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Pregnant Women's Knowledge About Dental Caries During Ante-Natal Care Using Animated Video Media at the Palang Tuban Community Health Center

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ABSTRACT

Background: Dental caries is one of the most common oral health problems experienced by pregnant women and can affect both maternal health and fetal development. Low knowledge regarding dental caries is one of the contributing factors to its high prevalence among pregnant women. **Object:** This study aimed to determine the level of knowledge of pregnant women about dental caries before and after receiving education using animated video media during Ante Natal Care (ANC) visits at Palang Public Health Center Tuban. **Methode:** . This research employed a descriptive design with data collected through pre-test and post-test questionnaires administered to 30 pregnant women. **Results:** The results showed that before the education was given, most respondents had a low level of knowledge (70%), followed by a moderate level (30%), and none in the good category. After receiving education through animated video media, knowledge levels increased significantly, with 90% of respondents achieving a good category, 10% moderate, and none in the low category. These findings demonstrate that animated video media is effective in improving pregnant women's knowledge about dental caries. **Conclusion :** It can be concluded that animated videos serve as an engaging and easy-to-understand educational tool that successfully enhances comprehension regarding the prevention of dental caries among pregnant women.

Keywords: ANC, Animated Video, Dental Caries, Knowledge, Pregnant Women

BACKGROUND

Pregnancy is a natural physiological process that induces significant hormonal, biological, and behavioral changes in women. These changes influence not only systemic health but also oral health conditions, particularly by increasing susceptibility to dental caries. Hormonal fluctuations during pregnancy may alter salivary composition and elevate oral acidity, which facilitates the proliferation of cariogenic bacteria such as Streptococcus mutans and Lactobacillus sp (Atiqoh, 2020). Symptoms such as nausea and vomiting further worsen oral acidity, especially in the first trimester, and may contribute to demineralization of dental tissues.

Dental caries remains a global oral health burden, affecting billions of individuals worldwide. Among pregnant women, the prevalence of caries is reported to be notably high. A previous study found that 84.69% of pregnant women experienced dental caries, with a mean DMF-T score of 4.34, indicating substantial oral health problems during pregnancy (Tahulending et al., 2013). Poor maternal oral health has been associated with unfavorable pregnancy outcomes, including preterm birth, low birth weight, and increased risk of early childhood caries (ECC) due to vertical transmission of cariogenic bacteria from mother to child (Manu et al., 2023).

Oral health knowledge plays a crucial role in shaping healthy behaviors during pregnancy. Lack of awareness regarding the impact of dental caries on maternal and fetal health may lead to inadequate oral hygiene practices and reduced utilization of dental services. A study indicated that lower maternal knowledge is significantly associated with poor oral health behavior, contributing to higher caries incidence during pregnancy (Muhsinah et al., 2014).

Observations conducted at Puskesmas Palang, Tuban revealed that 70% of pregnant women had insufficient knowledge regarding dental caries, and a similar proportion presented with carious lesions during intraoral examination. This highlights a gap in health education delivery, particularly during Ante Natal Care (ANC) visits. ANC serves as an essential platform for early detection and prevention efforts, allowing health workers to integrate oral health counseling as part of comprehensive maternal care (Puspitasari et al., 2024).

In the era of digital health transformation, technology-enhanced educational media have emerged as effective tools for improving health knowledge. Animated video media, in particular, provide visual clarity, simplify complex concepts, and enhance engagement. Previous studies have demonstrated that animated video–based health education significantly improves understanding and motivation among learners (Asnawati & Sutiah, 2023; Hapsari & Zulherman, 2021).

Research in maternal health education also found that audiovisual media are effective in increasing knowledge and awareness among pregnant women regarding various maternal health topics (Hadijah et al., 2021).

Despite the increasing utilization of digital educational tools, evidence supporting the effectiveness of animated video media for oral health promotion among pregnant women in Indonesia remains limited. Most existing maternal oral health education programs rely on conventional counseling methods, which may not adequately address differences in literacy levels, attention span, or comprehension among pregnant women.

Given the high prevalence of caries among pregnant women, inadequate oral health knowledge, and the potential of digital educational media, this study aims to analyze the change in knowledge of pregnant women regarding dental caries before and after receiving animated video–based education during ANC visits at Puskesmas Palang, Tuban. The findings are expected to contribute to the development of effective and sustainable oral health promotion strategies to support maternal and child health outcomes.

RESEARCH METHODE

Description of Materials or Research Subjects

The research subjects were 30 pregnant women who were undergoing antenatal care (ANC) examinations at Puskesmas Palang, Tuban. The materials used in this study included an educational animation video containing information about dental caries and proper tooth-brushing techniques, along with pretest and posttest questionnaires designed to assess the respondents' level of knowledge regarding dental caries before and after the intervention.

