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The relationship between sedentary lifestyle and intensity of primary dysmenorrhea in adolescent

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ABSTRACT

Background: The menstrual cycle can be disrupted by changes in hormone production during menstruation, leading to primary dysmenorrhea. Primary dysmenorrhea is caused by excessive contraction of the myometrium due to the concentration of prostaglandins produced by the endometrium and the endorphin hormone. This study aimed to determine whether there is a relationship between a sedentary lifestyle and the intensity of primary dysmenorrhea in high school girls.

Methods: The research method used an observational analytic study with a cross-sectional approach. The sampling technique employed purposive sampling. The total number of subjects in this study was 185, with the independent variable being the intensity of primary dysmenorrhea and the dependent variable being a sedentary lifestyle. Data were collected by distributing the International Physical Activity Questionnaire Short Form (IPAQ-SF) short form and checking pain intensity with the Numeric Rating Scale (NRS).

Results: In the Spearman rho analysis test, a significant result was obtained with a correlation coefficient value of 0.647, which means the relationship is strong, and a positive value indicates that the relationship between the variables is in one way.

Conclusion: There was a relationship between a sedentary lifestyle and the intensity of primary dysmenorrhea in girls of High School.

Keywords: adolescence, physical activities, primary dysmenorrhea, sedentary lifestyle.
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BACKGROUND

Teenagers or young people are the largest population in the world. Adolescence is a period when a person passes childhood and moves toward adulthood. The Regulation of the Minister of Health of the Republic of Indonesia Number 25 of 2014 states that teenagers are residents aged 10-18 years.[1] The puberty period in adolescent girls is marked by the onset of menstruation, which recurs every month as a sign that the reproductive organs have matured. Menstruation is periodic uterine bleeding that typically begins approximately 14 days after ovulation. It occurs due to the role of several female hormones, including estrogen, progesterone, follicle-stimulating hormone (FSH), and luteinizing hormone (LH).[2,3]

Menstruation that repeats every month is called the menstrual cycle. The menstrual cycle can be disrupted by changes in hormone production during menstruation, leading to various disorders such as oligomenorrhea, polymenorrhea, amenorrhea, and dysmenorrhea. Dysmenorrhea is pain that occurs during menstruation and can cause physical problems such as nausea, diarrhea, and weakness. It interferes with activities due to severe pain in the lower abdomen that radiates to the lower back, waist, hips, and legs.[4] Dysmenorrhea is divided into two types: primary and secondary. Primary dysmenorrhea is related to the ovulatory cycle. It is caused by myometrium contractions, which lead to ischemia due to increased prostaglandin concentration produced by the endometrium during the secretory phase.[5,6]

The incidence of primary dysmenorrhea in women in Indonesia is 72.89%, and secondary dysmenorrhea is 27.11%, with a range of dysmenorrhea incidence among productive women of 45-95%.[7] Bali has an incidence of dysmenorrhea reaching 29,505 people. Among these, some experience pain due to secondary dysmenorrhea, while others experience pain from primary dysmenorrhea, ranging from mild to severe. In Denpasar, the incidence of dysmenorrhea reached 2,115 people, including primary and secondary dysmenorrhea, with mild to severe degrees.[8]

Dysmenorrhea will have the impact of causing pathological conditions, increasing mortality, and hurting fertility. The effect on the psychological condition of young women is that it causes anxiety and discomfort and often creates sensitive feelings in young women. This usually causes young women to feel less enthusiastic about participating in learning at school, disrupting sleep patterns, disrupting daily activities due to pain, and causing stress.[9]

The current phenomenon experienced by teenagers, namely the sedentary

lifestyle, greatly influences dysmenorrhea disorders. A sedentary lifestyle is a lifestyle that tends to lack physical activity or tends to do monotonous activities such as sitting for long periods, leaning, and lying down. According to the Indonesian Ministry of Health, a sedentary lifestyle is a physical activity carried out outside bedtime, with very little calorie expenditure, namely <1.5 METs (Metabolic Equivalent of Task (s)). A sedentary lifestyle can cause ischemia so that blood flow to the reproductive organs becomes blocked, causing the production of endorphin hormones to be blocked, where this hormone functions to reduce pain during menstruation.[10] Using the information presented above, the researchers plan to investigate the association between a sedentary lifestyle and the severity of primary dysmenorrhea in high school females.

