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Association of Body Mass Index (BMI) and Sport Activity with Dysmenorrhea in Indonesian Teenager

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Abstrak

Nyeri selama menstruasi atau dismenore adalah keluhan ginekologis yang paling umum dan dialami oleh banyak wanita, terutama pada masa remaja atau pubertas. Rata- rata lebih dari 50% wanita di setiap negara mengalami dismenore primer. Sebanyak 55% wanita usia produktif di Indonesia mengalami dismenore. Meskipun dismenore adalah keluhan umum pada remaja, dismenore dapat mengganggu aktivitas dan produktivitas remaja, sehingga jika tidak dicegah atau tidak ditangani dengan benar dapat mengakibatkan penurunan kualitas hidup dan produktivitas remaja yang merupakan generasi penerus berikutnya. Beberapa faktor yang mempengaruhi kejadian dismenore adalah usia wanita, usia menarche, status gizi, stres dan kebiasaan berolahraga. Berdasarkan faktor-faktor ini, Indeks Massa Tubuh (IMT) dan kebiasaan aktivitas olahraga adalah faktor kebiasaan sehat yang sangat berguna untuk meningkatkan status kesehatan secara umum dan khususnya kesehatan reproduksi. Penelitian ini bertujuan untuk mengetahui hubungan antara Indeks Massa Tubuh (IMT) dan kebiasaan aktivitas olahraga dan kejadian dismenore pada remaja. Penelitian ini merupakan penelitian observasional dengan pendekatan cross-sectional. Semua responden berjumlah 142 siswa, mengalami menarche pada usia normal. Frekuensi menarche (mode) tertinggi adalah pada usia 12 tahun sebanyak 50 responden (35,2%). Seorang responden dengan kategori BMI normal ada 81 responden (57%), 44 (31%) responden memiliki kategori BMI kurang berat dan 17 (35%) mengalami obesitas. Sembilan puluh tiga responden atau 69,5% memiliki kebiasaan berolah raga, 49 (34,5%) tidak terbiasa berolahraga. Responden yang mengalami dismenore adalah 120 responden (84,5%) dan 22 responden (15,5%) tidak mengalami dismenore. BMI tidak berhubungan dengan kejadian dismenore dengan P-Value = 0,07. Sementara kebiasaan aktivitas olahraga secara signifikan terkait dengan dismenore dengan nilai-p = 0,01 <α (0,05), CI = 95%, dan Koefisien Kontingensi yang kuat dengan nilai 0,621.140.

***Kata kunci**: Dismenore, IMT (Indeks Massa Tubuh), Kebiasaan Berolahraga*

Abstract

Pain during menstruation or primary dysmenorrhea is the most common gynecological complaint and experienced by many women, especially in adolescence or puberty. On average more than 50% of women in each country experience primary dysmenorrhea. As many as 55% of productive age women in Indonesia experience dysmenorrhea. Although dysmenorrhea is a common complaint about adolescents, dysmenorrhea can disrupt the activities and productivity of adolescents, so that if it is not prevented or not handled properly it can result in a decrease in the quality of life and productivity of adolescents who are the next generation. Several factors that influence the incidence of dysmenorrhea

are the age of the woman, age of menarche, nutritional status, stress and exercise habits. Based on these factors, Body Mass Index (BMI) and sport activity habits are factors of the healthy habits that are very useful for improving health status in general and specifically reproductive health. Knowing the relationship between Body Mass Index (BMI) and sport activity habits and the incidence of dysmenorrhea in adolescents The study was an observational study with a cross-sectional approach. All respondents numbered 142 students, experiencing menarche at a normal age. The highest frequency of menarche (mode) is at the age of 12 years as many as 50 respondents (35.2%). A respondent with a normal BMI category there are 81 respondent (57%), 44 (31%) respondent have underweight BMI category and 17 (35%) was obese. Ninety-three respondents or 69.5% have sport activity habits, 49 (34.5%) were not used to exercise. Respondents who experienced dysmenorrhea were 120 respondents (84.5%) and 22 respondents (15.5%) did not experience dysmenorrhea. BMI is not associated with dysmenorrhea incidence with P-Value = 0,07. While sport activity habits are significantly associated with dysmenorrhea in high school students with a p-value = 0.01 <α (0.05), CI = 95%, and a strong Contingency Coefficient with a value of 0.621.

