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Different of Influence between Abdominal Exercise and Warm Compress on the Change of Dysmenorrhea

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Abstract

Reproductive health is an important issue for teenagers. The earliest change appear in young women is the onset of menstruation, which can lead to dysmenorrhea. This study aimed to examine the difference of influence between abdominal exercise and warm compresses on dysmenorrhea changes to be used to overcome dysmenorrhea problems. The type of this study was quasi experiments conducted on female college student level IV Physiotherapy Program of Health Polytechnic of Makassar in March - June 2017. The sample size was 20 people divided randomly into 2 groups i.e treatment group (Abdominal Exercise and Kinesio Taping) as many as 10 people, and control group (Warm Compress and Kinesio Taping) as many as 10 people. Wilcoxon test result in treatment group obtained p value = 0,004 (p <0,05) while result in control group obtained value p = 0,005 (p <0,05). This showed the effect on each treatment. Based on the test of different group by using test of Wann-Whitney test obtained value p = 0,002 (p <0,05), which showed the difference of influence between treatment group and control group. Intervention of abdominal exercise and kinesio taping is more effective in dysmenorrhea changes compared with warm compress and kinesio tapping interventions. It is recommended for female students or adolescents who have dysmenorrhea to apply abdominal exercise and kinesio taping interventions.

Keywords: Abdominal Exercise; Kinesio Tapping; Warm Compress; Visual Analoge Scale and Dysmenorrhea.

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1. Introduction

The incidence of menstrual pain in the world is huge. On average more than 50% of women in every country experience painful menstruation. The incidence rate in America is about 60% and in Sweden about 72%. While in Indonesia the figure is estimated by 55% of productive age women who were tormented by pain during menstruation [1]. According to Ningsih, Setyowati [2], dysmenorrhea prevalence in Indonesia is 64.25% consisting of 54.89% primary dysmenorrhea and 9.36% secondary dysmenorrhea.

Dysmenorrhea causes activity intolerance where women become moody, irritable, and unable to interact effectively with others. This condition leads to a decrease in the quality of life of women, for example students who experience primary dysmenorrhea cannot concentrate in learning and learning motivation decreases because of perceived pain [3]. Based on the results obtained by the researchers, from 30 female students of Level 4 Program of Physiotherapy of Health Polytechnic of Makassar, there are 23 people who experience dysmenorrhea (menstrual pain) during menstruation.

Dysmenorrhea can be treated with pharmacological and non-pharmacological therapies. Non-pharmacological therapies that can reduce menstrual pain are warm compresses, exercise, and kinesio taping and relaxation [1]. Exercise is one approach that can be used to reduce pain. This is due to the production of endorphins during exercise. This hormone can function as a natural sedative so it gives a sense of comfort. One way of exercise to reduce the intensity of menstrual pain is abdominal exercise. Abdominal exercise can increase muscle strength, endurance, and flexibility, so it is expected to reduce menstrual pain [4].

Another intervention used to overcome the problem is taping. Taping relieves pain by improving blood circulation through taping attached to the skin. Its application called Kinesio taping [5]. Warm compress is one of the effective treatment in reducing menstrual pain. Warm compresses are used at a temperature of 43-48 °C which leads to dilation of blood vessels in parts of the pain and increased blood flow in the area [6].

This study aimed to examine the difference in effect between abdominal exercise and warm compresses on dysmenorrhea changes to be used to overcome dysmenorrhea problems.

2. Methods and Materials

2.1 Research Design

This research was experimental research with pre test - post test control group design. This research was conducted in Campus of Physiotherapy Department of Health Polytechnic of Makassar for 2 months that is March - May 2017.

2.2 Population and sample

The population of this research was student Physiotherapy Program of Health Polytechnic of Makassar who experience menstrual pain. The study sample was female students who fulfilled the inclusion and exclusion

criteria.

2.2.1 Inclusion criteria

1. Students who experience menstrual pain before and during the first and second day of menstruation and the last 3 months in a row.
2. Not taking pain reliever medication during the study
3. Students who are willing and agree to be respondents.

2.2.2 Exclusion criteria

1. Students diagnosed with certain gynecological diseases or secondary dysmenorrhea.
2. Student who has signs/symptoms of certain gynecological diseases or secondary dysmenorrhea.

All samples obtained based on the above criteria were then randomly divided into 2 groups of samples ie the treatment group of 10 people were given the abdominal exercise intervention and kinesio taping and the control group as many as 10 people were given warm compress intervention and kinesio taping.