Research Design

This study employed a descriptive research design aimed at determining the level of knowledge of pregnant women regarding dental caries. The design involved providing an educational intervention using animated video media, followed by comparison of pretest and posttest questionnaire results to evaluate changes in knowledge.

Research Location and Period

The research was conducted at Puskesmas Palang, Tuban, specifically at the dental polyclinic during routine ANC

visits. The data collection was carried out from December 2024 to May 2025, covering preparation, intervention, monitoring, and evaluation stages.

Research Procedure

The research procedure was divided into three main stages:

1. Preparation Stage
   a. The researcher obtained formal permission to conduct the study from the Head of Puskesmas Palang, Tuban.
   b. Coordination was carried out with the dentist and dental nurse at the dental polyclinic to confirm research activities and scheduling.
   c. The researcher prepared the educational materials, including the animated video about dental caries and proper tooth-brushing techniques.
   d. Pretest and posttest questionnaires were developed and printed for data collection.
   e. Two research assistants were assigned to help during the data collection process.
2. Implementation Stage
   a. The researcher introduced herself to the dental health staff and explained the purpose of the research to ensure smooth implementation.
   b. Pregnant women who came for ANC (Antenatal Care) visits were given a pretest questionnaire to assess their initial knowledge of dental caries.
   c. The completed pretest questionnaires were collected.
   d. A health education session was conducted using the animated video as the intervention media.
   e. After the education session, the pregnant women were given a posttest questionnaire to evaluate changes in their knowledge levels.
   f. The completed posttest questionnaires were collected as part of the first evaluation.
   g. A second evaluation was conducted through follow-up monitoring using a WhatsApp communication group for ongoing assessment.
3. Data Processing Stage
   a. All completed pretest and posttest questionnaires were collected and organized.
   b. Each response was scored based on the predetermined scoring criteria (0–100 scale).
   c. The total score for each participant was calculated, and descriptive analysis was performed to compare pretest and posttest knowledge levels.
   d. The results were converted into percentage values to determine the overall improvement in knowledge after the intervention.

Instruments and Equipment

The primary research instrument was a structured questionnaire used to measure the respondents' knowledge of dental caries before and after the intervention. Additional equipment included a laptop or smartphone for presenting the educational animated video, and Animation video containing information on dental caries prevention and proper brushing technique.

Data Collection Methods

Data collection was carried out using pretest and posttest questionnaires distributed to pregnant women before and after the educational intervention using animated video media.

Data Analysis

The collected data were analyzed by scoring each respondent's answers, followed by calculating the mean score for both pretest and posttest assessments. The results were then converted into percentage form to determine the overall level of knowledge among pregnant women regarding dental caries at Puskesmas Palang, Tuban. The analysis aimed to identify the improvement in knowledge following the educational intervention.

Research Ethics

This study has received an ethical exemption from the Health Research Ethics Committee of the Surabaya Ministry of Health Polytechnic (Poltekkes Kemenkes Surabaya) under reference number No.EA/3832/KEPK-Poltekkes_Sby/V/2025. The ethical assessment was conducted in accordance with the seven WHO 2011 standards, which include social values, scientific values, the balance of risks and benefits, confidentiality, and informed consent in accordance with the 2016 CIOMS Guidelines. This ethical approval certificate is valid from 9 September 2025 until 9 September 2026.

RESULT AND DISCUSSION

This study was conducted at Puskesmas Palang, Tuban Regency, with a total of 30 pregnant women participating in the health education program regarding dental caries using animated video media.

Knowledge of Pregnant Women About Dental Caries Before Education.

Table 1.

Respondents' Answers Before Counseling Using Animated Video Media

No	Question	Respondents' Answers			
		Correct		Incorrect	
		Σ	%	Σ	%
1	What is meant by dental caries?	7	23	23	77
2	What causes dental caries?	5	17	25	83
3	Early signs of dental caries are indicated by?	4	13	26	87
4	Can tooth cavities canuse bad breath?	19	63	11	37
5	The cause of tooth decay is the sticking of food residues containing bacteria, called what?	21	70	9	30
6	What should be done when the tooth is already decayed?	10	33	20	67
7	How often do you brush your teeth every day?	19	63	11	37
8	Do you use toothpaste containing fluoride?	11	37	19	63
9	Do you use dental floss?	17	57	13	43
10	Do you routinely visit the dentist during pregnancy?	12	40	18	60

