

Effectiveness Of Pictorial Booklet-Based Health Education On Improving Menarche Knowledge: A Quasi-Experimental Study

Fitri Dyna^{1*}, Indy Meisyahrani¹, Desti Puswati¹, Arlia Purwaningsih¹, Veni Dayu Putri¹, Parichat Arayajaru²

¹ Institut Kesehatan Payung Negeri Pekanbaru, 28292, Pekanbaru Riau, Indonesia

² Boromarajonani College Of Nursing Ratchaburi, 70000, Muang District Ratchaburi, Thailand

*Correspondence: fitri.dyna@payungnegeri.ac.id

Abstract:

Reproductive health literacy is closely related to adolescents' readiness to face biological and social changes from an early age and remains a global public health concern. Menarche is a crucial component of menstrual health literacy and marks a significant milestone in girls' reproductive development. However, many elementary school students have limited knowledge about menarche, which may lead to fear, embarrassment, poor menstrual hygiene practices, and school absenteeism. Therefore, effective educational interventions are required to adequately prepare girls for this transition. This study aimed to evaluate the effectiveness of pictorial booklet-based education in improving elementary school students' knowledge of menarche. A quasi-experimental study with a one-group pretest-posttest design was conducted. The intervention consisted of health education delivered using pictorial booklets. A pretest was given before the intervention, and a posttest after the intervention. The intervention was carried out once by giving a picture booklet to each sample. The research population was all female students in grades III to VI who had not menstruated. The sample consisted of 36 respondents who were selected through stratified random sampling. The research was conducted at SDS YMI Tani Makmur, Rengat Barat. A statistical test using dependent sample T test. The results showed an overall increase in students' knowledge following the intervention. The mean knowledge score increased from 18.333 to 21.139 following the intervention. Statistical analysis revealed a significant difference in knowledge levels before and after the educational intervention ($p < 0.001$). These findings indicate that pictorial booklet-based education is effective in improving elementary school students' knowledge regarding menarche and may serve as a practical educational medium to enhance menstrual health literacy at an early age.

Keywords: health education, knowledge, menarche, pictorial booklet

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INTRODUCTION

Adolescence, also known as puberty, is a transitional period between childhood and adulthood characterized by physical, psychological, and psychosocial changes. One of the most important events during puberty is the onset of menstrual symptoms or menstruation for the first time (menarche), which is a sign of sexual maturity and the development of puberty in adolescent girls ([Sari & Effendy, 2019](#); [Widiastini et al., 2019](#); [Nnennaya et al., 2021](#)). One of the important stages in female reproductive development is menarche, which is an early sign of puberty and marks the biological readiness for reproductive function as well as the maturation of adolescent sexual development ([Susilawati et al., 2025](#)), ([Ir et al., 2016](#)). In recent years, the average age of menarche among adolescent girls in Indonesia has declined. This decline must be balanced with the physical and mental readiness of adolescent girls who have not yet entered puberty ([Lutfiya,](#)

[2016](#)). Menarche has a unique psychological role that can affect a person's attitude until they reach adulthood; thus, preparation is required when dealing with it. One of the necessary preparations is psychological preparedness. Psychic preparation can be achieved if adolescent girls have clear and precise information about menstruation. Often, the need to get information or explanations about menstruation is not met positively by people around them, particularly parents and family ([Nopia et al., 2020](#)).

