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THE EFFECT OF ABDOMINAL STRETCHING EXERCISE ON REDUCING THE INTENSITY OF MENSTRUAL PAIN (DYSMENORRHEA) IN PHYSIOTHERAPY STUDENTS AT THE MAKASSAR MINISTRY OF HEALTH POLYTECHNIC.

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Abstract

Background: Dysmenorrhea is menstrual pain caused by increased prostaglandins and uterine contractions, which can disrupt activities, concentration, and the learning process of female students. Many students still tend to ignore menstrual pain or manage it with temporary pharmacological approaches. Therefore, abdominal stretching exercise is urgently needed as a simple, safe, low-cost, and non-pharmacological intervention that can be practiced independently to reduce pain through increased muscle flexibility, blood circulation, and endorphin release. **Methods:** This study used a pre-experimental one-group pretest-posttest design involving 38 physiotherapy students at Poltekkes Kemenkes Makassar who experienced primary dysmenorrhea and met the inclusion criteria. The sample consisted of all eligible respondents from 43 screened students. The independent variable was abdominal stretching exercise, while the dependent variable was menstrual pain intensity measured using the Numeric Rating Scale (NRS). Pain was measured at pre-test and post-tests 1 to 4. Normality was assessed using the Shapiro-Wilk test, and differences in pain intensity were analyzed using the Wilcoxon signed-rank test because the data were not normally distributed. **Results:** The Shapiro-Wilk test showed that pain intensity data were not normally distributed ($p < 0.05$), so the results were presented using median pain categories. The median pain category decreased from severe pain at pre-test to moderate pain at post-tests 1 to 3 and mild pain at post-test 4. The Wilcoxon test showed $p < 0.001$ for each measurement comparison, indicating a significant reduction in menstrual pain after abdominal stretching exercise. **Conclusion:** Abdominal Stretching Exercise has a significant effect on reducing the intensity of menstrual pain, making it a safe, easy, and effective non-pharmacological therapy alternative for female students experiencing dysmenorrhea.

Keywords: Abdominal Stretching Exercise, Dysmenorrhea, Menstrual Pain, Numeric Rating Scale (NRS).

INTRODUCTION

Adolescence is a developmental phase toward adulthood that encompasses mental, emotional, social, and physical maturity. This period is marked by the maturation of the reproductive organs and readiness for reproduction. One manifestation of puberty in females is the first menstrual experience, known as menarche. Indonesia is currently undergoing a shift in the structure of its population pyramid. The demographic pattern observed in Indonesia resembles that of developed countries, characterized by a decline in the proportion and number of children, accompanied by a significant increase in the adolescent population (Haid & Putri, 2023).

Menstruation is a routine physiological phenomenon experienced by women every month throughout their reproductive years. It is characterized by periodic and cyclical bleeding accompanied by the shedding of the inner lining of the uterus, or endometrium, which is then expelled through the vagina in adult women. The menstrual cycle represents regular physiological changes in the female reproductive system regulated by reproductive hormones. This phase is crucial for reproductive function and generally occurs monthly from puberty until menopause. By definition, menstruation is periodic and cyclical uterine bleeding involving the shedding (desquamation) of the endometrium (Swandari, 2022).

Dysmenorrhea is the medical term for pain experienced during menstruation, usually felt in the lower abdomen shortly before or during the menstrual period (Mayangsari & Ayubi, 2024). It is also commonly referred to as menstrual pain or menstrual cramps. This common gynecological problem reported by women of reproductive age is classified into two types: primary and secondary dysmenorrhea (Mayangsari & Ayubi, 2024).

The World Health Organization (WHO) reported that the prevalence of dysmenorrhea among adolescent girls was 42.6% in 2020. This figure increased to 43.2% in 2021 and 43.9% in 2022. In ASEAN countries, particularly the Philippines and Malaysia, the prevalence of menstrual pain was reported to be 38.5% (WHO, 2022).