No	Question	Respondents' Answers			
		Correct		Incorrect	
		Σ	%	Σ	%
11	Have you experienced toothache during pregnancy?	22	73	8	27
12	If yes, how often does the pain occur?	18	60	12	40
13	Severe dental caries may cause?	4	13	26	87
14	Can dental caries be contagious?	3	10	27	90
15	Dental caries can be prevented by?	6	20	24	80
16	Dental caries that reaches the nerve is usually treated with?	17	57	13	43
17	What do you do when experiencing toothache?	22	73	8	27
18	The first layer of the tooth attacked by caries is?	9	30	21	70
19	Eating patterns that increase the risk of dental caries are?	18	60	12	40
20	What indicates that caries has reached the deeper part of the tooth?	3	10	27	90
	AVERAGE	**20**	**46%**	**17**	**54%**
	CATEGORY	**POOR**			

Table 1 shows that before receiving the counseling, the pregnant women showed a generally low level of knowledge about dental caries, with only 41% correct responses and most items answered incorrectly. Many respondents did not understand the definition, causes, early signs, prevention, or complications of dental caries, as indicated by low scores across most questions. Although a few aspects, such as brushing frequency and the link between cavities and bad breath, were better recognized, the overall results still placed the group in the poor knowledge category. These findings indicate that the participants had insufficient dental health knowledge prior to the educational intervention.

Table 2.

Distribution of Pregnant Women's Knowledge Before Counseling Using Animated Video Media

No	Knowledge Category	Number	(%)
1	Good	0	0
2	Fair	9	30
3	Poor	21	70

No	Knowledge Category	Number	(%)
	Total	**30**	**100**

Table 2 shows that before the health education was delivered, the majority of pregnant women had limited knowledge about dental caries. Table 4 shows that 70% were categorized as having poor knowledge, while 30% were in the fair category, and none demonstrated good knowledge.

Knowledge of Pregnant Women About Dental Caries After Counseling

Table 3.

Distribution of Pregnant Women's Knowledge After Counseling Using Animated Video Media

Knowledge Category	Total	Percentage (%)
Good	27	90
Fair	**3**	10
Poor	0	0
Total	**30**	**100**

After receiving health education using animated video media, respondents' knowledge increased significantly. Table 3 shows that 90% achieved good knowledge, while only 10% were in the fair category.

Table 4.

Respondents' Answers After Counseling Using Animated Video Media

No	Question	Respondents' Answers			
		Correct		Incorrect	
		Σ	%	Σ	%
1	What is meant by dental caries?	30	100	0	0
2	What causes dental caries?	29	97	1	3
3	Early signs of dental caries are indicated by?	27	90	3	10
4	Can tooth cavities canuse bad breath?	29	97	1	3
5	The cause of tooth decay is the sticking of food residues containing bacteria, called what?	26	87	4	13
6	What should be done when the tooth is already decayed?	27	90	3	10
7	How often do you brush your teeth every day?	29	97	1	3

No	Question	Respondents' Answers			
		Correct		Incorrect	
		Σ	%	Σ	%
8	Do you use toothpaste containing fluoride?	26	87	4	13
9	Do you use dental floss?	27	90	3	10
10	Do you routinely visit the dentist during pregnancy?	24	80	6	20
11	Have you experienced toothache during pregnancy?	28	93	2	7
12	If yes, how often does the pain occur?	28	93	2	7
13	Severe dental caries may cause?	26	87	4	13
14	Can dental caries be contagious?	26	87	4	13
15	Dental caries can be prevented by?	29	97	1	3
16	Dental caries that reaches the nerve is usually treated with?	22	73	8	27
17	What do you do when experiencing toothache?	28	93	2	7
18	The first layer of the tooth attacked by caries is?	26	87	4	13
19	Eating patterns that increase the risk of dental caries are?	22	73	8	27
20	What indicates that caries has reached the deeper part of the tooth?	21	70	9	30
	AVERAGE	**27**	**88%**	**3**	**12%**
	CATEGORY	**GOOD**			

Table 4 shows that after receiving counseling using animated video media, the respondents showed a significant improvement in their knowledge of dental caries. Most pregnant women answered the questions correctly across nearly all items, with an overall average of 88% correct responses, placing them in the good knowledge category. They demonstrated strong understanding of the definition, causes, early signs, prevention, and treatment of dental caries, as reflected by high correct response rates such as 100% for the meaning of caries and over 90% for many other questions. Although a few items still showed moderate errors, the results clearly indicate that the animated video education was effective in enhancing the participants' comprehension of oral health.

