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Effectiveness of Yoga in Reducing Menstrual Pain Intensity Among Adolescents: A Comparative Study Before and After Intervention

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ABSTRACT

Menstrual pain occurs in more than 90% of adolescence through out the world who experience pain during menstruation and 10% experience severe menstrual pain. One of non-pharmacological treatment is yoga therapy. The aim of this study was to determine the difference in the intensity of menstrual pain before and after yoga therapy. The design of this research is Pre-experimental with a one group pre test-posttest design at SMAN 2 Bangli from April to May 2024. Purposive Sampling was applied with a total 30 respondents. The yoga treatment was carried before menstruation and on the first day of menstruation, with a duration of 30 minutes each. An evaluation was conducted one hour after the second intervention using the Numeric Rating Scale. The results show that there is a difference before and after being given yoga therapy with a value of $p = 0.000$ ($\alpha < 0.05$). The lowest level of pain in pretest score was two and the highest score was six. The lowest level of pain in post test score was one, the highest was five. This demonstrates a significant difference in menstrual pain intensity among adolescent before and after yoga therapy. Adolescents are encouraged to practice yoga to manage menstrual pain.

INTRODUCTION

The World Health Organization (WHO) states that adolescence is a period of transition from childhood to adulthood that ranges from 10-19 years of age. The Population and Family Planning Agency (BKKBN) states that adolescents are individuals aged 10-24 years and are not married. In 2020, the number of adolescents aged 10-24 years reached 67.0 million individuals, equivalent to 24% of the total population of Indonesia. In the adolescent phase there are various changes such as physical changes, hormones and reproductive organs. For adolescent girls, menstruation is a sign of the beginning of the activity of the reproductive organs. For some people menstruation is a common thing, but for some women, menstruation can be an unpleasant experience. One of the problems that often arise is pain during menstruation caused by uterine muscle contractions, known as dysminorrhea or menstrual pain [1].

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Pain experienced during menstruation can have an emotional and physical impact on adolescent girls, so action or prevention needs to be taken to overcome this pain. Adolescents are often concerned about the potential negative effects on their reproductive system, and most of them do not know how to manage their pain. Period pain is often a reason for adolescent girls not to go to school, and if not managed properly, can have a negative impact on their health. Menstrual pain can cause discomfort, accompanied by symptoms such as nausea, vomiting, headache, diarrhea, and even fainting [2].

The prevalence of primary type dysmenorrhea in Indonesia is 54.89%, while the rest is secondary type [3]. Pharmacological efforts in pain management through the administration of Nonsteroidal Anti-inflammatory Drugs (NSAIDs) can relieve pain by inhibiting prostaglandins that cause pain. Besides pharmacological efforts, dysminorrhea can be overcome with a non-pharmacological approach, namely through yoga therapy [4]. Based on the results of the study conducted at SMP N 3 Mengwi, Badung, the average pain scale before and after the yoga therapy showed a decrease from 4.29 to 3.14. It can be concluded that yoga has an effect on reducing the intensity of menstrual pain among students at SMP N 3 Mengwi [5]. Yoga has been shown to increase the body's natural endorphin hormone production which can reduce pain. Yoga techniques include relaxation, breathing, improving posture to increase muscle strength, balance, and reduce pain [6]. An interview conducted at SMA N 2 Bangli revealed that 90% of the 373 menstruating female students experienced menstrual pain. Some reported severe pain that disrupted daily activities, including skipping classes and resting in the school clinic. Of the students interviewed, most did not practice any form of pain management, and none were aware of non-pharmacological approaches such as yoga.

The government has made efforts to overcome adolescent problems by forming Adolescent Care Health Services (PKPR), which is a health service that is friendly to adolescents. PKPR emphasizes acceptance, respect, confidentiality, and sensitivity to adolescent needs. Despite the implementation of services that care about adolescent problems, it turns out that these services have not been able to overcome the problem of menstrual pain that is often felt by adolescents. The purpose of this study was to identify the intensity of menstrual pain before yoga intervention, after yoga intervention and analyze the difference in the intensity of menstrual pain before and after yoga intervention for adolescent girls at SMAN 2 Bangli.

