriatmi[2)]

[1] Health Promotion, Faculty of Public Health, Diponegoro University, Semarang, Central Java, Indonesia 50275
[2] Public Health, Faculty of Public Health, Diponegoro University, Semarang, Central Java, Indonesia 50275
✉Email: ratna.angelika27@gmail.com

ABSTRACT

***Background**: Preeclampsia is one of the leading causes of maternal mortality in the world, so efforts are needed to prevent preeclampsia. Prevention efforts can be carried out through health education with videos, given the development of information technology that makes it easier to deliver health information.* ***Objective**: This study aims to determine the effect of education and the magnitude of changes in values using videos about preeclampsia on knowledge, attitudes and self-efficacy of pregnant women.* ***Methods**: This study is a quantitative study with a quasi-experimental design with a pretest-posttest with control group design. The research sample was 30 pregnant women in the intervention group and 30 people in the control group, and was conducted from October to Desember 2024. Result: The results of statistical tests in the intervention group showed an increase in the value of knowledge, attitudes and self-efficacy after receiving the intervention with a p-value of 0.000 or <0.05. After both groups get the intervention, it is known that there are differences in knowledge, attitudes and self-efficacy after getting the intervention with a p-value of 0.000 or <0.05. And statistical tests using the Linear Mixed Model found that there was an increase in knowledge scores by 15.93%, attitudes by 5.82% and self-efficacy of pregnant women by 6.35% due to the intervention.* ***Conclusion**: There is an effect of providing education using video media and leaflets and there are differences in the scores on knowledge, attitudes and self-efficacy in pregnant women, and there is an increase in knowledge scores, attitudes and self-efficacy after receiving the intervention.*

***Keywords**: Attitude, Indonesia, Knowledge, Preeclampsia, Self-Efficacy, Video Education*

INTRODUCTION

Pregnant women are potentially at risk of health problems from early pregnancy to the postpartum period, which can be caused by the pregnancy, labor or postpartum itself or the way it is managed. By 2023 more than 700 women a day will die during pregnancy and childbirth, with more than 90% of all maternal deaths occurring in developing or lower-middle income countries (WHO, 2019). Indonesia is a developing country with a high maternal mortality rate. Globally, Indonesia ranks 66th as the country with the highest maternal mortality rate (Suparji, 2024). At the ASEAN level, Indonesia ranks second in the number of maternal mortality rates with 305 deaths per 100,000 live births in January 2023 (Kementrian Kesehatan RI, 2024). One of the main causes of death in pregnant women worldwide is preeclampsia, including in Indonesia.

Preeclampsia is an increase in systolic blood pressure to 140 mmHg or diastolic pressure to 90 mmHg in pregnant women and there is proteinuria of 300mg within 24 hours (Phipps, Thadhani and Thomas Benzing, 2019). Preeclampsia is a serious threat during pregnancy, because if it does not get proper treatment it can turn into eclampsia which causes death in pregnant women. Pregnant women who experience preeclampsia fall into the category of high-risk pregnancies, and are a major factor in increasing maternal mortality and infant mortality rates.

There have been many initiatives to identify pregnancy hazards as early as possible in order to prevent illness and death (Ulfah and Anggraeni, 2023). Optimal efforts are needed to prevent or reduce recurrence in pregnant women with

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preeclampsia. One preventive measure is health promotion and education for pregnant women, as it can contribute positively to both maternal and infant health (Ugurlu, Yavan and Karasahin, 2021). Health education contributes to increasing knowledge and also helps shift attitudes toward a more positive understanding of health. Improved knowledge among pregnant women about preeclampsia, especially its prevention can help them recognize early symptoms and warning signs, allowing timely and appropriate medical intervention.

