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Effect of a Simulation-Based Educational Video on Menarche Readiness Among Fourth-Grade Girls in Yogyakarta

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ABSTRACT

Introduction: Menarche is a key biopsychosocial milestone in early adolescence, yet many young girls experience it with limited knowledge and emotional readiness due to inadequate, age-appropriate reproductive health education. This lack of readiness stems from insufficient understanding, limited information provided by parents and teachers, and suboptimal reproductive health education in schools. Providing education that is both comprehensive and age-appropriate about the physical and emotional changes of puberty is essential to help reduce fear, correct misconceptions, and lessen the stigma associated with menstruation.

Methods: The study aimed to analyze the effect of simulation-based video media on adolescent readiness to face menarche. This study employed a pre-experimental design with a one-group pretest-posttest approach. The sample comprised 54 fourth-grade female students within elementary school, selected via total sampling. The research instrument was a questionnaire assessing readiness to face menarche. The intervention video presented realistic scenarios depicting the physical and emotional experiences associated with menarche, including hygiene management and coping strategies for discomfort, to support both cognitive and affective learning.

Results: The analysis revealed an increase in readiness scores following the intervention, with a pretest mean of 15.44 and a posttest mean of 18.40. The Wilcoxon Signed Rank Test yielded a p-value of 0.000 ($p < 0.05$), indicating a significant effect of simulation-based video media on adolescent readiness to face menarche. Simulation-based video media effectively enhances adolescent readiness to face menarche and serves as a viable alternative for reproductive health education in elementary schools.

Conclusion: This media can be implemented as an effective and practical method for delivering reproductive health education in primary school settings. It also serves as a feasible tool to support adolescents' preparation for menarche by improving their readiness and understanding of this developmental milestone.

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INTRODUCTION

Adolescence is an important period in individual development, especially for adolescent girls, as this phase marks the transition from childhood to adulthood (1). These changes encompass biological, emotional, and social aspects, one of which is marked by the onset of menarche, which is the first menstrual period experienced by adolescent girls as part of the primary sexual characteristics influenced by hormonal changes (2). Menarche is an important stage in reproductive health as it marks the onset of puberty and the readiness of reproductive organs to function (3).

However, the reality on the ground shows that many adolescent girls lack adequate knowledge before experiencing menarche. The WHO 2018 notes that approximately 60% of adolescent girls in developing countries do not have sufficient information about menstruation before experiencing it (4). UNICEF (2021) also reports that 25% of adolescent girls never discuss menstruation before menarche and 17% are unaware that they are menstruating. These findings demonstrate a lack of early reproductive health communication, which contributes to low preparedness for menarche. This condition underscores the need for structured and developmentally appropriate educational interventions, including simulation-based video media, to support adolescents' readiness (5).

In Indonesia, the average age of menarche is 12 years old with a prevalence of 60%, but some experience it earlier, at 9-10 years old (2.6%) and 11 years old (30.3%), as well as at 13 years old (30%) (6). The Basic Health Research (7) also shows variations in the age of menarche from under 9 years to 17 years. The Indonesia Demographic and Health Survey reveals that 2% of girls experience menarche before the age of 10 (8). This phenomenon of early menarche is exacerbated by the limited information and education received by adolescents about reproductive health, whether from family, school, or the media (9).

Adolescents' attitudes toward menarche are significantly influenced by several factors, including age at menarche, parental role, and sources of information received (10). Lack of understanding can trigger negative reactions such as headaches, vomiting, lower back pain, and psychological complaints like confusion, anger, or sadness (11). Additionally, modernisation and current lifestyles have led to an increase in cases of early menarche, which is not always accompanied by emotional and psychological readiness in adolescents (12). Despite increased access to information, reproductive health education remains uneven and is often not optimally integrated into school curricula (13).

