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The Relationship of Body Mass Index and Physical Activity With Menstrual Pain in Adolescent Girl

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ABSTRACT

Background: Menstrual pain is cramps in the lower abdomen that appear before or during menstruation, sometimes so severe that they interfere with daily activities. The aim of this study was to determine the relationship between body mass index and physical activity with menstrual pain in adolescent girl. **Method:** This research uses a correlation analytical method with a cross sectional approach. The sampling technique in this research was total sampling. The sample for this research was 40 female students at Denpasar National Junior High School who met the inclusion and exclusion criteria. The instruments used are scales and height meters, the Numeric Rating Scale (NRS) questionnaire and the Global Physical Activity Questionnaire (GPAQ). **Result:** The results of the analysis show that the body mass index of female Adolescent girls is mostly in the good nutritional criteria (40.0%), physical activity is mostly in the moderate category (50.0%) and the majority of respondents suffer from menstrual pain (67.5%). Spearman rank analysis test shows there is a relationship between BMI ($p<0.05$) and physical activity ($p<0.05$) with menstrual pain. **Conclusion:** The conclusion of this research is that there is a relationship between body mass index and physical activity with menstrual pain with a low level of correlation.

Keywords: Body Mass Index, Physical Activity, Menstrual Pain, Adolescent girl

INTRODUCTION

Teenagers are living creatures in the age range of 10-19 years (*Health for the World's Adolescents A Second Chance in the Second Decade*, 2014). Teenagers also defined as people aged 10-18 years (Permenkes RI, 2020). The most dominant age structure of the Indonesian population is Generation Z and Millennials with a Gen Z percentage of 27.94% (74.93 million people) with an estimated current age of 10-25 years, whereas if categorized according to age groups 10-14 and 15-19 years is the age group with the highest number compared to other age groups. Adolescence is a phase in the human life cycle and is a transition period from childhood to adulthood. Adolescence is a transition period between childhood and adulthood. Reproductive and sexual health issues are important considering the large population of teenagers (Nurfadillah Hasna et al., 2021).

The transition period in adolescent girls is marked by menstruation as a sign of the activation of reproductive function. This first menstruation is called menarche. For some people, menstruation is a normal thing, but for some women this could be problem when they experiencing menstrual pain. Pain during menstruation caused by uterine muscle spasms during menstruation (Permata Sari et al., n.d.).

Information from the World Health Organization shows that the number of menstrual pain in the world is very large, more than 50% of women in the world experience menstrual pain and 10-15% of them experience severe menstrual pain, which makes them unable to carry out any activities (Permata Sari et al., n.d.). A similar thing also happens in Indonesia with the number of menstrual pain reaching 60-70%, as much as 54.89% is primary menstrual pain while 45.11% is the secondary type (Permata Sari et al., n.d.).

The pain caused by menstrual pain or dysmenorrhea will affect young women emotionally and physically so that action or prevention is needed to overcome the pain during menstruation. Menstrual pain is also often a reason for young women not to participate in learning activities, which can interfere with their learning achievements. Menstrual pain that is not resolved will have an impact on Adolescent girl, namely discomfort and they can experience nausea, vomiting, headaches, diarrhea and even fainting. The heavier the degree of menstruation, the more disrupted learning activities are (Wayan et al., n.d.)

One of the causes of problems that can cause menstrual pain is nutritional status. Nutritional status can affect the growth and

function of body organs, which can cause reproductive function to be disrupted. Abnormal nutritional status can be caused by lifestyle, ease of access in all walks of life makes teenagers tend to choose fast food or junk food, and modern drinks with high sugar content. Body Mass Index (BMI) is a simple tool or way to monitor nutritional status in adolescents. Insufficient or excessive body mass index is associated with menstrual pain. Based on the results of previous research, it shows that there is a relationship between nutritional status as measured by BMI and the incidence of menstrual pain, namely subjects who have insufficient and excessive BMI (Delia et al., 2021).

Another factor, namely physical activity, is also a risk factor for menstrual pain. The proportion of menstrual pain found in teenagers who rarely do physical activity or sports compared to teenagers who do physical activity. Teenagers' daily activities cannot be separated from the use of gadgets, in fact often the time spent is excessive so that teenagers become less physically active. Based on the results of research conducted on teenage girls, 74.42% of teenagers rarely exercise (Mutia et al., 2019).