Many adolescent girls feel ashamed or uncomfortable talking about menstruation because in many parts of Indonesia, it is considered a taboo topic ([Readytia et al., 2025](#)). Early adolescents do not have enough knowledge and understanding of the physical and psychological changes associated with menarche, as some individuals consider it taboo to discuss menstrual issues in the family. Furthermore, menstruation is considered embarrassing and should not be talked about, and should be kept a secret. As a result, women may exhibit unpleasant attitudes, behaviors, and emotional responses at the beginning of menstruation ([Dovis & Kurniawati, 2017](#)). Many girls don't know that menstruation is a normal biological process. Lack of knowledge about menstruation can leave them unprepared, resulting in both positive and negative reactions ([Murti et al., 2020](#)). Inconsistencies in information sources might influence women's emotional responses, attitudes, and behaviors during menarche and menstruation ([Chandra-mouli & Patel, 2017](#)). In Iran, for cultural reasons, most adolescent girls do not have proper and adequate information about the physical and mental changes of puberty, information obtained from unreliable sources so that 46.6% of them mention mental, physical and social growth as characteristics of puberty, almost half of them consider menstruation to be a physical change during puberty and 12.2% consider menstruation to be a disease, only 53% shower during menstruation ([Eghbal et al., 2023](#)).

The lack of knowledge of young women about menarche and its management makes young women feel confused, anxious, and uncomfortable, and even think that menarche is a disease. Mental readiness is indispensable before menarche because feelings of anxiety and fear will arise ([Winarti et al., 2017](#)). Readiness to face the first menstruation (menarche) occurs when a person is ready to reach one of the physical maturities of adolescence, namely, menarche. Understanding menarche as a normal process in women might help determine how prepared adolescent girls are for menarche. Although knowledge about menstruation should have been available since elementary school, elementary schools rarely provide additional menstruation lessons. Lack of knowledge results in worry, leaving adolescent unprepared for menarche, feeling anxious and confused about what to do throughout menstruation ([Lestari et al., 2022](#)).

Adolescents who are not ready to face menarche will be terrified of and reject this physiological process, perceiving menstruation as a threat; this situation may worsen. can continue in a more negative direction. Teenagers who are preparing for menarche, on the other hand, will feel happy and proud since they consider themselves biologically mature ([Nopia et al., 2020](#)). Unpreparedness for menarche will have an impact on adolescents' physical and psychological problems. Physical problems include poor personal hygiene, increased risk of urinary tract infections (UTIs), cessation of menstruation, and menstrual disorders. Meanwhile, the psychological impact of unpreparedness includes anxiety and fear, which affects self-concept, achievement, deviant behavior, and social maturity, as well as young women's unpreparedness to accept sex roles ([Kismiati et al., 2023](#)).

If adolescent girls are not provided with adequate health information or education, they may suffer from several negative effect from menarche events, such us being unprepared for menstruation, exhibiting signs of fear and anxiety, and experiencing physical complaints like nausea dizziness, irregular menstrual cycles, menstrual pain (dysmenorrhea), and other disorders that may have an impact on their mental and reproductive health ([Susilawati et al., 2025](#)) ([Readytia et al., 2025](#)). Girls reported a range of menstrual health challenges including access to information and social support, behavioural restrictions, stigma around menstruation, difficulty managing

bleeding and menstrual pain. The girls also described menstruation-related fear and stress and its impact on school attendance and participation. 12.8% of girls had missed school because of their periods, menstrual pain, and heavy bleeding, related to absenteeism, more negative attitudes towards menstruation predicted higher attendance ([Markham et al., 2022](#)). In India, although menstruation is considered a natural event "by the grace of God", women's perceptions of it vary widely across cultures and religions. Limited knowledge and many misconceptions about menstruation are generally passed down from mother to daughter. This usually causes excessive fear, anxiety and unwanted practices among young girls and women. About 74.3% of respondents knew that menstruation is a normal physiological process, 46.9% did not receive any information about menstruation before menarche. Mothers are the main source of information for 74.3% of respondents ([Panda et al., 2024](#)).

