Abdominal Stretching Exercise in Decreasing Pain of Dysmenorrhea Among Nursing Students

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Abstract: Dysmenorrhea is common among young women and could interfere studying concentration. This pain could be reduced by stretching. The study purpose was to determine the decrease of dysmenorrhea pain rate after being given abdominal stretching exercise on nursing students at STIKES TanawaliPersada, Takalar, Indonesia. A quasi-experimental study by pre-test post-test control group design on 96 random sampling samples consisting of 48 stretching intervention and 48 controls group. Abdominal stretching was given for 15 minutes, two times a week, for three weeks. Data analysis uses the tests of Mann-Whitney, Wilcoxon, and McNemar. The pain scale difference between intervention with control group on pretest was not significant (p value = 0,210), but posttest was significant with p = 0,001. A significance pain difference between the pretest and posttest intervention groups (p = 0.001). The difference in pretest and posttest control group pain was not significant (p = 0.068). Overall, there was a marked decreasing in the mean differences of pain value between the intervention groups and the controls with p = 0.000. This pain reduction was not affected by age of menarche and menstrual period. Therefore, abdominal stretching exercises suggested for young women to deal with primary dysmenorrhea in a non-drug manner.

1. Introduction

Through Dysmenorrhoea is menstruation pain characterized by cramping lower abdomen pain with some other signs and symptoms, such as nausea, headache, fatigue and diarrhea, asthenia, and irritability. Primary dysmenorrheal mainly affects adolescent girls in the age of 12-20 years old [1]. About an average of 50% of teenage women worldwide are affected with dysmenorrhea; the prevalence interval between 43-91%, even between 16-91% in Australia [1, 2]. Dysmenorrhea occurred in 56.4% of students; 6.5% of dysmenorrheal students suffered from unbearable menstrual pain, and 6.5% had pre-menstrual dysmenorrhea [3], meanwhile dysmenorrhea is experienced by 73% of 12-17 year old high school students in Brazil [4].

The pain is related to an overproduction of uterine prostaglandins F-2α (PFF-2α) which induces myometrium hypercontractility and arterioscope vasoconstriction, both involved in painful menstrual cramps [5]. Dysmenorrhoea has a negative impact on the concentration of learning due to the pain and headaches experienced, and decreases the academic performance of adolescents, among others due to increased absenteeism [6]. Therefore, efforts should be made to control, overcome or
treat this dysmenorrheal pain. There are two alternative dysmenorrheal controls, namely taking medicine and non-pharmacologic treatment, such as playing sports or physical exercise and special physical activity. The medicine could be used are those that can reduce pain and inhibit prostaglandin production from traumatized and inflammatory tissues that inhibit pain receptors to become sensitive to previous painful stimulus. The various types of drugs that can be administered are analgesics such as aspirin, ponstan, cetaminophen; non-steroidal anti-inflammatory drugs [1]. Treatment with non-steroidal anti-prostaglandin drugs such as endomethasin, ibuprofen, and naproxen. Treatment can be given before menstruation from one to three days before menstruation and can be the first day of menstruation.

One particular form of non-pharmacological form of physical exercise is abdominal stretching which gives a systematic and planned physiological effect [7, 8]. The results reveals that by doing exercise the body will produce endorphins in the brain and spinal cord [7].

Pain intensity is a picture of the severity of pain felt by a person. Measurement of pain intensity is subjective and individual. Pain objective approach could be done by using the body's physiological response to the pain felt by a person. The intensity of a person's pain can be measured using a pain scale with various methods such as Visual Analog Scale (VAS), Numeric Rating Scale (NRS), Verbal Rating Scale (VRS), Pale Scale-Revised Faces. Visual Analog Scale (VAS) Verbal Rating Scale (VRS), Scale-Revised Pain Faces, Numeric Rating Scale (NRS) [9].