Although regular antenatal check-ups can help detect potential pregnancy complications, every pregnant woman is also responsible for maintaining a healthy pregnancy by adopting health behaviors recommended by healthcare professionals to prevent possible complication (Sriatmi, Jati, Sutopo and Budiyanti, Rani, 2020). In addition to health workers, the development of communication technology encourages people including pregnant women to seek health information through the internet or applications through smartphones, of course, it is necessary to pay attention to the sources of information obtained. Providing information through health education currently needs to consider and pay attention to other factors in order to achieve educational success that affects the increase in knowledge, namely by utilizing smartphones as a medium for health information and communication (Fasimi, Rahayuning and Pratiwi, 2023). One of the most popular information media among smartphone users is video. Previous studies have shown that using video media for health education about preeclampsia in pregnant women is effective in increasing knowledge. Video media comes in various forms, one of which is educational videos. Educational videos are media that can stimulate the brain's ability to create a relationship between verbal and visual representations of content that can lead to deeper understanding for the audience (Imiliana, Dewi and Yuliyantina, 2024).

METHODS

This study is a quantitative study with a pre-experimental design with two group pretest-posttest with control group. This study was conducted at Gunungpati Health Center and Kedungmundu Health Center, in Semarang City. The sample in this study used a minimum sample size per group was used, a reserve sample equivalent to 10% of the minimum required sample size per group was added to anticipate potential dropouts. With a sample of 30 people in the intervention group in the class of pregnant women at Gunungpati Health Center and 30 people in the control group in the class of pregnant women at Kedungmundu Health Center. These two Puskesmas were chosen because in 2023 they were listed as the Puskesmas with the most high-risk pregnant women in Semarang City. Participants were included in the study if they were pregnant women who consented to participate in the full course of the intervention and possessed a smartphone. Exclusion criteria comprised those who declined participation, did not complete one or more of the asaessments (pretest, posttest 1, or posttest 2) or did not have access to smartphone. This study was conducted by giving educational video media and leaflets to the intervention group and the control group was only given leaflets. The educational video provided information on the definition, symptoms, risk factors, and preventive measures related to preeclampsia. The video featured a speaker delivering the content, supported by animations to enhance comprehension and engagement. The video was developed by the researchers and had been reviewed and validated by media and subject matter experts, who confirmed its suitability for use in the intervention. In contrast, the leaflet material was obtained from the Ministry of Health if the Republic of Indonesia. Posttest in this study was conducted twice, posttest 1 was conducted after two weeks of pretest and posttest 2 was conducted two weeks after posttest 1. This research was conducted from October to December 2024. This study was conducted based on ethical approval from the Health Research Ethics Committee from Faculty of Public Health Diponegoro University No. 329/EA/KEPK-FKM/2024, dated July 30, 2024.

Diagram 1. Research Design

Intervention group : O1--X1--O2--O3

Control group : O4--X2--O5--O6

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Description:
O1, O4 = Pretest
X1 = Intervention using video and leaflet
X2 = Intervention using leaflet
O2, O5 = Posttest 1 was conducted two weeks after the initial pretest
O3, O6 = Posttest 2 was conducted four weeks after the initial pretest

RESULTS AND DISCUSSION

Based on the results of the research that has been conducted, data on the characteristics of respondents based on maternal age, gestational age, education level, and maternal employment are obtained.

Table 1. Distributions of respondent characteristics

Characteristics	Intervention		Control	
	N	%	N	%
Mother Age				
20 - 35 years	22	73,3	27	90
> 35 years	8	26,7	3	10
Gestational Age				
Trimester I	6	20	7	23,3
Trimester II	10	33,3	8	26,7
Trimester III	14	46,7	15	50
Education				
Elementary school	1	3,3	0	0
Junior high school	5	16,7	2	6,7
Senior high school	13	43,3	17	56,7
College	11	36,7	11	36,7
Work				
Work	14	46,6	13	43,3
Not Work	16	53,4	17	56,7