The research ([Msovela et al., 2025](#)), shows that many adolescent boys and girls have limited knowledge about puberty and menstruation. Only about 34% of respondents felt they were sufficiently knowledgeable about puberty and 31% about menstruation. Respondents had insufficient knowledge about issues such as age at puberty, some physical changes in adolescent boys, menstrual mechanisms and menstrual cycles. Before menarche, 39% of respondents relied on school teachers as a source of information. Most respondents in Nigeria are not adequately prepared for the arrival of their first period. The level of knowledge and attitudes of adolescents regarding menstruation is still low ([Uzoechi et al., 2023](#)). A study by ([Desie & Tesfaye, 2017](#)) reported that only 22.7% of women were properly informed about menstruation, followed by 22.1% who were adequately informed, 32% who were inadequately informed, and 23.7% who were provided with completely inadequate information. According to research ([Retnaningsih et al., 2018](#)), 77.8% of female students are not ready for menarche, while 22.2% of female students are ready. They are not prepared because they are afraid, confused, or consider arrogance to be a troublesome thing. The majority of students affirmed that they were unprepared due to a lack of information. When women go through menarche, they feel embarrassed and anxious, and they avoid public places ([Behera et al., 2016](#)). A study ([Lahme et al., 2016](#)) recorded discriminatory behavior at school, especially by boys, when they wore stained uniforms that were considered embarrassing. This trauma can affect their readiness to go to school and interfere with their education, which in turn leads to increased school absenteeism, including during exams, and poor academic performance.

Adolescents' perceptions of menarche are influenced by a lack of knowledge and information about reproductive health, particularly menstruation. Perceptions formed about menarche will positively affect adolescents' readiness for menarche, while negatively formed perceptions will affect adolescents' mental rejection and unpreparedness to face menarche ([Hanifah et al., 2021](#)). Information can help adolescent girls understand menstruation. Health education can help provide information about menarche ([Widiastini et al., 2019](#)). The research ([Ghimire et al., 2024](#)), emphasizing the importance of health education interventions in schools in promoting menstrual hygiene among adolescent girls and the importance of comprehensive education programs designed specifically for young women of early age, taking into account the time of implementation, content and delivery methods. Although health education about menarche has been widely practiced in school settings, the approach used is still dominated by lecture methods, presentations using slides, or verbal delivery of information. This approach has some limitations because at the elementary school stage, it is easier for children to understand information in the form of visuals, images, illustrations and examples that are close to everyday experiences compared to explanations that are abstract or only in the form of text. In addition, the lecture method tends to be one-way, has relatively low information retention and does not provide opportunities for students to relearn the material independently after educational activities.

Pictorial media can be used to provide health education. Pictorial booklet media is a type of mass communication media used to promote, prohibit, and advocate messages to the public. Pictorial booklets integrate brief information with engaging visual illustrations to help students understand concepts that were previously considered difficult. Pictures are able to increase attention, make it easier to understand, and strengthen memory. Booklets have many advantages, such as being easy to carry, being able to be read at any time, having attractive images, being practical, achieving the goal, and not requiring electricity ([Lubis & Kasjono, 2022](#)). Through the use of illustrated booklets, nurses can provide reproductive health education that is structured, interesting and easy to understand so as to help increase students' knowledge and readiness to face menarche. This study aims to evaluate the effectiveness of illustrated booklet-based education in improving elementary school students' knowledge about menarche

METHODS

The design of this study was a pretest-posttest quasi-experiment, which aimed to evaluate the influence of education using pictorial booklets on the improvement of menarche knowledge in elementary school students. This study was conducted at SDS YMI Tani Makmur, Rengat Barat, Indragiri Hulu. The study population is students in grades III through VI who have not yet menarched. The sample size is calculated using the Lameshow formula, and a sample of 36 respondents was obtained. Samples were taken using stratified random sampling techniques. Sampling in each class uses a spinner, where all the names of students who have not yet menarche are entered into the spinner, then randomized and taken by a number of students according to the number of samples in each class. The research instrument was a questionnaire containing 24 questions with true and false answer options.