METHODS

The design of this research was observational analytics using a cross-sectional approach. This research design was used to determine the relationship between a sedentary lifestyle and the incidence of dysmenorrhea in adolescents. This research had two variables: the independent variable was a sedentary lifestyle, and the dependent variable was the intensity of dysmenorrhea. This research was conducted at Tunas Daud and Dwijendra Senior High Schools in Denpasar, Bali, from November 2023 to April 2024.

Inclusion criteria were that the subject was female, aged 15-17 years, had high school status with proof of a high school student card, had experienced menarche (first menstruation) or was currently menstruating, had a history of dysmenorrhea during menstruation, and was willing to be a research subject and fill out informed consent as approval to become a research sample. Exclusion criteria were subjects who were less than 15 or more than 18 years old, had not yet experienced menarche, did not feel dysmenorrhea during menstruation, were not willing to participate in the research, or did not fill out the questionnaire correctly and completely.

The subjects in this study were 185 individuals. The characteristics of the samples in the research were based on age, intensity of dysmenorrhea, physical activity, and duration of sitting. Data were collected by distributing the short form of the International Physical Activity Questionnaire Short Form (IPAQ-SF) questionnaire and checking pain intensity using the numeric rating scale (NRS). This research used IBM SPSS Statistics version 26 to analyze the data. This study received approval from the Research Ethics Commission, College of Medicine, Universitas Udayana, stating that this research was ethically feasible with number 0775/UN14.2.2.VII.14/LT/2024.

RESULTS

From a total of 185 subjects, the characteristics of the samples were based on age, intensity of dysmenorrhea, physical activity, and duration of sitting. Table 1 shows the sample distribution according to age: 64 subjects (34.6%) were 15 years old, 90 subjects (48.6%) were 16 years old, and 31 subjects (16.8%) were 17 years old. Regarding the intensity of dysmenorrhea, 47 subjects (25.4%) experienced mild pain, 96 subjects (51.9%) experienced moderate pain, 36 subjects (19.5%) experienced severe pain, and six subjects (3.2%) experienced very severe pain. It can be concluded that the majority of subjects experienced dysmenorrhea pain of moderate intensity.

The sample with light physical activity was 21 people, with a percentage of 11.4%; the sample with moderate physical activity was 151 people, with a rate of 81.6%. The sample with heavy physical activity was 13 people, with a percentage of 7%. The duration of sitting while working for samples can be categorized into the sedentary lifestyle category; namely, the sample with the moderate sedentary category is 23 people with a percentage of 12.4%. The sample with heavy sedentary is 162 people with a rate of 87.6%, which shows that most of the sample has severe sedentary lifestyle habits shown in Table 1.

Table 2 shows the results of the Spearman rho analysis test, showing a significance value of p=0.000 (p<0.05), which means there is a significant relationship between the two variables, namely sedentary lifestyle and the intensity of dysmenorrhea in high school teenage girls in Denpasar. Apart from that, based on the analysis test results, a correlation coefficient value of 0.674 was also obtained, which was positive. A positive value means that the two variables have a relationship in the same direction with a strong correlation level.

DISCUSSION

The research reveals that the subjects' dominant age is 16 years old. This is evidenced by the fact that most subjects fall into the 16-year-old age group, according to the data obtained by the researchers. According to Mons et al. in the Usop journal, teenagers can be categorized based on age ranges: 12-15 years for early teens, 15-18 years for middle teens, and 18-21 years as the age limit for late teens.[11] The study's findings revealed that the severity of dysmenorrhea pain felt by individuals was moderate, with 96 people falling into this category. The findings of this study are consistent with those of previous research.[12] According to this survey, 68.8% of female students at Riau University's Faculty of Nursing experienced moderate-intensity dysmenorrhea. The findings of this study are also consistent with previous research, which found that the level of dysmenorrhea among female students was moderate, with the primary focus being on discomfort.[13]

According to the study findings, most individuals engage in moderate physical activity, accounting for 81.6%. This contradicts the researchers' initial predictions, as they assumed that female high school students who studied did not engage in much physical activity. After all, students were supplied with transportation to school, and practically all of them had gadgets, increasing the likelihood that they would be sedentary about traveling. The research showed that physical activity data for class X and XI female students at Public Senior High School 4 Tanggerang had an average moderate physical activity of 53.1%.[14] The study's results reported that the physical activity level of most Yapalis Krian Vocational School students was moderate physical activity at 85%.[15]

