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IMPROVING ADOLESCENT GIRLS' KNOWLEDGE OF MENSTRUAL HEALTH THROUGH PHYSICAL ACTIVITY AND STRESS MANAGEMENT EDUCATION AMONG FEMALE STUDENTS OF SMA NEGERI 15 PALEMBANG

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Abstract

Menstrual disorders, particularly dysmenorrhea, are common among adolescent girls and can interfere with learning. Stress and low physical activity are modifiable factors associated with dysmenorrhea. This community service activity aimed to improve adolescent girls' knowledge of menstrual health through physical activity and stress management education. The activity was held on 23 January 2025 at SMA Negeri 15 Palembang and involved 60 female students. It included questionnaires on menstrual patterns, the Perceived Stress Scale (PSS-10), and the International Physical Activity Questionnaire (IPAQ-SF); interactive education; and practice of stretching and deep-breathing relaxation. Knowledge was measured with a 15-item questionnaire before and after education. Forty-one students (68.3%) experienced dysmenorrhea, 17 (28.3%) had irregular cycles, 42 (70.0%) had moderate-to-severe stress, and 29 (48.3%) had low physical activity. The proportion with dysmenorrhea increased with stress level (50.0%, 71.0%, and 90.9%; p for trend = 0.020) and decreased with physical activity level (82.8%, 63.6%, and 33.3%; p for trend = 0.005). The mean knowledge score increased from 51.9 ± 17.5 to 82.9 ± 11.5 ($p < 0.001$), with a mean N-gain of 0.65 (moderate). Physical activity and stress management education effectively improves students' knowledge of menstrual health and should be integrated into the school health program.
Keywords: *adolescent girls; dysmenorrhea; menstrual health; physical activity; stress management*

INTRODUCTION

Menstruation is an essential aspect of reproductive health for adolescent girls. However, many experience menstrual disturbances, such as painful periods (dysmenorrhea) and irregular cycles. Dysmenorrhea can impair concentration, lead to school absenteeism, and interfere with daily activities. Research involving high school students indicates that a large proportion—up to 85.5%—experience dysmenorrhea (Cahyani, 2022).

Primary dysmenorrhea is linked to an increase in prostaglandin production, which triggers strong uterine contractions. Stress can exacerbate this condition by affecting hormones and the nervous system, whereas regular physical activity can improve blood flow to the pelvic region and stimulate the release of endorphins, which help alleviate pain. A study of students at SMA Muhammadiyah 18 Jakarta identified a correlation between physical activity, fast-food consumption, stress levels, and the occurrence of dysmenorrhea (Dwiasrini et al., 2023). A strong association between stress levels and dysmenorrhea has also been reported among students at SMA Negeri 2 Sibolga (Aritonang & Manullang, 2024) as well as among other adolescent girls (Mivanda et al., 2023). Furthermore, stress is associated with menstrual cycle irregularities in adolescent girls (Amalia et al., 2023). However, findings across studies are not always consistent; for instance, while Cahyani (2022) found a significant link between physical activity and dysmenorrhea, no such link was found between stress levels and dysmenorrhea.

Since stress and physical activity are modifiable factors, education on these topics—specifically regarding physical activity and stress management—could potentially help adolescents maintain their menstrual health. At SMA Negeri 15 Palembang, many students report experiencing menstrual pain, with some requesting permission to go home or rest in the school infirmary (UKS) during their periods. Coordination with school counselors and the coordinators of the School Health Unit (UKS) revealed that female students typically manage menstrual pain by taking analgesics, without being aware of non-pharmacological preventive measures. Consequently, a team from the Bachelor of Applied Science (D4) program in Medical Laboratory Technology and the Master's program in Public Health at Universitas Kader Bangsa conducted an educational initiative on menstrual health, focusing on physical activity and stress management. This project aimed to: (1) map the students' menstrual patterns, stress levels, and physical activity; (2) analyze the relationship between stress, physical activity, and dysmenorrhea; and (3) enhance the students' knowledge regarding menstrual health.

METHOD

Time, location, and target participants. The activity took place on Thursday, January 23, 2025, in the hall of SMA Negeri 15 Palembang. The target participants were female students in grades X and XI who have begun menstruating and were willing to participate in the entire

program with the consent of their parents or guardians. A total of 60 students completed the full activity.

Implementation team and partners. The activity was conducted by faculty members from the Bachelor of Applied Science (D4) program in Medical Laboratory Technology and the Master's program in Public Health at Universitas Kader Bangsa, assisted by university students. This initiative was carried out in collaboration with the school's guidance counselors and the coordinators of the School Health Unit (UKS) at SMA Negeri 15 Palembang.

Stages of the activity.

