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Development of Educational Media to Increase Pregnant Women's Knowledge of Pre-Eclampsia; Can Animated Videos Play A Role?

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ABSTRACT: Pre-eclampsia is a leading cause of maternal morbidity and mortality in Indonesia. A significant factor contributing to this issue is the low level of understanding among mothers regarding pre-eclampsia, which often results in pregnant women failing to recognize its signs and symptoms early on. This lack of awareness can lead to delays in seeking medical assistance, which can have serious consequences for both the mother and the fetus. To address this gap in knowledge, effective educational initiatives are essential, and one promising approach is the use of media. The objective of this study was to develop an animated video as an educational tool aimed at enhancing pregnant women's understanding of pre-eclampsia. This research employed a development approach, consisting of several key stages: research and information gathering, planning the preliminary product, conducting preliminary field testing, revising the main product, and finally executing main field testing. Throughout this process, the animated video underwent validation by both material experts and media specialists to ensure its content and presentation were appropriate and effective. Once the video was revised and produced, it was tested with a sample population consisting of 100 pregnant women from the Want Jaya and Darul Imarah districts in Aceh Besar. Participants were selected using a quota sampling technique, with 50 individuals from each district. The results of the validation process indicated an average percentage of 70.4%, categorizing the video as "Decent" for educational purposes. Furthermore, the effectiveness of the video was assessed through a pre-test and post-test evaluation. Statistical analysis using the Wilcoxon test revealed a significant difference between the average knowledge scores before and after viewing the video (p-value < 0.05). This finding highlights the positive impact of the animated video in enhancing the knowledge of pregnant women regarding pre-eclampsia. In conclusion, the study demonstrates that animated videos are a suitable and effective medium for increasing awareness and understanding of pre-eclampsia among pregnant women. By leveraging modern technology and engaging visual content, this educational approach can help empower mothers with the knowledge they need to recognize the symptoms of pre-eclampsia early and seek timely medical intervention, ultimately improving maternal and fetal health outcomes.

KEYWORDS: Pre-eclampsia, Educational Media, Animated videos, pregnant women.

1. INTRODUCTION

Preeclampsia affects around 5% of pregnancies worldwide, resulting in an estimated 60,000 maternal deaths each year [1], [2], [3]. In Indonesia, the situation is more severe, with the incidence reaching approximately 24% of total pregnancies, making it the second leading cause of maternal death in the country. Globally, preeclampsia affects about 4.6% of pregnancies, with regional variations between 2.7% and 8.2%. Preeclampsia and eclampsia contribute to 10% to 15% of direct maternal deaths globally. In Indonesia, the incidence of preeclampsia is reported to range from 3% to 10%, and it accounts for a significant portion of maternal mortality, with the Indonesian Ministry of Health documenting 1,077 cases of preeclampsia among 7,389 pregnant women in 2021[4], [5], [6].

Pre-eclampsia is a significant complication during pregnancy and is a leading cause of mortality for both mothers and infants [6], [7]. It affects approximately 2% to 7% of all pregnancies. This condition negatively influences the health of mothers and babies, contributing to high rates of morbidity and mortality globally [1], [2]. In Indonesia, pre-eclampsia is the second most common cause of maternal deaths, with 1,066 reported cases (Ministry of Health, 2019). Specifically in Aceh Province, it accounts for 106 out of 471 maternal deaths (22.5%) (Aceh Health Profile, 2019). These statistics highlight the urgent need for effective strategies to prevent rising rates of maternal morbidity and mortality. Enhancing pregnant women’s awareness of the warning signs associated with pregnancy is crucial for enabling early detection and timely intervention to avert life-threatening complications. Knowledge about pre-eclampsia is vital for preventing, controlling, and managing the condition. Understanding the disease significantly benefits patients by improving treatment adherence and reducing related complications (Fondjo et al., 2019).

