

Comics as an Educational Tool to Increase Students' Knowledge and Attitudes Toward Menarche

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ABSTRACT

Background: Menarche is the first menstruation experienced by adolescent girls. Insufficient knowledge and attitudes related to menarche can lead to unpreparedness, resulting in feelings of shame, fear, confusion, and poor vulvar hygiene practices. Therefore, health education using comic media related to menarche is necessary. **Objectives:** This study aims to analyze the effectiveness of comic media in improving the knowledge and attitudes of elementary school students in facing menarche. **Methods:** This study employed a quasi-experimental design with a pre-test and post-test control group. The research sample consisted of 60 fifth-grade female students who had not yet experienced menarche, selected through total sampling and divided into two groups: 30 students in the control group and 30 in the intervention group. Data analysis was conducted using univariate and bivariate analyses, including paired t-tests and independent t-tests. **Results:** The results showed an increase in knowledge about menarche before and after the intervention in both the intervention and control groups, with a p-value <0.001 ($p < \alpha$, $\alpha = 0.05$), and an improvement in attitudes with a p-value <0.001 ($p < \alpha$, $\alpha = 0.05$). Significant differences were observed between the intervention and control groups in terms of knowledge (p-value <0.001 , $p < \alpha$, $\alpha = 0.05$) and attitudes (p-value <0.001 , $p < \alpha$, $\alpha = 0.05$). **Conclusion:** In conclusion, health education utilizing comic media about menarche is effective in enhancing the knowledge and attitudes of fifth-grade female students.

Keywords: Attitude, Health Education, Knowledge, Menarche Comics, Reproductive Health

INTRODUCTION

Menarche (the first menstruation) marks the culmination of various changes experienced by adolescent girls undergoing the process of maturation (Nurmawati and Erawantini, 2018). Menstruation can be defined as periodic bleeding from the uterus, accompanied by the desquamation (shedding) of the endometrium (Handayani, 2022).

Survey results from the Riset Kesehatan Dasar found that the average age of menarche in Indonesia is 13 years (20%), with some cases occurring at an age younger than 9 years. Nationally, approximately 37.5% of Indonesian girls experience menarche at ages 13-14, while others experience it as early as 9 years old. However, the proportion of girls experiencing menarche at a younger age is relatively small (Astriana, 2017).

The common emotional impacts of the first menstruation include feelings of sadness, anxiety, disappointment,

surprise, worry, shame, and confusion. Adolescents who are not yet psychologically stable and lack economic and social independence—particularly those experiencing menarche at a younger age—may feel anxious or react negatively if they lack adequate preparation and knowledge about menstruation (Delima, Andriani and Lestari, 2020).

Unpreparedness in facing menarche can lead to physical issues, such as inadequate personal hygiene, increasing the risk of urinary tract infections, menstrual irregularities, and menstrual disorders—problems further exacerbated by a lack of adolescent knowledge (Mahmudah and Daryanti, 2021). Psychological disturbances during this period may have lasting effects into adulthood, making proper psychological preparation crucial. Such preparation can be achieved by providing accurate information on how to cope with the first menstruation, helping adolescent girls

better adjust to these changes (Hidayah and Palila, 2018).

Lack of knowledge and awareness about menstruation can lead adolescents to perceive menarche as a disease and cause anxiety. Some adolescents may feel uncomfortable, sad, or ashamed, which makes them unprepared to face it. This lack of readiness increases the risk of poor vulvar hygiene behavior, with research showing that the risk is up to four times higher compared to adolescents who are prepared (Novitasari, Wardani and Ariwinanti, 2018). This finding is consistent with the research by Widyaningsih (2022), which also showed that more than half of the respondents had poor vulvar hygiene and experienced leucorrhea, indicating a significant relationship between vulvar hygiene behavior and leucorrhea. Poor hygiene can lead to infertility, early signs of cervical cancer, and mental health issues, highlighting the need for menstrual health education for adolescents (Widyaningsih *et al.*, 2022)

The preliminary survey was conducted at SDN Siwuluh 01 and 02 due to the absence of formal health education on menstruation within the school curriculum. At the time of the survey, no structured educational sessions addressing menarche had been implemented at these schools. Without access to accurate and age-appropriate information, students are left to rely on hearsay or incomplete explanations from peers and family, which can perpetuate myths and misconceptions. This situation underscores the urgency of providing comprehensive menstrual health education at the elementary school level to ensure that students are informed, prepared, and supported as they approach puberty.