Denpasar National Junior High School is a junior high school located in the working area of UPTD Puskesmas 1 South Denpasar. Based on the results of student screening in 2022, the biggest problem is adolescent nutrition, where among teenagers there are still teenagers with under- and over-nutrition status. Based on the interview on 10 female students who had menstruated, 9 of them experienced pain during menstruation and 8 of them did physical activity less than 3 times a week. Students who experience menstrual pain disrupt their activities and cause them to remain silent in the school health unit room and cannot participate in learning activities on the first day of menstruation. Research related to menstrual pain has never been carried out at Denpasar National Middle School.

METHOD

This research design is correlation analytic using a cross sectional approach. Data was collected using a questionnaire on young women who had menstruated and experienced primary menstrual pain. The sampling technique used was total sampling with a sample size of 40 people. The types of instruments used were weight scales and height measurements, the Global Physical Activity Questionnaire (GPAQ) physical activity questionnaire and the Numeric Rating Scale (NSR) menstrual pain scale questionnaire.

RESULTS

Age of respondents

The ages of the respondents are presented in table 1 below

Table 1. Frequency Distribution Of Respondents' Ages

Age	F	Percentage (%)
13	12	30.0
14	27	67.5
15	1	2.5
Amount	40	100

Table 1 shows that most of the respondents were 14 years old (67,5%).

Body Mass Index, Physical Activity and menstrual pain in Adolescent girl

Table 2. Body Mass Index, Physical Activity and Menstrual Pain in Adolescent girl

No	Variable	F	Percentage(%)
1	Body mass index		
	Malnutrition	12	30.0
	Under weight	11	27.5
	Normal	16	40.0
	Over weight	1	2.5
	Amount	40	100
2	Physical Activity		
	Heavy	10	25.0
	Medium	20	50.0
	Mild	10	25.0
	Amount	40	100
3	Menstrual Pain		
	Severe	5	12.5
	Moderate	8	20.0
	Mild	27	67.5
	Amount	40	100

Table 2 shows that the majority of respondents (40%) have normal nutritional status, most of the physical activity of young women (50%) in the moderate category, and most of the menstrual pain experienced by young women was in the mild category (67,5%.)

Cross Tabulation of Body Mass Index And Physical Activity With Menstrual Pain In Adolescent girl

Table 3. Cross Tabulation of Body Mass Index And Physical Activity With Menstrual Pain In

Adolescent girl

	Variable	Menstrual Pain						Total	
		Severe		Moderate		Mild			
		n	%	n	%	N	%	n	%
1	Body mass index								
	Malnutrition	1	8,33	0	0	11	91,7	12	100
	Under weight	2	18,2	1	9,1	8	72,7	11	100
	Normal	2	12,5	6	37,5	8	50	16	100
	Over weight	0	0	1	100	0	0	1	100
	Total	5	12,5	8	20	27	67,5	40	100
2	Physical activity								
	Heavy	2	20	4	40	4	40	10	100
	Medium	2	10	4	20	14	70	20	100
	Mild	1	10	0	0	9	90	10	100
	Total	5	12,5	8	20	27	67,5	40	100

Table 3 shows that the majority of respondents experienced mild menstrual pain in the Malnutrition, Under weight and normal BMI categories. Respondents who had Over weight experienced menstrual pain in the moderate category. Respondents with light activity mostly experienced severe menstrual pain.

The relationship between Body Mass Index and physical activity with menstrual pain in Adolescent girl

Table 4. The Relationship Between Body Mass Index And Physical Activity With Menstrual Pain In Adolescent girl

Variable	Menstrual pain	
	r	P
BMI	-0,367	0,020
physical activity	0,348	0,028

Table 4 shows that there is a relationship between body mass index and physical activity with menstrual pain in Adolescent girl. Based on the SPSS results, the p-value of body mass index and menstrual pain is 0.020 and the p-value of physical activity and menstrual pain is 0.028.

