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COMBINATION OF CAT STRETCH EXERCISE MOVEMENTS WITH COUNTER PRESSURE TECHNIQUE ON MENSTRUAL PAIN

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Abstract

Menstrual pain, or dysmenorrhea, is primarily associated with increased production of prostaglandins, which trigger uterine contractions and result in pain during menstruation. This condition affects approximately 29% of women, with around 12% frequently missing school each month. This study aimed to evaluate the effectiveness of combining cat stretch exercises (CSE) with counter pressure (CP) techniques in reducing menstrual pain among seventh-grade students. A quasi-experimental design with a pre-test and post-test control group approach was employed. A total of 56 respondents were selected through purposive sampling and divided into intervention and control groups. Pain intensity was measured using the Numeric Rating Scale (NRS), and the intervention was implemented according to standard operating procedures (SOP). Data were analyzed using Paired Sample t-test and Independent t-test to assess within-group and between-group differences. The results showed that the mean pre-test pain score was 4.36 ± 1.471 in the intervention group and 4.71 ± 2.034 in the control group, with no statistically significant difference (p = 0.455). After the intervention, the mean pain score decreased to 2.14 ± 1.407 in the intervention group and 3.21 ± 1.931 in the control group, indicating a statistically significant difference between groups (p = 0.021). In conclusion, there was a statistically significant reduction in menstrual pain among students who received the combination of cat stretch exercises and counter pressure techniques. These findings suggest that this combined intervention may be considered as a complementary approach to help manage menstrual pain in school settings, although further research with more rigorous designs is recommended.

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INTRODUCTION

Menstruation is the shedding of the uterine lining, influenced by hormones, and occurs regularly in women of reproductive age. Menstruation serves as a biological indicator of sexual maturity. During menstruation, many adolescent girls experience discomfort such as abdominal pain (dysmenorrhea) and may also face irregular menstrual cycles (1). A few days before menstruation, women often experience symptoms such as breast swelling, bloating, and irritability. Some women also experience more severe symptoms, including cramps caused by uterine muscle contractions, headaches, pain in the mid-abdominal area, restlessness, fatigue, and emotional sensitivity or the urge to cry. One of the most common conditions experienced by adolescent girls is menstrual pain or dysmenorrhea (2)

Menstrual pain or dysmenorrhea is a condition caused by an imbalance of the hormone progesterone in the body, leading to cramping during menstruation. Dysmenorrhea is a common condition among adolescent girls and women, characterized by painful uterine cramps during menstruation. It is estimated that 50%–90% of adolescents experience dysmenorrhea, with a substantial proportion reporting moderate to severe pain. In Indonesia, the prevalence reaches 64.25%, with most cases classified as primary dysmenorrhea(3). Menstrual pain or dysmenorrhea affects 50% to 90% of adolescent girls and adult women(4). This aligns with previous research showing that dysmenorrhea has a significant impact on adolescents' lives, with 43.3% of students missing school, 74.9% experiencing pain

during class, and 77.2% having difficulty engaging in physical activities or sports (5).

This condition has a significant impact on adolescents' daily lives, particularly on academic performance and participation in school activities. Many students report difficulty concentrating in class, limitations in physical activities, and increased absenteeism due to menstrual pain. On a broader scale, dysmenorrhea also contributes to reduced productivity and quality of life, highlighting its importance as a public health concern.[6]. Dysmenorrhea can cause physical weakness, making individuals feel fatigued and low in energy, which negatively affects their daily activities (7).

Pathophysiologically, primary dysmenorrhea is primarily associated with excessive production of prostaglandins in the endometrium, which induces strong uterine contractions, reduced uterine blood flow, and ischemia, ultimately leading to pain. In contrast, secondary dysmenorrhea is linked to identifiable pelvic pathologies such as endometriosis, adenomyosis, or uterine structural abnormalities. This biological mechanism highlights the importance of interventions that target both muscle relaxation and pain modulation.[6]. Knowledge regarding dysmenorrhea or menstrual pain is important for every adolescent girl to increase awareness and understanding of the reproductive health issues they may experience(8) .

