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The Effect of SP6 Acupressure and Cinnamon Decoction Combination on Hemoglobin in Dysmenorrhea Adolescents

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ABSTRACT

Introduction *: Dysmenorrhea is a common menstrual pain complaint experienced by adolescent girls. In East Java Province in 2021, approximately 4,653 adolescents experienced dysmenorrhea, with 4,297 (90.25%) experiencing primary dysmenorrhea. Meanwhile, in Bangkalan, approximately 66.7% experienced dysmenorrhea. Dysmenorrhea can reduce hemoglobin levels due to excessive uterine contractions triggered by prostaglandins. Non-pharmacological therapies such as acupressure at the Sanyinjiao point (SP6) can stimulate the nervous system and reduce uterine muscle contractions, while cinnamon contains active compounds with analgesic and anti-inflammatory properties. The purpose of this study was to determine the effect of a combination of SP6 acupressure and cinnamon decoction on hemoglobin levels in adolescents with dysmenorrhea.*
Method: *A single-group pretest-posttest design was used. The study was conducted at the adolescent health post (Posyandu) in Karang Asem Village with 32 respondents. The intervention was given twice daily for 5 days of menstruation.*
Results: *showed an increase in hemoglobin levels from an average of 12.20 ± 0.48 gr/dL to 13.75 ± 0.66 gr/dL. The Shapiro-Wilk test showed that the data were normally distributed. The paired t-test produced a p-value of 0.000 (p < 0.05), indicating a significant difference in hemoglobin levels before and after the intervention.*
Conclusion: *The combination of SP6 acupressure therapy and cinnamon decoction is effective in increasing hemoglobin levels in adolescents with dysmenorrhea, and can be a practical and safe non-pharmacological treatment alternative.*

Introduction

Puberty is a life stage characterized by rapid and drastic growth. During this phase, adolescents also experience physical changes, typically marked by changes in reproductive organ function, including the onset of menstruation (*menarche*) in girls and wet dreams in boys. These changes in adolescents result in adjustments due to physiological changes (Mutia, 2022) . One of the most common menstrual disorders is dysmenorrhea, described as menstrual pain caused by the excessive release of prostaglandins that trigger uterine contractions and result in mild to severe lower abdominal pain (Maharianingsih & Poruwati, 2021) . Dysmenorrhea should not be ignored because it can have serious consequences. Untreated dysmenorrhea can disrupt daily activities and can also lead to serious consequences such as depression, *retrograde menstruation* (menstruation that moves backward), infertility, undetected pregnancy, ectopic (fallopian tube) rupture, uterine perforation from an IUD, and infection (Luli, 2020) .

According to data from *the World Health Organization* (WHO) in 2021, according to research by Astiza, dysmenorrhea is a common problem worldwide. The prevalence of dysmenorrhea in adolescent girls ranges from 16.8% to 81%. WHO data indicates that 1,769,425 (90%) women experience dysmenorrhea, with 10-15% experiencing severe conditions (Rifiana et al., 2023) . Ministry of Health of the Republic of Indonesia, 2021 The incidence of dysmenorrhea in Indonesia was recorded at 72.89% and as many as 54% occurred in adolescent girls (Djailani et al., 2023) . Based on the 2021 East Java Province Adolescent

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Reproductive Health Survey (SKRR) data, it was found that around 4,653 adolescents experienced dysmenorrhea. The incidence of primary dysmenorrhea was 4,297 (90.25%) and others experienced secondary dysmenorrhea as many as 365 people (9.75%) (Christiana et al., 2023) . According to the results of previous research, in adolescent girls of SMAN 2 Bangkalan around 66.7% experienced dysmenorrhea, then the results of cross tabulation showed that of the 71 adolescent girls who experienced dysmenorrhea, 56 adolescent girls (78.9%) experienced dysmenorrhea . (Nadhiroh & Mufarrohah, 2022) .

Results of a preliminary study at the adolescent integrated health post in Karang Asem village, Klampis sub-district, Bangkalan Regency obtained 52 female adolescent populations, and the results of observations using a questionnaire regarding the occurrence of dysmenorrhea using the *NRS (Numeric Rating Scale)* to determine the level of dysmenorrhea, namely there were 32 female adolescent respondents who experienced dysmenorrhea with a scale of mild, moderate and severe pain. Many adolescents at this research location still do not know the factors that can influence and how to handle dysmenorrhea.