The questionnaire was adopted from Andayani's research (2022). Permission to use has been done via email. This study was conducted on one intervention group without a control group. The intervention given is in the form of education through pictorial booklets. A pre-intervention test was used to measure knowledge of menarche before the intervention, and a post-intervention test was used to reassess knowledge following the intervention. Respondents were gathered in one class, then given explanations and informed consent. Respondents were given 20 minutes to complete a pretest.

The implementation of the intervention was carried out once by giving a picture booklet to each respondent. The illustrated booklet contains material about the definition, the process of menarche, the age of menarche, the menstrual cycle, the signs of menstruation, how to use sanitary pads, myths about menstruation, overcoming pain and problems during menstruation, and maintaining genital hygiene during menstruation. Respondents were given 30 minutes to read the illustrated booklet. After that, the researcher explained the material in the illustrated booklet. After the education, respondents were given a booklet with pictures to take home so that they could be read again at home. The posttest was carried out three days after the implementation of the intervention ([Figure 1](#)).

Data analysis consisted of univariate and bivariate analyses. Univariate analysis describes respondent characteristics and the knowledge as shown in a frequency distribution. Bivariate analysis was carried out by a dependent t-test with a statistical significance of a p-value of less than 0.05. Before the dependent t-test is carried out, a data normality test is first carried out, and normally distributed data is obtained.

This research has received ethical approval from the ethics committee of the Institute of Health Science Payung Negeri Pekanbaru (No. 041/IKES PN/KEPK/V/2024). The information and data submitted by participants are kept confidential and used only for research purposes.

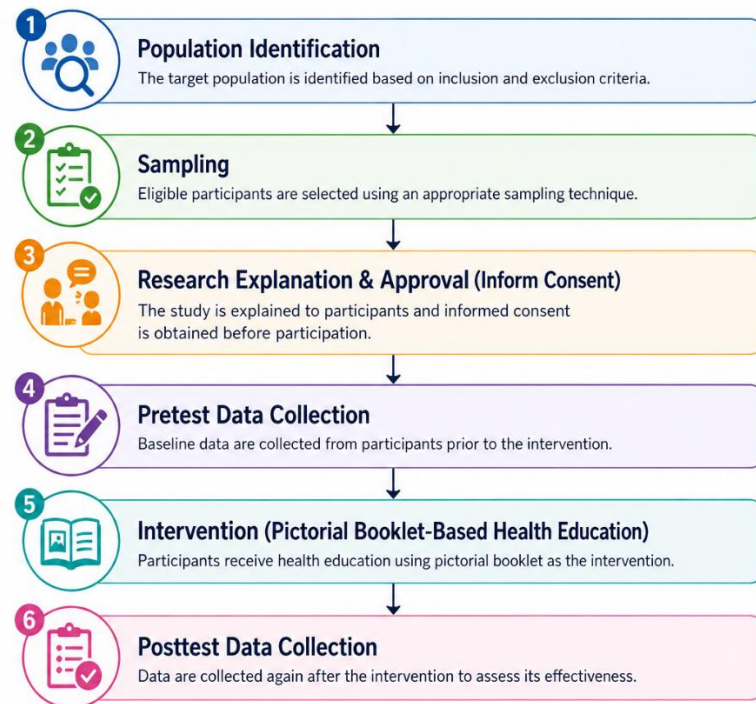


Figure 1. Steps and Procedures of the research

RESULTS

The results of the univariate analysis describe the characteristics of the respondents, which include age, information about menarche, and sources of information about menarche. Bivariate analysis used a T test dependent test to assess the effectiveness of illustrated booklets on increasing adolescents' knowledge of menarche. The results of the study are as follows:

Table 1. Distribution of Student Characteristics (n = 36)

Characteristic	N (36)	Percentage (%)
Age (Years)		
Children (5-11)	27	75.0
Teenagers (12-16)	9	25.0
Information About Menarche		
Ever	36	100.0
Never	0	0.0
Resources About Menarche		
Social Media	1	2.8
Parents	15	41.7
Teacher	19	52.8
Health Worker	1	2.8

