



THE EFFECT OF DARK CHOCOLATE ON DYSMENORRHEA IN YOUNG WOMEN AT STIKES RAFLESIA DEPOK

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ABSTRACT

Dysmenorrhea can affect young women's learning activities. Treatment of dysmenorrhea can be overcome with non-pharmacological therapy, such as dark chocolate. The magnesium content in dark chocolate can block prostaglandin hormones that trigger uterine muscle tension. The purpose of this study was to determine the effect of dark chocolate on dysmenorrhea in adolescent girls. This type of research is a quantitative method with a pre-experiment design of one group pretest-posttest without a control group. The subjects of this study were adolescent girls with primary dysmenorrhea on the first and second days, with as many as 55 respondents. The sample consisted of 30 respondents with a stratified random sampling technique. The data collection technique uses a numeric rating scale and a Wilcoxon data analysis test. In the univariate analysis of the degree of dysmenorrhea before and after the first and second days of dark chocolate, the highest category was medium, and after dark chocolate, the highest category was mild. The results of the Wilcoxon test on the first and second days showed the effect of dark chocolate on dysmenorrhea in young women with a p-value of 0.000 ($p < 0.05$). There was a decrease in the degree of dysmenorrhea after giving dark chocolate 100 grams (72%) to young women at STIKes Raflesia Depok.

Keywords: dark chocolate; dysmenorrhea; young women

First Received 09 July 2023	Revised 16 August 2023	Accepted 30 September 2023
Final Proof Received 02 November 2023		Published 28 November 2023
How to cite (in APA style) Wulandari, P., & Qoriyah, R. (2023). The Effect of Dark Chocolate on Dysmenorrhea in Young Women at Stikes Raflesia Depok. Indonesian Journal of Global Health Research, 5(4), 863-870. https://doi.org/10.37287/ijghr.v5i4.2503 .		

INTRODUCTION

Dysmenorrhea is menstrual pain. Menstrual pain arises in the lower abdomen, but it can extend to the pelvis, upper thighs, calves, waist, and even the lower back. Dysmenorrhea is caused by the constant tension of the uterine muscles when the uterus bleeds. Pain and cramps begin to be felt since bleeding and last 32-48 hours (Sinaga et al., 2017). The incidence of dysmenorrhea is very high worldwide. More than 50% of women suffer from dysmenorrhea, in America the ratio reaches 60%, in Sweden it reaches 72%, and in Indonesia alone, women who experience dysmenorrhea reach 64.25%, including primary dysmenorrhea at 54.89% and secondary dysmenorrhea at 9.36% (Desreza & marwati, 2021), and 54.9% of women in West Java experience dysmenorrhea with a percentage of mild pain at 24.5%, moderate pain at 21.28%, and severe pain at 9.36% (Fitriansyah, 2021). Meanwhile, in Depok, the incidence of dysmenorrhea is 93% (Characteristics of Young Women Experiencing Dysmenorrhea in Depok Region 2020).

Dysmenorrhea will have an impact on the daily activities of adolescents, as a result the absenteeism rate at school becomes high and the learning process is disrupted. Besides that,

dysmenorrhea can also result in a decrease in socializing in the community, a decrease in academic achievement scores, and a depreciation in the quality of life due to not participating in school learning. In most women, dysmenorrhea is considered a common thing to happen, even though dysmenorrhea can damage the quality of life if not addressed properly and correctly (Verma & Kadam, 2019). Dysmenorrhea can be treated in two ways: pharmacological and non-pharmacological treatment. Pharmacological treatment can be given non-steroidal anti-inflammatory drugs (such as mefenamic acid, naprosyn, and ibuprofen), and non-pharmacological treatment include do physical activity, massage, warm compresses, adequate rest, distraction techniques, and can consume foods that can inhibit prostaglandin in the brain, one of which is by consuming dark chocolate, where dark chocolate can stimulate the release of endorphin and serotonin so that prostaglandin inhibition occurs in the brain (Hidayanti et al., 2022).