One factor, namely hemoglobin levels, influences biomarkers of dysmenorrhea. Severe dysmenorrhea can be associated with anemia, including decreased hemoglobin levels. Adolescents who experience heavy menstrual bleeding tend to have lower hemoglobin levels than those who do not experience dysmenorrhea (Cahyani, 2024) . Normal hemoglobin levels for adolescent girls are 12-15g/dL (Dwi Aridya et al., 2023) .

There are various ways to treat dysmenorrhea, including pharmacological and non-pharmacological methods. The most commonly used pharmacological approach is the use of non-steroidal anti-inflammatory drugs (NSAIDs), which work by inhibiting prostaglandin production, thereby reducing uterine wall contractions during the first 2–3 days of menstruation (Sastriani et al., 2022). However, the use of these drugs carries the risk of side effects that can be harmful to health. Therefore, although pharmacological methods have proven effective in relieving dysmenorrhea, it is important to consider the potential risks (Hartinah et al., 2023) . Therefore, there are alternative treatments, namely non-pharmacological treatments that are natural and have minimal side effects, and are easy to perform individually at any time during dysmenorrhea, such as sayinjiao acupressure (SP6) and cinnamon decoction.

The Sanyinjiao (SP6) acupressure point strengthens the spleen, balances Yin and Yang, and supports kidney, liver, and blood health, while also aiding circulation. This point is unique because it is the meeting point of three Yin meridians in the foot, located approximately 3 cun (four fingers) above the inner ankle. Stimulating SP6 can reduce excessive blood flow to the uterus, thus helping to treat dysmenorrhea. Massaging SP6 stimulates the nervous system to trigger the release of endorphins . These hormones affect the pain receptor center in the brain, thereby suppressing pain perception. Blood circulation to the uterus also increases, and oxygen supply throughout the body increases, resulting in increased hemoglobin levels and decreased uterine vasoconstriction, thus reducing pain caused by dysmenorrhea due to the hormone's natural analgesic effect (Apriyelva et al., 2021). Previous research conducted by Ningrum et al. (2022) stated that Acupressure (*SP6* & *ST36*) can be an alternative method to increase hemoglobin levels, especially for young women or women who do not like consuming iron tablets (Ningrum et al., 2022) .

Meanwhile, in cinnamon (*cinnamomum Burmannii*) which has been tested *in vitro* shows that it has active compounds that have pharmacological effects in the form of anti-fungal, anti-viral, anti-oxidant, anti-cardiovascular, anti-cancer, anti-inflammatory, and analgesic , the analgesic content contained in cinnamon can relax the uterine muscles, so that blood circulation in the uterus will increase and oxygen circulation is distributed normally throughout the body which will cause an increase in hemoglobin levels so that uterine vasoconstriction will decrease and can reduce pain during menstruation (Husnah et al., 2024) . Previous research conducted

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by Maslahah & Hera (2023) Cinnamon is known to support increased metabolism and smooth blood circulation, thereby improving the distribution of oxygen and nutrients throughout the body, including to the bone marrow so that it can increase hemoglobin levels (Maslahah & Hera, 2023) .

By combining these two methods, it is hoped that it will provide a better effect in relieving menstrual pain naturally and holistically and can increase hemoglobin levels . Researchers want to know the effectiveness of non-pharmacological drugs combined with *Sanyinjiao acupressure (SP6)* and cinnamon decoction on the level of dysmenorrhea by looking at hemoglobin levels in adolescents with dysmenorrhea.

Based on the explanation above, this study aims to determine the effect of the combination of sayinjiao acupressure therapy (*SP6)* and cinnamon decoction on hemoglobin levels in adolescents with dysmenorrhea.

Methods

This type of research uses a quantitative method with a *pre-experimental design* by providing interventions, namely a combination of Acupressure at *the Sayinjiao point (SP6)* and Cinnamon decoction to respondents using *a one-group pretest-posttest design technique* , with one intervention group measured twice, namely before (pre-test) and after the intervention (post-test), without a comparison group. The location of the study was carried out at the Posyandu for adolescent girls in Karang Asem Village, Klampis District, Bangkalan Regency from January to April 2025. The population in the study were adolescent girls at the Posyandu for adolescents in Karang Asem Village, Klampis District, Bangkalan Regency, there were 32 populations from the results of observations using a questionnaire measuring dysmenorrhea on the NRS (Numeric Rate Scale). In this study, *Total sampling was used* where the entire population was used as a sample in the study. This means that every individual in the population will be involved in the sample without random or selective selection. The sample of this study were adolescent girls aged 17-20 years who experienced dysmenorrhea, were not taking painkillers at the time of the study, and were not diagnosed with reproductive diseases such as cysts, pelvic inflammation, and did not have allergies to cinnamon.