Based on Table 1, the sample used in this study consisted of 60 pregnant women who were divided into two groups, with 30 people in the intervention group who came from the class of pregnant women at Gunungpati Health Center and 30 people in the control group who came from the class of pregnant women at Kedungmundu Health Center. The characteristics of pregnant women in both groups were similar. In both groups, the mean age of pregnant women aged 20 to 35 years in the intervention group was 73,3% and in the control group was 90%. The gestational age of pregnant women in this study was partly in the third trimester in both the intervention group (46,7%) and the control group (50%), and almost half of the gestational age was in the second trimester in both the intervention group (33,3%) and the control group (26,7%). For educational history, most respondents from both groups were at the final secondary school level, both in the intervention group (43,3%) and the control group (56,7%). And almost most of the pregnant women in this study did not work or were housewives, both in the intervention group (53,4%) and the control group (56,7%). While those who worked were almost partially in the intervention group (46,6%) and control group (43,3%).

Table 2. The difference in the level of knowledge of respondents before and after the intervention in the intervention group and control group

Knowledge	Intervention		Control	
	Mean	p-value	Mean	p-value
Pretest	13,5	0,000	14,17	0,152
Posttest 1	17,77		14,87	
Pretest	13,5	0,000	14,17	0,802
Posttest 2	17,57		14,33	
Posttest 1	17,77	0,415	14,87	0,076
Posttest 2	17,57		14,33	

Based on table 2, the results of statistical analysis in the intervention group using the Wilcoxon Sign Rank Test showed a p-value of 0,000 or < 0,05 for the knowledge value of the intervention group from pretest to posttest 1 and from pretest to posttest 2. Statistically proven there is a significant difference between the value of knowledge before and after being given an intervention in the form of educational videos and leaflets in the intervention group. Meanwhile, from posttest 1 to posttest 2 using the Paired Sample T - Test showed a p-value is 0,415 or > 0,05, which means that there is no difference in the level of knowledge from posttest 1 and posttest 2 in the intervention group.

This is in line with research conducted by Idaman, et al., where there was an increase in the average knowledge of pregnant women who get education using videos about preeclampsia by 41,33% with a p-value of 0,000 or < 0,05. With the education using video can increase the

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value of knowledge of pregnant women because in the video there is interesting information accompanied by pictures and sentences that are easy for mothers to understand about preeclampsia (Meldafia, Yulia Darma and Deferma, 2023). In this study, the preeclampsia prevention video was presented on a website and divide into four segments, each lasting 3 to 4 minutes. And visual animation representing daily situations were included to enhance comprehension.

While in the control group, the level of knowledge based on the results of statistical tests obtained a p-value > 0,05 from pretest to posttest 1, prestest to posttest 2, and posttest 1 to posttest 2. This indicates that there were no significant differences in knowledge levels after intervention, which consisted only of a leaflet.

The use of a combined educational intervention involving both video and leaflet media demonstrated greater effectiveness in enhancing pregnant women's knowledge about preeclampsia compared to the use of leaflets alone. Videos integrate visual and auditory stimuli, which facilitate cognitive processing and enable the clearer communication of complex concepts through animations or live-action demonstrations. Conversely, leaflets depend exclusively on the reader's ability to independently comprehend written information, which may limit knowledge acquisition. Consistent with prior research, the synergistic use of audiovisual media alongside printed materials has been shown to significantly improve knowledge retention and understanding in pregnant women, highlighting the advantages of multimodal educational approaches in maternal health promotion (Rahayuningsih and Kristinawati, 2023).

Table 3. The Differences in respondent attitudes before and after the intervention in the intervention group and control group

Attitude	Intervention		Control	
	Mean	p-value	Mean	p-value
Pretest	28,37	0,000	28,13	0,495
Posttest 1	31,57		28,33	
Pretest	28,37	0,000	28,13	0,065
Posttest 2	31,27		27,43	
Posttest 1	31,57	0,417	28,13	0,003
Posttest 2	31,27		27,43	

Based on table 3, it is known that the results of statistical analysis in the intervention group using the Paired Sample T - Test on pretest to posttest 1 and Wilcoxon Sign Rank Test on pretest to posttest 2 show that the p-value is 0,000 or < 0,05 for the attitude value of the intervention group from pretest to posttest 1 and from pretest to posttest 2. Statistically, it shows that there is a significant difference between attitudes before and after being given interventions in the form of educational videos and leaflets in the inteverntion group. Whereas in posttest 1 to posttest 2 the results of statistical tests using the Wilcoxon Sign Rank Test showed a p-value of 0,417 or > 0,05 which means that there was no difference in attitude from posttest 1 to posttest 2 in the intervention group.