Keywords: *Dysmenorrhea, BMI (Body Mass Index), Sport Activity Habits*

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INTRODUCTION

Adolescence is a stage between childhood and adulthood. Growth and development in adolescence are very rapid, both physical and psychological. Developments that take place at the age of 10-15 years in women and 11-15 years in men. Girls are mature faster than boys. During puberty hormonal changes occur that affect secondary sex characteristics, such as androgen hormone in men and female estrogens. Secondary characteristics in women include hair growth in the pubis, hair growth in the armpit, as well as menarche or first menstruation.(1)(2)

Menstrual pain or dysmenorrheal is menstrual pain that forces women to rest or reducing daily activity.(3).(4) The incidence of dysmenorrhea in the world is high. On average more than 50% of women worldwide experience dysmenorrhea. The results of research in the United States says that the presentation of dysmenorrhea events about 60% Sweden by 72% and Indonesia amount 55%. Research in the United States states that dysmenorrhea is experienced by 30% -50% of women of reproductive age and 10% -15% of whom, they lose job opportunities, disturb their study and family life (5). In Indonesia the incidence of dysmenorrhea by 55% consisting of 54.89% primary dysmenorrhea and 0.36% secondary dysmenorrhea. Naturally, the causes of menstrual pain include hormonal changes during menstruation, and excessive anxiety. Stress responses include activation of the sympathetic nervous system and the release of various hormones and peptides. The more formation of prostaglandin E and vasopressin makes contraction of the uterine muscle more and more clamping the ends of nerve fibers, the stimulation is channeled through sympathetic nerve fibers and parasympathetic, felt dysmenorrhea.(1)

Dysmenorrhea can be debilitating and person becomes weak, unproductive, which negatively affects his daily activities and psychologically disturbs, even becoming one of

the most common reasons women do not attend school or work. Dysmenorrhea tends to become more frequent and more severe, in teenage girls who experience anxiety and tension If not resolved, menstrual pain/dysmenorrhea will often disrupt the activities of the teen. Several things are often associated with the incidence of dysmenorrhoea such as women under <30 years of age, women have menarche age under 12 years, long menstrual cycle, heavy menstrual bleeding, smoking, psychological disorders and nutrition status (5). According to research conducted by Dyah and Tinah, in Sragen High School, obtained 40 respondents have IMT between 18.25 - 20.00 as many as 19 respondents, IMT between 17.5 - 18.5 as many as 11 respondents, IMT between 16.0 - 17.5 as many as 7 respondents, and only 3 respondents who have IMT <16,0. Most of the respondents experienced menstrual pain as many as 39 respondents, while only 1 respondent who did not experience menstrual pain. Respondents with severe CED (chronic energy disease) experienced menstrual pain as many as 3 respondents, CED was 7 respondents, light weight CED 11 respondents, CED less as much as 18 respondents, and 1 respondent experienced menstrual pain. (6)

Sport activity habits also can be associated with dysmenhorrhea incidence. The frequency of sports activity is said to be good if done for 3-5 times/week. An exercise carried out 3-5 times/week will have a significant effect on health. The aim of the exercise carried out 3-5 times a week, besides being able to prevent disease disorders, can also create a stable level of health in order to improve achievement outside the field of sports, such as work performance, school achievements, or college. These exercises are for example jogging biking, swimming, table tennis.(7)a clinician based initiative in general practice that provides counselling on physical activity.\\n\\nDESIGN: Cluster randomised controlled trial. Practices were randomised before systematic screening and recruitment of patients.\\n\\nSETTING: 42 rural and urban general practices in one region of New Zealand.\\n\\nSUBJECTS: All sedentary 40-79 year old patients visiting their general practitioner during the study's recruitment period.\\n\\nINTERVENTION: General practitioners were prompted by the patient to give oral and written advice on physical activity during usual consultations. Exercise specialists continued support by telephone and post. Control patients received usual care.\\n\\nMAIN OUTCOME MEASURES: Change in physical activity, quality of life (as measured by the \"short form 36\" (SF-36