An initial survey conducted at SDN Siwuluh 01 on March 13, 2024, found 43 female students in grade V, of whom 3 had experienced menarche. At SDN Siwuluh 02 on March 14, 2024, there were 22 female students in grade V, with 2 having experienced menarche. Interviews with 10 female students from both schools who had not yet experienced menarche revealed that the majority were unaware and unprepared for it. Additionally, interviews with a teacher who had used comics as a teaching medium for Islamic Education and Character Education on the topic "Recognizing the Exemplary Traits of the Prophet Muhammad" showed high

enthusiasm from students and positive improvements in their knowledge scores. The teacher also recommended using comics as an educational medium for menstrual health, citing the advantages of this approach. The comic developed in this study not only conveys information but is also designed with an interactive approach and based on real-life experiences to enhance reader comprehension. Furthermore, this study evaluates the effectiveness of the comic in terms of material comprehension as well as changes in attitude and readiness to face menarche.

Reproductive health education at the elementary school level remains generic and lacks appeal to female students (Zantyka, Kasiati and Handayani, 2021), necessitating a more specific and engaging approach. Educational comic media can serve as an effective solution for providing health information in an enjoyable and engaging way (Palgunadi, 2020). Comics combine words and images to form a narrative that is easy to understand, creating an enjoyable atmosphere and avoiding monotony, which makes them appealing to elementary school students (Welliam, 2023) (Rosadi, Akhlakul and Karimah, 2021). Comics are more easily accessible to the target audience at any time without requiring additional devices such as screens or speakers, which are often necessary for audiovisual media. Additionally, with comics, readers can study the material at their own pace, revisit specific sections without time constraints, and gain a deeper understanding of the content. Research also shows that comics have a positive impact on changing health behaviors (Shimazaki *et al.*, 2018), highlighting the importance of investigating the effectiveness of comic media in enhancing elementary school girls' knowledge and attitudes toward menarche.

METHODS

This study is a quasi-experimental research design with a pre-test and post-test nonequivalent control group design. The study was conducted at SD Negeri Siwuluh 01 and 02 in Brebes Regency in June 2024. The sample consisted of 60 fifth-grade female students, divided into 30 students in the control group and 30 students in the intervention group.

Randomization was performed by using a spin wheel to assign the control and intervention groups from two existing class subjects. The sampling technique employed was total sampling, with inclusion criteria including students who had not yet experienced menarche and were willing to participate as respondents.

Assessment of respondents' knowledge and attitudes toward menstruation was conducted using a questionnaire that had been tested for validity and reliability. Knowledge scores were calculated based on the number of correct responses and categorized into three levels according to Bloom's cutoff: high (80-100%), moderate (60-79%), and low (<60%) (Bloom, 1956). Attitudes toward menstruation were measured using a Likert scale, with a positive attitude classified when the respondent's score was equal to or above the median, and a negative attitude when below the median (Ajzen, 1991). The use of this cut-off aimed to classify respondents' levels of understanding and preparedness in a more structured and objective manner.

This study utilized a research design based on Sugiyono (2015), where both groups were given the same pre-test to measure baseline knowledge. The intervention group then received health education using educational comics about menarche, while the control group did not receive this intervention. At the end of the study, both groups were given the same post-test to assess outcomes after the intervention. Data collection involved administering the pre-test to both groups, followed by the intervention for the experimental group. The process

concluded with administering the post-test to both groups.

The instruments used included a validated questionnaire on education and attitudes, developed by lecturers in Health Promotion at Dian Nuswantoro University, and an educational comic titled "Ada Apa dengan Moli?", developed by the researcher. The media development followed the P-Process method (analysis, strategy design, media creation, and testing), involving several experts in health education and comic creation to assess the feasibility before use in this study.

Collected test scores were analyzed using statistical tests. A normality test was conducted first to assess the data distribution for each test in both groups. The Wilcoxon test was used to evaluate differences in knowledge and attitudes within the intervention group because the data were not normally distributed (p -value < 0.05). The Paired T-test was employed for the control group to assess attitude differences, as the data were normally distributed (p -value > 0.05). The Mann-Whitney test was used to compare differences between the intervention and control groups.

This study received ethical clearance under protocol number 001536/Universitas Dian Nuswantoro/2024.

