ANALYSIS OF INTAKE CALCIUM AND IRON SUBSTANCE IN THE INCIDENT OF DISMENORE ON FEMALE ADOLESCENT

Hironima Niyati Fitri[1], Kadek Dwi Ariesthi[2]
hironimaniyatifitri@yahoo.com
[1), 2)] The Midwifery Diploma Program, Citra Bangsa University

ABSTRACT

Dysmenorrhea is a pain in the lower part of the stomach that occurs at the time before or during menstruation. Symptoms of dysmenore may be accompanied by nausea, vomiting, diarrhea and cramps. In Indonesia, the incidence is estimated at 55% of productive women who suffer from dysmenore, where 15% of them complain of activity becomes limited by dysmenorrhea. This study aims to analyzing calcium and iron source food intake for dysmenorrhea in female adolescent at Citra Bangsa High School. This research is a type of analytic study using the case control method. The independent variable in this study is the intake of calcium and iron sources, and the dependent variable is the incidence of dysmenorrhea in Female Adolescent. The population is female adolescentat Citra Bangsa Senior High School with a total sample of 32 people divided into a sample group of 8 respondents and a control group of 24 respondents involving a case group and a control group 1: 3. Data were collected using food recall 24-hour form to determine intake food sources of calcium and iron consumed by female adolecent. The bivariate analysis used was the Chi-square test with $\alpha = 0.05$. The result in this study are Most of the age of respondents in the second group depends on the age of late adolescents (17-25 years) and the longer the normal menstruation in the range of 2-7 days. The analysis showed that there was a significant relationship between intake of calcium source food with the incidence of dysmenorrhea ($p = 0.022$; OR = 26.6) and there was a significant relationship between the intake of food source substances with the incidence of dysmenorrhea ($p = 0.022$, OR = 14.0). Lack of intake of food sources and substances increases the incidence of dysmenorrhea of female adolecent. The intake of food sources needed every day cannot meet the needs of female adolecent need additional intake of calcium and iron in the form of supplements.

Keywords: dysmenorrhea, calcium intake, iron intake

Introduction

The problem experienced by most women at the time of menstruation is the discomfort or severe pain that is commonly called dysmenorrhea. Dysmenorrhea is a pain in the lower part of the stomach that occurs at the time before or during menstruation. Symptoms of dysmenore may be accompanied by nausea, vomiting, diarrhea and cramps. In Indonesia, the incidence is estimated at 55% of productive women who suffer from dysmenore, where 15% of them complain of activity becomes limited by dysmenorrhea. Dysmenorrhea or menstrual pains have a considerable impact on the female adolecent because they cause disruption to daily activities. Female adolecent who have pain dysmenorrhea or menstrual pain during menstruation will feel limited in conducting activities especially learning activities at school(1). The condition of female adolecent who are experiencing menstrual pain (dysmenorrhea) and at the same time following a learning activity in the process can cause learning activities to become impaired, not excited, the concentration of being decreased is even difficult to concentrate so that the material delivered during learning can not be well received even until some do not enter school (2). Factors of the cause of dysmenore are multi-factor, among others: psychiatric, individual, blockage in the cervical tract,

female reproductive organs, endocrine, allergies, and intake of nutrients (3). Nutrients that contribute to the occurrence of menstrual pain (dysmenorrhea) include calcium and iron. Calcium has a role in muscle contraction. Calcium is instrumental in the interaction of proteins in the muscles, namely actin and myosine when the muscles contract. The deficiency of calcium causes muscles can not loosing after contraction, so it can result in cramps Otot (4). The research conducted by Hidayati (2016), it states that there is a link between consumption of calcium and dysmenore events. Research conducted on female adolecent SMK Batik 2 Surakarta shows 83.6% of female adolecent have a calcium intake rendah (5). Iron has a role in the formation of hemoglobin. Deficiency of iron intake caused the disruption of the formation of hemoglobin, so the amount of hemoglobin in red blood cells will be reduced. Low hemoglobin conditions in red blood cells, causing the body to lack oxygen and cause anemia (6). According to Sylvia and Lorrainne (2006), anemia is one of the factors constitutions the cause of lack of immune resistance to pain during menstruation. Anemia is not only one of the causes of dysmenore, but it can also cause severe dismenore. A study conducted on students of SMK Negeri 10 Medan shows that 88% of the 171 students have less nutritional status (underweight) with anemia. Women with anemia have a risk of 1.2 times greater experiencing dismenore (7).