The lack of access to accurate reproductive health information and the limited effective communication between parents and adolescents have an impact on adolescents' low readiness in facing physical changes and reproductive risks (14). Providing accurate education about menarche is crucial so that adolescent girls can navigate these changes calmly, positively, and confidently. Accurate information helps form a positive image and reduce anxiety when facing menarche (15). The education provided must be comprehensive, covering physical, psychological, and mental protection (16). Many adolescents experience difficulties in accessing reproductive health information or services because discussions about menstruation are often framed as culturally sensitive, prompting feelings of shame, fear of judgment, and limited communication with parents or health providers. Similar challenges have been reported in various cultural contexts, including studies from South Asia, Sub-Saharan Africa, and Latin America, where social taboos and restricted communication similarly impede menstrual health literacy. This cross-cultural evidence reinforces that barriers to discussing menstruation are not unique to one setting and highlights the need for accessible and culturally adaptable educational interventions (17). As a result, adolescents tend to seek alternative sources of information, including peers or informal media, which are not always accurate (18).

However, the implementation of the Reproductive Health Education (PKR) programme in the School-Based Curriculum (KTSP) and the Merdeka Curriculum still faces challenges, including limited teacher training and cultural barriers that view sex education as taboo (19). Reproductive health education strategies for preparing children for menarche emphasize the importance of more innovative and interactive approaches, including the integration of education in schools, the use of audiovisual media based on digital technology, and participatory approaches in open communication about menstruation (20).

To address these challenges, the use of simulation-based video media has emerged as an innovative and promising educational solution. Video enables the visual and realistic presentation of information, providing concrete explanations about physical changes, the use of sanitary pads, and pain management or leakage during menstruation. This medium can stimulate imagination, aid in understanding abstract concepts, and offer a more meaningful learning

experience for students. Additionally, the simulation approach has been proven to increase learning motivation, active participation, and foster positive attitudes toward social and health issues. This study not only assesses cognitive aspects but also considers efficiency, emotional impact, and psychological readiness of participants. The research findings are expected to contribute scientifically to the development of a contextual, technology-based reproductive health education model tailored to the needs of today's adolescents.

Based on the above description, this study aimed to analyze the effect of simulation-based video media on adolescents' readiness to face menarche. This is based on the author's observations at a public elementary school in the Bantul region, which showed that most fourth-grade female students had not received adequate education about menarche, while some of them had already shown early signs of puberty. The school has also not actively implemented a structured reproductive health education program. Therefore, intervention using simulation-based video media is considered relevant and effective to be implemented in this school as an effort to improve the readiness of adolescent girls to welcome their first menstruation in a more positive and confident manner.

METHOD

Research Type

This study employed a quantitative pre-experimental one-group pretest-posttest design to evaluate the effect of simulation-based video media on menarche readiness. This design was selected because randomization and the inclusion of a control group were not feasible within the operational constraints of the elementary school setting. Although this approach inherently carries threats to internal validity such as maturation, history, and testing effects the study mitigated these risks through consistent measurement timing, standardized intervention delivery, and the use of identical instruments for both the pretest and posttest. To strengthen methodological rigor, the study incorporated validated psychometric instruments, expert-reviewed simulation-based video content, and structured implementation procedures to ensure intervention fidelity. Total sampling allowed the inclusion of all eligible fourth-grade girls, aligning the design with the study's objectives while acknowledging that the absence of randomization limits generalizability.

Population and Sample/Informants

The study population consisted of all fourth-grade female students who had not yet experienced menarche. The sample size for this study was 54 respondents, obtained through total sampling, as the entire population met the inclusion criteria and was accessible to the researcher. The inclusion criteria were fourth-grade female students who had not yet experienced menarche, were willing to participate in the research process, completed the informed consent form from their parents/guardians, and were present during the pretest, intervention, and posttest. The exclusion criteria included participants who did not complete the questionnaire or were absent during any of the data collection stages.

Research Location

This study was conducted an elementary school within May 2025.

Instrumentation or Tools

The instruments in this study consisted of a simulation-based educational video, a respondent characteristics sheet, and a questionnaire measuring adolescents' readiness for menarche. The intervention tool was a 7-minute simulation-based educational video that covered signs of puberty, correct use and disposal of sanitary pads, personal hygiene during menstruation, and simple relaxation techniques for managing menstrual discomfort. The video was developed using the ADDIE model and underwent expert validation. Reproductive health experts reviewed the scientific accuracy and relevance of the content, while a media expert evaluated visual quality, layout, and animation. All reviewers concluded that the video was appropriate and feasible for use as an intervention.