Based on data from the 2020 Profile of the Ministry of Health of the Republic of Indonesia, the prevalence of dysmenorrhea among adolescent girls was recorded at 41.6%. In 2021, the prevalence increased to 42.5%, and in 2022 it reached 43.1% (Ministry of Health, 2022).

In Indonesia, the incidence of primary dysmenorrhea is reported to be 55%, while the remaining cases are secondary dysmenorrhea. Dysmenorrhea is common among adolescents, with prevalence ranging from 45% to 95%. Approximately 75-85% of these adolescents report mild dysmenorrhea. The estimated incidence of endometriosis among adolescents experiencing pelvic pain is 25-40%. Furthermore, studies show that 75% of adolescents who underwent laparoscopy after failing to respond positively to menstrual pain management were confirmed to have a related condition (Haid & Putri, 2023).

According to data from the South Sulawesi Provincial Health Office, the incidence of menstrual pain among adolescent girls was recorded at 38.4% in 2020. This figure increased to 38.9% in 2021 and rose again to 39.3% in 2022 (South Sulawesi Provincial Health Office, 2022).

Preliminary observation data among female students in the Physiotherapy Department of the Makassar Ministry of Health Polytechnic showed that, of the 43 students who completed the screening questionnaire, 38 experienced primary dysmenorrhea. Common complaints during the first and second days of menstruation included lower abdominal pain, dizziness, and nausea. These conditions interfered with academic activities, including absence from lectures, decreased learning concentration, and disrupted social interaction due to mood changes. Some students tended to ignore the pain, rest without targeted management, or independently use pain-relieving medication. This indicates that students' knowledge, attitudes, and practices in managing dysmenorrhea still need to be directed toward safe, simple, non-pharmacological measures that can be performed independently.

Abdominal stretching exercise is a muscle-stretching activity focused on the abdominal area and performed for approximately 10 to 15 minutes. This exercise is recommended because it is easy to learn, requires no special equipment, can be performed independently, and is relatively safe for adolescent girls with primary dysmenorrhea. Physiologically, stretching can help improve muscle flexibility, enhance blood circulation, reduce muscle tension, and stimulate the release of endorphins, which act as the body's natural analgesics. Based on these considerations, abdominal stretching exercise was selected as the intervention in this study to reduce menstrual pain intensity among female students in the Physiotherapy Department of the Makassar Ministry of Health Polytechnic.

METHODS

Design, Setting, and Time

This study used a pre-experimental design with a one-group pretest-posttest approach. The study was conducted at the Physiotherapy Department Campus of the Makassar Ministry of Health Polytechnic from April to May 2026.

Number and Method of Subject Recruitment

The accessible population in this study consisted of 43 female students from the Physiotherapy Department of the Makassar Ministry of Health Polytechnic who participated in dysmenorrhea screening. The study sample comprised 38 students with primary dysmenorrhea who met the inclusion and exclusion criteria and agreed to participate by signing informed consent. The sample size was not determined using the Slovin formula; instead, it included all respondents from the accessible population who met the study criteria during the research period.

Thus, the final sample consisted of 38 respondents. Purposive sampling was used in accordance with the study criteria because the included respondents were required to have primary dysmenorrhea with moderate to severe pain.

The inclusion criteria were female students of the Physiotherapy Department at the Makassar Ministry of Health Polytechnic who experienced primary dysmenorrhea, had moderate to severe pain based on the Numeric Rating Scale (NRS), and agreed to participate by signing informed consent. The exclusion criteria were students with mild dysmenorrhea and students with diseases or abnormalities of the reproductive system.

Data Processing and Analysis

Data analysis was conducted according to the type of study variable. Age characteristics were presented categorically as frequencies and percentages. Menstrual pain intensity was measured using the Numeric Rating Scale (NRS) and categorized as mild, moderate, or severe. Because the Shapiro-Wilk normality test showed that the data were not normally distributed ($p < 0.05$), pain intensity data were presented using the median pain category, while changes in pain intensity before and after the intervention were analyzed using the Wilcoxon signed-rank test.