In alignment with research conducted by Reda, et al., that there was an increase in the attitude of pregnant women before and after the intervention well in most pregnant women which led to an increase in positive attitudes in pregnant women after receiving intervention in a video-based teaching program (MReda *et al.*, 2024). Positive attitudes in pregnant women can role as a prevention effort against preeclampsia (Istiqomah, Marsiwi and Haryanti, 2022).

While in the control group, it is known based on the Paired Sample T - Test statistical test that from pretest to posttest 1 and from pretest to posttest 2 has a p-value > 0,05, which means that there is no increase in attitudes in pregnant women who get education only through leaflets.

Pregnant women's attitudes toward preeclampsia prevention play a crucial role in determining the health behaviors they adopt during pregnancy. Previous studies have found that the combination of video and leaflet media is more effective in improving pregnant women's attitudes compared to education using leaflets alone. This is consistent with other research indicating that the combined use of video and leaflet media also effectively enhances pregnant women's motivation to engage in prenatal exercise, compared to the use of a single medium (Afra Sucita, 2019).

Tabel 4. The Differences in respondent self-efficacy before and after the

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intervention in the intervention group and control group

Self-Efficacy	Intervention		Control	
	Mean	p-value	Mean	p-value
Pretest	28,43	0,000	28	0,667
Posttest 1	32		28,13	
Pretest	28,43	0,002	28	0,132
Posttest 2	30,9		27,37	
Posttest 1	32	0,125	28,13	0,011
Posttest 2	30,9		27,37	

Based on table 4, the results of statistical tests using the Wilcoxon Sign Test on pretetst to posttest 1 and Paired Sample T - Test on pretest to posttest 2 in the intervention group obtained a p-value < 0,05 from pretest to posttest 1 and from pretest to posttest 2, which means that there is a difference between the self-efficacy of pregnant women before and after getting the intervention. Meanwhile, the Wilcoxon Sign Rank Test on posttest 1 to posttest 2 obtained a p-value > 0,05, which means that there is no difference in the self-efficacy of pregnant women from posttest 1 to posttest.

The results of this study are in line with the results of research conducted by Herinawati, et al., that there is an effect of video education media on the self-efficacy of pregnant women's knowledges (Herinawati *et al.*, 2021). High self-efficacy of pregnant women can encourage pregnant women to apply preeclampsia prevention behavior, because pregnant women with good self-efficacy tend to comply with the medical recommendations given and have the ability to apply disease prevention to themselves.

Whereas in the control group, the results of statistical analysis using the Wilcoxon Sign Rank Test from pretest to posttest 1 and pretest to posttest 2, the p-value of both results showed a value > 0,05, which means that there was no difference in the self-efficacy of pregnant women in the control group before and after being given an intervention in the form of only leaflets.

Enhancing pregnant women's self-efficacy in recognizing and preventing preeclampsia is crucial for reducing the risk of complications during pregnancy. The use of a combined educational intervention involving both video and leaflet media demonstrated more optimal results in improving pregnant women's self-efficacy compared to using leaflets alone.