[Table 1.](#) presents the characteristics of the respondents based on their age, information about menarche, and sources of information about menarche. According to the table, more than half of the respondents are children (5 – 11 years), with a total of 27 (75%). Up to 36 (100%) of the respondents had previously received information regarding menarche, and up to 19 (52.8%) of them had heard about it from school teachers

Table 2. Knowledge Scores Before and After Education Using Pictorial booklets (n = 36)

N	Knowledge	Mean	Standard Deviation (SD)	Standard Error of the Mean	P- Value
36	Pretest	18.333	2.808	0.468	0.001
	Posttest	21.139	1.929	0.322	

[Table 2.](#) demonstrates a statistically significant increase in students' menarche knowledge score after the intervention. The mean knowledge score rose from 18.333 (SD = 2.81) at pretest to 21.139 at posttest. The paired t-test confirmed that this improvement was highly significant ($p < 0.001$), indicating that health education delivered via pictorial booklets effectively enhances elementary school students' knowledge.

DISCUSSION

More than half of the respondents in this study were in the 5-11 years age range. Menarche is the first menstruation that usually occurs between the ages of ten and sixteen or at the beginning of adolescence in the middle of puberty, before entering the reproductive period ([Retnaningsih et al., 2018](#)). According to the Ministry of Health of the Republic of Indonesia (2019), in ([Ningrum et al., 2025](#)), menarche occurs most often in Indonesia at the age of 12.4 years with a prevalence of 60%, then 2.6% at the age of 9-10, 30.3% at the age of 11-12 years, 30% at the age of 13 years, and the rest experience menarche over the age of 13 years. According to research ([Yulita et al., 2022](#)), the picture of menarche in adolescents shows that 37 (94.8%) adolescents experience menarche from the age of 11 to 14 years. According to other research ([Nnennaya et al., 2021](#)), the average age of female students at menarche is 13.7 years old.

The availability of information about menarche affects the readiness of young women to deal with menarche. Menarche information can be accessed from a variety of sources, including print media, electronic media, social media, parents, teachers, friends, and health workers. The knowledge and insights gained by young women will help them have a positive image of menarche and become better prepared for menarche ([Narsih et al., 2021](#)). The results showed that all respondents had received information about puberty in science subjects at school delivered by teachers, but only a few explanations about menarche and menstruation. The school teacher also mentioned that science lessons discuss a lot about puberty. Previous studies ([Narsih et al., 2021](#)), support the results of this study, which found a relationship between the availability of information and the readiness of young women to face menarche ($p 0.003$). The most common sources of information are friends and teachers. A study ([Behera et al., 2016](#)), found that most participants didn't know much about menstruation and its process. This is particularly true for girls who have never experienced menarche. All communication about menstruation occurs between friends, while the role of the mother is limited. Studies ([Nnennaya et al., 2021](#)), found that mothers were the primary source of information for female students about menarche (48.1%).

The finding of this study indicates that delivering education through pictorial booklets is useful in enhancing students' understanding of menarche. The intervention given to female students is the provision of education through illustrated booklets. Each student was given a booklet containing pictures and information about menarche and menstruation. According to ([Lutfiya, 2016](#)), one of the factors influencing a young woman's readiness for menarche is knowledge. Young women who have good knowledge are better prepared for menarche. Young women must have a through awareness of menstruation to be fully prepared for menarche. Ignorance about menstruation can lead to a wrong view of menarche, such as thinking of menarche as a disease, which cause anxiety ([Novitasari et al., 2018](#)). One of the health efforts that can be made to promote knowledge about menarche for adolescent girls is health promotion through health education ([Widiastini et al., 2019](#)). A study ([Chairunisa et al., 2025](#)), discovered that adolescent girls' knowledge of menarche preparation improved following health education through flipbook media. According to research ([Murti et al., 2020](#)), students' knowledge of menarche improves after receiving education using pop-up books. In addition, health education about

menstruation has a positive impact on the psychological readiness of preadolescent girls for menarche ([Widiastini et al., 2019](#)).