RESULTS

Univariate Analysis

Based on Table 1, most respondents were in the late-adolescent age group of 18-19 years, totaling 35 individuals (92.1%), while 3 respondents (7.9%) were 20 years old. This age distribution indicates that the respondents were relatively homogeneous and were within the age range from late adolescence to early adulthood.

Table 1. Respondents' Age Characteristics

Age group	f	%
Late adolescence (18-19 years)	35	92,1
Early adulthood (20 years)	3	7,9
Total	38	100,0

Data source: Primary Data, 2026

Bivariate Analysis

Based on Table 2, before the intervention, most respondents experienced severe pain, totaling 30 individuals (78.9%), while 8 individuals (21.1%) experienced moderate pain. After abdominal stretching exercise, pain intensity gradually decreased. At post-test 1, the number of respondents with moderate pain increased to 22 (57.9%), while those with severe pain decreased to 16 (42.1%). At post-test 2, 34 respondents (89.5%) were in the moderate-pain category, while 4 respondents (10.5%) still experienced severe pain. At post-test 3, all respondents were in the moderate-pain category. At post-test 4, 22 respondents (57.9%) experienced mild pain and 16 respondents (42.1%) experienced moderate pain.

Table 2. Analysis of Menstrual Pain Categories

Measurement time	Pain category	f	%
Pre-test	Moderate pain	8	21,1
	Severe pain	30	78,9
Post-test 1	Moderate pain	22	57,9
	Severe pain	16	42,1
Post-test 2	Moderate pain	34	89,5
	Severe pain	4	10,5
Post-test 3	Moderate pain	38	100,0
Post-test 4	Mild pain	22	57,9
	Moderate pain	16	42,1

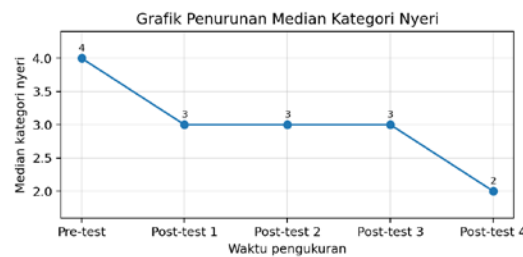
Data source: Primary Data, 2026

Based on Table 3, the Shapiro-Wilk normality test showed that the pre-test, post-test 1, post-test 2, and post-test 4 data had p-values of <0.001, indicating that the data were not normally distributed. At post-test 3, the normality test could not be calculated because all respondents were in the same pain category. Therefore, pain intensity results were presented using the median pain category, and differences were analyzed using the Wilcoxon test.

Table 3. Normality Test and Median Pain Category

Measurement time	p Shapiro-Wilk	Median pain category	IQR
Pre-test	<0,001	Severe pain	0
Post-test 1	<0,001	Moderate pain	1
Post-test 2	<0,001	Moderate pain	0
Post-test 3	Constant data	Moderate pain	0
Post-test 4	<0,001	Mild pain	1

Data source: Primary Data, 2026

Figure 1. Graph of the Reduction in Median Pain Category

Based on Table 4, the Wilcoxon test showed p-values of <0.001 for all comparisons between measurement times. These results indicate significant differences between the pre-test and post-test 1, post-test 1 and post-test 2, post-test 2 and post-test 3, and post-test 3 and post-test 4. Thus, abdominal stretching exercise had a significant effect on reducing dysmenorrhea intensity at each measurement time.

Table 4. Wilcoxon Test Results for Dysmenorrhea Intensity

Comparison of measurement times	n	Z	p-value
Post-test 1 vs Pre-test	38	-5,109	<0,001
Post-test 2 vs Post-test 1	38	-4,564	<0,001
Post-test 3 vs Post-test 2	38	-3,945	<0,001
Post-test 4 vs Post-test 3	38	-5,458	<0,001

Data source: Primary Data, 2026

DISCUSSION

Before the intervention, most respondents experienced dysmenorrhea categorized as severe pain. The high pain intensity may have been influenced by increased prostaglandin levels that trigger uterine contractions, abdominal muscle tension, and respondents' suboptimal methods of managing menstrual pain. In addition to physiological factors, limited knowledge and the habit of ignoring pain may also worsen the impact of dysmenorrhea on learning activities, concentration, and respondents' comfort during lectures.