There are various non-pharmacological methods, such as abdominal stretching exercises that involve a combination of Cat Stretch Exercise movements and the Counter-Pressure Technique, which can be performed by adolescent girls. [9]. The Cat Stretch Exercise is a form of light exercise suitable for adolescents. This exercise involves stretching that can improve blood circulation and relax the uterine muscles, thereby helping to alleviate menstrual pain. Performing the Cat Stretch Exercise stimulates the body to produce endorphins, which help regulate blood vessels and maintain smooth blood flow. Endorphins act as natural analgesics, thus reducing menstrual pain (9).

A study by Ikrima et al., (10) reported a p-value of 0.000 before and after Cat Stretch Exercise training, indicating that $p < 0.05$. A p-value below 0.05 signifies that H0 is rejected and H1 is accepted, demonstrating that the Cat Stretch Exercise is effective in reducing dysmenorrhea pain. Additionally, the Counter-Pressure Technique is another effective non-pharmacological method for managing pain. This technique involves applying firm pressure using the heel of the hand, the flat part of the hand, or a tennis ball, either with straight movements or small circular motions (11). A study by Henniwati et al.,(12) showed that the average pre-test score was 6.42 and the post-test score was 1.82, with an average difference of 4.56. This indicates a reduction in menstrual pain after the application of the counter-pressure technique. In addition, the significance value (Sig.) obtained was 0.000, indicating that the counter-pressure technique has a significant effect on reducing menstrual pain intensity among adolescent girls. Menstrual disorders in school-aged adolescent girls can affect the teaching and learning process they undergo. This is due to menstrual pain that can last for a considerable duration, contributing to high levels of school absenteeism (13).

Non-pharmacological approaches have increasingly been recommended as first-line or complementary strategies for managing dysmenorrhea, particularly among adolescents, due to their safety and accessibility. Among these, exercise-based interventions such as Cat Stretch Exercise (CSE) have been shown to enhance pelvic blood circulation, reduce muscle stiffness, and stimulate endorphin release, thereby contributing to pain reduction. Similarly, the counter-pressure (CP) technique has demonstrated effectiveness in alleviating pain through mechanical stimulation of sensory receptors, which modulates pain transmission pathways (13). However, although prior studies have established the effectiveness of Cat Stretch Exercise and counter-pressure techniques as separate interventions, evidence regarding their combined application remains scarce. In particular, there is a lack of empirical research examining the synergistic effect of integrating stretching-based and pressure-based interventions in reducing dysmenorrhea among adolescent populations in school settings. This gap is important, as combining two complementary mechanisms, muscle relaxation and pain modulation, may result in a more effective and holistic intervention(14). Therefore, this study aims to evaluate the effect of a combined intervention of Cat Stretch Exercise movements and the Counter-Pressure Technique on menstrual pain. This research is expected to provide evidence-based support for the

development of practical, non-pharmacological interventions that can be implemented within school health programs to improve adolescent well-being.

METHODS

This study employed a Quasi-Experimental Design using a Pre-Test and Post-Test with a non-equivalent control group design. The selection of this design was based on the characteristics of the sample, in which the intervention and control groups were determined according to predefined inclusion criteria (15). The target population refers to the population defined based on the research problem, while the survey population consists of individuals who can be reached by the researcher (16). The population of this study included all seventh-grade female students at SMPN 13 Depok.

The sample size in this study was calculated manually using the Isaac & Michael formula. This formula is specifically used to determine sample size in quantitative research when the population is large enough to produce accurate results. This formula takes into account factors such as population size and the desired error rate, ensuring efficient research. To anticipate drop-out (DO), the researcher prepared a data sample reserve of 10% so that the number of samples obtained in this study was 56 people. The sample was proportionally divided into two groups: an intervention group and a control group, each comprising 28 students. [(16)]. The sampling technique used was purposive sampling, based on specific characteristics relevant to the research objectives. [(17).] This sampling technique involves selecting participants based on specific characteristics relevant to the research objectives, which can limit the representativeness of the sample and reduce the generalizability of the findings.

