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ORIGINAL RESEARCH

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COMPARISON OF EFFECTS OF ABDOMINAL STRETCHING EXERCISE AND COLD COMPRESS THERAPY ON MENSTRUAL PAIN INTENSITY IN TEENAGE GIRLS

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ABSTRACT

Background: Pain during menstruation is not uncommon, especially in young women, which has an impact on their life activities.

Objective: To examine the effect of abdominal stretching exercise and cold compress therapy on decreasing intensity of menstrual pain in teenage girls.

Design: A quasi-experimental study with two group comparison pretest-posttest design at SMK Bakti Indonesia Medika, Indonesia. There were 46 respondents selected in this study by consecutive sampling that consisted of 23 samples in the abdominal stretching exercise group and 23 samples in the cold compress group. The menstrual pain was measured using VAS (visual analog scale). Data were analyzed using Mann-Whitney, Chi-Square, and Wilcoxon test.

Results: Findings showed that the mean of menstrual pain before intervention in the abdominal stretching exercise was 7.04 and in the cold compress therapy was 6.74 with p-value 0.211 (<0.05), which indicated that there was no mean difference of pain between both groups. However, after intervention, the menstrual pain was reduced from 7.04 to 1.91 (5.09 difference) in the abdominal stretching exercise group; and from 6.74 to 5.52 (1.22 difference) in the cold compress group with p-value 0.000 (<0.05), which indicated that there was statistically significant difference of menstrual pain before and after intervention, both abdominal stretching exercise and cold compress therapy.

Conclusion: There were statistically significant effects of abdominal stretching exercise and cold compress therapy on menstrual pain in teenage girls. The abdominal stretching exercise is more effective than cold compress therapy in reducing menstrual pain intensity. Thus, it is suggested that abdominal stretching exercise can be an alternative choice of management of dysmenorrhea in teenage girls, and can be a part of subject in the education as non-pharmacological medicine.

Keywords: abdominal stretching exercise, cold compress, menstrual pain

INTRODUCTION

Menstrual pain is the most common gynecological problem experienced by adult and adolescent women.¹ Menstrual pain is described as cramping pain in the lower abdomen that occurs during menstruation.¹ In the United States, it was reported that about 15% of adolescent girls had severe menstrual pain and was a major cause of absence in school.² In Sweden, adolescent girls aged 19 (90%) and 24 years old (67%) reported that menstrual pain interfering with daily activities.² The prevalence of menstrual pain in Thailand was 84.2% in adolescent female, and the number of school attendance was 21.1% associated with the severity of symptoms.³ In Malaysia, the prevalence was 62.3%; and in Indonesia the incidence of menstrual pain was 64.25% consisting of 54.89% primary menstrual pain and 9.36% of secondary menstrual pain.⁴

The result of preliminary study at Senior High School (SMK) of Kesehatan Bakti Indonesia Medika Ponorogo Regency with 281 students revealed that 65.1% of them had dysmenorrhea every month, 10.5% of students experienced severe menstrual pain, 48.3% experienced moderate menstrual pain, and the rest experienced mild dysmenorrhea. In this regard, those who had severe dysmenorrhea admitted having difficulty concentrating in receiving lessons. However, it could be said that 90% of women in Indonesia have experienced menstrual pain.

Menstrual pain causes impairment in learning activities. The condition of students who are not fit due to moderate and severe dysmenorrhea during lectures will disrupt the activity.⁵ The psychological impact of menstrual pain on learning activities is the decrease of concentration in listening to the material delivered and less active during the activity, even if the students are unable to

withstand the pain due to severe menstrual pain, they may choose not to attend the class.⁵

In addition, menstrual pain can have an impact on the life activities of women especially adolescents. Menstrual periods make women unable to move normally and require treatment.⁶ This condition could decrease their quality of life. Women who experience pain or intermittent pain is usually concentrated in the pubic area of the supra. Pain can spread to the back of the leg or lower back with systemic symptoms including nausea, vomiting, diarrhea, fatigue, mild fever, and headache or dizziness. Pain usually develops within a few hours from the onset of menstruation and peaks as the flow becomes the heaviest during the first or two days of the cycle.⁶