The readiness questionnaire was adopted from Solehah 2018 and consisted of 22 dichotomous items representing cognitive, affective, and behavioral aspects of menarche readiness. Construct validity in the original development study was tested using the Pearson Product–Moment correlation, where all items met the criterion of r-calculated > r-table. Reliability testing demonstrated a Cronbach's alpha of 0.936, indicating excellent internal

consistency. These psychometric properties support the questionnaire's suitability for assessing readiness in the present study (27).

Data Collection Procedures

Data collection was conducted in two stages using the same questionnaire, namely the pretest before the intervention and the posttest afterward. After completing the pretest, the simulation-based video was shown twice in a controlled classroom environment using identical equipment and seating arrangements to ensure procedural consistency across all participants. During the screening, the facilitator maintained a standardized role, providing only brief, predetermined clarifications and conducting a structured question-and-answer session to reinforce understanding without introducing new instructional content. Supplementary education was limited strictly to clarifying unfamiliar terms and responding to direct participant questions using standardized explanations, thereby preventing facilitator bias and minimizing unintended learning contamination. No additional teaching materials or external sources of information were provided, ensuring that the video remained the primary intervention influencing the observed changes between pretest and posttest.

Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25.0. Data were analyzed using the Wilcoxon Signed Rank Test to determine differences in readiness scores before and after the intervention. Statistical analysis was performed with a significance level of $p < 0.05$ to assess the effect of the simulation-based video media on participants' readiness to face menarche.

Ethical Approval

This study was reviewed and approved by the Health Research Ethics Committee of Universitas 'Aisyiyah Yogyakarta, Indonesia, with approval number PK.01.06/KEPK/078/2025. All procedures were conducted in accordance with the ethical standards of the institutional and national research. Written informed consent was obtained from the participants and their parents prior to data collection.

RESULTS

Table 1. Frequency Distribution of Respondents' Ages

Age	Frequency (f)	Percentage (%)
9	1	1.9
10	34	63.0
11	19	35.2
Total	**54**	**100**

Based on the characteristics of the respondents, it shows that out of a total of 54 respondents, there were 34 respondents (63.0%) aged 10 years. Furthermore, there were 19 respondents aged 11 years (35.2%), and only 1 respondent (1.9%) aged 9 years. This indicates that the majority of respondents are in the late childhood age range, which is a critical stage in the development of knowledge regarding health issues, including reproductive health.

Table 2. Sources of Information for Respondents

Source of Information	Frequency (f)	Percentage (%)
No Information	2	3.7
Mother	15	27.8
Older Sister	5	9.3
Friends	11	20.4
School Environment	14	25.9
Electronic Media	7	13.0
Total	**54**	**100**

Table 2 shows that out of 54 respondents, there were various sources of information accessed related to health. The majority of respondents obtained information from their mothers (27.8%), followed by the school environment (25.9%), friends (20.4%), electronic media (13.0%), older sisters (9.3%), and 3.7% of respondents did not obtain any information at all.

Table 3. Frequency Distribution of Respondents' Attitudes

Attitude	Frequency (f)	Percentage%
Pretest		
Negative	33	61.1
Positive	21	38.9
Posttest		
Negative	9	16.7
Positive	45	83.3
Total	**54**	**100**

Based on Table 3, before the intervention (pretest), 33 respondents (61.1%) showed negative attitudes and 21 respondents (38.9%) showed positive attitudes. After the intervention (posttest), 9 respondents (16.7%) showed negative attitudes and 45 respondents (83.3%) showed positive attitudes.