Tabel 5. The Differences in knowledge of pregnant women in the intervention group and control group

Knowledge	Mean of Intervention	Mean of Control	p-value
Pretest	13,5	14,17	0,162
Posttest 1	17,77	14,87	0,000
Posttest 2	17,57	14,33	0,000

Based on table 5, it is known that the results of statistical analysis using the Mann-Whitney test on pretest knowledge between the intervention group and the control group obtained a p-value of 0,162 or > 0,05, which means that statistically there is no difference in knowledge between the intervention group and the control group before treatment. After being given treatment in the form of video education at posttest 1 and posttest 2, the knowledge of pregnant women between the intervention group and the control group obtained a p-value of 0,000 or < 0,05, which means that there is a significant difference in the knowledge of pregnant women in the intervention group and control group after treatment.

Tabel 6. The Differences in attitude of pregnant women in the intervention group and control group

Attitude	Mean of Intervention	Mean of Control	p-value
Pretest	28,37	28,13	0,746
Posttest 1	31,57	28,33	0,000
Posttest 2	31,27	27,43	0,812

Based on table 6, it is known that the results of statistical analysis using the Independent T - Test test on the pretest attitude of pregnant women between the intervention group and the control group get a p-value > 0,05, which means that there is no initial difference in the attitude of pregnant women before getting treatment. In posttest 1, the results of statistical analysis of attitudes were obtained with a p-value of 0,000 or <0.05, which means that there is a difference in the attitude of pregnant women between the intervention group and the control group after receiving treatment. However, at posttest 2, the results of statistical analysis with Mann-Whitney showed a p-

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value of 0,812 or > 0,05 so it was concluded that there was no difference in attitude between the intervention group and the control group at posttest 2.

Tabel 7. The Differences in self-efficacy of pregnant women in the intervention group and control group

Self - Efficacy	Mean of Intervention	Mean of Control	p-value
Pretest	28,43	28	0,730
Posttest 1	32	28,13	0,000
Posttest 2	30,9	27,37	0,000

Based on table 7, it is known that the results of statistical analysis using the Mann-Whitney test on the pretest of pregnant women's self-efficacy obtained a p-value of 0,730 or > 0,05, which means that there is no difference in the self-efficacy of pregnant women between the intervention group and the control group before getting treatment. In posttets 1 and posttest 2, the results of statistical analysis with a p-value of 0,000 or < 0,05 mean that there is a difference in the self-efficacy of pregnant women between the intervention group and the control group after treatment.

The results of this study are in line with previous research which states that there is a significant difference between the control group that did not receive intervention using videos and the intervention group that received education through videos (Amalia, Pamungkasari and Priyatama, 2024).

Table 8. The Effect of intervention on unadjusted scores, knowledge, attitudes and self-efficacy

Grand Mean Score	Overall Mean at Baseline (Grand Mean)	Intervention effects (unadjusted), Follow-up I			Intervention effects (unadjusted), Follow-up II		
		Absolute Magnitude (95% CI)	p-value	As % of Baseline	Absolute Magnitude (95% CI)	p-value	As % of Baseline
Knowledge	15,378	2,450 (1,429 - 3,471)	0,000	15,93	2,083 (1,063 - 3,104)	0,000	13,54
Attitude	29,183	1,700 (0,269 - 3,131)	0,014	5,82	1,100 (0,331 - 2,531)	0,195	3,77
Self-efficacy	29,139	1,850 (0,371 - 3,329)	0,009	6,35	0,917 (0,563 - 2,396)	0,408	3,15

Based on table 8, it is known that the percentage change in the value of knowledge, attitudes and self-efficacy of pregnant women after getting treatment. It is known that the increase in knowledge caused by the treatment was 15,93% at follow-up I (pretest to posttest 1) and an increase in knowledge of 13,54% at follow-up II (pretest to posttest 2). Then the increase in the attitude variable at follow-up I (pretest to posttest 1) was 5,82% and at follow-up II (pretest to posttest 2) was 3,77%.