METHOD

This study used a Pre-experimental method using a one group pre-test post-test only design involving one group of subjects. The subject group was observed before treatment (pre-test) and then observed again after being given yoga movement treatment (post-test). The intensity of menstrual pain in the subject was assessed using a numerical rating scale (NRS) with a score range of 1-10. The treatment given was yoga therapy. Yoga therapy in this study is a series of yoga poses used in research is a series of poses Balasana, Paschimottanasana, Virasana, Adho Mukha Virasana, Padmasana, Adho Mukha Virasana, Admasana, Adho Muka Baddha Konasana, Parsva Uvistha Konasana, Baradvajasana, Adho Mukha Savanasana, Prasarita Padottanasana, Parsvottanasana, Supta Virasana, Supta Badha Konasana, Matsyasana, Supta Padangusthasana.

This series of yoga poses was made into an educational video. The video was demonstrated by students to provide clear instructions for the implementation of the yoga movement cycle as a therapy to reduce menstrual pain. Yoga therapy was given twice with a duration of 30 minutes each. The first intervention was given immediately after the pretest simultaneously to the research subjects at the SMAN 2 Bangli school environment. The second intervention was conducted on the first day of menstruation periode at the home of the research subject. The second evaluation was conducted one hour after the second intervention by a numerical rating scale. So that the second treatment was carried out on different days for each respondent due to different menstrual time.

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Univariate analysis was conducted to describe the frequency of menstrual pain intensity experienced by female students before and after being given Yoga treatment. This is done to determine the maximum, minimum value of menstrual pain intensity experienced by female students, standard deviation and average (median) level of menstrual pain before and after being given yoga treatment. The data normality test used is the ShapiroWilk test. Bivariate analysis uses the Wilcoxon test to compare the mean of two paired data where the samples come from the same respondent. The paired data in this study were the level of menstrual pain intensity of class X and XI female students at SMA Negeri 2 Bangli before and after the intervention with a significance / confidence level of 95% (α = 0.05). Ethical clearance of this study was approved by the Ethics Commission of Health Research of the Poltekkes Kemenkes Denpasar, with letter number DP.0402/F.XXXII.25/0511/2024.

This study was conducted at SMA N 2 Bangli which is located in Bangli. This location was chosen because based on preliminary studies conducted on female students who experience menstrual pain said that female students do not know about non-pharmacological treatments to treat menstrual pain such as yoga, and no similar research has been done at the school. Data collection in this study was carried out from April to May, namely for 5 weeks. Respondents of young women who participated as many as 30 female students of SMAN 2 Bangli. The sampling technique used was nonprobability sampling with purposive sampling. The inclusion criteria of the research subjects are: female students who experience primary menstrual pain, female students who do not take analgesic drugs during menstruation, female students who do not experience heart problems or diseases, and female students who are willing to become respondents. The exclusion criteria were students who experienced chronic pain during menstruation, students who had experienced injuries to the feet, hands, back and hips.

RESULT AND DISCUSSION

Characteristics Of Research Subjects

Table 1. Characteristic of Respondent

Characteristic	Frequency (F)	Percentage (%)
Age		
15	12	40
16	18	60
Amount	**30**	**100**
Age of *Menarche*		
11 years old	11	36,6
12 years old	13	43,4
13 years old	6	20
Amount	**30**	**100**
BMI		
underweight	9	30
Normal range	19	63,4
overweight	1	3,3
Obese	1	3,3
Amount	**30**	**100**
length of menstrual period		
3-5 days	23	76,6
6-10 days	7	23,4
Amount	**30**	**100**

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Table 1 describes that all respondents were aged 15-16 years. Based on age characteristics, namely at the age of 12 years as many as 13 respondents (43.4%), in the IMT category, the most respondents with Normal BMI were 19 people (63.4%), and in the characteristics of the length of menstruation the most were three to five days. Characteristics of respondents based on BMI, there were 19 respondents who had a normal BMI or 63.4%, BMI is very influential on menstrual disorders because if someone experiences certain hormonal changes characterized by striking weight loss or obesity, it will certainly have an impact on the function of the hormonal system in the body in the form of an increase or decrease in progesterone, esterogen, LH, and FSH. These changes cause menstrual problems such as menstrual pain [7]. Characteristics of respondents based on the length of menstruation were 23 people or 76.6% experienced menstruation for 3-5 days and the rest experienced menstruation for more than 7 days. Longer menstruation causes the uterus to contract frequently and more prostaglandins are released which causes pain and continuous uterine contractions cause the blood supply to the uterus to stop, causing menstrual pain [8].

