

Enhancing Adolescent Girls' Knowledge of Premenstrual Syndrome through Flipbook and Video-Based Health Education

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ABSTRACT

Background: Premenstrual syndrome (PMS) is symptom occur in luteal phase. The manifestation of PMS varies in each individual, may affect the quality of life in physical and physiological. Knowledge about PMS possibly improved through health education especially in adolescent girls as high-risk group. Flipbook and video are the media usually used for education; both are digital innovations that potentially facilitate the provision of health education.

Methods: This quasi-experimental study was conducted by pre-posttest design without control group. A total population of 254 adolescent girls were selected for random sampling, resulting in 80 participants divided into two groups. The data was taken before and after education by questionnaires, analyzed with Wilcoxon test, and compared with Mann-Whitney test.

Results: The result indicated there were increase to high level knowledge in flipbook group (50%) with mean score 77.83 and video group (72,5%) with mean score 85.33. The p-value using Wilcoxon test was $p < 0.001$ ($p < 0.01$) respectively for both flipbook and video group. Mann-Whitney test resulted in higher effectiveness of video $p = 0.003$ ($p < 0,05$).

Conclusion: There is increase in knowledge level after education both in flipbook and video groups. Meanwhile, video is highly suggested that the result shows higher effectiveness than flipbook.

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INTRODUCTION

Premenstrual syndrome (PMS) is a series of symptoms experienced in the luteal phase or 7-10 days before menstruation (Barus *et al*, 2020). It commonly ends a few days after the cycle begins. The prevalence of PMS is 75% worldwide (Upadhyay *et al.*, 2023) while the number may increase in develop country due to its health access. In Indonesia itself, 85% women are experiencing PMS symptoms which is huge enough to affect the quality of life. PMS occurs through complex pathophysiological mechanism that have not been ascertained. However, the most strongly believed etiology is due to the fluctuation of hormones before the onset of menstruation or mainly called the first day (Daiyah & Ahmad Rizani, 2021).

According to the American College of Obstetric and Gynecology (ACOG), clinical manifestations of PMS differ in each individual, but in general, PMS can be classified into emotional and physical symptoms. The emotional symptoms that are often found are depression, anxiety, impaired concentration, and sudden emotional changes. The physical symptoms that frequently appear are bloating, abdominal pain, breast pain, leg edema, digestive disorders, dizziness, or acne (ACOG, 2025).

Although PMS may happen to any woman in reproductive age, adolescents are categorized as a high-risk group since they have just experienced menarche which provoking the hormones to become more fluctuating. Besides, low knowledge due to lack of education or experience make adolescent girls unable to manage symptoms (Agista Rahmayanti et al., 2023). The discomfort during PMS in adolescent girls may have serious implication on the quality of life such as reduce 50% productivity than the normal day (Loukzadeh et al., 2024), reduce study performance (Zulaika et al., 2023) demotivation, lower score, or absent from class (Mohammed et al., 2023). Therefore, to raise awareness of PMS in adolescent girls, education on the topic should be provided.

One of the strategies to reduce the risk of PMS is to increase knowledge through health education. Health education is promotional strategy to empower adolescent girls on recognizing symptoms and managing them independently. The educational media used should be interesting to attract and stimulate the adolescent thinking process. Give education in adolescent girls while they experiencing concrete moment in life is a golden action to shape their healthy lifestyle and behavior (Suryana et al., 2022).

In this multimedia era, various educational media can be used for education, for example flipbooks and video. Flipbook is a visual printed media with information and images, attractive visualization, affordable price, easy to create, and adjustable read speed based on the reader's choice. In comparison, video is an audiovisual electronic media that presents animation supported with sound (Yolanita et al., 2025).

Videos are widely used by educators for their conciseness, reaching large-scale audience, and not easily damage. Both flipbook and video are preferable media in visual and audiovisual categories. The utilization of flipbook and video effectively increased the knowledge of the audience in many studies. However, there is still lack of study comparing those two media, whereas finding the best one would be beneficial for effective health education. Thus, this research aims to determine the most effective media, especially for adolescents who are in transition from simple to rational-abstract thinking patterns (Suryana et al., 2022).