Numeric Rating Scale is a measuring instrument that asks patients to assess their pain according to their pain intensity level at the numeral scale of 0-10 or 0-100. The pain scale 0-10 can be grouped into 5 groups of pain, where scale 0 = no pain, scale 1-3 = mild pain, scale 4-6 = moderate pain, scale 7-9 = controlled severe pain, and scale 10 = uncontrolled severe pain. The scale is most effectively used when assessing pain intensity before and after therapeutic intervention.

Exercise may decrease symptoms of dysmenorrheal such as vomiting and nausea. The effect of stretching in reducing pain is associated with increased endorphin production [10]. Stretching exercise is a simple, safe and effective exercise. Some benefits of stretching exercise to dysmenorrheal are increased elasticity and strengthen the spine and pelvic muscles, the diaphragm becomes more elastic and strong, oxygenation and other fluids are circulated properly to the uterus, decrease pain of joints and backache, stimulate the appetite and bowel action, anemia decrease and free flow during menstruation, and maintain the hormone balance [7].

This study will focus specially on the effect of abdominal stretching in reducing dysmenorrheal pain rate among students operational.

2. Method and Materials
Learning: A quasi-experimental study by pre-test post-test control group design on 96 random sampling samples consisting of 48 stretching intervention and 48 controls group. The data was collecting from the students of a nursing college (Sekolah Tinggi Kesehatan) Tanawali Persada, Takalar, Indonesia. Inclusion criteria were adolescents who experienced dysmenorrhea in the menstrual cycle in the last 6 months, did not use pharmacological therapy such as painkillers during the study, were able to communicate verbally and non verbally, willing to follow the research procedure, and willing to be the research respondents. Criteria Exclusion was a particular gynecologic disease and the level of pain so great that it is not possible or harmful to physical intervention.

The study population of 161 nursing students were drawn as many as 96 samples, then divided into 2 groups, 46 each made into intervention group by getting stretching exercise, and control group that did not get stretching exercise. Before and after intervention was done, the pain intensity was measured using NRS scale 0-10. Risk factor data were collected on age, menarche, and menstrual age. Physical exercises that used to reduce dysmenorrhea was abdominal stretching exercise. This stretching was a physical exercise of muscle tension, especially in the abdominal area performed more or less for 10-15 minutes. The aim of this exercise was to increase muscle strength, endurance, and flexibility of muscles, so it is expected to decrease the pain of dysmenorrhea in women [7].
The intervention group received exercise in the form of abdominal stretching was given for 15 minutes, two times a week, for three weeks. Data analysis uses the tests of Mann-Whitney, Wilcoxon, and McNemar[11].

3. Result and Discussion
An image of the frequency distribution of respondents by age, age of menarche, and average duration of the menstrual days is observed (see Table 1).

| Table 1. Distribution of Respondents by Age, Age Menarche, and Length of Menstruation |
|---------------------------------|---------------------------------|----------------|
| Age                | Frequency | Percentage |
| 18                 | 59        | 61,5       |
| 19                 | 37        | 38,5       |
|                    |           |            |
| Menarche (Years)   |           |            |
| ≥ 12               | 93        | 96,9       |
| < 12               | 3         | 3,1        |
|                    |           |            |
| Length of Menstruations (days) |       |            |
| < 7                | 87        | 90,6       |
| ≥ 7                | 9         | 9,4        |
| Total              | 96        | 100        |

Respondents aged between 18 years (61.5%) and 19 years (38.5%), menarche age most (96.9%) after age 12 years, and most menstrual periods (90.6%) less than 7 days. Measurement of pain intensity of all respondents showed the mean of pain = 4.65, median 5.00, SD = 1.60, with the range value between the scale of 2-8. Analysis of the difference between mean intensity of pain at pretest and post time in each stretching intervention group and control group was performed using Wilcoxon test. The results showed that in the intervention group there was a significant difference between mean pain intensity before and after intervention (p = 0.0001); whereas in the control group there was no difference between the mean intensity of pain before and after intervention (p = 0.068).