The first step was observation using a questionnaire with dysmenorrhea measurements, namely the NRS scale, to determine the level of pain experienced by the respondents. Next, a pre-test was carried out on a hematology analyzer laboratory check to check hemoglobin levels on the first day of menstruation before the intervention was given . Then, the intervention was given by first giving Cinnamon Decoction by : preparing 5 grams of cinnamon segments then boiling them with 100cc/ml water until boiling for 5 minutes using medium heat, and pouring 50 cc into a glass to drink while warm. Both of these treatments were carried out 2x a day (8 am and 8 pm). After that, take a break for 10-15 minutes to absorb the benefits of the cinnamon decoction and start the process of warming the body gradually . Next , Acupressure was carried out at Point *SP 6* by means of pressing the 3 cun point (4 fingers) above the inner ankle with a clockwise circular motion 30 times for 10 minutes on each foot (right and left) Both treatments were carried out on days 1-5 of menstruation. Furthermore, on the 6th day a laboratory examination (post-test) was carried out to determine the hemoglobin level after the intervention was given. then analyzed using a paired t-Test after a normality test using the Shapiro-Wilk test. If the p-value is <0.005, the research results are considered statistically significant .

Results

The results of the study on the Effect of the Combination of *Sanyinjiao* Acupressure (SP6) and Cinnamon Decoction on *Hemoglobin Levels* in Dysmenorrhea-stricken Adolescents in adolescent

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girls at the adolescent health post in Karang Asem Village, Klampis District, Bangkalan Regency with 32 respondents .

Table1. Frequency Distribution Of General Characteristic Data

Variables	Category	n=32	%
Age	11-13 year	0	0
	14-16 year	10	31.3
	17-20 year	22	68.8
Education	No school	0	0
	Elementary School	17	53.1
	JUNIOR HIGH SCHOOL	11	34.4
	SENIOR HIGH SCHOOL	4	12.5
	PT	0	0
Age from first menstruation	<12 year	13	40.6
	12-14 year	14	43.8
	>14 year	5	15.6
Menstruation period	<4 day	0	0
	4-7 day	19	59.4
	>7 day	13	40.6
Frequency from painful duration	<1-2 day before menstruation	0	0
	1-2 day from period	25	78.1
	>2 day from period	7	21.9
Dysmenorrhea	0 NO painful	0	0
	1-3 gentle painful	19	59.4
	4-6 currently painful	12	37.5
	7-9 heavy painful	1	3.1
Nutrition status	underweight	14	43.8
	normal	18	56.3
	overweight	0	0
	obesity	0	0
Physique activity	<1-2 time A week (Never)	23	71.9
	1-2 time a week	9	28.1
	3-4 time a week	0	0

SPSS data: 2025

Based on table 1 characteristics age respondents It is known that most of the respondents are 17-20 years old, namely 22 respondents (68.8%), Educational characteristics are known that most of the last education they received was at elementary school level, namely 17 respondents (53.1%), Menarche age is known that almost half of the respondents experienced their first menstruation in the age range of 12-14 years, namely 14 respondents (43.8%), The characteristics of the duration of menstruation are known that most of them experience menstruation within 4-7 days, namely 19 respondents (59.4%), The frequency of pain is known that almost all of the respondents felt dysmenorrhea on days 1-2, namely 25 respondents (78.1%), The pain scale is known that most of the teenagers experienced pain levels in the range of 1-3 (mild pain), namely 19 respondents (59.4%), The characteristics of nutritional status are mostly in normal conditions, namely 18 respondents (56.3%), Most of the

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teenagers' physical activity is doing sports <1-2 times a week / never, namely 23 respondents (71.9%).