After abdominal stretching exercise, dysmenorrhea intensity gradually decreased from severe pain at the pre-test to moderate pain during several initial measurements and then to mild pain at post-test 4. This change indicates that repeated exercise can help respondents manage menstrual pain more effectively. The Wilcoxon test showed p-values of <0.001 for each comparison between measurement times, indicating that the reduction in pain was statistically significant.

The pain-reduction mechanism of abdominal stretching exercise can be explained by increased stretching of the abdominal muscles, improved blood circulation, reduced muscle tension, and increased endorphin release. Endorphins act as natural analgesics that can reduce pain perception and improve comfort. Therefore, abdominal stretching exercise can serve as an easy, inexpensive, non-pharmacological alternative that does not cause medication dependence among female students experiencing dysmenorrhea (Sutrisni, Sri Lestari, Arsy Widyatriastuti, Gunawan, 2022).

Light physical activity in the form of abdominal stretching also helps respondents become more relaxed and more aware of their physical condition during menstruation. This exercise requires no special equipment and can therefore be performed on campus or at home. These advantages support the recommendation of abdominal stretching exercise as a self-care measure to reduce primary dysmenorrhea among adolescent girls and female university students.

The findings of this study are consistent with research conducted by Ummah et al. (2023). That study used an experimental method with a one-group pretest-posttest design. A total of 32 adolescent girls were included as the sample and selected using simple purposive sampling. Before the intervention (pre-test), the data showed that most respondents, namely 9 individuals (28.1%), experienced category 1 pain (mild pain). Statistical analysis using the dependent t-test produced a p-value of 0.000 ($p < 0.05$). After the intervention, post-test data from the 32 respondents indicated that most respondents, namely 10 individuals (31.2%), experienced category 0 pain (no pain). These findings demonstrate that abdominal stretching exercise is effective in reducing dysmenorrhea pain (Ilmiah & Kesehatan, 2023).

Based on the research results of Casebella et al. (2024), Table 4.3 shows that the Wilcoxon test conducted before and after abdominal stretching exercise yielded a significance value of 0.00. Because the p-value was < 0.05 , H_0 was rejected and H_a was accepted, indicating that abdominal stretching exercise affected the reduction of dysmenorrhea pain among adolescent girls at State Senior High School 5 Bandar Lampung.

CONCLUSION

Thus, this study demonstrates that abdominal stretching exercise had a significant effect on reducing menstrual pain intensity (dysmenorrhea) among female students in the Physiotherapy Department of the Makassar Ministry of Health Polytechnic. Therefore, H_0 was rejected and H_1 was accepted, indicating a significant difference in pain intensity before and after abdominal stretching exercise. These findings show that continuously performed abdominal stretching exercises are effective in reducing menstrual pain intensity (dysmenorrhea).

RECOMMENDATIONS

1. For Students: Female students experiencing dysmenorrhea are advised to use abdominal stretching exercise as a non-pharmacological measure to reduce menstrual pain. The exercise can be performed routinely before or during menstruation according to the correct procedure to obtain optimal benefits.
2. For the Institution: The Makassar Ministry of Health Polytechnic is expected to strengthen education on non-pharmacological management of dysmenorrhea through health promotion activities, counseling, and practical training in abdominal stretching exercise. This will enable students to gain the knowledge and skills needed to manage menstrual pain independently without relying on pharmacological therapy.
3. For Researchers: Future studies are expected to use stronger research designs, such as quasi-experimental studies or randomized controlled trials (RCTs) with a control group, so that the effects of the intervention can be compared more objectively. In addition, the sample size may be increased and the observation period extended to improve the generalizability of the findings. Future research is also advised to consider other factors that may influence dysmenorrhea intensity, such as body mass index, level of physical activity, stress level, sleep patterns, dietary patterns, age at menarche, duration of menstruation, and family history.

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