Effect of Spice Drinks (Red Ginger and Cinnamon) on Dysmenorrhea Pain

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Abstract

Menstrual pain is called dysmenorrhea; 15% of women who experience menstrual pain feel uncomfortable. Savitri & Swari (2020) stated that menstrual pain occurs 1-2 days before menstruation appears and continues until the third day of menstruation or the end. Some studies declare that ginger water decoction can reduce menstrual pain or dysmenorrhea. In vitro and in vivo, ginger has been shown to have antimicrobial, antifungal, anthelmintic, antioxidant, anti-inflammatory, antitumor, immunomodulatory, antilipidemic, analgesic properties, and protective effects on the digestive tract. Likewise, cinnamon and cloves can relieve toothache. This research method uses a *quasi-experimental design with control* by giving ginger and cinnamon spice drinks. The population of this study was women aged 19-21 years who experienced menstrual pain with a large sample of the results of the calculation of the average difference test in two pairs of groups, which were 30 respondents in each group, both intervention, and control. The study found that a spiced drink consisting of red ginger, cloves, and cinnamon and given honey positively affected menstrual pain (dysmenorrhea) with the p-value. There is an effect of a spiced drink consisting of red ginger, cloves, and cinnamon and given honey on menstrual pain (dysmenorrhea).

Keywords: *Spice Drink, Menstrual Pain, Red Ginger.*

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A. INTRODUCTION

Adolescence is a period of human development. This period is a transitional period in which there are changes from childhood to adulthood, including differences in biology, psychology, and social change (Irwansyah, 2016). The Ministry of Health of the Republic of Indonesia (2015) defines youth as the transition from childhood to adulthood when sexual maturity occurs between the ages of 10 and 18. Women's attainment of sexual maturity is marked by menstruation, periodic and cyclic bleeding from the uterus accompanied by shedding of the uterine wall.

Menstruation/menstruation is a physiological condition that occurs in every ordinary woman, but not all women can accept menstrual conditions in a comfortable and enjoyable condition every month (Simanjuntak, 2008). Menstrual pain is called dysmenorrhea; for some women who experience it can be mild and do not interfere with routine. However, for some other women, menstrual pain often causes discomfort. Sometimes it interferes with the daily activities of sufferers. 15% of women experience this condition (Astuti, 2017).

Symptoms often occur when dysmenorrhea is a pain in the lower abdomen radiating to the waist, which usually begins to be felt 2-3 days before menstruation (Gant & Cunningham, 2010). One of the physical discomforts during menstruation is

menstrual pain. Menstrual pain, in medical terms, is called menstrual cramps or dysmenorrhea (Saguni et al., 2013).

Dysmenorrhea is lower abdominal pain during menstruation which is usually accompanied by symptoms of sweating, headache, diarrhea, and vomiting (Ju et al., 2014). Dysmenorrhea can be classified into two based on the cause: primary and secondary. Secondary dysmenorrhea occurs due to abnormalities in the reproductive organs, while primary dysmenorrhea occurs due to hormonal processes without abnormalities in the reproductive organs (Kasdu, 2005). Systemic symptoms of dysmenorrhea include fatigue, breast pain, nausea, bloating, constipation, and fainting (Handayani & Rahayu, 2014). The pain will appear before menstruation, and the occurrence can be repeated for 2 to 3 days. Furthermore, the feeling of being hurt will be intermittent and range from mild to severe (Larasati & Alatas, 2016).

According to data from the World Health Organization (WHO) (Rahayu et al., 2017), there were 1,769,425 people (90%) of women who experienced dysmenorrhea or menstrual pain, with 10-15% experiencing heavy menstrual pain. According to WHO criteria, adolescents' ages range from 10-19 years. The incidence of dysmenorrhea in the world is quite significant; on average more than 50% of women in every country experience dysmenorrhea. Based on data, it is estimated that 45-90% of adolescents in the United States experience dysmenorrhea; in Sweden, 90% of women younger than 19 years and 67% aged 24 years reported experiencing dysmenorrhea. While in Indonesia, the data shows the incidence of menstrual pain is relatively high at 54.89% in primary menstrual pain and 9.36% in secondary menstrual pain.