2.3 Data Collection

At the beginning of the study, all samples were measured menstrual pain with a VAS scale (Visual Analogue Scale). The measurement procedure are: 1) VAS are measuring instruments used to examine the intensity of pain and typically include 10 cm of lines, with each tip marked by a level of pain intensity (left end is marked "no pain" and the right end is marked "bad pain"). 2) The patient is asked to scan along the line according to the level of pain intensity felt by the patient. 3) Then the distance is measured from the left border to the mark given by the patient (size mm) and that's the score that indicates the level of pain intensity 4) Then the score is recorded to see the progress of the next therapy.

VAS measurement data at the beginning of the study is pre test data. After being measured in accordance with the sample group, ie abdominal exercise and kinesio taping in the treatment group and warm compresses and kinesio taping in the control group with design dose that has been established. After the intervention was given 8 times both in the treatment group and control group, it was measured again the value of the pain with VAS as post test data.

2.4 Intervention Procedures

Interventions given to the treatment group were Abdominal Exercise and Kinesio Taping, where the Abdominal Exercise consisted of Cat Stretch, Lower Trunk Rotation, Buttock / Hip Stretch, Abdominal Strengthening: Curl Up, Lower Abdominal Strengthening, The Bridge Position. Each technique is repeated 10 times count with 2 sets of exercises. While in the control group is Warm Compress and Kinesio Taping. Warm compresses are made using a jar or physiopack in warm water content and placed in the lower abdominal area for 10 minutes repeated 2 times with 2 times/week of therapy frequency. Then, each taping was placed in the treatment group

and the control group on the lower abdominal area and the waist.

1. Abdominal area: vertical-horizontal "I" shape, taping length 10 cm and 15 cm, frequency of therapy 2x / week.
2. Waist area: horizontal "I" shape, 5 cm long taping, 2x / week therapy frequency.

Abdominal Exercise Procedure Instruct respondents to perform abdominal exercise. These techniques are performed for 10 times count with 2 sets of exercises:

1. Cat Stretch

Initial position: hands and knees on the floor, hands under the shoulders, knees under the hips, feet relaxed, eyes staring at the floor.

- a. Back arched, stomach moved to the floor as comfortable as possible. Keep your chin and eyes on the floor. Hold for 10 seconds while counting with a voice, then relax.
- b. Then the back is moved up and head down to the floor. Hold for 10 seconds while counting with a voice, then relax
- c. Sitting on your heels, stretch your arms forward as far as possible. Hold for 20 seconds while counting with a voice, then relax. The exercise was done 3 times.

2. Lower Trunk Rotation

Initial position lying on your back, knees bent, feet on the floor, hands thrown out.

- a. Turn your knees slowly to the right as close to the floor as possible. Keep the shoulders fixed on the floor. Hold for 20 seconds while counting with a voice.
- b. Turn slowly back to your knees to the left as close to the floor as possible. Keep the shoulders fixed on the floor. Hold for 20 seconds while counting with a voice, then back to the starting position. The exercise was done 3 times.

3. Buttock / Hip Stretch

Initial position: lying on your back, knees bent.

- a. Place the outside of the right ankle on the left thigh above the knee.
- b. Hold the back of the thigh and pull it towards the chest as comfortable as possible. Hold for 20 seconds while counting with a sound, then return to the starting position and relax.

4. Abdominal Strengthening: Curl Up

Initial position: lying on your back, knees bent, feet on the floor, hands under your head.

- a. Arch your back from the floor and push it toward the ceiling. Hold for 20 seconds while counting with a voice.
- b. Align the back parallel to the floor by flexing the abdominal muscles and buttocks.
- c. Bend the upper part of the body towards the knee. Hold for 20 seconds while counting with a voice. The exercise was done 3 times.

5. Lower Abdominal Strengthening

Initial position: lying on your back, knees bent, arms extended partially out.

- a. Put the ball between the heel and the buttocks. Flatten the lower back to the floor by tightening the abdominal muscles and buttocks.
- b. Gently pull both knees toward the chest while pulling heels and balls, tighten the butt muscles. Do not arch your back. The exercise was done 15 times.

6. The Bridge Position

Initial position: lying on your back, knees bent, feet and elbows on the floor, arms extended partially out.

- a. Smooth the backs on the floor by tightening the muscles of the abdomen and buttocks.
- b. Raise your hips and lower back to form a straight line from knee to chest. Hold for 20 seconds while counting with a sound, then slowly to the starting position and relax. The exercise was done 3 times.

After the abdominal exercise is then given kinesio taping with a tensile dose of 50%, the length of the tape is 5 cm for the lower waist, 10 cm for the front vertically and 15 cm for the front horizontally using the shape 'T' which is taped vertically and horizontally on lower abdomen.