Education in this study uses a picture booklet. The illustrated booklet is related to increasing the knowledge of female students about menarche. The booklet contains interesting pictures about menarche and menstruation. The booklet uses simple language so that it is easy for students to understand. The discussion carried out during the education provided an opportunity for respondents to ask questions about menstruation, and the assistance from teachers during the implementation of the intervention made the respondents more focused. After the education, students were given a booklet with pictures to take home so that they could be read and studied again at home. During the implementation of the intervention, the researcher was accompanied by the teacher, so that the students became more focused. These factors contribute to the improvement of students' knowledge after the intervention. The pictures in the booklet help students understand the complex concepts of menstruation. The booklet can be read at any time and from any location, allowing students to learn about menarche on their own more effectively. Studies ([Lubis & Kasjono, 2022](#)) showed that menstrual counseling using booklet media had an impact on students' knowledge and perceptions of menarche. In addition, health education using booklet media can increase students' knowledge about menstrual hygiene ([Pramesti et al., 2019](#)). Booklets have numerous advantages, including the fact that they are usable by everyone, are easy to carry, are useful for studying, and are not easily damaged. Furthermore, booklets are interesting because they contain both text and image. Research ([Parasuraman et al., 2022](#)), showed that health education interventions improve adolescents' knowledge of menstruation and adolescent menstrual hygiene attitudes and practices. School-centered, community-based menstrual health education programs significantly improve knowledge, hygiene practices, and school attendance and reduce symptoms similar to reproductive tract infections in adolescent girls in rural areas ([Gohar et al., 2025](#)). According to research ([Setyowati et al., 2015](#)), reproductive health education related to preparing for menarche effectively improves adolescent girls' knowledge, emotional responses, and perceptions about menarche. A pocket booklet is used to provide reproductive health education about preparing for the first menstruation, including information about reproductive organs, physical changes that occur during adolescence, problems that may arise during menstruation, and ways to overcome these problems. Research ([Solikhafi & Aprilina, 2023](#)) found that adolescent girls' knowledge and perceptions of menarche increased after health education was provided through lectures and booklets. The research ([Khan & Mahishale, 2024](#)), recommends that menstrual hygiene education should begin from the pre-menarche age. The need to develop strategies to increase understanding among mothers, adolescent girls, teachers and the community to reduce the negative impact of inadequate menstrual hygiene. Students should receive comprehensive information, education and communication such as booklets, pamphlets or other awareness programs to raise awareness of menstrual health.

CONCLUSION

Based on the findings of research on the effectiveness of education using pictorial booklets in raising students' knowledge of menarche, it can be concluded that education through pictorial booklets has a significant impact on improving students' knowledge about menarche. As a result, pictorial booklets have proven to be effective in teaching reproductive health to elementary school students. It is intended that health workers and teachers can develop and use educational media that are interesting, easy to use, and appropriate for children's age, such as pictorial booklets, in health promotion and education activities.

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AUTHOR CONTRIBUTION

FD (principal investigator) developed the conceptualization and research plan, designed the research, secured funding, coordinated the research process, analyzed the data, and wrote and revised the manuscript. IM handles research permits, ethical testing, the research process and data collection, and data analysis. DP and AP handle the research process and data collection, and data analysis. VD handles manuscript writing, including manuscript translation. PA provides conceptual guidance and ensures that the English used in the manuscript meets standards.

ETHICAL APPROVAL

The Institute Health Science Payung Negeri Pekanbaru Ethics committee provided ethical approval for this research (No.041/IKES PN/KEPK/V/2024). Participant information is kept private and processed exclusively for study purposes.

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CONFLICT OF INTEREST

The authors report that there are no conflicts of interest with any individuals or organizations related to this research.

PROTOCOL REGISTRATION

Registration of this study was not performed

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