Christiana & Jayanti (2020) stated that menstrual pain occurs 1-2 days before menstruation appears and continues for up to 3 days after menstruation comes or during menstruation. Symptoms that accompany this pain are nausea, vomiting, weakness, lethargy, lack of energy, and even diarrhea. It is said that one way to reduce pain at home is to use medicine or herbs. One of the herbs he suggested was wedang ginger.

Several studies on the effect of ginger on menstrual pain state that boiling ginger water can reduce menstrual pain or dysmenorrhea (Gustin, 2019; Swastika et al., 2019; Faizah & Mukhoirotin, 2019). Likewise, Harwati (2009) stated ginger, cinnamon, and clove spices could also reduce pain. This study explained that ginger, both in vitro and in vivo, has been shown to have antimicrobial, antifungal, antihelmintic, antioxidative, anti-inflammatory, antitumor, immunomodulatory, antilipidemic, analgesic, and protective effects on the digestive tract. Meanwhile, clinically, the most apparent effect of ginger is to relieve symptoms of nausea in pregnant women. Other effects include preventing nausea after surgery, motion sickness, and pain due to osteoarthritis. In clinical studies, it is effective at 2 grams per day (in one dose or divided several times) and can be done unlimitedly. Cloves and cinnamon can relieve toothache and launch menstruation. Indrayani, 2015, explained that the highest antioxidant test was obtained with a result of 53.48% in the A3B1

treatment, namely drying for 40 minutes at 55oC by adding 0.5 grams of cinnamon and 0.25 grams of cloves.

In this research, the ginger drink will be mixed with cinnamon to strengthen its efficacy in reducing menstrual pain and honey to increase stamina and sweetener. This study aims to determine the characteristics of respondents, to determine the results of laboratory tests on the levels of substances contained in spice drinks, and to analyze the effect of spice drinks (red ginger and cinnamon) on dysmenorrhea pain.

B. METHODS

The variables in this study, namely *spice drinks* as the independent variable (*independent*) and the dependent variable (*dependent*), are menstrual pain/dysmenorrhea. This study uses a quasi-experimental with a control group design. The research consists of several stages, namely:

1. Phase I: at this stage, collaboration and consultation with pharmacology experts will be carried out to manufacture spiced drinks made from red ginger, cinnamon, and palm sugar, to be developed in the form of fresh drinks/drink sachet powder ready to drink. The output of this research at this stage is to obtain intellectual property rights from making spice drinks.
2. Phase II: trial of fresh drinks or sachets in women with dysmenorrhea. Quasi-experimental pre-post and post-test design with control group design. This design aims to see the possibility of a causal relationship that appears after the intervention is given. The intervention results are compared with the control group, the group without intervention.
3. Phase III: product development by preparing spiced drink ingredients such as red ginger, cinnamon, and palm sugar.

The research was conducted in the Jakarta area from January to December 2021. The population in this study were all adolescents aged 19-21 years who experienced menstrual pain in the Jakarta III Poltekkes environment. The research subjects were all adolescents with inclusion criteria experiencing mild to moderate menstrual pain who were willing to participate in this study and drink the concoctions provided. The exclusion criteria used were having a history of menstrual pain leading to unconsciousness. The sampling technique used *is purposive sampling* with the research sample formula. Hypothesis Test for the Average Difference in 2 groups so that the number of samples is 27 respondents plus 10% for the possibility of respondents dropping out so that the respondents needed are 30 in each group.

The procedure for this research is as follows:

1. Plant determination
   Dried fresh red ginger and dried cinnamon fronds were determined in the Poltekkes Jakarta III pharmaceutical laboratory.
2. Manufacturing of Spice Drinks
   The manufacture of this spiced drink is in collaboration with someone competent in the pharmaceutical field to make fresh drinks in collaboration with the Jakarta II Poltekkes pharmaceutical laboratory. The spice drink is

expected to be produced in packaging, making it easier for respondents to drink it. In addition, an analysis was also carried out on the safety of the drink and its nutritional content. This spiced drink has been produced with several experiments: making a solution, drying the ingredients, and cooking.