Based on a preliminary study conducted at Gamping 1 Senior High School for 10 female students. 9 students have dysmenorrhea during menstruation. In early adolescence is needed fulfillment of adequate nutritional needs for avoiding undernutrition status and reducing the risk of dysmenorrhea. The incidence of dysmenorrhea often affecting daily activities, including study.(8). For that it takes a good knowledge about the fulfillment of nutrition in early adolescents so that the nutritional needs are met. The purpose of this study is to know whether there is association between BMI with the incidence of dysmenorrhea in adolescent girls Gamping 1 Senior High School.

MATERIALS AND METHODS

This research used the observational method (analytic survey). The population used in this study is all of 154 female students class X and XI in Gamping 1 Senior High School. We use the total sampling technique as many as 142 students attended during the research. 12 students must be excluded from the study because they have a history of illness that can be affecting the result of the study. The location of this study was conducted in Gamping 1 Senior High School. in May 2016. The instrument used in this study is a questionnaire, weight and height measurement.

The data result analysis is univariate and bivariate analysis by the chi-square test. The univariate analysis used to know the respondent characteristic frequency distribution. The bivariate analysis used to know the relationship between dysmenorrhea and BMI.

RESULTS AND DISCUSSION

Character of Respondents Based on Age

Table 1. Distribution of Frequency of Respondent Age

Age (years)	F	%
15	24	16.9
16	74	52.1
17	42	29.6
18	2	1.4
Total	142	100

The Table 1 showed that on my research respondent was 15-18 years old . The Majority of respondent was 16 years old , 74 respondents (52,1%), respondents with age 17 years old are 42 respondents (29,6%), respondents with age 15 years are 24 respondents (16,9%), and the lowest was respondents with age 18 years old are 2 respondents (1,45%).

Character of Respondents Based on Age of Menarche

Table 2. Distribution of Frequency of Respondent Menarche Age

Age of Menarche (years)	F	%
9	1	0.7
10	2	1.4
11	21	14.8
12	50	35.2
13	42	29.6
14	23	16.2
15	3	2.1
Total	142	100

Table 2 showed that on my sample research the menarche age was 9-15 years old. Majority of the respondent got their menarche was 12 years old (35,2%), then they got menarche was 13 years old (29,6%), then the respondents that got their menarche was 14 years as 16,2%, 15 years old as many as 2,1% respondent, and only 1 respondent had menarche age 9 years old.

Character of Respondents Based on Sport Habits

Table 3. Distribution of Frequency of Respondent Sports Habits

Sports Habits	F	%
Having Sport Habits	49	33.5
No Having Sport Habits	93	65.5
Total	142	100

Table 3 showed that on my sample research 65,5% respondent was not have sport activity habits and 33,5% of the respondent have sport habits.

Character of Respondents Based on Body Mass Index

Table 4. Frequency Distribution of Respondent Body Mass Index

Types of Menstrual Syndrom	F	%
Underweight	44	31
Normal	81	57
Overweight	17	12
Obese	0	0
Total	142	100

Table 4 showed that on my sample research 65,5% respondents included on normal BMI was 81 respondents (57%), while there are 44 respondents (31%) of underweight BMI category and 17 respondents was obese .

Character of Respondents Based On Dysmenorrhea

Table 5. Frequency Distribution of Respondent Dysmenorrhea

Dysmenorrhea	F	%
Yes	120	84.5
No	22	15.5
Total	142	100

Table 5 showed that on my sample research 65,5% respondents who experienced dysmenorrhea were 120 respondents (84,5%) and respondents without dysmenorrhea were 22 respondents (15,5%).