And the increase in the self-efficacy variable in follow-up I (pretest to posttest 1) was 6,35% and in follow-up II (pretest to posttest 2) an increase of 3,15%. And it is known that the increase in knowledge scores is higher than the value of attitude and self-efficacy variables, so another measurement of the knowledge variable has been adjusted with the attitude score and self-efficacy score. Differences in scores between Follow-up I and Follow-up II may be attributed to various factors, such as decreased information retention or external influences. Longitudinal studies have shown that knowledge and skills can decline over time without additional reinforcement (Ameh *et al.*, 2018). External factors in the field may also affect scores at Follow-up I and Follow-up II, such as variations in the psychological condition of pregnant women at the time of posttest 1 and posttest 2. Moreover, this phenomenon can be explained by considering psychological and environmental factors that potentially influence the effectiveness of the intervention. Previous research has indicated that psychological conditions among pregnant women, including pregnancy-related anxiety, emotional fatigue, and family stress, can affect their concentration and motivation to absorb educational content (Rahayuningsih and Kristinawati, 2023). Additionally, environmental support—such as family involvement, the quality of healthcare facilities, and continuous access to educational media—also plays a critical role in the successful formation of attitudes and self-efficacy. Pregnant women who do not receive ongoing reinforcement from healthcare providers or lack a supportive environment tend to experience decreased motivation and confidence in practicing health-promoting behaviors during pregnancy.

Table 9. The Effect of intervention on pregnant women's knowledge score on preeclampsia prevention adjusted by attitude and self-efficacy scores

Grand Mean Score	Overall Mean at Baseline (Grand Mean)	Intervention effects (unadjusted), Follow-up I			Intervention effects (unadjusted), Follow-up II		
		Absolute Magnitude (95% CI)	p-value	As % of Baseline	Absolute Magnitude (95% CI)	p-value	As % of Baseline
Knowledge	15,378	2,450 (1,429 - 3,471)	0,000	15,93	2,083 (1,063 - 3,104)	0,000	13,54

In this study, it is known that the variables during the unadjusted process consist of knowledge, attitudes and self-

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efficacy, while the adjusted process only consists of knowledge variables with fixed effects, namely repetition and random effects in the form of attitude scores and self-efficacy scores of pregnant women.

Based on table 9, it is known that the increase in knowledge variable scores based on intervention, attitude factors and self-efficacy factors after being adjusted is 14,43% in follow-up I (pretest to posttest 1) and 12,16% in follow-up II (pretest to posttest 2). In addition, based on the research results obtained, random effects in the form of attitude scores and self-efficacy scores made an initial contribution of 1,5% at follow-up I and 1,38% at follow-up II to changes in knowledge.

The results of this study prove that interventions using videos can influence and can improve the knowledge, attitudes and self-efficacy of pregnant women in preventing preeclampsia better when compared to the control group who only received education through leaflets. A person's attitude and self-efficacy can also have an influence on a person's knowledge, either increasing knowledge or becoming the opposite (Meldafia, Yulia Darma and Deferma, 2023). Knowledge tends to increase more readily because it is the cognitive domain most easily influenced by new information, particularly through educational media such as videos and leaflets. According to Bloom's Taxonomy, the cognitive domain (knowledge) represents the most fundamental level and is more easily attained compared to the affective (attitude) and psychomotor (behavior) domains (University of Waterloo, 2025). Previous studies have demonstrated that education using a combination of video and leaflet is effective in enhancing pregnant women's knowledge about preeclampsia. However, improvements in attitudes and practices require more in-depth and repeated approaches (Ermiati, Puteri and Koeryaman, 2017).

The deliverability of health education materials through electronic or online media has been proven to make it easier for pregnant women to access important information (Sriatmi *et al.*, 2020).

CONCLUSION

There were differences in knowledge, attitudes and self-efficacy of pregnant women about the prevention of preeclampsia between the group of pregnant women who received interventions in the form of videos and leaflets compared to the group of pregnant women who only received leaflets. There was also a significant difference in the intervention group before and after receiving the intervention. The educational intervention of preeclampsia prevention through videos for pregnant women was able to increase the average knowledge, attitudes and self-efficacy of pregnant women. The highest increase occurred in the variable of knowledge of pregnant women.

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