3. Making Red Ginger by Cooking
   In this study, the drink was given when the respondent felt menstrual pain at a dose of 1 tablespoon plus 150 cc of hot water with a temperature of 80-90 cc and allowed to stand when he wanted to drink it until the temperature became warm and suitable for drinking 2 days before menstruation and 3 days during menstruation (Mahdiyah et al., 2016).

Researchers collected data directly on adolescents who experience menstrual pain or dysmenorrhoea in the Jakarta III Health Polytechnic. The analysis used was univariate and bivariate analysis using a related measure ANOVA parametric test to see the effect of giving spice drinks and pure ginger and palm sugar drinks. This data analysis was carried out by comparing the average values of cases and controls. The value of the measurement results of menstrual pain was seen by the difference from day 1 to day 3.

C. RESULTS AND DISCUSSION

This study was conducted when the respondent was menstruating without any previous intervention. Respondents were Department of Midwifery Poltekkes Jakarta III students who experienced dysmenorrhea.

1. Spice Drink Flavor Rating

Based on the spiced drink assessment test on 34 respondents, the average value was 4.26 (good) with a scale of 1-5 (starting from 1 = very bad, 2 = not good, 3 = doubtful, 4 = good, and 5 = very tasty). Some statements obtained from respondents:

a. Respondent 1: "Ginger drink is refreshing and can make you relax,
b. Respondent 2: It is warm when it enters the throat because it has ginger; it smells perfect because it has cinnamon and palm sugar, so it is sweet, so if you want something sweeter, add honey to the ginger spice drink.
c. Respondent 3: "It is delicious; the right combination is red ginger, cinnamon, and palm sugar."
d. Respondent 4: "It is delicious because it tastes familiar with warm spices. The taste is not bitter and not strange. Anyway, I recommend it to be a drink every menstruation."
e. Respondent 5: "The taste is normal, it's not very good, it's not good either. But it's delicious when you add honey."

2. Characteristics of Respondents

The age of the respondents ranged from 17 years to 22 years. As for the experience of dysmenorrhea treatment, most of them just let it go (30.8%), warm compresses (26.2%), drank warm water (26.2%), and took pain medication (12.3%), slept (3.1%) and drank herbal medicine (1.5%).

Table 1. Distribution of Respondents Based on Age and Dysmonere and Treatment Before the Research

Variable	N	%
Age		
17 years	2	3.1
18 years	24	36.9
19 years old	15	23.1
20 years	15	23.1
21 years	8	12.1
22 years	1	1.5
Treatment		
Compress	17	26,2
Drink Warm Water	17	26,2
Take medicine	8	12.3
Drink Jamu	1	1.5
Sleep	2	3,1
Just leave it	20	30,8
Total	**65**	**100**

The results of this study indicate that the average mean in each group can be explained in table 2 below.

Table 2. Distribution of Dysmenorrhea Pain Score Based on the Numerical Rating Scale (NRS) Instrument

Intervention	N	Mean	Std.
Early time			
Drink spices	35	5.00	1.28
Warm Compress	30	4.76	1.404
Time 30 minutes			
Drink spices	35	3.65	1.23
Warm Compress	30	3.90	1.18
Time 1 hour			
Drink spices	35	3.14	1.55
Warm Compress	30	3.56	1.45
2 hours			
Drink spices	35	1.86	1.37
Warm Compress	30	2.67	1.49

This study assessed the dysmenorrhea pain score using the Numerical Rating Scale (NRS) instrument (Siagian et al., 2015). The initial measurement of the mean dysmenorrhea pain score in the intervention group with herbal drinks was 5, with a standard deviation of 1.28, and 4.76 for warm compresses, with a standard deviation of 1.4.