Association of Body Mass Index with Dysmenorrhea

Table 6. Cross tabulation of Body Mass Index and Dysmenorrhea

Body Mass Index	Dysmenorrhea						p-value
	Yes		No		Total		
	F	%	F	%	F	%	
Underweight	36	30	8	36.4	44	31	0.798
Normal	69	57.5	12	54.5	81	57	
Obese	15	12.5	2	9.1	17	12	
Total	120	100	22	100	142	100	

Table 6 showed that on my sample research, cross tabulation between BMI and Dysmenorrhea explain that 30% respondent with Dysmenorrhea were in underweight BMI category, 57,5% respondent with Dysmenorrhea were in normal BMI category and 12,5% respondent with dysmenorrhea were ini obese BMI category. Respondent without dysmenorrhea and have underweight BMI were 31%, 57% respondent without Dysmenorrhea were in normal BMI category and 12,5% respondent without dysmenorrhea were ini obese BMI category.

Based on statisticah chi square test obtained result p value equal to 0,798, there in no relationship between body mass index with the incidence of dysmenorrhea.

Association of Sport Activity Habits and Dysmenorrhea

Table 7 showed that on my sample research, cross tabulation between sport habits and Dysmenorrhea explain that 40% respondent with Dysmenorrhea have sport habist, while 60% respondent with Dysmenorrhea have not sport habits. Respondent without dysmenorrhea and have sport habits were 4,5%, 95,5% respondent without Dysmenorrhea have not sport habits.

Based on statistical chi square test obtained result p value equal to 0,01. It be conclude that there is relationship between sport activity habits and dysmenorrhea. The Coefficient Contingency value is 0,621, this is mean that sport activity habits and dysmenorrhea have strong relationship.

Discussions

Characteristics of Respondents

Characteristics of respondents is based on age, that the majority of respondents aged 16 years as many as 74 students (52.1%) The study took respondents in 1 Gamping Senior High School, mostly belonging to middle adolescent, about 15-17 years (9). Dysmenorrhea generally occurs 2 - 3 years after menarche, the ideal menarche age is 13-14 years, so dysmenorrhea occurs more frequently at the age of 15-17 years. In addition at that age occurs the development of reproductive organs and hormonal changes.(2)(8)

At the beginning of the menstrual period there is often an anovulatory or menstrual cycle of menstruation without the release of the egg

Tabel 7. Cross Tabulation of Sport Activity Habits and Dysmenorrhea

Sport Activity Habits	Dysmenorrhea				Jumlah	Contingency Coefficient	P_{value}
	Yes		No				
	F	%	F	%			
Having Sport Habits	48	40	1	4,5	49	0,621	0.01
No Having Sport Habits	72	60	21	95.5	93		
Total	22	100	120	100	142		

caused by a lack of feedback response from the hypothalamus to estrogen and ovaries. Continuous exposure to estrogen in the ovaries and proliferating endometrial decay results in irregular menstrual patterns and often with pain. (10) (4)

Based on data that has been obtained the most menarche age at the age of 12 years as many as 50 female students (35.2%). One of the signs of girl entering puberty is menarche. From Tiwari research (10) Menarche or first menstruation is generally experienced by adolescents at age 13 - 14 years, but in some cases can occur at age ≤ 12 years. 12 years old is too young for a girl got her menarche the reproductive organs have not developed maximally and still constriction on the cervix, it will arise during menstrual pain. because the female reproductive organs have not functioned optimally.(11)(10)

Body Mass Index (BMI)

The results of research conducted at Gamping 1 Senior High School about the relationship of body mass index BMIwith the incidence of dysmenorrhea obtained the result of some teenagers have BMI between 18.5-24,0 as many as 81 respondents (57.0%). While the remaining 17 respondents (12%) have an IMT between 25.0-> 27.0. Index weight / height body is a measure of body weight (BB) based on height. As a measure of body composition, the index of weight / height can meet the expected criteria of having a close relationship with the amount of body fat and a low relationship with height or body composition.(12)