Table 4. The Effect of Simulation-Based Video Media on Adolescents' Readiness to Face Menarche

Group	N	Mean	Std. Dev	p-value
Pretest	54	13.09	2.067	0.000
Posttest	54	18.67	1.229	

Based on Table 4, the readiness questionnaire had a maximum total score of 22. Before the intervention, the mean readiness score was 13.09 with a standard deviation of 2.067, which corresponds to 59.5% of the maximum score and indicates a low level of readiness. After the intervention, the mean increased to 18.67 with a standard deviation of 1.229, equivalent to 84.86% of the maximum score, indicating a high level of readiness. The statistical test results showed a p-value of 0.000, which is smaller than the significance threshold of 0.05. This indicates that there is a statistically significant effect between the use of simulation-based video media and the improvement in adolescents' readiness to face menarche.

DISCUSSION

Based on the research results, the average score for adolescents' readiness to face menarche was 13.09, which is equivalent to 59.5%, indicating that the level of readiness among adolescents to face menarche at the initial stage of the study was still relatively low. After intervention with simulation-based video media, there was a significant change in the readiness of adolescents, as shown in the posttest results. The average posttest score showed a significant increase to 18.67. This value is equivalent to 84.86%, indicating that most respondents were at a high level of readiness to face menarche after receiving the intervention. With a standard deviation decreasing to 1.229, this indicates that the increase in readiness did not only occur generally but was also more evenly distributed among all respondents. The improvement in readiness can be understood through cognitive, affective, and sociocultural mechanisms. Cognitively, the simulation-based video enhances dual-channel processing and reduces abstract cognitive load through concrete demonstrations. Affectively, relatable characters and supportive narration reduce anxiety and increase receptiveness to information. Socioculturally, the video provides a safe and standardized learning space that bypasses menstrual taboos and inconsistent communication in the home or school environment. The simulation-based video media in this study was designed in accordance with the psychological characteristics and learning styles of today's teenagers. Realistic content, attractive visuals, short but dense duration, and empathetic and friendly delivery make the information easier to understand and accept. This video also helps boost confidence, reduce feelings of embarrassment or fear, and provide learning experiences. Their ability to be replayed gives

adolescents the opportunity to reinforce their understanding independently, thereby promoting overall cognitive, affective, and psychomotor readiness.

The present study offers a distinct contribution by introducing simulation-based video media. The simulation provides step by step demonstrations of first menstruation scenarios such as recognizing the onset of bleeding, selecting and correctly using sanitary pads, and managing emotional responses, creating an interactive and immersive experiential learning environment. This modality has rarely been applied in menarche related education, particularly for younger primary-school-aged girls. Furthermore, this study adopts a holistic assessment of menarche readiness by integrating psychological, practical, and emotional dimensions, thereby offering a deeper and more comprehensive evaluation of girls' preparedness. These innovative elements distinguish the present study from prior research and underscore its contribution to the development of early, developmentally appropriate reproductive health interventions. This study is in line with previous research that the lack of knowledge and understanding before the video intervention was given was due to a lack of information about menarche among female students. The lack of information regarding female students' knowledge in facing menarche was because teachers at SDN 90 Palembang did not teach lessons about menstruation, resulting in their lack of knowledge (21). In line with previous research, the use of educational videos has been proven to improve adolescents' understanding of reproductive health topics. They noted that knowledge improvement was more significant in the group that received audiovisual intervention compared to the traditional lecture method. This is because videos are more engaging, easier to understand, and avoid boredom in the learning process (22). Research conducted by found that health education improves students' knowledge and readiness for menarche in children aged 9-12 years. The study found that there is a relationship between students' knowledge and readiness for menarche (23). There are still gaps in information and limited access to services that meet the needs of adolescents, both in terms of the availability of materials, communication approaches, and the sensitivity of health workers. Adolescents often feel reluctant or embarrassed to ask directly to parents or health providers, leading them to seek alternative sources of information (24).