Dark chocolate can relax the uterine muscles, create a calm feeling, stabilize the mood, and stimulate the brain by combining neurotransmitters and collagen to release endorphins. Endorphins are substances produced by the body and secreted to inhibit the immune response to pain. This is due to the magnesium content it contains (Wahtini et al., 2021). Based on the results of a preliminary study in the form of a mini survey related to the incidence of dysmenorrhea in female students at STIKes Raflesia Depok on 10 female students, the results showed that 70% of female students experienced dysmenorrhea, 50% of female students experienced dysmenorrhea on the first and second days, 20% of female students experienced dysmenorrhea on the first to third days, and 30% experienced dysmenorrhea before and during menstruation. Female students felt various degrees of dysmenorrhea, from mild to severe. As for managing dysmenorrhea, 30% of the students use medication, 40% only rest, and another 30% use warm compresses. The students expressed that dysmenorrhea disrupts their focus in learning on class and, in some cases, even leads to missing lectures. The purpose of this study was to determine the effect of dark chocolate on dysmenorrhea in young women at STIKes Raflesia Depok.

METHOD

This type of research is a quantitative method that is classified as pre experimen one- group pretest-posttest without a control group. This study used 100 grams of 72% dark chocolate. Sampling is done using stratified random sampling. The purpose of this analysis is to measure the degree of dysmenorrhea in young women at STIKes Raflesia Depok who are menstruating by observing and collecting data on the first and second days. Measurements were made to determine the degree of dysmenorrhea before and after giving dark chocolate. This study used univariate and bivariate analyses. The bivariate analysis of the research wilcoxon test this study was to determine the effect of dark chocolate on dysmenorrhea in young women at STIKes Raflesia Depok. The sample consisted of 30 respondents. This study uses data collection techniques that are carried out directly by observing the degree of dysmenorrhea before and after giving dark chocolate. The data needed to support the degree of dysmenorrhea is direct data from research subjects with a numeric rating scale.

RESULTS

Table 1, it can be concluded that the majority of respondents aged 20 years and older have as many as 9 (30%) menstrual of 4-7 days and as many as 28 (93.3%), while the majority of menarche age > 11 years have as many as 25 (83.3%).

Tabel 1.
Characteristics of Primary Dysmenorrhea Respondents

Variables	f	%
Age		
18	3	10
19	7	23,3
20	9	30
21	5	16,7
22	4	13,3
24	2	6,7
Duration of menstruation		
4-7	28	93,3
>7	2	6,7
Age of menarche		
<11	5	16,7
>11	25	83,3

Univariate Test Result

Univariate analysis was carried out to determine the frequency distribution and percentage of the observed samples. The results of the study of the description of the degree of dysmenorrhea in young women at STIKes Raflesia Depok were carried out by collecting data and then calculating the data so that the data was in the form of frequency distribution, percentage and graph, as can be seen in the following table:

Tabel 2.
Frequency distribution results of first day pain categories

Category	Criteria	Before		After	
		f	%	f	%
No pain	0	0	0	2	6,7
Mild pain	1-3	3	10	17	56,7
Moderate pain	4-6	21	70	11	36,7
Severe pain	7-9	6	20	0	0

Table 2, it is known that before giving dark chocolate, the highest degree of dysmenorrhea is in the moderate category with a total of 21 (70%), and after giving dark chocolate, the highest degree of dysmenorrhea is in the mild category with a total of 17 (56.7%).

Tabel 3.
Frequency distribution results of second day pain categories

Category	Criteria	Before		After	
		f	%	f	%
No pain	0	0	0	2	6,7
Mild pain	1-3	5	16,7	24	80
Moderate pain	4-6	21	70	4	13,3
Severe pain	7-9	4	13,3	0	0

Table 3, it is known that before giving dark chocolate, the highest degree of dysmenorrhea is moderate, with a total of 21 (70%), and after giving dark chocolate, the highest degree of dysmenorrhea is mild, with a total of 24 (80%).