1. Preparation. The team coordinated with the school and developed educational materials, including a video on stretching exercises, a leaflet titled "Healthy, Active, and Calm During Menstruation," and a questionnaire.
2. Questionnaire and pre-test. Students provided data on their menstrual patterns over the last three months (cycle length and the presence of menstrual pain that interferes with daily activities). They also completed the Perceived Stress Scale (PSS-10), the International Physical Activity Questionnaire Short Form (IPAQ-SF), and a 15-item knowledge assessment.
3. Education. An interactive session lasting approximately 60 minutes covered topics such as the normal menstrual cycle, menstrual disorders and warning signs requiring medical attention, the relationship between stress, physical activity, and menstrual pain, recommendations for at least 60 minutes of daily physical activity for adolescents, and stress management techniques (deep breathing exercises, progressive muscle relaxation, adequate sleep, and study time management). The material also addressed menstrual hygiene and the consumption of iron-supplement tablets.
4. Practical session. Under the guidance of the team, students participated in a 20-minute practical session featuring stretching exercises to alleviate menstrual pain and deep breathing relaxation techniques.
5. Evaluation and follow-up. Students completed a post-test and outlined their personal follow-up plans. Students experiencing severe menstrual pain or highly irregular cycles are advised to consult a community health center (puskesmas).

Operational definitions. Dysmenorrhea is defined as menstrual pain that interferes with a student's daily activities within the last three months. A menstrual cycle is considered irregular if its duration falls outside the 21–35 day range. Stress levels, based on PSS-10 scores, are categorized as mild (0–13), moderate (14–26), and severe (27–40). Physical activity, assessed via the IPAQ-SF, is categorized as low, moderate, or high. Knowledge scores (0–100) are classified as good (≥76), fair (56–75), or poor (<56).

Data analysis. Data are presented as frequencies and percentages. The associations between stress levels, physical activity, and dysmenorrhea were examined using the chi-square test and the linear-by-linear association trend test. The difference between pre-test and post-test scores followed a normal distribution (Shapiro–Wilk $p = 0.156$); therefore, a paired t-test was applied. The effectiveness of the educational intervention was evaluated using the N-gain score. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Implementation of activities

The activity lasted for about 3 hours and was attended by 60 female students. The students actively asked questions—notably about whether it is permissible to exercise during menstruation, whether severe menstrual pain is considered normal, and how to manage stress leading up to exams. A practical session on stretching exercises and breathing relaxation techniques was met with great enthusiasm.



Figure 1. Documentation of Activities

Overview of menstrual patterns, stress, and physical activity

Table 1. Menstrual patterns, stress levels, and physical activity among female students (n = 60)

Variable	Category	n	%
Dysmenorrhea	Yes	41	68,3
	No	19	31,7
Menstrual cycle	Regular (21–35 days)	43	71,7
	Irregular	17	28,3
Stress level (PSS-10)	Light	18	30,0
	Currently	31	51,7
	Heavy	11	18,3
Physical activity (IPAQ-SF)	Low	29	48,3
	Currently	22	36,7
	Tall	9	15,0

The majority of female students (68.3%) experience dysmenorrhea, and nearly one-third have irregular menstrual cycles. A total of 70.0% of the students experience moderate to severe stress, and nearly half (48.3%) engage in low levels of physical activity. High stress levels may be linked to academic burdens and school-related activities, while low physical activity reflects habits such as prolonged sitting during study and the use of electronic devices.

The relationship between stress, physical activity, and dysmenorrhea

Table 2. Incidence of dysmenorrhea according to stress level and physical activity (n = 60)

Variable	Category	Dysmenorrhea, n (%)	No dysmenorrhea, n (%)	p (chi-square)	p tren
Stress level	Mild (n = 18)	9 (50,0)	9 (50,0)	0,064	0,020
	Moderate (n = 31)	22 (71,0)	9 (29,0)		
	Weight (n = 11)	10 (90,9)	1 (9,1)		
Physical activity	Low (n = 29)	24 (82,8)	5 (17,2)	0,017	0,005
	Moderate (n = 22)	14 (63,6)	8 (36,4)		
	High (n = 9)	3 (33,3)	6 (66,7)		