DISCUSSION

Body Mass Index and physical activity with menstrual pain Adolescent girl The results of this study showed that out of 40 respondents (100%) the majority of the Body Mass Index of Adolescent Girls at Denpasar National Junior High School was 16 respondents (40.0%) with good/normal nutritional status, categorized as good nutrition if the threshold results (Z-score) -2SD to +1 SD, but there are still 12 respondents (30.0%) of young women with malnutrition with a threshold value category (Z-score) <-3SD and malnutrition as many as 11 respondents (27 .5%) with a threshold value category (Z-score) -3SD to <-2SD. Body Mass Index (BMI) is a tool for measuring by comparing a person's weight and height. Body Mass Index is a simple way to monitor a person's nutritional status. Monitoring nutritional status is useful for determining a person's nutritional status, including poor nutrition, undernutrition, good nutrition, overnutrition and obesity. In general, BMI is used as an indicator to determine a person's nutritional status.(Rusydi et al., n.d.) The large number of respondents with poor nutritional status can be caused by insufficient intake or insufficient nutrition in the body, where nutritional stores will be used for body tissue which causes a weak physical condition so that resistance to pain will be reduced. Adolescent girls with poor or limited nutrition will not only affect growth and the function of the body's organs, it will also cause disruption to the function of the reproductive organs. The impact is menstrual disorders such as menstrual pain. Complaints that are often felt include menstrual pain in the form of discomfort in the stomach, but in some teenagers this is not felt because it is influenced by good nutrition.

Current technological developments make it easier for individuals to meet their daily needs, lack of physical activity is a risk factor for menstrual pain. The pain caused by menstrual pain occurs due to increased secretion of prostaglandin hormones and decreased blood and oxygen circulation to the uterine organs, thus requiring increased physical activity During the Covid-19 pandemic individuals are still advised to engage in physical activity by doing it at least three times a week at moderate intensity for 30 minutes. Physical activity can be done in the environment around the house, in the form of walking or jogging at home,video-guided training, tread mill, weight lifting, and other activities.(Furkan et al., 2021)A woman who exercises regularly or at least twice a week makes time for physical activity proven to reduce complaints of menstrual pain (primary dysmenorrhoea).(Aulia et al., 2022) Doing physical activity will stimulate the secretion of substances that can increase feelings in the brain, called endorphins, produced by the pituitary gland and hypothalamus. Endorphins or “endogenous morphine” (morphine produced from within the body) can increase the pain threshold. Endorphins also improve mood and provide a feeling of pleasure and produce analgesics and help to reduce the effects of prostaglandins so that they can provide a feeling of comfort and produce short-term non-specific analgesics to reduce pain (Delia et al., 2021)

Research that was conducted on 40 female Adolescent girl respondents (100%) obtained results that the majority of respondents, namely 27 respondents (67.5%) experienced mild menstrual pain with a pain

scale on the NRS scale of 1-3, namely pain felt in the lower abdomen, can still be endured, can still carry out activities and concentrate on studying, but there are 8 respondents (20.0%) experiencing moderate menstrual pain with the pain scale on the NRS being a scale of 4-6, namely pain that feels like cramps in the lower abdomen, the pain spreads to waist making it difficult to concentrate, and 5 respondents (13.0%) experienced severe menstrual pain with a scale on the NRS, namely a scale of 7-9, namely severe pain, feeling of severe cramps in the lower abdomen, pain spreading to the waist, thighs or back, no appetite, nausea, body weakness, and inability to carry out activities. Some of the pain experienced by these young women can still be tolerated and they can carry out activities as usual, while others cannot be tolerated, such as having to rest all day. The factor causing the frequency of menstrual pain in female students categorized as severe menstrual pain is due to lower abdominal (stomach) pain such as cramps, while in female students categorized as moderate menstrual pain it is caused by symptoms of pelvic pain that spreads to the back and thighs. Menstrual pain is pain in the lower abdomen, spreading to the waist and thighs. This pain occurs shortly before or with the onset of menstruation and lasts for several hours, although in some cases it can last several days before and after and during menstruation. Menstrual pain itself is related to activity due to a strong stimulant of the smooth muscle of the myometrium and contraction of the uterine blood vessels. This aggravates uterine hypoxia which normally occurs during menstruation, resulting in severe pain. So that if there is severe pain, activity will be reduced (Setiawan & Lestari, 2018).