Based on the pre-research study in Senior High School No. 1 Lawang, from 15 students interviewed, 9 students have less knowledge, and 6 students have moderate knowledge about PMS, means that the level of knowledge about PMS is quite low. This urgency led the researcher to compare the effectiveness of the two media further to support reproductive health promotion especially in adolescent girls. The research was conducted in Senior High School No. 1 Lawang, Malang.

MATERIALS AND METHODS

The research design used was a pre-post test group design to determine the level of knowledge of adolescent girls about premenstrual syndrome before and after being given health education intervention. This design was chosen because it allowed researchers to measure changes in knowledge directly in the same group after receiving treatment. Thus, the results of the study can show the effectiveness of flipbooks and videos in increasing adolescent girls' knowledge about premenstrual syndrome.

This study was conducted in November 2024 for X-grade students at Senior High School No. 1 Lawang. The cluster sampling was applied by choosing 8 female students from 10 classes, resulting to 80 subjects from 254 population in total. Subjects then divided into two groups randomly based on the number they took from lottery (number 1 for flipbook group and number 2 for video group). There was no control group in this study that we focused on comparing the two media.

The inclusion criteria for subject were adolescent girls aged 15-19 years who had experienced menstruation and agreed to become respondent. The exclusion criteria for the subject were adolescent girls who were absent or resigned, had a medical history of reproductive disease, had received education about PMS from government institutions, and had family members working as health workers.

The independent variable in this study was health education based on flipbooks and videos, which was provided as an intervention to adolescent girls. The dependent variable was the level of adolescent girls' knowledge about premenstrual syndrome, which was measured before and after the intervention. Thus, this study aimed to determine the effect of providing health education through flipbooks and videos on improving adolescent girls' knowledge about premenstrual syndrome.

The educational media used in this study were flipbooks and videos made by researchers. The flipbook was 18 pages and the video's ratio were 16:9. Both of the media were given for 10 minutes intervention, discussing about premenstrual syndrome including definition, symptoms, effects, and homecare relieve. To assess the knowledge, we used questionnaire containing 15 true-false valid questions with validity score $p < 0.05$ for each item, the reliability score Cronbach's alpha was $\alpha = 0.825$.

First, the pretest score was collected. Second, both of the groups were given health education using the media provided for 10 minutes. Third, the post-test score was collected. The knowledge level was categorized ordinaly based on the score: low (<60), moderate (60-75), and high (76-100). The data were analyzed using the Wilcoxon test because we found the data from the two groups were not normally distributed. Finally, non-parametric test with Mann-Whitney was used to compare the effectiveness between the two media.

For deeper verification on the effectiveness before and after education, the analysis using effect size was performed. The type of effect size used for this study is d-type effect sizes which have specific use to compare two intervention groups. Effect size was counted using formula: mean score post test – mean score pretest or standard deviation pretest. d-type effect size around or lower than 0.20 interpreted as small, around 0.50 interpreted as medium, and around or higher than 0.80 interpreted as large.

This study has obtained ethical approval with number 384/EC/KEPK-S1-KB/11/2024. The approval was granted by the Health Research Ethics Committee prior to data collection. All participants received an explanation of the study objectives and gave their consent to participate.

RESULTS

Table 1. The Characteristics of Age, Menarche Age, and Media Accessed for Health Education (n = 40)

Variable	Flipbook Group		Video Group	
	n	%	n	%
Age				
15 years	20	50	20	50

16 years	20	50	20	50
Total	40	100	40	100
Menarche Age				
9 years	1	2.5	1	2.5
10 years	1	2.5	3	7.5
11 years	6	15.0	9	22.5
12 years	16	40.0	11	27.5
13 years	12	30.0	12	30.0
14 years	3	7.5	1	2.5
15 years	1	2.5	1	2.5
16 years			2	5.0
Total	40	100	40	100
Media Accessed for Health Education				
Health workers	16	19.5	12	14.0
Instagram	21	25.7	22	25.6
Tiktok	29	35.3	34	39.5
Youtube	9	11.0	14	16.4
Google	7	8.5	4	4.5
Total	40	100	40	100

Note: n = number of observations; % = percentage

According to Table 1, the subjects in both groups were homogenous with respondents' age were 15 and 16 years equally 50% each. Menarche age in both groups was dominated by 12 years (40% in flipbook group and 27.5% in video group) and 13 years (30% in flipbook group and 30% in video group). Media accessed for health education showed the same characteristic too, with Tiktok as the most preferable (35.3% in flipbook group and 39.5% in video group), followed by Instagram (25.7% in flipbook group and 25.6% in video group).