The results of this study show that the sitting duration of the female high school students studied was ≥5 hours a day at most, 87.6%. This indicates that the

Table 1. Frequency distribution of sample characteristics based on age, dysmenorrhea intensity, physical activity, and sitting duration

Characteristic	Frequency (n)	Percentage
Age		
15	64	34.6
16	90	48.6
17	31	16.8
Intensity of dysmenorrhea		
Mild pain	47	25.4
Moderate pain	96	51.9
Severe pain	36	19.5
Extreme pain	6	3.2
Physical activity		
Light physical activity	21	11.4
Moderate physical activity	151	81.6
Vigorous physical activity	13	7
Sitting duration		
<2 hour	0	0
2-5 hour	23	12.4
≥5 hour	162	87.6
Total	185	100.0

Table 2. Relationship between sedentary lifestyle and dysmenorrhea intensity

Variable correlation	Correlation	*p*-value
Sedentary Lifestyle	0.647	0.000
Dysmenorrhea pain		

sedentary behavior of subjects in the severe sedentary category, if linked to data on physical activity characteristics, in a week, the subject mostly only does activities that require moderate physical activity such as sweeping, lifting light objects, light exercises such as light cycling, and light physical activity.[16] Meanwhile, only (7%) of those who do heavy activities make up the total. The sitting duration for students at Brawijaya University was ≥3 hours at 82.8%. In this study, the percentage of people with sedentary behavior≥3 hours was five times higher than those with sedentary behavior ≤3 Hours.[17]

In this study, the correlation coefficient value was determined. In contrast, the research found no significant association between sedentary behavior and menstruation abnormalities among Surakarta's female public high school students. This is because, in this study, the variables studied were all menstrual disorders, namely menorrhagia, hypomenorrhea, amenorrhea, oligomenorrhea, polymenorrhea, PMS, and dysmenorrhea. This research showed that 50.2% of female students had behavior.[18]

Primary dysmenorrhea can be induced by an increase in prostaglandins along with a reduction in estrogen/progesterone hormone levels. This causes uterine muscle spasms as a result of excessive muscle contractions, which reduces blood flow to the uterine muscles, resulting in uterine ischemia and primary dysmenorrhea discomfort.[19] Dysmenorrhea is a detrimental condition for many women and has a large and major impact on health-related quality of life. As a result, dysmenorrhea also holds responsibility for considerable economic losses due to the costs of medication, medical treatment, and decreased productivity, such as the inability to concentrate on studying or work and reduced motivation to study or work due to the pain experienced.[20,21]

There were some limitations of this study. First, this study focused on adolescents aged 15-17 years from specific schools in Denpasar City, which may limit the generalizability of the findings to broader populations of adolescents from different geographical or socio-economic backgrounds. Second, physical activity and sedentary behavior data were collected using self-reported measures (IPAQ-SF questionnaire), subject to recall bias and may not accurately reflect actual behavior. Similarly, pain intensity assessed with the Numeric Rating Scale relies on subjective reporting and interpretation. Third, while the study focused on sedentary lifestyle and dysmenorrhea intensity, other potential confounding variables (e.g., dietary habits, psychological factors) that could influence dysmenorrhea were not assessed, limiting the comprehensive understanding of factors contributing to dysmenorrhea severity.

CONCLUSION

There was a significant relationship between a sedentary lifestyle and the intensity of primary dysmenorrhea in high school adolescents. The level of correlation between the two was positive, meaning the relationship between the two variables is strong and in the same direction. Future research should Expand the study to include adolescents from diverse geographical and socio-economic backgrounds beyond Denpasar. This broader inclusion can provide a more representative sample and improve the generalizability of findings across different populations. Complement self-reported physical activity and sedentary behavior data with objective measures like accelerometers or activity monitors. This approach can reduce recall bias and provide more accurate insights into participants' activity levels.

ETHICAL CLEARANCE

The Research Ethics Commission, College of Medicine, Universitas Udayana, approved this study and stated it is ethically feasible (number 0775/UN14.2.2.VII.14/LT/2024).

CONFLICT OF INTEREST

The author certifies that there are no conflicts of interest.

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AUTHOR CONTRIBUTIONS

IGAW developed the study's methodology, gathered data, and published the article. SAPT, NWT, and IDGAK conducted literature searches, edited the article, and assessed the final version of the paper.

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