Inclusion criteria should specify characteristics such as: 1) Active seventh-grade female students at SMPN 13 Depok who are menstruating; 2) Experiencing menstrual pain before and during menstruation on days 1 to 3; 3) Seventh-grade female students who are willing to commit to being research respondents and are ready to undergo intervention on days 1 to 3 during menstruation. Meanwhile, exclusion criteria include: 1) Female students who have been medically diagnosed with gynecological disorders (such as endometriosis, müllerian malformation, uterine fibroids, adenomyosis), pelvic masses, or infections, as these conditions require medical attention; 2) Female students who regularly take analgesics or other medications during menstruation; and 3) Female students who are currently taking blood thinners. Providing detailed criteria ensures transparency in the sampling process and helps minimize bias, thereby strengthening the validity and reliability of the research findings.

The study was conducted from November to December 2024. The intervention group received education on menstruation, pain mechanisms, and detailed explanations of the interventions through presentations and demonstrations of the Cat Stretch Exercise and Counter Pressure technique following the Standard Operating Procedure (SOP).

This sampling technique involves selecting participants based on specific characteristics relevant to the research objectives, which can limit the representativeness of the sample and reduce the generalizability of the findings. Inclusion criteria should specify characteristics such as: 1) Active seventh-grade female students at SMPN 13 Depok who are menstruating; 2) Experiencing menstrual pain before and during menstruation on days 1 to 3; 3) Seventh-grade female students who are willing to commit to being research respondents and are ready to undergo intervention on days 1 to 3 during menstruation. Meanwhile, exclusion criteria include: 1) Female students who have been medically diagnosed with gynecological disorders (such as endometriosis, müllerian malformation, uterine fibroids, adenomyosis), pelvic masses, or infections, as these conditions require medical attention; 2) Female students who regularly take analgesics or other medications during menstruation; and 3) Female students who are currently taking blood thinners. Providing detailed criteria ensures transparency in the sampling process and helps minimize bias, thereby strengthening the validity and reliability of the research findings.

The intervention included basic cat stretch movements (starting position, arching position, and relaxation position) and pressure application on the sacral points (S2–S4) using the heel of the hand(18)**.** After the demonstration, the researcher distributed

SOP leaflets as a guide for independent practice. Based on research by Setiawan et al (2021) and Sutiyono (2023), this intervention can be carried out for at least three days during menstruation, for 20 minutes, after which the pre-test, post-test, and observation sheet are completed (19). Data collection was conducted using the Numeric Rating Scale (NRS), which has been proven valid and reliable. The NRS is a horizontal scale ranging from 0 to 10, where 0 indicates no pain, and 10 indicates severe pain(20).

Data analysis included univariate and bivariate analyses, as well as homogeneity tests. Univariate analysis was used to describe respondent characteristics and was presented in tables, frequency distributions, graphs, and narrative form (21). Bivariate analysis was conducted to compare two variables before and after the intervention (22). This study ensured the rights and confidentiality of respondents through informed consent, parental consent, and privacy protection procedures. In this study, the homogeneity test was conducted on both pre-test and post-test data. For the pre-test data, this test ensured that any differences in outcomes between the two groups were due to the intervention provided, rather than differences in their initial characteristics. Meanwhile, the homogeneity test on the post-test data aimed to assess whether the variability of the results after the intervention remained consistent.

RESULTS AND DISCUSSION

Table 1 Distribution of Average Respondent Characteristics

Characteristic	Mean ± SD	Min	Max
Menarche	11,20 ± 0,749	9	13
Menstrual Period	6,48 ± 0,894	4	8

Table 1 presents the distribution of respondents' characteristics based on age at menarche and menstrual period duration. The mean age at menarche is 11.20 years with a standard deviation of 0.749, indicating that the majority of respondents experienced the onset of menstruation within a relatively consistent age range. The reported ages range from 9 to 13 years, which aligns with the typical physiological window for menarche. The average duration of the menstrual period is 6.48 days with a standard deviation of 0.894, reflecting moderate variability in cycle length among respondents. The minimum reported duration is 4 days, while the maximum is 8 days, both of which fall within clinically normal limits. Overall, the table demonstrates that the respondents' menarcheal age and menstrual duration generally follow expected normative patterns.