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One effective way to boost awareness among pregnant women is through the development of suitable educational media, particularly targeted at community members. Media development is essential as it can reach a broader audience effectively [8]. This initiative aims to serve as a health education tool that enhances pregnant women's understanding of pre-eclampsia. Audio-visual media is one promising educational resource, as it presents engaging audio and visual content, making the information more appealing [9].
For instance, animated videos utilize a dynamic sequence of images to convey information. While animated videos were traditionally shared via television, numerous social media platforms, including YouTube, now serve as venues for disseminating this type of content [10], [11], [12]. According to research findings, pregnant women and mothers of young children greatly value the information and support available through online applications. They are accustomed to using digital media and expect improved access from governmental sources. The objective of this study is to create educational media focused on pre-eclampsia in the form of animated videos and to assess their effectiveness in enhancing pregnant women's knowledge about the condition.

2. METHOD

This study employs a "research and development" approach, focusing on creating educational video animation media that introduces pre-eclampsia to pregnant women in the community. The development process consists of six key stages: research and information gathering, planning the preliminary product, creating the preliminary field version, revising the main product, and conducting the main field test. Initially, the video content is validated by specialists in obstetrics as well as media experts to ensure its accuracy and effectiveness. The eligibility of the media is assessed using a Likert scale instrument, where results between 60% and 80% are deemed "eligible," while scores from 80% to 100% are classified as "very eligible." Following this validation process, the video is tested with a group of respondents to evaluate its impact. In this study, the target population includes all pregnant women residing in the Ingin Jaya and Darul Imarah districts of Aceh Besar, Aceh Province, during the year 2022. The sample size consists of 100 participants, selected through quota sampling, with 50 individuals from the Want Jaya sub-district and 50 from the Darul Imarah district. Data collection is conducted using a structured questionnaire designed to gather relevant information regarding the participants' knowledge and perceptions of pre-eclampsia after viewing the video. For data analysis, the Wilcoxon test statistic is utilized, as the collected data do not follow a normal distribution. This methodological framework ensures a comprehensive evaluation of the educational video's effectiveness in enhancing knowledge about pre-eclampsia among pregnant women in the specified communities.

3. RESULTS AND DISCUSSIONS

The development of animated video media in this study is guided by the Borg & Gall theory, which outlines a comprehensive 10-step process: (1) Research and information collection, (2) Planning, (3) Development of a preliminary product, (4) Preliminary field testing, (5) Main product revision, (6) Main field testing, (7) Operational product revision, (8) Operational field testing, (9) Final product revision, and (10) Dissemination and implementation (Septian et al., 2019). However, this study focused only on the first six steps of this framework. In the initial phase, relevant data about pre-eclampsia is gathered to understand the needs and gaps within the healthcare system. Planning involves setting clear objectives and schedules for the project. The development stage includes creating storyboards and scripts while consulting with experts to ensure the content is accurate. Preliminary field testing is conducted through focus group discussions with midwives and pregnant women to gather feedback on the video's effectiveness. This feedback informs the main product revision, where adjustments are made to enhance quality. Finally, main field testing is carried out at community health centers with a sample of 100 pregnant women to assess the video's impact on their knowledge. This structured approach ensures that the educational media produced is relevant and effective in raising awareness about pre-eclampsia within the community. The steps involved in product development are summarized in the following table:

Table 1. Animated Video Product Development Framework for Pre-eclampsia

Number	Step	Target
1	Research and Information Collecting	Identify (1) health service conditions, (2) specific needs, (3) discrepancies between field conditions and needs, (4) conduct interviews with department stakeholders and field midwives to assess organizational potential, and (5) perform data analysis.
2	Planning	Define parameters including (1) video production schedule, (2) animaker team, (3) design, outline, and content, and (4) product control measures.
3	Development of Preliminary Form of Product	(1) Create storyboards, scripts, and materials; (2) consult with animation experts on video production; (3) consult with Obstetrics and Gynecology experts regarding content.
4	Preliminary Field Testing / Focus Group Discussion (FGD)	(1) Assemble a focus group with midwives and pregnant women; (2) apply FGD techniques; (3) evaluate product validity in terms of

		visuals, audio, quality, and benefits.
5	Main Product Revision	(1) Revise the media based on FGD feedback regarding its validity and appropriateness; (2) make subjective revisions to the product.
6	Main Field Testing	Conduct main field tests at two community health centers with 100 pregnant women as respondents, and collect quantitative data on product effectiveness through pre- and post-tests.