To test the difference between the mean intensity ofintervention group and control at each pretest and posttest time, a Mann-Whitney test was performed. The results showed that in the pretest group there was no difference between the mean intensity of pain in the intervention group compared with the control (p value = 0.210). While in posttest group there was significant difference between mean of pain intensity in intervention group compared with control (p value = 0.001). See Table 2.

After a thorough test of the difference in mean intensity of pain at the pretest and posttest between the two groups, using the Mann-Whitney test, found a significant decrease in the degree of pain between the groups receiving stretching intervention with the control group at the time before the intervention compared with after stretching. That is, the provision of stretching exercise to students who dysmenorrhea successfully reduce the scale of pain from the average scale of 4.85 (moderate pain) to 3.00 (mild pain).

| Table 2. Effects of Abdominal Stretching Exercises on Reduction of Menstrual Pain |
|---------------------------------|---------------------------------|----------------|
| Group Study | Average Pre-test Pain | Average Post-test Pain | Pain difference | P-value * |
| Streching  | 4.85                  | 3.00                  | 1.85           | 0.000     |
| No-        | 4.45                  | 4.60                  | 0.16           | 0.068     |
Furthermore, to assess the possibility of potential confounding factors of menarche age with menstrual duration against dysmenorrhea, McNemar test was performed. The test results indicate that these two variables have no relationship with dysmenorrheal.

Table 3. Comparison of Pain Category in Intervention Group and Control Group Based on Menarche Age

| Menarche age (year) | Pain Category | Total | \(P\) value |
|--------------------|---------------|-------|-------------|
|                    | Light | Height |       |           |
| Intervention        | ≥ 12  | 43     | 3     | 48        | 1,000 |
|                     | < 12  | 2      | 0     |           |       |
| Control             | ≥ 12  | 30     | 17    | 48        | 1,000 |
|                     | < 12  | 1      | 0     |           |       |

Table 4. Comparison of Pain Categories in Groups Given Intervention and Control Groups Based on Length of Menstruation

| Length of Menstruation (day) | Pain Category | Total | \(P\) value |
|-------------------------------|---------------|-------|-------------|
|                               | Light | Height |       |           |
| Intervention                  | ≤ 7   | 43     | 2     | 48        | 0,875 |
|                               | > 7   | 3      | 0     |           |       |
| Control                       | ≤ 7   | 28     | 3     | 48        | 0,190 |
|                               | > 7   | 13     | 4     |           |       |

Pain that occurs in dysmenorrhea can be measured in various ways, including NRS performed in this study and has been carried out by other studies [12, 13]. Dysmenorrhea can be controlled by non-pharmacological approach such as stretching [7, 8, 14, 15]. The stretching implementation varies, such as duration for 8 weeks, 3 days per week, 2 times per day, 10 minutes each time [14]. Most researchers found a positive impact of stretching therapy in the form of decreased pain both among high school students [2], adolescents [16], college students [3], university students [4], nursing students [7]. In addition, stretching can be done various forms of exercise [10, 17], core strengthening program [5], and aerobic training [15, 18]. Treatment approach using drugs such as ibuprofen [19], analgesic mefenamic acid [20], fish oil [19], and sour turmeric [16]. In analyzing the effect of stretching on dysmenorrheal was used Wilcoxon test [14, 16], Mann
Whitney test [21]. For analysis of risk factor dysmenorrhea conducted McNemar test [21, 22]. In addition to the age of menarche and length of menstruation, other risk factors for dysmenorrhea include stress factors [23, 24], nullipara [9, 24], obesity [24], family history [2], and lifestyle [25].

The limitations found in the study are as follows: using the experimental method with a short time so it can not see the effect of intervention for long period of time; involving a limited number of research subjects.

4. Conclusion
There was a marked decrease in the mean differences of pain value between the intervention groups and the controls. This pain reduction was not affected by the age of menarche and menstrual period. Therefore, abdominal stretching exercises suggested for young women to deal with primary dysmenorrhea in a non-drug manner.

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