Menstrual Pain Level Before Yoga Therapy

Table 2. Menstrual pain intensity of adolescent before being given yoga therapy

Pain Level	Frequency (f)	Percentage (%)	Median	Min	Max
2	5	17			
3	9	30			
4	4	13	4	2	6
5	3	10			
6	9	30			
Amount	**30**	**100**			

The results of observations of the level of menstrual pain felt by 30 adolescent female respondents before being given yoga therapy found that the most pain intensity was at level three as many as 9 people (30%) and level six as many as 9 people (30%), minimum score 2, maximum 6 and median four. The results showed that before being given yoga therapy a number of respondents experienced more pain level 3. More adolescent girls experience moderate levels of menstrual pain which also interfere with daily activities [2,9]. Primary menstrual pain that occurs in adolescent girls is caused by excessive contractions [7].

Pain tolerance varies among individuals, and only the person experiencing it can accurately assess the scale or intensity of their pain. Menstrual pain may occur due to an increase in prostaglandin levels during menstruation. This substance causes the endometrial muscles to contract, and the higher the prostaglandin level, the stronger the contractions. These contractions lead to vasoconstriction, or narrowing of the blood vessels, which reduces oxygen supply to the tissues and results in ischemia, thereby causing pain.

Menstrual Pain Level After Yoga Therapy

The results of the normality test showed a significance value of 0.000 (< 0.05) for both the pretest and posttest of menstrual pain intensity among adolescents, indicating that the data were not normally distributed. Therefore, hypothesis testing was conducted using the Wilcoxon signed-rank test.

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Table 3. Menstrual pain intensity of adolescent after being given yoga therapy

Pain Level	Frequency (f)	Percentage (%)	Median	Min	Max
1	12	40			
2	7	24			
3	4	13	2	1	5
4	6	20			
5	1	3			
Amount	**30**	**100**			

Table 3 shows that after the provision of yoga therapy intervention, the intensity of menstrual pain in adolescent girls is mostly at pain level one as many as 12 (40%). This result shows that there is a decrease in the average pain scale after being given treatment in the form of yoga therapy. The decrease in menstrual pain intensity occurs because when doing yoga exercises, the joints are moved optimally according to their range of motion so that they can refunction the cartilage that is rarely used and flow oxygen and blood in that direction [10] . This can prevent conditions such as pain. Yoga is a relaxation technique to reduce pain, strengthen organs around the pelvis and reproductive organs, stabilize blood pressure and breathing. Several previous studies support the findings of this research. stated that during yoga exercises, joints move optimally within their range of motion, which helps activate rarely used cartilage and improves blood and oxygen flow, thereby preventing pain. Yoga is also known as a relaxation technique that can reduce pain, improve sexual function, and regulate blood pressure and breathing. Similarly, a study by Endah found that after yoga exercises, nearly half of the 35 female students in class X at SMA 2 Probolinggo reported a decrease in menstrual pain, with 34.3% experiencing only mild pain (scale 1)[11]. Another study conducted on 15 eighth-grade students at SMPN 1 Bendo who experienced dysmenorrhea showed that the average pain scale after yoga was 2.87, with a minimum scale of 1 and a maximum of 5. Most respondents experienced a decrease in dysmenorrhea levels after 45 minutes of yoga, with 12 out of 15 participants reporting reduced pain[12].

Differences In Menstrual Pain Intensity Before And After Yoga Therapy

The results of the data normality test in this study found that the data were not normally distributed, so the next analysis used the Wilcloxon test. Before conducting the Wilcoxon test, first determine the maximum and minimum values in the frequency of menstrual pain intensity before and after being given yoga therapy, so that the median value can be determined in each frequency distribution of menstrual pain as a comparison.

Table 4. Differences In Menstrual Pain Intensity Before And After Yoga Therapy

Yoga Therapy	Pain level				
	Median	minimum	maximum	Z Value	P Value
Before	4	2	6	-4.797[b]	0,000
After	2	1	5		

Table 4 shows that there is a decrease in the intensity of menstrual pain in adolescent girls after yoga therapy intervention. The median value before the intervention was higher at 4 and decreased after the intervention to two with a median value difference of two. Differences also appear in the minimum and maximum pain interventions.