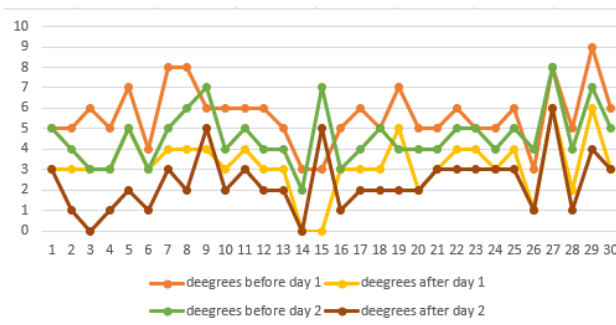


Figure 1. Graph of the degree of dysmenorrhea on the first and second days

Based on the data obtained during the measurement of the degree of dysmenorrhea on the first day, the highest results were found in respondent No. 29 with the result of 9 (controlled weight) and after giving dark chocolate to 6 (moderate), and the lowest results were found in respondents No. 14 and 15 with the result of 3 (mild) after giving dark chocolate to 0 (no pain), and the data obtained during the measurement of the degree of dysmenorrhea on the second day, the highest results were found in respondent No. 27 with the result of 8 (controlled weight) and after giving dark chocolate to 6 (moderate) and the lowest results were found in respondent No. 14 with a result of 2 (mild) after giving dark chocolate to 0 (no pain).

Bivariate Test Result

A bivariate analysis was conducted to determine the significance of the effect (prove the hypothesis) between before giving dark chocolate and after giving dark chocolate on the first and second days. This study uses the Wilcoxon test, which explains the changes in the degree of dysmenorrhea before and after giving dark chocolate. The results of the data analysis can be seen as follows using cross-tabulation:

Tabel 4.
Wilcoxon test results of the first day

Variables	n	Mean	SD	p value
Before dark chocolate administration	30	5,63	1,450	0,000
After dark chocolate administration	30	3,23	1,382	

The results of table 4 above, it can be concluded that the p-value of the Wilcoxon test above is smaller than $0.000 < 0.05$, so it can be seen that there is an effect of dark chocolate on dysmenorrhea before and after administration on the first day.

Tabel 5.
Wilcoxon test result of day two

Variables	n	Mean	SD	p value
Before dark chocolate administration	30	4,60	1,354	0,000
After dark chocolate administration	30	2,37	1,402	

The results of table 5 above, it can be concluded that the p-value of the Wilcoxon test above is smaller than $0.000 < 0.05$, so it can be seen that there is an effect of dark chocolate on dysmenorrhea before and after administration on the second day.

DISCUSSION

The results of the degree of dysmenorrhea before being given dark chocolate in young women at STIKes Raflesia

The results of the degree of dysmenorrhea before being given dark chocolate on the first day showed that 10%, or 3 adolescent girls, felt mild dysmenorrhea, 70%, or 21 adolescent girls, felt moderate dysmenorrhea and 20%, or 6 adolescent girls, felt severe dysmenorrhea. While the degree of dysmenorrhea before being given dark chocolate on the second day showed 26.7%, or 5 adolescent girls, felt mild dysmenorrhea, 70% or 21 adolescent girls, felt moderate dysmenorrhea, and 13.3%, or 4 adolescent girls, felt severe dysmenorrhea. The results of the study concluded that the degree of dysmenorrhea before giving dark chocolate on the first and second days was 4-6 (moderate dysmenorrhea). Dysmenorrhea experienced is a normal dysmenorrhea condition. Dysmenorrhea is discomfort or pain felt during menstruation that can be felt with signs of cramps in the lower abdomen, both mild and severe, which can cause disruption of daily activities. During menstruation, estrogen and hormones secreted by the uterine wall trigger the uterus to release prostaglandins. the more prostaglandins released, the stronger the uterus contracts, eventually causing dysmenorrhea. The pain caused by the release of more prostaglandins often causes heartburn, dizziness, and even fainting (Azwar, 2021).