Table 2. Tabulation of the Effect of Combination of *Sanyinjiao* Acupressure (SP6) and Cinnamon Decoction on Hemoglobin Levels

Effect of Combination of *Sanyinjiao* Acupressure (SP6) and Cinnamon Decoction on Hemoglobin Levels	Hemoglobin levels							
	Low (<12gr/dL)		Normal (12-15g/dL)		Tall (>15 gr/dL)		TOTAL	
	F	%	F	%	F	%	F	%
Not Regular < 2x a day	0	0	3	9.4	0	0	3	9.4
Routinely 2x a week	0	0	29	90.6	0	0	29	100
TOTAL	0	0	32	100.0	0	0	32	100

Table 2. Tabulation of the administration of a combination of *sanyinjio acupressure (SP6)* and cinnamon decoction on hemoglobin levels was known after the intervention (post-test), showing that all respondents, both those who did it regularly (29 respondents) and those who did it not regularly (3 respondents), obtained hemoglobin levels in the normal category (12-15gr/dL) with a total of 32 respondents (100.0%).

Table 3. Hemoglobin Levels Before and After Administration of a Combination of Sanyinjiao Acupressure (SP6) and Cinnamon Decoction

Hemoglobin Level	F	%	Mean±SD Median; Min-Max	P Value	P Value
Pre-Exam					
Low <12 gr/dL	9	28.1	12.291 ± 0.4842	0.335*	
Normal is 12-15 gr/dL	23	71.9	12.200;11.3-13.4		
Height >15 gr/dL	0	0			
TOTAL	32	100.0			
					0.00**
Post Test					
Low <12 gr/dL	0	0			
Normal is 12-15 gr/dL	32	100	13,750 ± 0.6653	0.543*	
Height >15 gr/dL	0		13,850;12.5-15		
TOTAL	32	100.0			

* *Shapiro-Wilk* ** Paired *Sample T-test*

Table 3 shows that before the intervention (*pre-test*) was given, the hemoglobin levels of almost all 23 respondents (71.9%) were in the normal range, namely 12-15 gr/dL. Meanwhile, the laboratory results after the intervention (*post-test*) showed that all

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respondents (100%) after undergoing the intervention regularly, obtained hemoglobin levels in the normal range, namely 12-15 gr/dL.

The first test analysis was carried out by conducting a normality test using the *Shapiro-Wilk data test* for before (*pre-test*) and after treatment *(post-test)* , the results of the test data showed that the data before treatment (*pre-test*) had a value of p = 0.335 (p> 0.05) Meanwhile, for the test results of the data after treatment *(post-test*) showed a result of p = 0.543 (p> 0.05). From the results of the Shapiro-Wilk test, the data before (*pre-test*) and after *(post-test)* after the intervention was given showed that the data was normally distributed, then continued by conducting a Paired T-Test. The results obtained from the test showed a value of p = 0.000 (p <0.005) which means that there is a significant influence on the provision of sayinjiao acupressure intervention (SP6) and cinnamon infusion on hemoglobin levels.

Discussion

1. Identifying Hemoglobin Levels Before Administering a Combination of *Sanyinjiao Acupressure* (SP6) and Cinnamon Decoction to Adolescents with Dysmenorrhea

Before the intervention (*Pre-Test*), it showed that the hemoglobin levels of almost all respondents, 23 people (71.9%) were in the normal range, namely 12-15 gr/dL, and as many as 9 respondents (28.1%) experienced low anemia, namely <12 gr/dL. The characteristics related to the hemoglobin levels experienced by respondents were age, menstrual duration, frequency of pain duration, dysmenorrhea scale, nutritional status, and physical activity. These factors have a direct or indirect relationship to the occurrence of dysmenorrhea and its relationship with increased hemoglobin levels (Atik et al., 2022) .

Based on the data on the age of adolescents, most of the respondents were in the 17-20 year age range, namely 22 people (68.8%) of the total 32 adolescents who were the research subjects. This age is late adolescence, a time when physiological and hormonal maturation are actively underway. During this time, girls begin to menstruate regularly and monthly, which directly causes blood loss and can lead to decreased hemoglobin levels in some respondents, especially if not balanced with adequate iron intake. (Edward et al., 2025) . This is in line with the research findings presented by Matilda et al. (2024). The study showed that nearly half of the respondents experiencing dysmenorrhea were in the 17-20 age group (16 respondents (48.5%). This condition is thought to contribute to the high incidence of dysmenorrhea in this group. Furthermore, low hemoglobin levels are assumed to exacerbate dysmenorrhea symptoms .