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The results of bivariate analysis with Wilcoxontest obtained a Z value of -4,797 with a value of 0.000 (α <0.005). This shows that there is a significant difference in the intensity of menstrual pain of adolescent girls before and after being given yoga therapy. These results prove that there is a significant effect between the provision of yoga therapy on the intensity of adolescent girls' menstrual pain. primary menstrual pain is caused by excessive contractions. Pain during menstruation can occur due to an increase in prostaglandins during menstruation. The prostaglandin causes the endometrial muscles to contract so that the higher the prostaglandin substance, the stronger the contraction in the endometrium to experience vasoconstriction or narrowing of blood vessels so that the oxygen supply to the blood vessels is ischemia or lack of oxygen so that pain occurs. The presence of prostaglandins triggers stress, causing suppression of the sensation of the nerves of the hip and lower back muscles, causing dysmenorrhea[7] . Primary menstrual pain is caused by excessive contractions. Pain during menstruation can occur due to an increase in prostaglandins during menstruation. The prostaglandin causes the endometrial muscles to contract so that the higher the prostaglandin substance, the stronger the contraction of the endometrium to experience vasoconstriction or narrowing of blood vessels so that the oxygen supply to the blood vessels experiences ischemia or lack of oxygen resulting in pain. The presence of prostaglandins triggers stress, causing suppression of the sensation of the nerves of the hip and lower back muscles, causing dysmenorrhea.

Yoga is one of the relaxation techniques to reduce pain. Relaxation techniques in yoga could stimulate the body to release endorphins and enkephalin, which are endogenous opioid peptide compounds that act as analgesics, in other words, these compounds function in the process of inhibiting pain. Yoga can reduce pain by relaxing the endometrial muscles that experience muscle contraction and ischemia due to an increase in prostaglandins so that blood vessel vasodilation occurs. This causes blood flow into spasm and ischemia to increase so that the pain felt can decrease [10]. From the results of research conducted on 35 adolescent girls in class X at SMA 2 Probolinggo City, it was found that 34.3% of respondents experienced menstrual pain with scale 1, which is the lowest pain scale [11]. These results were obtained by providing only one yoga therapy intervention. Yoga therapy intervention in this study was given twice, namely when completing the pretest, which was carried out simultaneously on 30 research subjects. While the second intervention was carried out during the second day of the research subject's period. When compared to research conducted by previous researchers at SMA 2 Probolinggo City, the frequency of yoga therapy in this study was more, namely twice. according to the researcher, the increase in the frequency of giving yoga therapy to research subjects is more effective in reducing the intensity of pain during menstruation. The series of yoga poses is proven to increase b-endorphin levels up to five times in the blood, the more you do a series of yoga movements, the higher the levels of b-endorphins produced by the body [5].

Yoga could effectively reduce the intensity of menstrual pain. Some yoga movements can help relieve abdominal cramps and reduce emotional stress that can affect menstrual pain. Studies show that yoga can help reduce menstrual pain in about 60-87.5% of women who experience menstrual pain[11]. Yoga movements or poses that are assembled as educational materials are formulated in such a way that affects the hips, spine, legs, posture so that it launches the hormone system, provides comfort to the organs in the abdomen and womb and can help maintain hormonal balance. A series of yoga movements can not only reduce the intensity of menstrual pain but can even eliminate pain if done regularly. The series of yoga movements always ends with relaxation not only affects physical relaxation, especially in the pelvic area of adolescent girls. Relaxation can also provide psychological calmness which can reduce stress due to menstrual pain. A complex series of yoga movements consisting of breathing exercises, physical movements and silence during meditation, provides a comprehensive calmness both physically and psychologically for adolescent girls.

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CONCLUSION

Based on the results of data analysis of pain intensity in adolescent girls, there is a significant difference in the intensity of menstrual pain in adolescent girls before and after yoga therapy. In order to know the real effect, further researchers are advised to provide interventions more than twice in order to have an optimal effect on reducing the intensity of pain in adolescent girls. Yoga that is routinely done not only provides benefits to reduce the intensity of menstrual pain but also for physical and mental health benefits.

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