From the FGD activities conducted during the initial field testing with 10 informants, including health practitioners and pregnant women, a media eligibility questionnaire was utilized. The results indicated an average validation percentage of 70.4%, categorizing the media as "adequate," as summarized in Table 2.

Table 2. Animated video media validation

Aspect	Component	Percent	Criteria
Visual	Appropriate display and background Appropriate presentation of images and material discussed The duration of the video is quite ideal for viewing. Illustrations are easy to understand and appropriate to everyday life. Accurate selection of colors and fonts Compatibility of image and animation settings suitability of image and animation settings with everyday life	70,7	Eligible
Audio	Match sound and animation. The sound presented is clear.	75	Eligible
Quality	Good video quality	65	Eligible
Benefit	Assist in providing counseling.	76	Eligible
Average		70,4	Eligible

Furthermore, the main field trial work steps were completed in two community health centers, Darul Imarah and Want Jaya. The trial involved 100 respondents. The characteristics of the respondents can be seen in Table 3.

Table 3: Respondent characteristics (n = 100)

Number	Characteristics	f	%
1	Age		
	20-35 Years	87	87,0
	<20 Years	1	1,0
	>35 Years	12	12,0
2	Gestasional Age		
	Trimester I (0-12 Weeks)	17	17,0
	Second Trimester (13-24 Weeks)	45	45,0
	Trimester III (>25 Weeks)	38	38,0

According to Table 3, the characteristics of the respondents, according to the age of the majority, were 87 (87%). Respondents with more gestational age categories in the second trimester (13–24 weeks) were 45 people (45.0%).

Table 4. Respondents' average knowledge about pre-eclampsia before and after the video animation (n = 100).

Number	Knowledge	Average	SD	Minimum	Maxsimum
1	Pre-test	7,57	1,57	3,00	7,00
2	Post-test	9,30	0,89	5,00	10,00

Table 4 shows the average respondent's knowledge about pre-eclampsia before being given the animated video, namely 7.57 with a minimum value of 3.00 and a maximum value of 7.00. After being given an animated video, the average respondent's knowledge increased to 9.30, with a minimum value of 5.00 and a maximum value of 10.00. According to the results of statistical calculations with the Wilcoxon rank test, there is a significant difference between the average pre-test and post-test knowledge scores after being given education with animated videos about pre-eclampsia.

Table 5 shows the differences in respondents' average knowledge before and after viewing the animation video.

Knowledge	N	Mean Rank	Sum of Ranks	Z	p-value

Pre – Post Test	Negative Ranks	5	19,50	97,50	-7,573	0,000
	Positive Ranks	78	43,44	3388,50		
	Ties	17				

Based on the results of this study, it is known that there is an increase in knowledge after being given education using animated video media. This shows that animated videos are effective in increasing pregnant women's knowledge about pre-eclampsia. The results of this study are in line with research conducted in Jatinangor, which showed that there were differences in the knowledge of pregnant women about pre-eclampsia before and after being given health education using video compared to media leaflets [13], [14]. Based on the findings of this study, there is a clear indication of increased knowledge among pregnant women following education delivered through animated video media. This suggests that animated videos are an effective tool for enhancing awareness about pre-eclampsia among expectant mothers. The results align with previous research conducted in Jatinangor, which demonstrated a significant difference in the knowledge levels of pregnant women regarding pre-eclampsia before and after receiving health education via video, particularly when compared to traditional media like leaflets [14], [15]. Furthermore, animated video media can be easily disseminated through social media platforms, which have become a widely utilized source of information. According to the national health information trend survey (HINTS), there has been a remarkable increase in the use of the internet to seek health information, with 80% of internet users accessing health-related content online [16], [17].