The Relationship Between Body Mass Index And Physical Activity With Menstrual Pain In Adolescent girl

The large number of respondents who experience menstrual pain is in accordance with the theory which explains that one of the causes of menstrual pain in women is body mass index with poor nutrition and malnutrition, this can cause a reduction in the body's resistance to pain. Other factors that cause menstrual pain to become severe include anemia, premature menarche, family history of severe menstrual pain, stress experienced by teenagers and so on. This possibility could be the cause, considering that the cause of menstrual pain is influenced by multiple factors, not just one BMI factor (Oktorika et al., n.d.).

Body Mass Index can be influenced by several factors such as age, dietary intake and patterns, physical activity, and gender. Adolescent girls who have poor, deficient and excessive BMI mostly experience primary menstrual pain. Adolescent girls who have a BMI in the poor and undernourished categories generally feel pain more easily because they are influenced by relatively lower body resistance than adolescent girls who have a normal BMI or good nutrition.(Rusydi et al., n.d.)Malnutrition in Adolescent girl can be caused by the perception of body image in Adolescent girls along with changes in the perception of ideal body image due to exposure to various mass media throughout the world. Adolescent girls have more body image perceptions. Achievement and weight control are factors associated with body image distortion in boys and girls (Chae, 2022).

This research is in line with other research which shows that the group of

teenagers who experience menstrual pain are aged 14-16 years, with the majority of respondents having normal nutritional status (62.5%) (Mutia et al., 2019). Another study conducted at SMA Dwijendra Denpasar in 2018 found that respondents who experienced menstrual pain were mostly in the BMI <25 group (92.2%) or the group who had an abnormal BMI.(Widyanthi et al., 2021)Research by Fredelika et al (2020) regarding "Behavior of managing dysmenorrhea pain in adolescents at SMP PGRI 5 Denpasar" stated that the highest age of respondents was 14 years who had good knowledge and attitudes in handling menstrual pain (Fredelika et al., 2020). Researchers assume the magnitude of mild menstrual pain experienced by young women can be influenced by other factors such as knowledge and attitudes due to peers.

The results of the analysis show that there is a low relationship between body mass index and menstrual pain in adolescent girls. This research is in line with other research which found that there were 27 young women who had poor nutritional status (27.55%) and 16 children (16.33%) who had more nutritional status. Most of them were at normal nutritional status, 55 people (56.12%). There were 59 adolence who experienced menstrual disorders (60.20%). The results of the research show that statistical calculations show that the p-value (0.035) is less than α=0.05, so there is a relationship between the nutritional status of adolescent girls and menstrual disorders. Apart from that, a similar study was also carried out by Silaen et al (2019). The results showed that 9 young women with nutritional status were underweight, 21 people had normal nutritional status and 2 people had overweight nutritional status. The total number of respondents who experienced menstrual pain in this study was 74.42%. In this study, menstrual pain disorders were highest in the group of respondents with normal nutritional status, even though based on theory, normal nutritional status can reduce the risk of menstrual pain in teenagers. This may be due to other factors that can reduce a person's body's resistance to pain, such as weak physical condition, anemia, chronic illness, and so on, even if the body mass index calculation is categorized as normal.

Teenage female respondents who do light physical activity are one of the risk factors for the severity of menstrual pain. Adolescent girl who do less activity can increase the secretion of prostaglandin hormones, so that the pain they experience becomes more painful. Exercise can increase the production of endorphins (the body's natural pain killers), and can increase serotonin levels (a hormone that functions to improve mood). The study show that there is a relationship between physical activity and menstrual pain in adolescent girls. This research is in line with other research, 74.42% of young women experience menstrual pain, there are 25 people who rarely do sports and 7 people who often do sports. The habit of exercising is a factor that reduces the risk of menstrual pain. This is because when you exercise, the body will produce endorphin hormones which will then trigger the release of one of the opiate receptors, namely Beta-endorphin, which has effective properties in reducing pain. This is what causes individuals who regularly do physical activity to have a lower risk of experiencing menstrual pain (Mutia et al., 2019).

CONCLUSION

There is a relationship between body mass index and physical activity with menstrual pain with a low level of correlation

Conflict of Interest

Authors declare that they have no conflict of interest.

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