RESULTS AND DISCUSSION

Development of Educational Menarche Comic Media

Analysis

The results of interviews with 10 female students from each of SD Negeri Siwuluh 01 and 02 are as follows

Table 1. Results of the Problem Analysis Survey

| Items | SD Negeri Siwuluh 01 | | | SD Negeri Siwuluh 02 | | |
|---|----------------------|--------|-----------|----------------------|--------|-----------|
| | Yes (%) | No (%) | Total (%) | Yes (%) | No (%) | Total (%) |
| 1 Are you prepared to face menarche? | 20 | 80 | 100 | 10 | 90 | 100 |
| 2 Are you afraid of facing menarche? | 60 | 40 | 100 | 70 | 30 | 100 |
| 3 Are you confused about how to handle menarche? | 50 | 50 | 100 | 50 | 50 | 100 |
| 4 Do you know how to clean the vagina and change sanitary pads during menstruation? | 20 | 80 | 100 | 30 | 70 | 100 |
| 5 Do you feel worried and embarrassed about facing menarche | 60 | 40 | 100 | 70 | 30 | 100 |

| Items | SD Negeri Siwuluh 01 | | | SD Negeri Siwuluh 02 | | |
|---|----------------------|--------|-----------|----------------------|--------|-----------|
| | Yes (%) | No (%) | Total (%) | Yes (%) | No (%) | Total (%) |
| 6 Have you ever received information about menarache? | 20 | 80 | 100 | 20 | 80 | 100 |

The results of the problem analysis survey conducted with students from SD Negeri Siwuluh 01 and 02 indicate that the students feel unprepared for their first menstruation, expressing feelings of fear, confusion, and anxiety. This is attributed to a lack of adequate information regarding menarache and how to cope with it.

Interviews with teachers from SD Negeri Siwuluh 01 and 02 revealed that no health education related to menarache had been previously conducted at these schools. The teachers recommended using comic media, as previous experiences with this medium in the learning process had yielded positive outcomes in student performance.

Strategy Design

The second stage involved designing the educational comic on menarache. The design process began with defining the objective of creating the comic, which was to improve respondents' knowledge and attitudes regarding menarache. The developed comic is a printed medium that can be carried and read anytime and anywhere.

The messaging conveyed in the educational menarache comic includes definitions and concepts of menarache, changes that occur during menstruation, the menstrual cycle, symptoms of menstruation, how to use and dispose of sanitary pads, personal hygiene during menstruation, nutritious intake during menstruation, and myths about menstruation.

The positioning strategy employed includes using characters that align with the characteristics of the respondents, specifically elementary school students, incorporating bright and attention-grabbing colors, using easily understandable language, providing clear, concise, and straightforward material, and selecting fonts that match the target audience's characteristics and are legible in size.

Development and Testing of the Media Media Development



The development process began with the creation of characters for the educational comic on menarache titled "Ada Apa dengan Moli?", featuring the characters Moli, Moli's mother, and Nana.

| Moli | Moli's Mother | Nana |
|--|---|-----------------------------------|
| | | |
| Character: Innocent, a little bit scared but enthusiastic about new things | Character: Smart and has a calm personality | Character: Moli's cheerful friend |

Figure 1 Characters in the comic "What's Wrong with Moli?"

After developing the characters, the next step was to design the comic sequentially and cohesively, ensuring a logical flow from one storyline to the next. The comic creation process utilized CorelDRAW software to design the panels for each page and Ibis Paint X for creating the characters. Additionally, instruments for expert validation were developed during this stage.

Testing and Revision

The media testing process involved validation or feasibility assessments conducted by experts. Material validation was carried out by an elementary school teacher from SD Negeri Siwuluh 01 and a midwife from Puskesmas Siwuluh, while media feasibility was assessed by a Health Promotion Lecturer. The aspects evaluated for material validity included the alignment of the comic with educational objectives, the relevance of the content to educational goals, adherence to health education messaging criteria, suitability for fifth-grade students, and the comic's appeal as an educational health medium. Meanwhile, media feasibility aspects assessed included appropriate sizing, proper arrangement of illustrations, visual

appeal, integration of visual elements, and clarity of the storyline.

The validation and feasibility assessments provided feedback and suggestions from experts for improvements before the media's distribution. The material expert suggested that the dialogue was too rigid and needed to be replaced with language more accessible to fifth-grade elementary school students. The media expert recommended revisions to reduce excessive discussions on less relevant topics and to condense overly long narratives to enhance comprehension for children.