Most of the respondents had a BMI of 18.4 - 25.0. Was the normal category ((13). BMI is obtained by measuring height and weight, so BMI depends on one's nutritional status. Nutritional status is the expression of a state of equilibrium in the form of a particular variable or the embodiment of nutriture in a particular form. The factors that affect the nutritional status of consumption patterns and food intake, health status, knowledge, health care, and environment (14)

Respondents in this study showed that most of their BMI was normal. This is can be caused of the knowledge of health, especially about the intake of nutrients is good enough. knowledge about health it self can be influenced by age, environment and culture is good enough. But not only from the nutritional status that can cause dysmenorrhea such as stress, exercise habits, increase in prostaglandin hormone that occurs during menstruation. Therefore it is very important for adolescents to pay attention to the health of themselves for good nutrition status and can minimize the disturbances that can attack health conditions. Teenagers need to maintain their health by keeping the diet and eating a balanced diet, regular exercise is also needed for adolescents because they are still in the growth period, regular breaks, and always positive thinking can help maintain the health of a person psychic (2).

Exercise is one of relaxation techniques that can be used to reduce pain. This is because when doing exercise the body will produce endorphins. Endorphins are produced by the brain and the spinal cord. In accordance with the Endorfin-Enkefalin theory of understanding the mechanism of pain is the discovery of opiate receptors in the synapse membrane and the dorsal horn of the spinal cord. There are three main classes of endogenous opioid peptides, the enkefalin, beta-endorphin, and dinorphine groups. Beta-endofin secreted during exercise is very effective at reducing pain (15).

Sport Activities Habits

The frequency of sports activity is said to be good if done for 3-5 times / week 46. What is meant by sports frequency is the amount of exercise per unit time. Exercise carried out 3-5x /

week will have a significant effect on health. The aim of the exercise carried out 3-5 times a week, besides being able to prevent disease disorders, can also create a stable level of health in order to improve achievement outside the field of sports, such as work performance, school achievement, or college. These exercises are for example jogging biking, swimming, table tennis.(4)

The results showed that around 49 respondents (33.5%) were not used to doing sports because this was because students who did not take sport were obliged with information: menstrual pain, pain, and not wanting to exercise. From the results of the study it was found that a small percentage of respondents had exercised 1x / week with a duration of <30-60 minutes in 1x of exercise. negative impact on the body.(16)

Sports habits are not good for respondents in Gamping 1 High School, also in terms of duration of exercise. The duration of exercise is said to be not good if the total duration of exercise achieved is for <30 -> 60 minutes 59. Excessive exercise is actually bad for health because the body has a resistance threshold. This will reduce the performance of the respondents

Dysmenorrhea Incidence

The results of research conducted at Gamping 1 Senior High School about BMI (body mass index) with the incidence of dysmenorrhea in class X and XI students, based on **Table 6** in the results obtained that some students have dysmenorrhea is indicated by there are 120 respondents (84.5%) and students who did not have dysmenorrhea were presented with 22 respondents with 15.5% percentage. Dysmenorrhea is a physical disorder in the form of pain (abdominal cramps). Dysmenorrhea is pain before, during, and after menstruation (21).

This disorder usually begins to occur within 24 hours before the occurrence of menstrual bleeding and can be felt 24-36 hours. The cramps are especially felt in the lower abdominal area radiating to the back or the inner surface of the thigh. Dysmenorrhea is influenced by several factors such as psychological factors, constitutional factors, cervical canal obstruction factors, endocrine factors, allergic factors, nutritional status factors. If the nutritional status is not good, it will affect the health disorders of the body. Especially in adolescence which in the growth period requires the intake of good nutrition. In young women is important in paying attention to the nutritional status, because women every month experience menstruation. At the time of the luteal phase period there will be an increase in nutritional needs, and if this is ignored it will occur discomfort during the menstrual cycle. Therefore, although students in the normal category also need to pay attention to nutritional intake at the time of menstruation increased nutritional needs.(10)