In the first 30 minutes of measurement in the spice drink intervention group, the average pain intensity score was 3.65, with a standard deviation of 1.23. Hence,

the decrease from the initial score was around 1.35 points. The control group (warm compresses) had an average reduction of around 3.90 with a standard deviation of 1.18, so the decrease from the initial score was 1.18.

In the third measurement, 1 hour after the initial measurement in the spice drink intervention group, the average pain intensity score was 3.14 with a standard deviation of 1.55. Hence, the decrease from the second score was around 0.51 points. In the control group (warm compresses), there was an average decrease of about 3.56 with a standard deviation of 1.45, so the decrease of the second score was 0.36.

In the fourth stretch, at 2 hours after the initial measurement in the spice drink intervention group, the average pain intensity score was 1.86 with a standard deviation of 1.37. Hence, the decrease from the third score was around 1.28 points. In the control group (warm compresses), there was an average decrease of about 2.67 with a standard deviation of 1.49, so the reduction of the third score was 0.89. More clearly can be seen in table 2 above.

Furthermore, the researchers saw the existence of homogeneity, it was found in the statistical results of the Levene's Test, the value of sig. > 0.05 means that the assumption of the equality of variance between the two groups is met at least at the level of one measurement level. In another analysis, it was found that the results of the test box resulted in a sig value. 0.792, which means the covariance matrix is equal for all measurement levels. This shows that the data has homogeneity in each measurement. This statement can be seen in tables 3 and 4 below:

Table 3. Results of Homogeneity Test in 2 Control Groups and Intervention Groups

Intervention	Sig
Start time (0)	0.407
Time 30 minutes	0910
Time 1 hour	0.914
2 hours	0.454

Levene's Test results, sig. > 0.05, meaning that the assumption of the equality of variance between the two groups is fulfilled at least at level one measurement level.

Table 4. Test Box Analysis Results (Covariance)

Intervention	Sig
Initial time (0)	0.792
Time 30 minutes	
Time 1 hour	
Time 2 hours	

The results of the test box produce a sig value. 0.792, which means the covariance matrix is equal for all measurement levels. Based on Wilk's Lambda statistical test, it shows a significant value. 0.000, meaning that, in general, intervention (drinking spices and warm compresses) affects the level of dysmenorrhea pain. Partial Eta Squared value of 0.851, meaning that this multivariate analysis can explain the variation in pain scores of 85.1%. In general, an interaction was found between pain*intervention (sig.0.005). This statement can be seen in table 5 below

Table.5. Wilks' Lambda Multivariate Test Results

Intervention	Sig	Partial Eta Squared
Painful	0.000	0.851
Pain and drinking spices	0.005	0.186

At the Greenhouse-Geisser on pain, the value of sig. 0.000 means that there is an effect of the intervention on the variation of pain in the two groups from time to time. The value of partial eta squared is 0.730, which means that the variation in pain can be explained by as much as 73% by univariate analysis. This can be more clearly seen in table 6 below**:**

Table 6 Results of Tests of Within-Subjects Effects with Greenhouse-Geisser

Intervention	Mean Square	Sig	Partial Eta Squared
Painful	99,778	0.000	0.730
Pain and drinking spices	3.977	0.001	0.097

Furthermore, data analysis is carried out at each level:

Table 7 Tests of Within-Subjects Contrasts

Intervention	Mean Square	Sig	Partial Eta Squared
Painful			
Level 1 vs. Level 4	444,030	0.000	0.839
Level 2 vs. Level 4	148,633	0.000	0.702
Level 3 vs. Level 4	77,173	0.000	0.617
Pain and drink herbs			
Level 1 vs. Level 4	17,568	0.001	0.171
Level 2 vs. Level 4	5.187	0.26	0.076
Level 3 vs. Level 4	2,403	0.080	0.048

Sig value. on pain showed a significant difference between the pain scores of the 1st, 2nd, and 3rd measurements compared to the initial pain.