The results of the degree of dysmenorrhea after being given dark chocolate in young women at TIKes Raflesia

The results of the degree of dysmenorrhea after being given dark chocolate on the first day showed that 6.7%, or 2 adolescent girls, did not feel dysmenorrhea, 56.7%, or 17 adolescent girls felt mild dysmenorrhea, and 36.7%, or 11 adolescent girls, felt moderate dysmenorrhea. While the degree of dysmenorrhea after being given dark chocolate on the second day showed that 6.7%, or 2 adolescent girls, did not feel dysmenorrhea, 80%, or 24 adolescent girls, felt mild dysmenorrhea, and 13.3%, or 4 adolescent girls, felt moderate dysmenorrhea. The results of the study concluded that the degree of dysmenorrhea after giving dark chocolate on the first and second days was 1-3, which means that dysmenorrhea is in a mild category. The decrease in primary dysmenorrhea that occurs in adolescent girls is due to the fact that dark chocolate is beneficial to the body, one of which is the release of neurotransmitters so as to increase mood, and has substances that can inhibit oxidants. The vitamins and minerals in dark chocolate trigger the brain to release endorphins. In addition, the content of dark chocolate, such as magnesium is beneficial to the body in synthesizing serotonin and endorphins. Endorphins are substances produced by the body and secreted to inhibit the immune response to pain (Ikawati & Syamsuryanita, 2022). This research is in line with the research of Nur Asih et al., (2020) on the Effect of Dark Chocolate on Reducing Menstrual Pain in Adolescents, which found that consuming dark chocolate can reduce pain from a severe degree to a moderate degree and from a moderate degree to a mild degree. This is because dark chocolate has the role of activating endorphin secretion. In addition, the serotonin content in dark chocolate inhibits pain, so that pain cannot be transmitted to the spinal cornu dorsalis.

The results before and after giving dark chocolate to the degree of dysmenorrhea in young women at STIKes Raflesia

The results of the study before and after giving dark chocolate to primary dysmenorrhea on the first day showed a decrease in the degree of dysmenorrhea. Respondents before being given dark chocolate were 10%, or 3 adolescent girls, who felt mild dysmenorrhea, 70%, or 21 adolescent girls, felt moderate dysmenorrhea, and 20%, or 6 adolescent girls, felt severe dysmenorrhea. However, after giving dark chocolate, there was a decrease in the degree of

dysmenorrhea. This statement can be seen from the results after giving dark chocolate, where there are 6.7% or 2 adolescent girls in the degree of no pain, 56.7% or 17 adolescent girls in the mild degree, and 36.7% or 11 adolescent girls in the moderate degree.

The results of the study before and after giving dark chocolate to primary dysmenorrhea on the second day were found to have decreased the degree of primary dysmenorrhea. Respondents before being given dark chocolate were 16.7%, or 5 adolescent girls, who felt mild dysmenorrhea, 70%, or 21 adolescent girls, felt moderate dysmenorrhea, and 13.3%, or 4 adolescent girls, had severe dysmenorrhea. However, after giving dark chocolate, there is a decrease in the degree of primary dysmenorrhea. This statement can be seen from the results after giving dark chocolate, where there are 6.7%, or 2 adolescent girls, on a no pain scale, 80%, or 24 adolescent girls, on a mild pain scale and 13.3%, or 4 adolescent girls, on a moderate pain scale.

This research is in line with research conducted by Adytia, (2020), about the effect of giving dark chocolate on reducing the level of menstrual pain (primary dysmenorrhea) of nursing students at level IV of Stikes Bhakti Husada Mulia Madiun, Taman District, Madiun City. The results obtained are a variety of vitamins (A, B, C, D, and E) and mineral content (copper, zinc, iron, and magnesium) contained in dark chocolate, which plays a role in reducing the degree of dysmenorrhea, especially magnesium in dark chocolate, which is quite high. Magnesium in dark chocolate can block excess prostaglandins to reduce the degree of dysmenorrhea. Chocolate is also useful as a pain reliever, anti-inflammatory, and antipyretic, which in turn can relieve dysmenorrhea.

The average decrease in the degree of dysmenorrhea that occurred on the first and second days was 2-3 degrees. However, on the first day, there were 6 adolescent girls who experienced a decrease still in the same category, and on the second day, there were 3 adolescent girls who experienced a decrease still in the same category. This is because this study is categorical, so there is no significant decrease. Then the average difference in dysmenorrhea degree reduction is due to the various therapeutic effects of genetic and environmental factors on a person. This genetic factor can determine the outcome of protein-related therapies such as ion channels, metabolizing enzymes, and nerve ending stimulation (Nuryanti, 2017).