Method

This research is a type of analytical research using the case control method, to study the intake of calcium and iron with dysmenore. The research was conducted at Citra Bangsa Senior High School on September 2019. The population of the case in this study was all the female adolecent in Citra Bangsa High School with a sample of research of 32 people divided in 8 respondents case groups and 24 respondents control group with comparisons of case groups and control groups of 1:3. The criteria for the inclusion of the case in this research is the respondent willing to be the subject of the study by signing the informed consent that has been provided and subjected to dysmenore every month while the exclusion criteria of the case is if the respondent is not able to communicate/not willing to be the subject of research. The control population is obtained from all female adolecent who do not experience dysmenorrhea or painful menstruation every month. The criteria for inclusion of the case in this study is that respondents are willing to be subject to research by signing informed consent that has been provided, while the case exclusion criteria is if the respondent is not able to communicate/not willing to be the subject of research. The types of data collected in this study are primary and secondary data. Secondary data is derived from the number of female adolecent in Citra Bangsa High School. Primary Data is collected using a 24-hour food recall form to determine the intake of calcium and iron consumed by female adolecent. Bivariate analysis uses chisquare test with $\alpha = 0$.

Result

Table 1. Characteristic of respondents

No	Characteristic	Case (%)	Control (%)
	Age		
1.	Early teens (12-16 years old)	3 (9,4)	6 (18,7)
2.	Late teens(17-24 years old)	5 (15,6)	18 (56,3)
	Total	**8 (25)**	**24 (75)**
	Long Menstruation		
1.	< 2 Days	0 (0,0)	0 (0,0)
2.	2–7 Days	8 (25,0)	24 (75,0)
3.	>7 Days	0 (0,0)	0 (0,0)
	Total	**8 (25)**	**24 (75)**

Table 1 shows that most of the respondents were in the late adolescent age range in either case groups (15,6%) As well as in the control group (56,3%). The length of menstruation every month in both groups, the case group (25%) and control

group (75%) is at a normal time span of 2-7 days.

Table 2. Analysis of calcium intake and iron to the incidence of dysmenore

No	Risk Factor	Case (%)	Control (%)	*p*	*OR*
	Calcium Intake				
1.	< 77%	7 (21,8)	5 (15,6)	0,005	26,6
2.	≥ 77%	1 (3,2)	19 (59,4)		
	Total	**8 (25)**	**24 (75)**		
	Iron Intake				
1	< 77%	7 (21,8)	8 (25,0)	0,022	14,0
2	≥ 77%	1 (3,2)	16 (50,0)		
	Total	**8 (25)**	**24 (75)**		

Table 2 indicates a significant link between the intake of calcium and the occurrence of dysmenore with the value p < 0.05; OR 26,6 which means that female adolecent who consume calcium intake of < 77% risk 26 times higher in dysmenore than the female adolecent who consume calcium intake ≥ 77%. There is a significant relationship also between iron intake and dysmenore occurrence with the value p < 0.05; OR 14,0 which means that female adolecent who consume iron intake of <77% risk 14 times higher in dysmenore than the female adolecent who consume iron intake ≥ 77%.

Stated that there was a relationship between the knowledge of pregnant women about anemia and adherence to consuming Fe tablets with a p value <of 0.05 (p = 0,000).