In Indonesia, many women who experience menstrual pain do not report or visit a doctor. Shyness to see doctor and tendency to underestimate the disease often make the data of patients with certain diseases cannot be ascertained absolutely. Though still many women consume drugs and certain products to relieve menstrual pain, but they do not understand that there are side effects when taking drugs or products too often, either short-term or long term effects.⁷

Actually, there are many ways to eliminate or reduce menstrual pain, both pharmacologically and non-pharmacologically. However, non-pharmacologic management is safer to use because it does not cause side effects. One of the non-pharmacologic ways is by performing abdominal stretching exercises.⁸ Abdominal stretching exercise is a muscles stretching especially in the abdomen performed for 15 minutes. This exercise tends to increase muscle strength, power resistant and flexibility, so it is expected to reduce menstrual pain. This is supported by Wong et al⁹ who stated that exercises by moving the pelvis, knee-

chest position, and breathing exercises may be useful to reduce menstrual pain.

Besides, to reduce menstrual pain, cold compress therapy can be one of the alternative treatments.¹⁰ Cold therapy for 15 minutes provides the effect of lowering blood flow to the body area, reducing the need for oxygen in the tissues and eliminating the pain. Study stated that cold compress therapy stimulates the release of useful endorphins to reject pain relief stimulus and can provide a comfortable feeling and the focus of attention on the stimulus.¹¹ This result is reinforced by Price and Wilson¹² revealed that cold therapy cannot only reduce muscle spasm but also can cause analgesic effects that slow the speed of nerve conduction so that pain impulse reaches the brain more a little, and the perceived pain will be reduced.

Therefore, with the incidence of menstrual pain in Indonesia and the alternative solutions identified in the literature, this study aimed to examine the effect of abdominal stretching exercise and cold compress therapy to decrease the intensity of menstrual pain in young women.

METHODS

Design

A quasi-experimental study with two group comparison pretest-posttest design.

Setting

The study was conducted on September - October 2016 in SMK Health Bakti Indonesia Medika Ponorogo Regency, East Java Indonesia.

Population and Sample

There were 46 respondents selected in this study by consecutive sampling that consisted of 23 samples in the abdominal stretching exercise group and 23 samples in the cold compress group.

The inclusion criteria in the study were women who experienced primary dysmenorrhea aged 16-21 years, had regular monthly menstrual cycles, unmarried, had a history of menstrual pain, lived in the dormitory of SMK Health Bakti Indonesia Medika, and had been willing to be respondents in the study. The exclusion criteria were adolescents diagnosed with certain gynecologic disease or secondary dysmenorrhea, had no signs of gynecological disease or secondary dysmenorrhea, and adolescents undergoing pharmacological treatment with painkillers (analgesics).

Intervention

In the allocation of both abdominal stretching exercise and cold compress therapy, the respondents were told to contact the researcher on the first day of their menstruation in the first month, then the researchers and enumerators went to the samples who experienced menstrual pain. After that the researchers did the measurement of menstrual pain in the first month by asking the intensity of menstrual pain and measured based on visual analog scale.

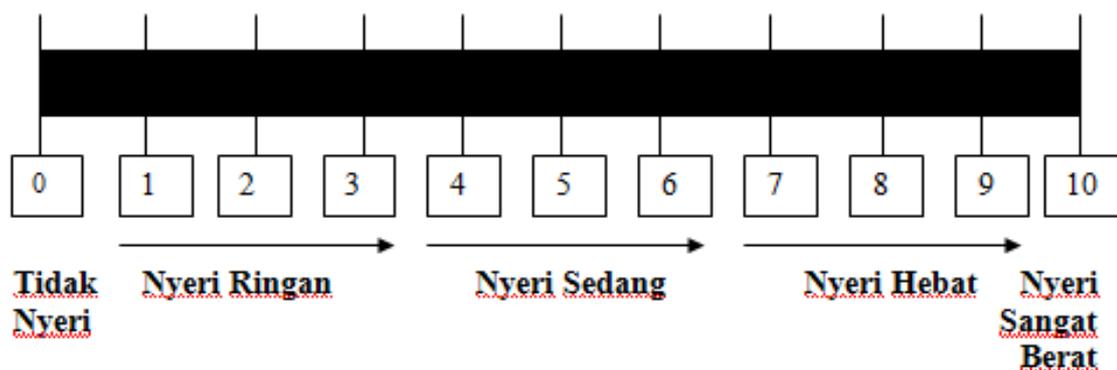
For abdominal stretching exercise, the time of treatment was based on the estimation according to the previous menstrual cycle. For example, if the previous month's menstrual cycle was on January 24 and the respondent had a 28-day menstrual cycle, then it was estimated that the first day of menstruation would come on February 22, so the treatment was administered from 19 - 22 February. The treatment was conducted twice a day in the morning and afternoon.