The effect of dark chocolate on dysmenorrhea in young women at STIKes Raflesia

The degree of dysmenorrhea in adolescent girls on the first day after consuming dark chocolate decreased the degree of dysmenorrhea. The pre-test mean of 5.63 to the post-test mean of 3.23 obtained a p-value (asymptotic 2-tailed) of $0.000 < 0.05$. It can be concluded that H_0 is rejected and H_a is accepted. While the effect of giving dark chocolate on the second day decreased the degree of dysmenorrhea after consuming dark chocolate, the pre-test mean of 4.60 to the post-test mean of 2.37 obtained a p-value (asymptotic 2-tailed) of $0.000 < 0.05$, it can be concluded that H_0 is rejected and H_a is accepted. H_a is accepted, meaning that there is a significant effect before and after consuming dark chocolate on changes in the degree of dysmenorrhea. This research is in line with research conducted by Desreza & marwati, (2021) about the Effect of Giving Dark Chocolate on Menstrual Pain Scale (Primary Dysmenorrhea) in Young women. The content of dark chocolate has the effect of activating endorphin secretion. Endorphins are produced in the brain and spinal cord; besides that, serotonin in dark chocolate inhibits pain so that pain cannot be passed on to the spinal cornu dorsalis.

This research is also in line with researchers conducted by Adri, (2020) about the effect of dark chocolate consumption (*Theobroma cacao*) on dysmenorrhea in midwifery students at Muhammadiyah University of West Sumatra. The results obtained show that serotonin in dark chocolate inhibits pain so that pain sensory information cannot be forwarded to the spinal cornu dorsalis. Lack of serotonin will increase pain sensitivity; how to increase the amount of serotonin in one's body can stimulate. Giving dark chocolate can trigger the release of endorphins that stimulate the brain's pain relief system. These endorphins can counteract the formation of prostanooids (cyclooxygenase enzyme), and as a result of not forming PGG₂, PGG₂ can produce alpha- PGF₂, which is a pain receptor. The therapeutic process in the body of the carbohydrate content in dark chocolate is what has an impact on the release of endorphin.

The statement can be remembered that pain is one of the subjective feelings where each person can describe how severe the degree of dysmenorrhea they feel. The continuous release of prostaglandin F₂ alpha from the uterine wall causes dysmenorrhea. The uterine wall undergoes a follicular stage to a luteal stage, thus increasing prostaglandin by many folds, and during menstruation there will be further increases in prostaglandin. Increased prostaglandin is accompanied by progesterone depreciation that occurs in the late luteal stage; this results in thickening of the uterine lining and excessive uterine contractions (Desreza & marwati, (2021). Therefore, there is a need for action to overcome dysmenorrhea, namely giving therapy or consuming dark chocolate. Based on the description above, it can be concluded that giving dark chocolate can be an alternative to reducing the degree of dysmenorrhea in young women at STIKes Raflesia Depok. Broadly speaking, in this study, the degree of dysmenorrhea in young women at STIKes Raflesia Depok after being given the treatment of dark chocolate decreased. This can occur because the content of dark chocolate has the effect of triggering the secretion of endorphins. Endorphins are produced in the brain and spinal cord; in addition, serotonin in dark chocolate inhibits pain so that pain cannot be transmitted to the spinal cord. In addition, the magnesium content can change the feeling of being relaxed and help control unstable moods, causing the disappearance of pain sensations, and then the degree of dysmenorrhea gradually decreases.

CONCLUSION

Based on the description of the results of the research and discussion above about the Effect of Dark Chocolate on Dysmenorrhea in Young women at STIKes Raflesia Depok, the degree of dysmenorrhea on the first day before being given dark chocolate obtained the highest category of moderate (4-6), namely 21 young women and, after being given dark chocolate obtained the highest category of mild (1-3), namely 17 young women. The degree of dysmenorrhea on the second day before being given dark chocolate obtained the highest category of moderate (4-6), namely 21 young women, and after being given dark chocolate, the highest category of mild (1-3), namely 24 young women. The bivariate results of the first day showed the first day Wilcoxon test p-value of 0.000 <0.05, and the second day showed the second day Wilcoxon test p-value of 0.000 <0.05. So it can be concluded that there is an effect of dark chocolate on dysmenorrhea in young women.

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