Relationship between Body Mass Index With Dysmenorrhea Incidence Gamping 1 Senior High School

After chi-square statistic test obtained results, it was found that there is no Relation of Body Mass Index with dysmenorrhea at SMA N 1 Gamping with a p value of 0.798 (p value> 0.05). The results of this study also support previous research by Singh et al (2012) which in his study also found no relationship between BMI with dysmenorrhea with P value of 0.2222. hasil from research Pande and Purnawati (2015) “Relationship Between Body Mass Index (BMI) With dysmenorrhoea “the location of this study at Udayana University, Denpasar from the analysis of data note that there is no relationship between body mass index with the incidence of dysmenorrheal (23). In this study there is no relationship between IMT with the incidence of dysmenorrhea due to dysmenorrhea can be caused by several factors such as lifestyle, stress, local environment and sports habits.

The results obtained in this study different from previous research by Heni (2013)

"Relationship Between BMI (Body Mass Index) With Dysmenorrhea Occurrence in Young Women VII Class In Mojoanyar Junior High School" which states that IMT has a significant relationship as a risk factor for the occurrence dysmenorrhea with p value <0,019 Results are also obtained by Ariska (2013) that there is a significant relationship between BMI with the incidence of dysmenorrhea with a value of p <0.001 (7). The results of this study do not support the research of Heni conducted in Mojoanyar, East Java in 2013 while in this study conducted in Gamping 1 Senior High School in 2016.

In this study no relationship could be caused because so many factors affecting dysmenhorea, not only BMI can affect dysmenhorea. dysmenorrhea experiencing of all BMI category, for the further research will be better if conducting case control design or cohort design to know how actually the relationship about dysmenhorea and BMI. Subjects with a skinny category that indicates a lack of nutrient intake affects the growth and function of organs that will lead to disruption of reproductive function. This affects menstrual disorders including dysmenorrhea. BMI with normal category also experienced dysmenorrhea because dysmenorrhea is not only influenced by IMT alone but also influenced by sport, lifestyle, and stress factor. In chi-square test, it was found that IMT with the most fat category experienced dysmenorrhea has excess fat tissue so that there will be blood vessel penetration by fat tissue in female reproductive organs so that interrupt the process of menstruation and cause dysmenorrhea.(10).

Relationship between Sport Activities Habits With Dysmenorrhea Incidence Gamping 1 Senior High School

Based on stastitical Chi Square test obtained result p value equal to 0,01. (tabel 8). It be conclude that there is relationship between Sport Activity and Dismenorhea. The Contingency Coefficient value is 0,621, this is mean that sport activity habist and dismenorhea have strong relationship.

The sport activities habits affecting dysmenorrhea because exercise is one of the relaxation techniques that relaxing the uterine muscles. Sport activities increasing vasoconstriction which can be used as a relaxation to the onset of dishminorhea pain. When women regularly exercise, the woman can provide oxygen 2 times per minute of oxygen, so the blood can be available for blood vessels . Sport activity will release endorphins in the blood. Endhorphin hormon can reduce pain.(15)

CONCLUSION AND RECOMMENDATION

Body Mass Index (BMI) is not associated with primer dysmenorrhea incidence. It can be caused by BMI is a nutritional status indicator which can not explain about micronutrition deficiency, there are so many hipotesis about what micronutrition can affected dysmenorrhea. Sport Activity Habits strongly associated with primer dysmenorrhea incidence. (10)

For further research important to study what the micronutrition affected dysmenorrhea or how hormon reaction with special nutrition can affected dysmenorrhea and how to solve dysmenorrhea. Another study that conducted by Eva Nurinda et.al discovered about effect of turmeric and pyridoxyn to reduce dysmenorrhea and another premenstrual syndrome. (17)(18).

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