Table 8 Tests of Within-Subjects Contrasts

Intervention	Mean Square	Sig	Partial Eta Squared
Intercept	823,352	0.000	0.829
Intervention	1,560	0.324	0.015

Test of Between-Subject Effects shows the value of sig. 0.324 means no difference in pain scores between the two groups of observations. Based on the plot analysis, it can be seen that the intervention group (drinking spices) had a better reduction in pain scores, especially at the 3rd and 4th observation levels, as seen from the steeper decline.

Menstruation is a periodic and cyclic (monthly) bleeding event from the uterus accompanied by the release of the uterine mucous membrane (endometrium) through the vagina in sexually mature women. Every healthy woman who is not pregnant and has not had menopause will get her period every month. Under normal circumstances, the length of menstruation ranges from 3-7 days and, on average, repeats every 28 days. Pain during menstruation is the most common gynecological complaint experienced by many women. Dysmenorrhea is menstrual pain, a

symptom and not a disease (Baziad, 2003). Dysmenorrhea is pain during menstruation that can interfere with daily activities (Manuaba, 2001).

Menstruation is an indicator of sexual maturity in adolescent girls. The pain felt by a woman when she gets her period is called dysmenorrhea (Prawirohardjo, 2010). Generally, most women feel uncomfortable before menstruating, about to menstruate, or as menstruating. Uterine muscle contractions cause this discomfort to drain menstrual blood (Charu et al., 2012). High levels of prostaglandins that enter the endometrium cause the myometrium to contract strongly; this contraction can also narrow the blood vessels, which can cause ischemia, bleeding and pain, and endometrial disintegration. The pain is mainly felt under the abdominal area spreading into the back or inner thigh surface (Maimunah et al, 2010).

Although dysmenorrhea is not life-threatening, it can harm the quality of life. In an epidemiological study by El-Gilani et al. (2005), of 664 school students in Egypt, about 75% had dysmenorrhea, graded mild at 55.3%, moderate at 30%, and severe at 14.7%. In a study of female students, 42% had a session absent from teaching or time off from daily activities due to dysmenorrhea. Studies show that 50% of girls believe their dysmenorrhea interferes with daily activities. Some methods such as drugs (including the consumption of OCPs and nonsteroidal anti-inflammatory drugs (NSAIDs)), non-pharmacological (including exercise, heat therapy, acupuncture, and neurotransmission), electrical stimulation (TENS), dietary supplements (vitamins E, B, C, and Ca, Mg) and herbal remedies used in the primary treatment of dysmenorrhea.

Synthetic drugs have long-term side effects such as nausea, gastric irritation, ulcers, renal papillary necrosis, and decreased blood flow to the kidneys. Most young women do not intend to use hormones for pain reduction. More than 80% of people in developing countries use complementary and alternative medicine to treat health conditions. One of them is herbal medicine and alternative therapy recognized for its biological properties, such as Ceylancium Cinnamon which has been widely used in medicine but needs to be sufficiently documented. Cinnamomum Zeylancium, from the Lauraceae family, is used as a popular condiment in Asian, South American, and Caribbean foods not only to enhance the taste of foods and beverages but also in traditional and modern medicines (Badalzadeh R et al., 2014). Besides cinnamon, ginger is another herb often used to treat menstrual pain.

Ginger contains gingerol, which can block prostaglandins. Research shows that ginger has the same effectiveness as mefenamic acid and ibuprofen in reducing pain in primary menstrual pain. In addition, there were no serious side effects from ginger. Ginger has the same effect as ibuprofen in reducing pain. In general, ibuprofen is rapidly and effectively absorbed after oral administration. The peak concentration in plasma is very short, between 15 minutes and 1 hour. This study used a non-pharmacological therapeutic solution in a red ginger-cinnamon concoction and compared it with ginger compresses. Non-pharmacological drugs are safer because they do not cause side effects (Muttaqin et al., 2015).