Menstrual duration and frequency of pain also play a role in the severity of dysmenorrhea. Most respondents experienced menstruation lasting 4-7 days (19 respondents (54.4%), while 13 respondents (40.6%) had menstruation lasting >7 days, with pain lasting 1-2 days (25 respondents (78.1%). Menstrual duration was calculated from the first day to the last day of bleeding. Iron loss that exceeds normal limits can occur in adolescent girls who experience menstruation with a heavier blood volume and longer duration. This indicates that the body experiences an inflammatory process for a longer duration that can trigger an increase or release of prostaglandins that aggravate uterine contractions, thereby worsening dysmenorrhea symptoms (Hadijah et al., 2019) . In line with previous research conducted by Annisa et al. (2024), which showed that during menstruation, rapid blood loss results in reduced iron stores. The more blood lost during menstruation, the more iron is lost. (Gazali et al., 2024) . Based on the characteristics of the respondents, as many as 13 respondents (40.6%) who experienced

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menstruation lasting >7 days experienced a decrease in hemoglobin levels <12 gr/dL which can trigger uterine contractions and experience dysmenorrhea.

Based on the results of the study measured using *the Numeric Rating Scale* (NRS), it was found that most female adolescents experienced mild dysmenorrhea as many as 19 respondents (59.4%), moderate dysmenorrhea as many as 12 respondents (37.5%), and only 1 respondent (3.1%) experienced severe dysmenorrhea. Low hemoglobin levels are also the most important factor influencing the occurrence of dysmenorrhea in women, because hemoglobin functions to connect oxygen to blood circulation. So when low hemoglobin levels in the human body are insufficient and affect the occurrence of hypoxia which will cause the release of prostaglandins which will worsen vasoconstriction in the uterus, and cause dysmenorrhea (Hou et al., 2024) . This theory is strengthened by research conducted by Eka & Retno (2023) showing that of 49 female students with anemia hemoglobin levels , 36 (73.5%) experienced dysmenorrhea. and 13 (26.5%) who experienced dysmenorrhea did not experience dysmenorrhea . It can be concluded that there is a relationship between hemoglobin levels with the occurrence of dysmenorrhea (Sulistyaningdiah & Astuti, 2023) . The results of the data obtained before the intervention (*pre-test*) showed that the majority of respondents had hemoglobin levels in the normal category, but there were still some respondents who experienced mild anemia. This study also showed that based on the results of the NRS *(Numeric Rating Scale) pain scale measurements* , respondents who experienced mild anemia experienced higher levels of dysmenorrhea, namely in the range of moderate to severe pain, while respondents who experienced normal hemoglobin levels only showed mild to moderate pain.

The nutritional status of respondents showed that the majority were in the normal nutritional status category, namely 18 respondents (56.3%), but there were also 14 respondents (43.8%) who were classified as underweight. Insufficient nutritional status, especially in underweight adolescent girls, has a direct impact on the intake of iron, vitamin B12, and folate, important nutrients in the formation of red blood cells and hemoglobin. This nutritional deficiency causes reduced hemoglobin production, thereby reducing the blood's ability to transport oxygen to tissues, including the uterus, resulting in uterine contractions during menstruation and causing dysmenorrhea (Janapriya et al., 2024) . This study is in line with the results of previous research by Emilia et al. (2024) which obtained the proportion of respondents based on nutritional status, namely Twenty women (52.6%) had normal nutritional status. The study found a significant relationship between nutritional status and the incidence of dysmenorrhea in female students (Rahmawati et al., 2024) . Respondents with underweight nutritional status tended to have lower hemoglobin levels than those with normal nutritional status. This condition is thought to contribute to the increased frequency of dysmenorrhea experienced by respondents. Furthermore, suboptimal nutritional status is considered a factor influencing the severity of menstrual pain in adolescent girls in this study.