Table 2 Distribution of the Mean Menstrual Pain Scale

Dysmenorrhea Pain Scale	Mean ± SD	Min	Max
Intervention Group			
Pre Test	4,36 ± 1,471	2	7
Post Test	2,14 ± 1,407	0	5
Control Group			
Pre Test	4,71 ± 2,034	1	9
Post Test	3,21 ± 1,931	0	7

Table 2 presents the distribution of mean menstrual pain scores in the intervention and control groups during the pre-test and post-test assessments. In the intervention group, the mean dysmenorrhea score decreased from 4.36 ± 1.471 at pre-test to 2.14 ± 1.407 at post-test. The minimum score declined from 2 to 0, while the maximum score decreased from 7 to 5, indicating a clear reduction in pain intensity following the intervention. In the control group, the mean pain score also decreased, though the change was less substantial. The average score dropped from 4.71 ± 2.034 at pre-test to 3.21 ± 1.931 at post-test. The minimum score changed from 1 to 0, and the maximum score decreased from 9 to 7, suggesting a moderate reduction that may reflect natural variation rather than the effect of a specific intervention. Overall, the table indicates that the intervention group experienced a more pronounced decline in menstrual pain levels compared to the control group.

Table 3 Normality Test

Dysmenorrhea Pain Scale	Shapiro-Wilk (Statistic)	Sig.
Pre Test	0,938	0,099
Post Test	0,931	0,067
Pre Test	0,962	0,384
Post Test	0,937	0,91

Table 3 presents the results of the normality test for dysmenorrhea pain scale scores in both the intervention and control groups using the Shapiro–Wilk test. In the intervention group (n = 28), the pre-test produced a Shapiro–Wilk statistic of 0.938 with a significance value of 0.099, while the post-test yielded a statistic of 0.931 with a significance value of 0.067. Both p-values exceed 0.05, indicating that the data are normally distributed. Similarly, in the control group (n = 28), the pre-test resulted in a statistic of 0.962 with a significance value of 0.384, and the post-test produced a statistic of 0.937 with a significance value of 0.910. These p-values also exceed the 0.05 threshold, confirming normal data distribution. Overall, the results demonstrate that dysmenorrhea pain scale scores in both groups across pre-test and post-test measurements meet the assumption of normality, allowing for the use of parametric statistical analyses.

Table 4 Homogeneity Test on Pre-Test and Post-Test Scores

	Levene Statistic	df1	df2	Sig.
Pre Test	2,731	1	54	0,104
Post Test	2,224	1	54	0,142

In Table 4, the results of the homogeneity test using Levene's Test show that the significance value (Sig.) for the pre-test was 0.104, and for the post-test it was 0.142. Both values are greater than 0.05, indicating that the variance between groups in the pre-test and post-test is homogeneous. The degrees of freedom used in this test consist of df1 = 1, which indicates a comparison between two groups, and df2 = 54, which reflects the total number of data points of 56 (54 + 2). Thus, the assumption of homogeneity of variance is met, so that the data meet the criteria for parametric statistical analysis.

Table 5 presents the effect of combining Cat Stretch Exercises with the Counter-Pressure technique on menstrual pain (dysmenorrhea) in the intervention group (n = 28). The mean pain score decreased substantially from 4.36 ± 1.471 at pre-test to 2.14 ± 1.407 at post-test. The analysis shows a p-value of 0.000, indicating a statistically significant difference in pain levels before and after the intervention. The 95% confidence interval for the mean difference ranges from 1.775 to 2.654, confirming that the reduction in menstrual pain is both statistically significant and clinically meaningful. Overall, these results demonstrate that the combination of Cat Stretch Exercises and the Counter-Pressure technique is effective in reducing dysmenorrhea in the intervention group.