Table 2. Differences in Knowledge Before and After Education in Flipbook Group (n = 30)

Knowledge Level	Category	Before Education		After Education	
		n	%	n	%
<60	Low	12	30.0	0	0
60-75	Moderate	21	52.5	20	50.0
76-100	High	7	17.5	20	50.0
Total		40	100	40	100

Note: n = number of observations; % = percentage

Based on the Table 2, before education with flipbook had given, 52,5% respondents had moderate knowledge about PMS. Significant effect showed after intervention had given, the knowledge level is increase to 50% respondents had high knowledge about PMS.

Table 3. Differences in Knowledge Before and After Education in Video Group (n = 30)

Knowledge Level	Category	Before Education		After Education	
		n	%	n	%
<60	Low	12	30	0	0
60-75	Moderate	19	47.5	11	27.5

76-100	High	9	22.5	29	72.5
Total		40	100	40	100

Based on the Table 3, before education with video had given, 47,5% respondents had moderate knowledge while only 22,5% respondents had high knowledge about PMS. Significant results showed an increase of post test score to 72,5% of respondents who had high knowledge level. This indicates the respondent earn knowledge after education with video about PMS.

Table 4. Statistical Analysis Before and After Education in Flipbook and Video Group (n = 30)

Media	Knowledge	n	Min	Max	Mean	Wilcoxon	Mann-Whitney
Flipbook	Pretest	40	33.33	86.67	62.50	<0.001	0.915
	Post test	40	66.67	93.33	77.83		
Video	Pretest	40	33.33	86.67	63.00	<0.001	0.003
	Post test	40	66.67	100	85.33		

Table 4 shows the statistical analysis for both flipbook and video groups. In pretest, there is no significant difference in knowledge level within two groups that the mean score is 62.5 in flipbook group and 63.0 in video group. Meanwhile in posttest, the mean score is increased to 77.83 in flipbook group and 85.33 in video group. Statistically analyzed by Wilcoxon test, both of the group have the same p-value ($p=0.000$, $p<0.05$) which can be concluded that there is significant effect after education given in flipbook and video group.

Otherwise, there is no difference in knowledge level from pretest score between flipbook and video group ($p>0.05$). The significant result shows in post test which video group had more significant effect than flipbook with $p=0.003$ ($p<0.05$). The significant effect is shown in size effect. The effect size of video group is 1.55 (high category), shows 0.5 points higher than flipbook with effect size 1.05 (high category).

DISCUSSION

The results of the study from 80 respondents showed an increase in the knowledge level about PMS. A difference can be seen in flipbook group with mean in pre-test score from 62.5 in moderate category to 77.83 for post-test in high category. The Wilcoxon test also showed similar result where the significance reached meaning there was a significant effect on increasing the knowledge level about PMS after education with flipbook.

The increase of the knowledge in flipbook group is in line with the study from (Setiawati & Andayani., 2022) that flipbook is increase knowledge about physical activity in college students from average of 16.7% to 66.67% after education with flipbook. Although the respondent is not in same development stage with this research, it proves that flipbook is applicable in different ages of audience. Another study found that flipbook interventions significantly improved knowledge about pregnancy planning in women by 26.86 points (Sulastri & Hilman., 2023).

This finding in line with the result in flipbook group clearly said that flipbook is beneficial tools to use for health education. The effectiveness of flipbook is pointed to its ability to stimulate thinking patterns by visualization. The small size of the flipbook and concise information per page supports the respondents focus while reading. Thus, the

effectiveness of flipbook is influenced by the visualization, information, and illustrations of the topics discussed.