For cold compress therapy, it was performed on the first day when the samples experienced menstrual pain, done 8 times in the duration of 15 minutes with a temperature of 18°C.

Instrument

A numerical visual analog scale (VAS) was used to measure the level of pain intensity. The pain VAS is available in the public domain at no cost.¹³ Graphic formats for the VAS may be obtained from Scott & Huskisson.¹⁴ This scale can be used in school-age children through adolescence. The instrument was translated to Indonesian language. This is a 10 cm long horizontal graph. The left end portrays the painless condition and the right end represents the intensity of the most severe pain (See Figure 1 – Indonesian version). The mechanism of measurement with this scale is that respondents were asked to mark one point

on a line graph that was considered to be close to or describe the intensity of pain felt at the time of measurement. This measurement tool is a scale that is easy to use and easy to interpret. Pain measurements in this study were performed on the second month of menstruation period at 15 minutes after the abdominal stretching exercise and cold compress therapy on the last day of treatment. Then researchers and enumerators asked the intensity of menstrual pain samples and were measured by "Visual Analog Scale", then the researchers gave positive reinforcement to all respondents for their involvement in the study.



0= No Pain, 10 = The worst pain

Figure 1 Visual Analog Scale

Ethical Consideration

This study has been approved by the Health Research Ethics Committee (K.EP.K) of Health Polytechnic of Ministry of Health (Poltekkes) of Semarang with No. 242/ KEPK/Poltekkes -SMG/EC/2016. The study permission was also obtained from SMK Health Bakti Indonesia Medika Ponorogo. The researchers ensured that all respondents have obtained the appropriate informed consent.

Data Analysis

Data were analyzed using Mann-Whitney, Chi Square and Wilcoxon tests.

RESULTS

Table 1 shows that there was statistically no difference of characteristics of the respondents between the group of abdominal stretching exercise and cold compress group. The majority of respondents was aged 17, and having 7 days menstrual period and a habit of taking medicine.

Table 1 Characteristics of respondents

| Variable | Group | | P-value |
|---------------------------------|--------------------------------------|----------------------|--------------------|
| | Abdominal Stretching Exercise (n=23) | Cold compress (n=23) | |
| Age (year) | | | |
| Mean (SD) | 17.04 (0.767) | 16.91 (0.900) | 0.584 ¹ |
| Median | 17 | 17 | |
| Min ± max | 16±18 | 16±18 | |
| Menstrual period (day) | | | |
| Mean (SD) | 7.00 (0.522) | 7.09 (0.288) | 0.505 ¹ |
| Median | 7 | 7 | |
| Min-max | 6±8 | 7±8 | |
| Habit of taking medicine | | | |
| Yes | 65.2% | 52.2% | 0.238 ² |
| No | 34.8% | 47.8% | |