Table 5 The Effect of Combining Cat Stretch Exercises with the Counter-Pressure Technique on Menstrual Pain (Dysmenorrhea) in the Intervention Group (n=28)

	Mean ± SD	Sig. (2-tailed)	95% CI	
			Lower	Upper
Pre Test	4,36 ± 1,471	p<0,001	1,775	2,654
Post Test	2,14 ± 1,407			

Table 6 Differences in the Mean Menstrual Pain Scale Before Treatment (Pre-Test) Between the Intervention and Control Groups (n=28)

	Mean ± SD	Mean Difference	Std. Error Difference	Sig. (2-tailed)	95% CI	
					Lower	Upper
Intervention	4,36 ± 1,471	-0,357	0,474	0,455	-1,308	0,594
Control	4,71 ± 2,034					

Based on Table 6, the pre-test results show that the mean menstrual pain score in the intervention group was 4.36 ± 1.47, while the control group had a mean score of 4.71 ± 2.03. The mean difference between the two groups was 4.36 ± 1.47 with a standard error of 0.474. The significance value (p = 0.455) indicates that there was no statistically significant difference in menstrual pain levels between the intervention and control groups before the treatment. These findings demonstrate that both groups had comparable baseline pain levels before the intervention was administered. Furthermore, the 95% confidence interval for the mean difference ranges from -1.308 to 0.594, which includes the value of zero. Based on these results, it can be concluded that there is no

statistically significant difference between the mean pre-test scores of the intervention and control groups. This indicates that both groups were in a balanced baseline before the intervention.

Table 7 Differences in the Mean Menstrual Pain Scale After Treatment (Post-Test) Between the Intervention and Control Groups (n=28)

	Mean ± SD	Mean Difference	Std. Error Difference	Sig. (2-tailed)	95% CI	
					Lower	Upper
Intervetion	2,14 ± 1,407	-1,071	0,452	0,021	-1,977	-0,166
Control	3,21 ± 1,931					

Based on Table 7, the post-test results show that the mean menstrual pain score in the intervention group decreased to 2.14 ± 1.41, whereas the control group recorded a mean score of 3.21 ± 1.93 after treatment. The mean difference between the two groups was –1.071 with a standard error of 0.452. The significance value (p = 0.021) indicates a statistically significant difference in menstrual pain levels between the intervention and control groups following the treatment. These findings suggest that the intervention was effective in reducing menstrual pain more significantly compared to the control group. The 95% confidence interval for the mean difference ranges from -1.977 to -0.166, and this range does not include the zero value. It can be concluded that the resulting significance value (Sig. 2-tailed) is 0.21, which is greater than the value of α = 0.05. These results indicate that the intervention has a significant effect on the post-test results when compared to the control group. The main finding of this study is that the combined intervention of Cat Stretch Exercise and Counter Pressure proved to be significantly effective in reducing menstrual pain among respondents in the intervention group. The analysis showed a Sig. (2-tailed) value of 0.000 ($p < 0.05$), indicating a statistically significant difference between the intensity of menstrual pain before and after the intervention. This demonstrates that the intervention effectively reduced menstrual pain. The significance value also confirms that the changes observed were not incidental but resulted directly from the intervention. Another important finding is the Sig. (2-tailed) value of 0.021 ($p < 0.05$), indicating a statistically significant difference between the post-test scores of the intervention and control groups. These results show that the intervention given to the intervention group was more effective in reducing menstrual pain compared to the control group.

A study by Permaini et al.,(23) also demonstrated significant differences in menstrual pain severity before and after the implementation of abdominal stretching using the Cat Stretch Exercise method in young women. This approach can be utilized as an effective nursing care strategy for adolescents with dysmenorrhea. Healthcare providers play an essential role in offering education and practical guidance on these exercises to individuals experiencing menstrual discomfort. Abdominal stretching can be integrated into holistic nursing care to help reduce menstrual pain among adolescents; however, systematic and structured implementation is required for optimal effectiveness.