Discussion

Female adolecent experience menstruation every month so that the body loses a lot of iron coming out through the blood menstruation. According to WHO, each month the young woman experiences an iron loss of 12.5-15 mg per month or 0.4-0.5 mg per day due to her menstrual periods. This is what causes iron reserves in the body of the female adolecent less than the young men. To compensate or replace the loss of iron that occurs at the time of menstruation, the body needs a high intake of iron. High iron intake is also necessary to expand the volume of blood because at the age of adolescence occurs very fast growth (8,9).

This research consistent with the research conducted by Hidayati, et al (2016) conducted on the students at SMK Batik 2 Surakarta, where the research show nutrition intake Most of the respondents are in the category of less good intake of calcium (83.6%) or iron intake (71.6%). The occurrence of dysmenorrhea or menstrual pains suffered by most respondents are in the category of moderate pain (22.4%). Bivariate analysis also shows the connection between calcium intake and the occurrence of dysmenore with the value of p < 0.05; R-0415 value and there is a link between the intake of iron with the occurrence of dysmenore with the value p < 0.05 and the value of R-0586. The lower the intake of calcium and iron, the higher the dysmenorrhea or the perceived menstrual pain (5).

Adolescent age requires mineral intake especially calcium intake. For teenage years, calcium is not only needed for bone growth but it is also necessary to reduce or minimize the pain that occurs before or during menstruation commonly referred to as the term dysmenorrhea. Calcium intake affects the permeability of the nerve membrane. The condition of muscle cramps can occur due to low intake of kalsium (10,11). A female adolecent also needs to reduce high fatty foods that can cause pain before or during menstruation (12). In addition to calcium, iron is also indispensable for the formation of hemoglobin (Hb) in the bone marrow. Plasma iron levels can be reduced in case of insufficient iron intake. This causes the supply of iron into the bone marrow to be reduced, thus interrupting the process of even lowering the hemoglobin formation. The deficiency of hemoglobin in the blood can lead to anemia. Anemia is one of the

factors that can cause a decrease in body endurance and cause high sensitivity to pain when menstruation (5,12,13). In addition, research conducted by Rosvita, et al. (2017) shows that female adolecent who are in the category of calcium consumption are more or less in the group of female adolecent who have experienced abdominal cramps during menstruation as much as 83,7%. The intake of calcium female adolecent aged 13-18 years according to the national standard Recommended Dietary Allowance (RDA)is≥ 1200 mg/day. The consumption rate of calcium in the category of less is ≥ 1200 mg/day. The consumption rate of calcium in the less category is < 77% (14).

Based on the recommendation of Recommended Dietary Allowance (RDA)2013, the adequacy of iron per day for adolescents aged 13-21 years is 26 mg/day. In this research, the description of the type and quantity of food and beverages consumed by respondents daily to see the total intake of iron is obtained using the method of interview using Food Frequency Questionnaire (FFQ) (15).

Nutritional intake also has an influence on Dysmenore events. The most influential nutrients include iron. Iron has various functions, such as: Iron has a role in the formation of hemoglobin. Hemoglobin is a protein that carries oxygen in red blood cells throughout the tissues. Deficiency of iron intake can cause disruption of the formation of hemoglobin, so the amount of hemoglobin in red blood cells will also be reduced. Low hemoglobin conditions in red blood cells, causing the body to lack oxygen and cause anemia. Anemia can cause a health disorder in a person (16). According to Sylvia and Lorrainne, anemia is one of the factors constitutions that causes a lack of immune to pain during menstruation. Anemia is not only one of the causes of dysmenore, but it can also be worsened dysmenore. Iron also has a function as an immune system. Iron holds a role in the immune system. Cell immune response by lymphocytes-T is interrupted due to the reduced formation of these cells, which are likely caused by decreased DNA synthesis. The decrease in DNA cycleesis is caused by a disturbance of ribonuotide reductase enzymes requiring iron to function. This immune system that can affect the pain of menstruation .