Low physical activity was found in the majority of respondents, namely <1-2 times a week and never exercising as many as 23 respondents (71.9%). Physical activity affects hemoglobin, because lack of movement can inhibit oxygen flow to the reproductive organs, causing vasoconstriction, and causing dysmenorrhea (Rahmawati et al., 2024) . This study is supported by Fadliyah & Sudiamin (2022), who stated that adolescents who rarely exercise are at higher risk of experiencing low hemoglobin levels because oxygen flow to the body will be hampered, resulting in menstrual disorders

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such as dysmenorrhea, because physical activity plays a role in maintaining hormonal balance and reducing uterine muscle tension. Adequate physical exercise can improve the body's metabolism and provide a natural analgesic effect on menstrual pain (Fadliyah & Sudiamin, 2022) . Low physical activity in most respondents contributed to decreased hemoglobin levels and increased complaints of dysmenorrhea.

Based on the theory and previous research described above, researchers believe that hemoglobin levels, age, menstrual duration, pain level, nutritional status, and physical activity play a significant role in influencing the incidence of dysmenorrhea. Adolescents with mild anemia, poor nutritional status, and low physical activity tend to experience more severe dysmenorrhea. Therefore, ensuring a balanced diet, increasing physical activity, and preventing anemia are essential to reduce the severity of dysmenorrhea in adolescents.

2. Identifying Hemoglobin Levels After Administering a Combination of *Sanyinjiao Acupressure* (SP6) and Cinnamon Decoction to Adolescents with Dysmenorrhea

sanyinjiao acupressure (SP6) and cinnamon decoction intervention , it showed that the post-test laboratory results showed that all 32 respondents (100%) after undergoing the intervention, obtained hemoglobin levels within the normal range, namely (12-15 gr / dL) which experienced an average increase (11.8%). Respondents who did not regularly participate in the intervention also experienced an increase, but the increase was smaller, namely <1 gr / dL. The increase in hemoglobin levels physiologically reflects an increase in the process of hematopoiesis or the formation of red blood cells in the bone marrow. This process is influenced by various factors, such as improved iron intake, increased metabolism, and hormonal stimulation that supports erythrocyte production so that hemoglobin levels will increase (Cahyani, 2024) .

The effects of Sanyinjiao (SP6) acupressure and cinnamon decoction are believed to stimulate blood flow, improve digestive and circulatory function, and aid in the absorption of nutrients, which play a vital role in hemoglobin synthesis. SP6 acupressure balances yin and yang energy and strengthens kidney and spleen function. Improved spleen function optimizes iron distribution throughout the body. Proper iron distribution plays a crucial role in red blood cell formation, contributing to increased hemoglobin levels. (Sholihah et al., 2023) . Meanwhile, cinnamon is known to contain antioxidants and active compounds such as cinnamaldehyde, eugenol, flavonoids, and anticoagulants that support increased metabolism and smooth blood circulation, thereby improving the distribution of oxygen and nutrients throughout the body, including to the bone marrow so that it can increase hemoglobin levels (Maslahah & Hera, 2023) . Increased hemoglobin levels indicate an improvement in the body's physiological condition, especially in the process of red blood cell formation and increased oxygen supply to all body tissues can reduce the occurrence of vasoconstriction in the uterus so that the level of dysmenorrhea will decrease.

This research is in line with previous research conducted by Zeny Fatmawati (2021) that by providing Remakuda Juice intervention given to female students to drink for 5 days during menstruation, the results showed that hemoglobin levels after the intervention were higher than before with a p value = 0.010 (Fatmawati et al., 2021) . Another study conducted by Ningrum, et al. (2022) stated that Acupressure (*SP6* & *ST36*) can be an alternative method to increase hemoglobin levels, especially for young women or women who do not like consuming iron tablets (Ningrum et al., 2022) .

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Based on the theory and supporting research, this study shows that it is in line with both because there was an increase in hemoglobin levels after administering a combination intervention of Sanyinjiao acupressure (SP6) and cinnamon decoction.

3. Analyzing the Effect of a Combination of *Sanyinjiao Acupressure* (SP6) and Cinnamon Decoction on Hemoglobin Levels

Based on the results of the Paired t-Test statistical test, it was found that the significance value was p=0.000 (p<0.05), this indicates that there is a significant effect of the combination of *sanyinjiao acupressure* (SP6) and cinnamon decoction on increasing hemoglobin levels.