Retesting

After the media was revised by the researcher, it was re-evaluated by the experts. Based on the retesting process, which assessed 11 sub-points of feasibility criteria on a scale from 1 to 5, the results were as follows: validation by the first material expert (a teacher from SDN Siwuluh 01) yielded a total score of 48, with an average score of 4.34. The second material expert (a midwife from Puskesmas Siwuluh) gave a total score of 50, with an average score of 4.54. For the media feasibility test, the third expert (a Health Promotion Lecturer) provided a total score of 47, with an average score of 4.27.

The average of the total validation scores from the material and media experts was 48.3, calculated using the formula: $((48 + 50 + 47) / 3)$. The feasibility scoring of the material was calculated using the following formula:

$$\rho = \frac{fN}{N} \times 100$$

$$\rho = \frac{48,3}{55} \times 100 = 87,8$$

After analyzing the obtained scores, it can be concluded whether the media is suitable for dissemination based on the following feasibility categories:

Table 2 Eligibility Criteria (Arikunto, 2016)

| Average score | Category |
|----------------|----------------|
| 81% ≤ ρ ≤ 100% | Very Eligible |
| 61% ≤ ρ ≤ 80% | Eligible |
| 41% ≤ ρ ≤ 60% | Quite Eligible |
| 21% ≤ ρ ≤ 40% | Not Eligible |
| 0% ≤ ρ ≤ 20% | Very Eligible |

The feasibility score calculation resulted in a value of 89.09%, indicating that the comic media is highly feasible

according to the established feasibility criteria interval.

Characteristics of Respondents

Table 3 Frequency Distribution of Respondents' Age Characteristics

| Respondent Characteristics | Group | | | |
|----------------------------|--------------|-----|---------|-------|
| | Intervention | | Control | |
| | N | % | N | % |
| Age | | | | |
| 10 years | 9 | 30 | 7 | 23,33 |
| 11 years | 18 | 60 | 20 | 66,67 |
| 12 years | 3 | 10 | 3 | 10 |
| Total | 30 | 100 | 30 | 100 |

The age characteristics of respondents, based on Table 1, show that the majority in both the intervention and control groups were 11 years old, with 18 respondents (60%) in the intervention group and 20 respondents (66.67%) in the control group. The smallest number of respondents was in the 12-year-old age group, with 3 respondents (10%) in each group. This age range corresponds to the pubertal period, marked by the onset of menarche in adolescent girls.

Table 4 Frequency Distribution of Knowledge and Attitude Levels of Female Students at SDN Siwuluh 01 and 02 Before Receiving Educational Menarche Comics

| Categories | Group | | | |
|--------------------------|--------------|-------|---------|-------|
| | Intervention | | Control | |
| | N | % | N | % |
| Knowledge | | | | |
| High Level (80%-100%) | 1 | 3,33 | 3 | 10,00 |
| Moderate Level (60%-79%) | 13 | 43,33 | 12 | 40,00 |
| Low Level (<60%) | 16 | 53,33 | 15 | 50,00 |
| Attitude | | | | |
| Positive | 14 | 46,67 | 14 | 46,67 |
| Negative | 16 | 53,33 | 16 | 53,33 |

Based on Table 4, it was evident that before the intervention, in terms of knowledge, the majority of participants in both the intervention (53.33%) and control (50%) groups were classified as having low-level knowledge (<60%). A smaller proportion of students had moderate knowledge levels (60-79%) in both groups: 43.33% in the intervention group and 40% in the control group. High-level knowledge (80-100%) was observed in only 3.33% of the intervention group and 10% of the control group. Regarding attitudes, both groups showed identical distributions: 46.67% of students exhibited a positive attitude toward menarche, while 53.33%

displayed a negative attitude. These findings align with the study conducted by Anggraini (2022), which stated that health education can enhance knowledge and influence individuals' attitudes in decision-making. A lack of knowledge among female students is often a contributing factor to the emergence of unfavorable behaviors, highlighting the need for health education. Based on the findings of this study, it can be concluded that providing information through health education is essential for improving knowledge and fostering positive attitudes toward menarche.