Conclusion

I nsufficient intake of calcium and iron in female adolecent can increase the risk of menstrual pain (dysmenorrhea). Female adolecent need to meet the needs of calcium and iron per day. Since the need for calcium and iron affects the incidence of dysmenore, the female adolecent are expected to consume more foods that contain a lot of these minerals. If the foodstuffs are not able to fulfill the nutritional needs of these nutrients, the government in this case health department and related sectors can seek the provision of iron tablets and also fortification foodstuffs with nutrients needed in the period of growth and development of adolescents, especially female adolescent (6).

Acknowledgements

The author would like to express gratitude to Citra Bangsa University for funding this research. We would like also to thanks for all female adolecents and All parties who had agreed to become informants in this study.

References

1. Proverawati M. Menarche Menstruasi Pertama Penuh Makna. Yogyakarta: Nuha Medika; 2009.
2. Putri SA. Hubungan antara nyeri haid terhadap aktivitas belajar pada siswi kelas XI SMA Negeri 52 Jakarta (Essay). Fac Sport Sci UN Malang. 2017;
3. Isnaeni S. Faktor-faktor Yang Berkaitan Terjadinya Dismenorea Pada Remaja Putri (Essay). Medan:USU; 2010.
4. Yuliarti N. A to Z Food Supplement. Yogyakarta: Andi; 2009.
5. Hidayati KR. Hubungan Antara Asupan

Kalsium Dan Asupan Zat Besi Dengan Kejadian Dismenore Pada Siswi Di Smk Batik 2 Surakarta (Essay). UMS; 2016.
6. Price, A. Sylvia LMCW. Patofisiologi : Konsep Klinis Proses-proses Penyaki. 6th ed. Jakarta: Peter Anugrah, EGC; 2006.
7. Sophia, F., Muda, S. J. Faktor-Faktor yang Berhubungan dengan Dismenore pada Siswi SMK Negeri 10 Medan Tahun 2013. Sumatra Utara University; 2013.
8. Proctor ML FC. Dysmenorrhea. Br Med J. 2007;3.
9. Veratamala A. Mengapa Remaja Perempuan Membutuhkan Lebih Banyak Zat Besi? 2016.
10. Department of Nutrition and Public Health Faculty of Public Health Indonesia University. Gizi dan Kesehatan Masyatrakat. revised ed. Jakarta: Rajawali Pers; 2013.
11. Kabirian M, Abedian Z, Mazlom SR, Mahram B JM. Self-management in primary dysmenorrhea: toward evidence-based education. Life Sci J. 2011;
12. Widjanarko B. Dismenore Tinjauan Terapi pada Dismenore Primer. Maj Kedokt Damianus. 2006;Volume 5.
13. Okoro RN, Malgwi H OG. Evaluation of factors that increase the severity of dysmenorrhea among university female students in Maiduguri, North eastern Nigeria. Internet J Allied Heal Sci Pract. 2013;
14. Rosvita, Novalia Clara dkk. Hubungan Tingkat Konsumsi Kalsium, Magnesium, Status Gizi (Imt/U), Dan Aktivitas Fisik Dengan Kram Perut Saat Menstruasi Primer Pada Remaja Putri (Studi Di Sekolah Menengah Atas Kesatrian 2 Kota Semarang Tahun 2017. Fac Public Heal JKM e-journal. 2018;Volume 6,.
15. Hamsari, Inddi Nursyafitri D. Hubungan Asupan Zat Besi Dengan Kejadian Dismenore Pada Mahasiswi Angkatan 2016 Fakultas Kedokteran Universitas Tadulako Tahun 2017 (Essay). Tadulako Palu Univ Med Tadulako, J Ilm Kedokt. 2019;Vol. 6 No.
16. Evelyn. Anatomi dan Fisiologi Untuk Paramedis. In Jakarta: PT. Gramedia Pustaka Utama; 2009.