In the results of this study, table 2 shows that after being given a spiced drink, the average respondent experienced decreased pain. In the beginning, the average pain score had a score of 5; in the next 30 minutes, it became 3.65; the next 1 hour was 3.14; and in 2 hours dropped to 1.86, so the total decrease in pain score was 3.14. This shows that the spiced drink affects reducing the pain of dysmenorrhea. This is in line with research (Rahayu & Nujulah, 2018), which said that respondents experienced 73% mild pain, 19% moderate pain, and the intensity of pain before the intervention of giving ginger decoction 8% severe pain. Rahayu & Nujulah (2017) showed that the average pain before the ginger decoction intervention was 2.12 and after being given the ginger boiled intervention was 1.35. The decrease in the average value of pain intensity in respondents before and after was 0.77, so it can be concluded that there was a decrease in pain intensity before and after the ginger intervention was given. In general, based on Wilk's Lambda statistical test shows a significance value of 0.000, meaning that there is an effect of the intervention (drinking herbs and warm compresses) on the level of dysmenorrhea pain. The partial Eta Squared value is 0.851, meaning that the variation in pain scores is 85.1%.

In the Greenhouse-Geisser on pain, a significance value of 0.000 means that there is an effect of the intervention on the variation of pain in the two groups from time to time. The value of partial eta squared is 0.730, which means that the variation in pain can be explained by as much as 73% by univariate analysis. In the results of this study, the significance value on pain showed a significant difference between the pain scores on the 1st, 2nd, and 3rd measurements compared to the initial pain in the two intervention groups. *Test of Between-Subject Effects* showed a significance value of 0.324, meaning that there was no difference in pain scores between the two groups of observations. However, from the plot analysis, it can be seen that the spice drink intervention group had a better reduction in pain scores compared to warm compresses, especially at the 3rd and 4th observation levels, as seen from a steeper decrease.

Warm compresses are one of the methods used by local warm temperatures that can cause physiological effects. Warm compresses can be used to treat pain and relax tense muscles. Warm compresses can be done by filling a rubber bag with warm water or a towel soaked for the aching body. The physiological effect of warm compresses is to soften fibrous cells, relax body muscles, relieve pain, and improve blood flow (Nida & Sari. 2016).

The results of this study indicate that there is a decrease in pain levels after warm compresses. Following the research of Oktaviana & Imron (2016) that warm compresses can eliminate dysmenorrhea by using a paired t-test and obtained a p-value of 0.00, $p < 0.05$, it can be concluded that there is an effect of warm compresses to relieve dysmenorrhea pain.

The results of this study showed that all post-treatment groups received pain relief. Kozier et al. (2010) state that warm compresses with a temperature of 500 C cause vasodilation, which can open blood circulation, smooth blood circulation, relax muscles and reduce muscle contractions, reducing pain. Warm compresses are one of

the non-pharmacological methods considered to be the most effective in relieving pain or muscle spasms. Thermal energy can be circulated through conduction, convection, and conversion. The pain caused by bruising, muscle spasms, and arthritis responds well to a rise in temperature because it can dilate blood vessels and increase local blood circulation. The purpose of giving warm compresses, according to Nida & Sari (2016), is that warm compresses provide warmth to respondents by using fluids or tools that create warmth in the parts of the body that need it, reducing pain intensity with the benefits of giving warm compresses biologically which causes dilation of blood vessels to make improvements. of blood circulation.

D. CONCLUSION

Red ginger is an analgesic and has a protective effect on the digestive tract, while cinnamon can also relieve the pain of dysmenorrhea. Spicy drinks derived from red ginger, cinnamon, and warm compresses can reduce pain during menstruation or dysmenorrhea. Although a warm compress was not carried out with maximal temperature monitoring in this study, both can significantly reduce pain intensity based on statistical tests. At the end of the measurements, 3 and 4-spice drinks can reduce pain intensity more sharply than warm compresses. However, this cannot be compared because the temperature on hot compresses using buli-buli was not monitored for 2 hours. This herbal drink can reduce primary dysmenorrheal menstrual pain in adolescent girls and can be used as an alternative treatment for adolescents with primary dysmenorrhea. This research needs to be improved again, especially in monitoring the temperature control in the hot compress group.

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