Besides, the video group also shows similar results. The mean in pre-test score from 63.0 in moderate category to 88.33 for post-test in high category. The Wilcoxon test also showed similar results where the significance reached, meaning that there was a significant effect on increasing the level of knowledge about PMS after education with video.

The result is consistent with prior study by Hindriati et al. (2023) which explained the effectiveness of video that improved knowledge about the impact of unplanned pregnancy in the adolescent for 36 points. Similar result gained from elementary setting that video able to rise the knowledge from 44.72 to 82.29 after learning with video (Insani et al., 2023). Those two-study taken same respondent setting revealed consistent result of video for media education, prove its ability on delivering information well to adolescent.

The feasibility of video for education is based on realistic visualization with additional auditory stimulation. Those characteristics can maximize the transfer of knowledge where humans remember something better if they use more senses. This interesting learning experience not only increases motivation, but also facilitates visual and auditory learning styles, thereby reaching wider audience (Insani et al., 2023).

Based on the analysis and hypothesis testing, the output obtained is that both flipbook and video are effective for increasing knowledge in adolescent girls about premenstrual syndrome respectively. However, the increase in knowledge after education shows different outputs. In pre-test, the mean of flipbook group was 62.5 and the mean of video group was 63.0, mean both groups have same level of knowledge about PMS.

The difference obtained after education is that in post-test, the mean score of flipbooks was 77.83 while the mean score of videos was 85.33. The difference in post-test score that video earns 7.5 point bigger than flipbook indicates that video is better than flipbook. The result is strengthened by Mann-Whitney test for video group; it can be concluded that video is more effective than flipbook for increasing the level of knowledge in adolescent girls about premenstrual syndrome.

Compared to flipbook, video is likely to have bigger impact on the improvement of the knowledge, as can be seen in effect size which video have 0.5 point higher than flipbook. This result revealed a correlation between preference and learning output. To access health information, the respondents tend to use Tiktok than other social media. The attraction of Tiktok as social media is caused by its shorts video, sometimes given by health workers themselves, building trust and making learning process easier. Those characteristics are also found in video, which support respondent to learn better at their stage, thus will stimulate the brain to memorize the information (Ramadhan et al., 2022) or called as constructive scientific learning process from informal education (Nguyen & Diederich., 2023).

The respondent is showing a transition in teenager thinking process to more logical but still need adjustment in delivery process. Moreover, videos presented with animation and sound create attention span which induces learning with dual-channel sensory stimulation. This study represents a key point that video is the most suitable media for adolescents because it supports their thinking pattern. Another point to notice is the importance of giving appropriate media for audience based on their stage and characteristic to assure the information is well delivered (Susilawati et al., 2022).

In summary, video is not only present as educational media, but concrete and meaningful learning process. In addition, choosing media for education should consider respondent's characteristics. For instance, respondents' age, educators will have idea on which type of media needed, the language use, the topic to deliver, the trigger to catch the focus, as well as their thinking stage to create optimal learning experience. This finding also gives an insight into health promotion strategies to use proper media on educational programs.

This study is limited by the absence of control group, making it unable to compare the difference in knowledge level between the intervention and without intervention group. Apart from that, the study was only conducted in one school and one grade, so the output cannot be generalized globally. Short follow up in this study restrict access for the researcher to rule out external factors that might affect the result.

CONCLUSION

Flipbook and video are effective media to increase the knowledge of adolescent girls about premenstrual syndrome. However, video is considered more effective than flipbook to increase the knowledge about premenstrual syndrome in adolescent girl. The choice between flipbook or video depends on available local resource. For larger audience with compatible tools, video is suggested. While to small audience, flipbook likely preferable and can be combined with interactive teaching. Survey of audience preferences is important to meet the needs and attract the interest during the educational process.

This study found a crucial point on how learning process could be boosted by providing medium that adjusted with audience's thinking development. For practical field, this study also brings an applicable insight in health promotion, particularly in school-based program. In specific term, this study can be a reference for subsequent studies on premenstrual syndrome in adolescent girls to encourage more optimal health and midwifery care throughout the women's life cycle.

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