Table 5 Frequency Distribution of Knowledge and Attitude Levels of Female Students at SDN Siwuluh 01 and 02 After Receiving Educational Menarche Comics

| Categories | Group | | | |
|--------------------------|--------------|-------|---------|-------|
| | Intervention | | Control | |
| | N | % | N | % |
| Knowledge | | | | |
| High Level (80%-100%) | 26 | 86,67 | 3 | 10,00 |
| Moderate Level (60%-79%) | 4 | 13,33 | 12 | 40,00 |
| Low Level (<60%) | 0 | 0,00 | 15 | 50,00 |
| Attitude | | | | |
| Positive | 21 | 70,00 | 14 | 46,67 |
| Negative | 9 | 30,00 | 16 | 53,33 |

Based on Table 5, it was found that after receiving educational menarche comics, there was a marked improvement in knowledge and attitude levels among female students in the intervention group. In the intervention group, 86.67% of students achieved high-level knowledge (80%-100%), a substantial increase compared to only 3.33% before the intervention. Additionally, 13.33% had moderate knowledge (60%-79%), and none remained in the low knowledge category (<60%). Conversely, the control group displayed minimal changes, with the majority (50%) still in the low knowledge category, 40% in the moderate category, and only 10% reaching high knowledge levels. Regarding attitudes, 70% of students in the intervention group exhibited a positive attitude, while 30% held negative attitudes. Meanwhile, the control group showed no significant improvement, with 46.67% displaying positive attitudes and 53.33% negative attitudes, similar to the pre-intervention proportions.

Based on the distribution of questionnaire responses before health

education was provided to the experimental group using comic media, the most well-understood material by respondents was the basic concept of menstruation as a normal experience for women, with 87% answering correctly. Conversely, the least understood question was related to menstrual myths, specifically the belief that eating meat during menstruation can cause menstrual blood to have an unpleasant odor, with 87% answering incorrectly. After health education using comic media, the greatest increase in correct responses was observed in the topic of menstrual myths, with 87% of respondents answering correctly.

Similar results were reported by Nur Hidayah et al. (2021) who found that providing health education through educational comic media could improve students' knowledge and attitudes regarding menarche. The more information students receive, the better their understanding of menarche becomes. A study conducted at SD Inpres Tamalanrea V and II in Makassar revealed an improvement in students' attitudes toward menarche in the post-test after health education was delivered using educational menarche comics.

Consistent findings were also reported by Ni Wayan Suarniti et al. (2024), showing that comic media significantly influenced students' attitudes toward menstruation. The median attitude score before receiving educational comics was 88, with the lowest score being 60 and the highest 73. After the intervention, the median attitude score increased to 90, with the lowest score being 73 and the highest 100. This indicates that attitude changes are influenced not only by knowledge but also by personal experiences, mass media, and external influences or interventions, which serve as the foundation for attitude formation.

Table 6 Results of the Knowledge Difference Test Before and After Receiving Educational Comics

| Knowledge | Mean | Δ Mean | Sig. |
|---------------------|------|---------------|--------|
| Intervention | | | |
| Pre-test | 5,37 | 3,46 | <0,001 |
| Post-test | 9,13 | | |
| Control | | | |
| Pre-test | 5,60 | 0,07 | 0,480 |
| Post-test | 5,67 | | |

Table 6 shows that the average knowledge score in the intervention group

before receiving health education through educational comics was 5.37, which increased to 9.13 after the intervention. This indicates that health education about menarche using educational comics significantly improved respondents' knowledge in the intervention group. This result is reinforced by the Wilcoxon Signed Ranks Test, which yielded a significance value of <0.001. Since this value is lower than the predetermined alpha level ($\alpha = 0.05$), it indicates a statistically significant difference in knowledge levels before and after the health education intervention.

Thus, health education using educational comics about menarche has been proven to have a significant effect on increasing students' knowledge regarding menarche. Meanwhile, the Wilcoxon Signed Ranks Test conducted in the control group (which did not receive the intervention) yielded a p-value of 0.480 (>0.05). This result suggests that there was no significant difference in knowledge scores within the control group.

Table 7 Results of the Attitude Difference Test Before and After Being Provided with Educational Comics

| Attitude | Mean | Δ Mean | Sig. |
|---------------------|-------|---------------|--------|
| Intervention | | | |
| Pre-test | 25,23 | 11,27 | <0,001 |
| Post-test | 36,50 | | |
| Control | | | |
| Pre-test | 25,63 | 0,00 | 1,000 |
| Post-test | 25,63 | | |

Table 7 illustrates that the mean attitude score in the intervention group was 25.23 prior to receiving health education through educational comics, increasing to 36.50 after the intervention. This indicates that health education about menarche using educational comics positively influences respondents' attitudes in the intervention group. This finding is supported by the results of the Wilcoxon Signed Ranks Test, which yielded a significance value of <0.001. Since this value is less than α (0.05), it can be concluded that there is a statistically significant difference in attitudes before and after the health education intervention in the intervention group. Therefore, health education using educational comics about menarche has been proven to significantly improve students' attitudes toward menarche.