Physiologically, hemoglobin levels tend to be lower (<12 gr/dL) during menstruation because on the first day of menstruation, young women will lose a lot of blood with an average blood loss during menstruation of 84 ml or a loss of Hb of 133 g/l, so that young women will need additional iron (Cahyani, 2024) . The amount of iron that tends to be low during menstruation causes young women to experience low hemoglobin levels which is a factor in the emergence of dysmenorrhea in women, because hemoglobin has an important function in transporting oxygen through the bloodstream. When hemoglobin levels are insufficient, the body is unable to distribute oxygen optimally to the body's tissues and organs, this condition can cause hypoxia, namely a lack of oxygen in the tissues, which then stimulates the release of prostaglandins. This increase in prostaglandins can worsen vasoconstriction in the uterus, thereby triggering or worsening dysmenorrhea (Hou et al., 2024) .

After administering the combination of *Sayinjiao acupressure* (*SP6)* and cinnamon decoction, all 32 respondents (100%) experienced a significant increase in hemoglobin levels, within the normal range (12-15 g/dL) . This increase indicates stable hematopoiesis, or the formation of red blood cells in the bone marrow. *Sayinjiao acupressure* (*SP6*) works by strengthening spleen function, which contributes to the even distribution of iron throughout the body. Optimal iron distribution supports hemoglobin production, thereby increasing its levels in the blood (Sholihah et al., 2023) . Meanwhile, cinnamon decoction is known to contain various bioactive compounds such as cinnamaldehyde, eugenol, flavonoids, and anticoagulants that have anti-inflammatory and antioxidant properties, thus helping to reduce oxidative stress that affects red blood cell production and can facilitate oxygen throughout the body so that it can increase hemoglobin (Maslahah & Hera, 2023) .

This research aligns with previous research conducted by Ningrum et al. (2022), which explains that menstrual bleeding can reduce hemoglobin levels in adolescents, which can lead to anemia. One alternative treatment is acupuncture and acupressure therapy at the Zusanli (ST36) and Sanyinjiao (SP6) points, which has been shown to increase hemoglobin levels, as indicated by an increase in *pre-test* and *post-test results.* (Ningrum et al., 2022) .

This research is also in line with Sholihah's theory (2023), *Sanyinjiao* acupressure (*SP6*) shows that it is effective in helping to stabilize the hematopoiesis process in the body or the formation of red blood cells which directly contributes to hemoglobin so that hemoglobin levels in the body will increase. (Sholihah et al., 2023) .

In addition, this research is also in line with the theory of maslahah & Hera (2023) which explains that Cinnamon decoction contains active compounds that are anti-inflammatory and antioxidant, thus helping to reduce oxidative stress that affects red

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blood cell production, can facilitate oxygen throughout the body, so that there can be an increase in hemoglobin (Maslahah & Hera, 2023) .

Thus, the combination of *Sanyinjiao* (*SP6*) acupressure and cinnamon decoction has been clinically and statistically proven effective in increasing hemoglobin levels in adolescent girls with primary dysmenorrhea. This intervention could be a potentially inexpensive, home-based, and side-effect-free alternative to complementary non-pharmacological therapy for treating dysmenorrhea.

Research limitations

1. Although there was an increase in hemoglobin levels after the intervention, the increase was not significant because most respondents already had normal hemoglobin levels from the start. The body has mechanisms that maintain stable hemoglobin levels as needed. When hemoglobin levels are sufficient, the body will not absorb iron or produce excessive red blood cells.
2. **The influence of external factors ,** such as diet, consumption of other herbal drinks, or physical fatigue, cannot be fully controlled and has the potential to affect hemoglobin level results.

Conclusion

This study demonstrates that the combination of Sanyinjiao (SP6) acupressure therapy and cinnamon decoction significantly increases hemoglobin levels in adolescent girls with primary dysmenorrhea. The mechanism of action of this combination therapy involves improving blood circulation, optimizing iron distribution, stimulating hematopoiesis, and a natural analgesic effect that can reduce menstrual pain. This therapy is considered effective, easy to perform, inexpensive, and has minimal risk of side effects, making it a potential non-pharmacological treatment alternative that can be independently implemented by adolescent girls experiencing dysmenorrhea.

Ethics approval and consent to participate

An Ethical Clearance test has been carried out at the Health Research Ethics Testing Commission of the Faculty of Health Sciences, PGRI Adi Buana University, Surabaya, No: 149-KEPK on January 21, 2025, stating that the research protocol has been approved and declared ETHICALLY FEASIBLE.

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