This increase in readiness aligns with previous research indicating that interactive video-based learning media can provide a more contextual and in-depth learning experience, particularly in understanding biological changes such as menarche. This medium not only conveys information visually and auditorily but also provides situational simulations that allow adolescents to understand real-life scenarios they may encounter (25). The use of video media in efforts to enhance knowledge can occur because video media has several advantages, including capturing attention, presenting realistic depictions of real-life situations, clarifying abstract concepts, employing specific techniques and effects that influence emotions, and accurately depicting events (26). Adolescents tend to be more responsive to media that address situations they recognize directly. By featuring characters of the same age, a school setting, and simple, familiar language, the video facilitates the process of identification and emotional connection, making educational messages easier to accept and internalize (27).

The ideal video duration of 5-10 minutes also contributes to the effectiveness of the media. Based on Wahyuni's 2019 study, short durations with a focus on dense content have been proven to be more effective in maintaining attention and information retention in elementary school children (28). Each educational segment is divided into a narrative storyline and direct instructions that do not overload the child's concentration but still provide comprehensive information. Previous research also mentions videos that include animated illustrations, repetition of key points, expressive facial expressions of characters, and the use of friendly and empathetic voice intonation. These elements significantly influence the formation of positive attitudes and reduce adolescents' anxiety toward the topic of menstruation, which is often considered sensitive or frightening (29).

Children with a visual learning style can understand more easily from images; auditory learners benefit from clear narration and dialogue; while kinesthetic learners respond to demonstrative scenes such as how to use a pad or clean themselves. This makes videos an inclusive medium that values diversity in learning styles, making them more effective than single methods (30). Videos can be watched repeatedly, enabling self-directed learning reinforcement. This supports the principle of knowledge internalization: from merely knowing (cognitive) to understanding (comprehension), accepting (affective), and finally being ready to act (behavioral readiness). This repetition cannot be achieved in traditional verbal education, which occurs only once and is easily forgotten (31).

In many cultures, including Indonesia, the topic of menstruation is still considered taboo, even by female teachers. Video media helps bridge the gap between educators and students: teachers do not have to explain explicitly

but can facilitate and discuss the video content (32). This helps reduce social pressure on teachers, improves classroom comfort, and opens up more free discussion after the video. Parents can also use these videos as a starting point for discussions with their children (33).

This study has several limitations. The pre-experimental one group pretest-posttest design lacked a control group, which limits internal validity and makes it difficult to rule out external influences on the outcomes. Research assistants were involved based on availability rather than standardized criteria, creating potential variation in instruction delivery. Environmental conditions during the intervention were suboptimal, as the video was shown in an improvised hall with limited preparation time, restricted audio quality due to the use of a small speaker, and noise disturbances from concurrent school activities.

CONCLUSION

The readiness of adolescents before receiving intervention through simulation-based video media shows that most respondents still have a low level of readiness, with an average pretest score of 13.09 or 59.5% of the total maximum score. After the intervention, there was a significant increase, as indicated by an average posttest score of 18.67 or 84.86%, reflecting high readiness. The results of the Wilcoxon Signed Rank Test showed a p-value of 0.000, indicating that simulation-based video media significantly influences the improvement of adolescents' readiness to face menarche.

AUTHOR'S CONTRIBUTION STATEMENT

Conceptualization, Wahyuni Idvia Nova, Djauhar Ismail and Andari Wuri Astuti.
Methodology, Wahyuni Idvia Nova, Djauhar Ismail and Andari Wuri Astuti.
Validation, Djauhar Ismail and Andari Wuri Astuti.
Formal Analysis, Wahyuni Idvia Nova.
Investigation, Wahyuni Idvia Nova.
Resources, Djauhar Ismail and Andari Wuri Astuti.
Data Curation, Wahyuni Idvia Nova.
Writing – Original Draft Preparation, Wahyuni Idvia Nova.
Writing – Review and Editing, Djauhar Ismail and Andari Wuri Astuti.
Visualization, Wahyuni Idvia Nova.
Supervision, Djauhar Ismail and Andari Wuri Astuti.

CONFLICTS OF INTEREST

All authors declare to have no conflict of interest.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The author used Chat-GPT to assist in language translation, grammar correction, and style refinement during the preparation of this work. After using these tools, the author reviewed and edited the content as needed and takes full responsibility for the final version of the manuscript.

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