Table 5.
Distribution of Pregnant Women's Knowledge Before and After Counseling Using Animated Video Media

Knowledge Category	Before		After	
	Number	Percentage (%)	Number	Percentage (%)
Good	0	0	27	90
Fair	3	10	3	10
Poor	27	90	0	0
Total	**30**	**100**	**30**	**100**

Table 5 shows that the comparison of knowledge levels before and after counseling shows a substantial improvement among pregnant women. Prior to the intervention, none of the respondents were categorized as having good knowledge, while 90% fell into the poor category. After receiving counseling using animated video media, 90% of the women achieved good knowledge, and none remained in the poor category. The fair category remained unchanged at 10%. These findings indicate that the animated video intervention was highly effective in enhancing the participants' understanding of dental caries.

Discussion

This study aimed to evaluate the effectiveness of animated video media in increasing pregnant women's knowledge about dental caries during antenatal visits at Puskesmas Palang, Tuban Regency.

The findings demonstrate a substantial improvement in the respondents' understanding after receiving health education through audiovisual media. The effectiveness of such media is strongly supported by previous research showing that clear, engaging, and structured educational tools significantly enhance health literacy, particularly among pregnant women who require accurate information to support maternal and fetal well-being (Achmad & Hipituew, 2024; Amjad et al., 2024). The discussion below elaborates on the conditions before and after the intervention, supported by relevant literature.

Knowledge of Pregnant Women at Puskesmas Palang, Tuban, Indonesia Before Counseling Using Animated Video Media

Before the counseling intervention was administered, pregnant women displayed a considerably low level of knowledge regarding dental caries, with 90% categorized in the poor group based on the assessment results. Many respondents were unable to accurately identify what dental caries are, the contributing factors that cause caries to form, the early warning signs that may indicate caries development, as well as appropriate preventive measures and potential complications. This lack of understanding reflects the general limitations of traditional health education approaches that rely primarily on verbal explanations without visual reinforcement, as highlighted by Annisa et al (2022), who noted that conventional or verbal-only health education often fails to effectively improve maternal knowledge.

Likewise, Kolantung et al. (2021) emphasized that insufficient information delivery leads to suboptimal maternal health decisions. Poor oral health literacy

during pregnancy is also linked to limited exposure to interactive health education tools, making pregnant women less likely to adopt recommended oral hygiene behaviors (Wulandari et al., 2021; Hayati, 2021). Additionally, health education that lacks engaging formats tends to result in low retention and minimal behavioral impact, particularly for topics considered secondary, such as dental hygiene (Putri et al., 2021).

Nasriyah and Wulandari (2022) further highlighted that supportive health education is essential for empowering pregnant women to adopt healthier practices. The low baseline knowledge found in this study is consistent with broader findings indicating that without innovative educational media, maternal health awareness frequently remains low across various domains, including oral health, pregnancy preparation, and risk reduction (Nisa et al., 2021). Thus, the pre-intervention findings clearly reflect a broader need for modern, engaging educational methods.

Knowledge of Pregnant Women at Puskesmas Palang, Tuban, Indonesia After Counseling Using Animated Video Media

Following the educational intervention using animated video media, there was a substantial increase in respondents' understanding, with 90% categorized as having good knowledge and achieving an average correct response rate of 88%. Animated videos present information through synchronized visual and auditory channels, promoting better comprehension and retention, which is consistent with findings by Melati and Afifah (2021).

The structured and engaging nature of animated media enhances focus and supports deeper cognitive processing, which contributes to improved knowledge acquisition. According to Yuliana and Wahyuni (2020), structured maternal education helps prepare pregnant women to better understand and apply health information, reinforcing the importance of accessible educational strategies.

Similarly, Putri et al. (2021) demonstrated that animation-based media enhance attention and understanding, making them highly suitable for health promotion. Audiovisual tools also support long-term knowledge retention and foster behavioral changes, as highlighted by studies exploring maternal education during pregnancy (Wulandari et al., 2021).

The integration of digital media in ANC services aligns with current technological advancements and strengthens the effectiveness of healthcare delivery (Purba & Sembiring, 2021). Therefore, the improvement observed after the intervention confirms that animated video media are a powerful tool for enhancing maternal knowledge and should be widely implemented in ANC educational programs.

CONCLUSION

Based on the results of the study entitled Knowledge About Dental Caries Among Pregnant Women at Puskesmas Palang, Tuban, the findings indicate that pregnant women initially demonstrated a low level of knowledge regarding dental caries prior to the provision of animated video–based health education. However, after receiving counseling using the animated video media, their level of knowledge increased significantly, resulting in a classification within the good category.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this research. All stages of the study were conducted objectively and independently.

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