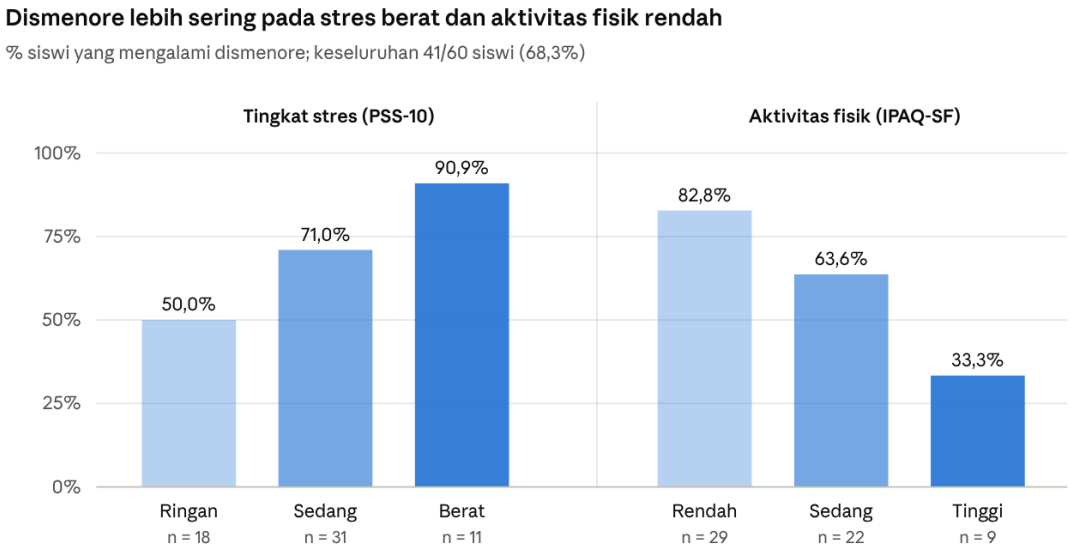


Figure 2. Proportion of dysmenorrhea according to stress level and physical activity

The proportion of dysmenorrhea increases with higher levels of stress, rising from 50.0% among those with mild stress to 90.9% among those with severe stress (p-trend = 0.020). Conversely, the proportion of dysmenorrhea decreases with higher levels of physical activity, falling from 82.8% among those with low physical activity to 33.3% among those with high physical activity (p-trend = 0.005). A chi-square test indicates a significant association for physical activity (p = 0.017), but the association for stress levels is not yet statistically significant (p = 0.064), despite a clear upward trend. This is likely due to the relatively small number of female students experiencing severe stress.

These findings are consistent with those of Dwiasrini et al. (2023), who identified an association between physical activity, stress levels, and dysmenorrhea among high school girls, as well as with Aritonang and Manullang (2024) and Mivanda et al. (2023), who reported a significant link between stress and dysmenorrhea. These results also align with Cahyani (2022), who found a significant association between physical activity and dysmenorrhea. Physiologically, stress increases stress hormones and sympathetic nervous system activity, which can intensify uterine contractions; meanwhile, regular physical activity improves blood flow to the pelvic region

and stimulates the release of endorphins, which act as natural pain relievers. Stress can also disrupt the hormonal balance that regulates the menstrual cycle (Amalia et al., 2023). These findings underscore the importance of education that emphasizes physical activity and stress management as non-pharmacological approaches for the prevention and management of dysmenorrhea.

Changes in knowledge and follow-up action plans among female students

Table 3. Knowledge scores and categories before and after education (n = 60)

Parameter	*Pre-test*	*Post-test*
Mean ± SD	51,9 ± 17,5	82,9 ± 11,5
Median (min–maks)	53,3 (13,3–93,3)	86,7 (40,0–100)
Good, n (%)	4 (6,7)	45 (75,0)
Enough, n (%)	22 (36,7)	14 (23,3)
Not Enough, n (%)	34 (56,7)	1 (1,7)
Mean difference (95% CI)	31,0 (27,8–34,2)	
Paired t test	t = 19,11; p < 0,001	
Average N-gain	0,65 (moderate)	
Score increased/remained the same/decreased	59/1/0	

The mean knowledge score increased by 31.0 points following the educational intervention ($p < 0.001$), and the proportion of students with a good level of knowledge rose from 6.7% to 75.0%. Prior to the intervention, many students believed that exercise should be avoided during menstruation and were unaware that stress could affect their menstrual cycle and the severity of menstrual pain. Following the intervention, 49 students (81.7%) stated they would exercise at least three times a week, 52 students (86.7%) indicated they would practice deep-breathing relaxation techniques when experiencing stress or menstrual pain, and 50 students (83.3%) planned to track their menstrual cycles each month.

Limitations

Data regarding menstrual patterns, stress, and physical activity were collected at a single point in time using a self-administered questionnaire; therefore, causal relationships cannot be established, and the results may be subject to recall bias. The severity of menstrual pain was not assessed using a standardized pain scale. Furthermore, changes in behavior and menstrual-related complaints following the educational intervention have not yet been evaluated.

CONCLUSIONS AND SUGGESTIONS

Conclusion. A majority of female students at SMA Negeri 15 Palembang experience dysmenorrhea (68.3%), moderate to severe stress (70.0%), and low levels of physical activity (48.3%). The proportion of students experiencing dysmenorrhea increases with higher stress levels and decreases with higher levels of physical activity. Health education regarding menstruation—focusing on physical activity and stress management—significantly improved the students' knowledge (from 51.9 to 82.9; $p < 0.001$; N-gain 0.65).

Recommendations.

1. For SMA Negeri 15 Palembang: Incorporate stretching exercises and relaxation techniques into school health unit (UKS) activities or regular physical education, and provide counseling services to help students manage academic stress.
2. For students: Engage in regular exercise, practice deep-breathing relaxation, ensure adequate sleep, track menstrual cycles, and seek medical consultation if menstrual pain becomes severe or cycles become highly irregular.
3. For future initiatives: Assess the severity of menstrual pain using a pain scale, evaluate changes in physical activity, stress levels, and menstrual complaints several months post-education, and involve parents.

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