Other findings in this study showed that the intervention group experienced a decrease in mean menstrual pain from 4.36 ± 1.471 (pre-test) to 2.14 ± 1.407 (post-test). This reduction indicates a shift from moderate to mild pain, with relatively small data variation, suggesting consistent results among respondents. In contrast, the control group's pain intensity only decreased from 4.71 ± 2.034 to 3.21 ± 1.931, remaining within the moderate pain category with greater data variation. The more substantial reduction in the intervention group confirms the effectiveness of the Cat Stretch Exercise combined with Counter Pressure in reducing menstrual pain compared to the control group, which did not receive the intervention.

These findings are consistent with Setiawan et al., (9) who reported that the mean dysmenorrhea intensity score

before and after performing Cat Stretch Exercise was 2.267, with a significance value of $p = 0.000$ ($p < 0.05$). This resulted in the rejection of H0, indicating a significant effect of Cat Stretch Exercise on reducing dysmenorrhea intensity among high school students at SMA Muhammadiyah Tasikmalaya. This supports the conclusion that Cat Stretch Exercise is effective in reducing menstrual pain. Similarly, Lestari et al., (24) found an Asymp. Sig. (2-tailed) value of 0.000, which is less than 0.05, indicating a significant difference before and after the application of Counter Pressure techniques. This confirms the effectiveness of Counter Pressure Massage in reducing labor pain during the active phase of the first stage of labor at Rahayu Clinic, Ungaran.

Menstrual pain or dysmenorrhea is a common gynecological condition that significantly affects women's physical and mental well-being, education, and overall quality of life. Primary dysmenorrhea, which occurs before or during menstruation without pelvic abnormalities, is caused by endometrial inflammation and increased prostaglandin release, which triggers uterine contractions that lead to pain (25). Management of dysmenorrhea includes pharmacological treatments using analgesics and non-pharmacological methods such as the combination of Cat Stretch Exercise and Counter Pressure.

This combined approach is effective in reducing pain intensity, particularly for individuals with dysmenorrhea. Cat Stretch Exercise is a stretching technique involving flexible movements of the back and abdomen, which help relieve muscle tension, improve flexibility, and enhance blood flow to the pelvic area (26). Counter Pressure, on the other hand, is a technique that applies pressure to specific body points, such as the lower back, to reduce pain by stimulating skin and muscle receptors that send pain-modulating signals to the brain (27). The combination of both techniques provides dual benefits: stretching that reduces muscle tension and pressure that decreases pain perception. This approach enhances the effectiveness of menstrual pain management and offers more comprehensive care for individuals experiencing dysmenorrhea.

CONCLUSION

The results of this study indicate that the combination of Cat Stretch Exercise and Counter Pressure techniques is effective in reducing menstrual pain among seventh-grade students. This is because both methods help relax the pelvic muscles and decrease pain perception. These findings reinforce that this non-pharmacological approach can serve as a safe, self-managed option for alleviating dysmenorrhea. Based on these results, it is recommended that students practice these techniques when experiencing menstrual pain, schools integrate related education into their health programs, and future research employ stronger designs and instruments to obtain more comprehensive outcomes.

This study has several limitations. The non-randomized design may introduce selection bias, while the small sample size limits generalizability. The use of a self-reported pain scale may lead to subjective bias, and the short intervention duration may not reflect long-term effects. Based on the level of evidence, this study is categorized as moderate (Level II–III). Although the findings support the effectiveness of the intervention, further research using randomized controlled trials with larger samples is needed. Clinically, this intervention can be considered a safe and practical non-pharmacological option, but it should be applied cautiously as supportive evidence rather than a definitive guideline.

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The study obtained ethical approval from the Health Research Ethics Committee under Approval Number 415/X/2024/KEP. Informed consent was obtained from all participants before data collection, ensuring that ethical principles such as autonomy, confidentiality, and voluntary participation were upheld throughout the study.

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