In contrast, the Paired T-test for attitudes in the control group yielded a p-

value of 1.000 (>0.05). This result indicates that there was no significant change in attitude scores within the control group.

Table 8 Differences in the Increase of Knowledge and Attitudes Between the Intervention and Control Groups

| Variables | Mean | Δ Mean | Sig. (2-tailed) |
|------------------|-------|---------------|-----------------|
| Knowledge | | | |
| Intervention | 9,13 | 3,46 | <0,001 |
| Control | 5,67 | | |
| Attitudes | | | |
| Intervention | 36,50 | 11,27 | <0,001 |
| Control | 25,63 | | |

The study findings reveal that the mean increase in knowledge scores after the health education intervention was 9.13 in the intervention group, which is higher than the control group's score of 5.67. This demonstrates that respondents who received health education using comic media showed a greater improvement in knowledge compared to those who did not receive such education. This finding is further supported by the Mann-Whitney test, which yielded a significance value of <0.001. Therefore, it can be statistically concluded that health education using educational comics is effective in improving students' knowledge about menarche.

The research also indicates that the average increase in attitude scores after receiving health education was 36.50 in the intervention group, compared to 25.63 in the control group. This further demonstrates that respondents who received health education using comic media experienced a greater improvement in attitudes than those who did not receive such education. This result is reinforced by the Mann-Whitney test, which showed a significance value of <0.001. Thus, it can be statistically concluded that health education using educational comics is effective in improving students' attitudes toward menarche.

Education can influence individual behavior, including lifestyle choices. In general, the higher an individual's level of education, the more readily they accept and understand information. Higher levels of formal education are expected to enhance understanding of health, particularly awareness related to menstruation (Sofiyati, 2022).

Information can be provided to expand and improve an individual's knowledge, as it is influenced by various

factors, including input from others and mass media. Girls will better understand menarche when sufficient information is available, enabling them to prepare themselves and motivating them to adopt healthy behaviors. In this context, health education about menarche is essential to provide information that can develop and improve girls' understanding (Pasha, 2022).

Comic media is a form of learning resource that can assist students and complement the teacher's role in learning activities, both inside and outside the classroom. Comic media can be employed in interactive learning processes, functioning as both a teaching aid and a self-directed learning tool for students (Hidayah *et al.*, 2021).

Comic media enhances memory retention by visualizing images, addressing the need for visualization by transforming abstract information into more concrete representations. The utilization of comic media, which integrates both visual and verbal elements with a predominant focus on visuals, facilitates children's imaginative development. The integration of visual imagery and textual elements within a narrative structure can promote balanced engagement of both the right and left hemispheres of the brain (Nuraini and Ronoatmodjo, 2018).

According to the researcher's assumption, comic media has significant effectiveness in improving knowledge and attitudes among adolescent girls, particularly those at the elementary school level. This is attributed to the tendency of adolescent girls to be attracted to engaging materials like comics, which indirectly increases their interest in reading. Comic media is also regarded as an interactive learning tool that can be utilized both as a teaching aid and as a self-directed learning medium for students.

This study used a quasi-experimental design, which is commonly applied in educational research because it allows for practical implementation in real classroom settings. However, this design does not include random assignment of participants, which means that other factors—such as students' previous knowledge, family support, or learning environment—could influence the results. These uncontrolled factors, known as confounders, may affect the accuracy of the findings. As a result, the conclusions

about the effectiveness of the intervention should be interpreted with caution.

Additionally, the study only assessed the immediate impact of comic-based health education on knowledge and attitudes related to menarche among fifth-grade female students at SD Negeri Siwuluh 01 and 02. It did not evaluate long-term behavioral changes, as such outcomes require extended observation periods. Due to time constraints, the researcher was unable to conduct a longitudinal follow-up to examine whether the changes in knowledge and attitudes translated into actual behavioral preparedness for menarche.

CONCLUSION

A difference between pre-test and post-test knowledge and attitudes was observed in the intervention group that received health education through comic media, while no such difference was noted in the control group. Health education utilizing comic media significantly affects the knowledge and attitudes of fifth-grade female students in preparation for menarche.

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