Over the past decade, social media platforms such as Facebook, YouTube, Twitter, Instagram, Snapchat, and WhatsApp have revolutionized how people consume media, establishing themselves as prominent sources for information[12], [17]. In Indonesia, the number of social media users continues to grow, currently comprising 59% of the total population of 272.1 million (Harahap & Susri Adeni, 2020). Research conducted in China involving 20 pregnant women revealed that they frequently seek information about pregnancy through social media, often prioritizing information gathering over sharing with others. Commonly sought topics include fetal development, the prospective father's role during pregnancy, pregnancy-related issues, discussion groups, and verifying information with other online sources

The increasing number of social media users facilitates the dissemination of health information, especially for pregnant women. It is crucial to provide information about pre-eclampsia not only to those currently pregnant but also to women preparing for pregnancy, enabling them to take proactive steps in advance. Having adequate knowledge about pre-eclampsia is vital for its prevention, control, and management. Studies conducted in the United States and various African countries reveal that pregnant women's understanding of pre-eclampsia remains insufficient. For instance, research in Ghana involving 351 pregnant women found that 88.4% had low knowledge about pre-eclampsia, while only 11.6% had adequate knowledge, and a mere 2.3% demonstrated high knowledge.

Animated videos present information in an engaging manner, often using imaginative scenarios that make the content more interesting and motivational [18]. This engaging format contributes to an increase in knowledge among mothers, empowering them to recognize and mitigate risk factors associated with pre-eclampsia. However, it's noteworthy that some pregnant women did not exhibit any change in knowledge or maintained the same scores before and after the intervention. Similar findings were reported in studies at Geisinger in Danville, PA, and Forty Fort, PA, where no significant increase in patient knowledge retention was observed when comparing graphic card education to educational videos utilized during routine prenatal counseling. This phenomenon might occur because knowledge scores can improve even in the absence of visual aids, as patients may already be aware of the dangers posed by pre-eclampsia to their health and the potential risks to fetal growth and development.

4. CONCLUSION

The development of this animated video educational medium was meticulously executed in six distinct stages, each designed to ensure the product's effectiveness and relevance. The process began with thorough research and planning, followed by the creation of the preliminary video content. Subsequent stages included preliminary field testing, where feedback was gathered from focus groups, and revisions based on this feedback to enhance the video's quality and educational value. Finally, the main field testing was conducted to assess the video's impact on the target audience, which consisted of pregnant women. To ensure the credibility and effectiveness of the animated video, it underwent validation by both material and media experts. This validation process is crucial as it confirms that the content is accurate, engaging, and suitable for the audience. The validation results yielded an impressive average score of 70.4%, categorizing the video as "Eligible" for educational use. This rating indicates that the video meets the necessary criteria for quality and effectiveness in conveying important health information. In evaluating the effectiveness of the video as an educational tool, a comparative analysis was conducted between the average pre-test and post-test knowledge scores of the participants. The results revealed a statistically significant difference ($p < 0.05$), indicating that the animated video had a positive impact on the knowledge levels of pregnant women regarding pre-eclampsia. This significant improvement underscores the potential of animated videos as an effective medium for health education. Given these findings, it is evident that the animated video is not only eligible but also highly effective in enhancing the knowledge of pregnant women about pre-eclampsia. The

engaging and informative nature of the animation helps to simplify complex medical inormation, making it more accessible and easier to understand for the audience. By utilizing this innovative educational medium, healthcare providers can better inform pregnant women about the risks, symptoms, and preventive measures related to pre-eclampsia, ultimately contributing to improved maternal and fetal health outcomes.

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