¹Mann Whitney; ²Wilcoxon

Table 2 Difference of menstrual pain between the abdominal stretching exercise group and cold compress group

| Variable | Group | | p-value ¹ |
|---|--------------------------------------|----------------------|----------------------|
| | Abdominal Stretching Exercise (n=23) | Cold compress (n=23) | |
| Before intervention¹ | | | |
| Mean ± SD | 7.04±0.825 | 6.74±0.689 | 0.211 |
| Min-max | 6-9 | 6-8 | |
| Median | 7.00 | 7.00 | |
| After intervention¹ | | | |
| Mean ± SD | 1.91±0.668 | 5.52±1.310 | 0.000 |
| Min-max | 1-3 | 2-7 | |
| Median | 2.00 | 6.00 | |
| Difference of pain before and after intervention | | | |
| p-value ² | 0.000 | 0.000 | |
| Mean difference² | | | |
| Mean ± SD | 5.09±0.793 | 1.22±1.313 | 0.000 |
| Min-max | 3-6 | 0-5 | |
| Median | 5.00 | 1.00 | |

¹Mann Whitney; ²Wilcoxon

Table 2 shows that the mean of menstrual pain before intervention in the abdominal stretching exercise was 7.04 and in the cold compress therapy was 6.74 with p-value 0.211 (<0.05), which indicated that there was no mean difference of pain between both groups. However, after intervention, the menstrual pain was reduced from 7.04 to 1.91 (5.09

difference) in the abdominal stretching exercise group, and from 6.74 to 5.52 (1.22 difference) in the cold compress group with p-value 0.000 (<0.05), which indicated that there was statistically significant difference of menstrual pain before and after intervention, both abdominal stretching exercise and cold compress therapy.

DISCUSSION

This study aimed to examine the effect of abdominal stretching exercise and cold compress therapy to decrease the intensity of menstrual pain in teenage girls, and the findings revealed that there were significant effects of both interventions on menstrual pain intensity in teenage girls.

In this study, abdominal stretching exercise had a better effect than cold compress therapy, which the menstrual pain reduced from 7.04 to 1.91 (5.09 difference), and in the cold compress group from 6.74 to 5.52 (1.22 difference) of the menstrual pain. However, this result was consistent with the previous study that found a significant relationship between abdominal exercise with decreased levels of muscle fatigue, especially on the abdomen that the pain intensity may decrease.^{8,15} Research has shown that knee chest position intervention can be used in conjunction with HMP to reduce pain and menstrual abnormalities in primary menstrual pain.⁶ This is supported by studies suggesting that home-based abdominal stretching exercise interventions provide a significant increase in the reduction of primary menstrual pain.^{6,8}

Physiologically, abdominal stretching exercise affects the processes in the body through the adrenal pituitary system (HP Axis). HP Axis line releases the CRF (corticotropin releasing factor) hormone. Further, CRF stimulates the pituitary gland to affect the adrenal medulla in increasing proopiomelanocortin production so enkephalin is increased. The pituitary gland that produces β -endorphin as a neurotransmitter can affect mood becomes relaxed and as a medicine to relieve pain. Increased levels of endorphins in the body can relieve pain during contractions.¹⁶

On the other hand, although cold compress therapy in this study did not

show a progressive decrease of menstrual pain, but there was still a decrease of the pain. Cold compress is a simple form of therapy or method in the local low-temperature use that can cause some physiological effects.¹¹ Cold compress is to reduce blood flow to a part of the body and reduce bleeding. It is thought that cold therapy creates an analgesic effect by compressing the velocity of the nerve conduction so that the pain implants reach the brain less.¹⁰ In addition, another mechanism that works is that cold perception becomes dominant and reduces the perception of pain.¹¹ *Limitation of the study*

The study did not measure prostaglandin levels as a more objective in measuring the intensity of menstrual pain. Assessment of intensity of menstrual pain based on the respondent's perception might be bias.

CONCLUSION

Based on the findings of this study, it can be concluded that there were statistically significant effects of abdominal stretching exercise and cold compress therapy on menstrual pain in teenage girls. The abdominal stretching exercise is more effective than cold compress therapy in reducing menstrual pain intensity. Thus, it is suggested that abdominal stretching exercise can be an alternative choice of management of dysmenorrhea in teenage girls, and can be a part of subject in the education as non-pharmacological medicine.

Declaration of Conflicting Interest

None declared.

Acknowledgement

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Authorship Contribution

Authors equally contributed in this study.

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