Procedure of warm compress and kinesio taping Give warm compresses using jars filled with warm water 2/3 from jar with temperature 43°-48°C, then place the jar in the lower abdominal area with a linen or a thin towel for 15 - 30 minute, ask the sample to deliver when it is too hot. Conducted in 2 times a week as many as 8 times action for 4 weeks. The steps of giving warm compresses are:

1. Check the sample to make sure there is no contraindication to the use of the hot jar or physiopack.
2. Request sample approval and explain the purpose of this procedure.
3. Fill whether the hot pot is hot water up to half the size of the bladder and measure the desired temperature with the thermometer. Checking the jar did not leak.
4. Wrap the hot pot with a towel or cloth to protect the sample's skin.
5. Instruct the sample to let you know when the jar is overheated.
6. Check the area to be given a hot pot, whether there is a wound or something
7. Place the jar at the bottom of the abdomen.

After a warm compress is then given kinesio taping with a tensile dose of 50%, 5 cm tape length for the lower

waist, 10 cm for the front vertically and 15 cm for the front horizontally using a vertical and horizontal "I" shape on lower abdomen.

2.5 Data Analysis

Mann-Whitney Test was conducted to test the effect of Abdominal Exercise and warm compresses on Dysmenorrhea changes.

3. Result

Table 1: Characteristic of sample by Age

Age (year)	Intervention Group		Control Group	
	n	%	n	%
21	6	60	5	50
22	4	40	5	50
	10	100	10	100

Table 1 showed the characteristics of the sample based on the age of the female college students of Physiotherapy program was in the treatment group showing the number of 21-year-old samples of 6 people (60%) and the 22-year-olds as many as 4 people (40%). In the control group, the number of 21-year-old samples were 5 (50%) and the 22-year-olds were 5 (50%).

Table 2: The results of VAS measurements in the intervention group and control group

VAS Assesment	Intervention Group		Control Group	
	Mean	Standart Deviation	Mean	Standart Deviation
Pre test	6,70	1,160	6,90	0,738
Post test	3,00	0,667	4,60	1,075
Difference	3,70	0,493	2,3	0,337

Based on table 2 can be explained that in the treatment group obtained mean pre test value of 6.70 ± 1.160 , post test value of 3.00 ± 0.667 , and the difference value of 3.70 ± 0.493 .

This suggests that administration of abdominal exercise and kinesio taping results in a decrease in dysmenorrhea with an average decrease of 3.70.

In the control group obtained mean pre test value of 6.90 ± 0.738 , post test value of 4.60 ± 1.075 , and the value

of the difference of 2.3 ± 0.337 .

This suggests that giving warm compresses and kinesio tapping resulted in a decrease in dysmenorrhea with a mean decrease of 2.3.

Table 3: VAS average difference test between pre test and post test in Intervention group and control group.

Group	n	Average	Standart Deviation	p
Intervention	10	3,7	0,493	0,002
Group	10	2,3	0,337	

Based on Table 3, the Intervention group viewed from Rank value obtained value 10 on negative Rank which means all respondents experience decrease of pain after given abdominal exercise and kinesio tapping. While seen from p value = 0,004 (p value <0,05), there is influence of giving abdominal exercise and kinesio taping to decrease of menstrual pain.

In the control group seen from the Rank score obtained a value of 10 on the negative Rank which means all respondents experienced a decrease in pain after the warm compresses and kinesio tapping. While seen from p value = 0,005 (p value <0,05) mean that there is influence of giving warm compress and kinesio taping to decrease of menstrual pain in student.

Table 4: Test difference of mean difference of VAS between interventin group and control group.

Group	Test	Average	Standart Deviation	p
Intervention Group	Pre test	6,70	1,1160	0,004
	Post test	3,00	0,667	
Control Group	Pre test	6,90	0,738	0,05
	Post test	4,60	1,075	

Table 4 showed the results of the Mann-Whitney Test test for testing the above hypothesis, which obtained p value 0.05 which means that there is a significant effect difference between intervention of treatment group and control group. This suggests that giving of abdominal exercise and kinesio taping has significantly more influence than warm compresses and kinesio taping on dysmenorrhea changes.

4. Discussions

Based on the results of the study in table 3 showed that giving abdominal exercise and kinesio taping can produce significant menstrual pain (dysmenorrhea) changes. During dysmenorrhea, uterine muscle contractions

develop from prostaglandins, causing vasospasm of the uterine arterioles which leads to ischemia and cramps in the lower abdomen that will stimulate pain in the coming months as a result of the release of certain prostaglandins. Prostaglandin F₂ alpha derived from uterine endometrium cells. Prostaglandin F₂ alpha is one of the strong stimulants of myometrium smooth muscle contraction and uterine vascular contraction [7].

Abdominal exercise is useful for the management of dysmenorrhea in several ways, such as reducing stress, reducing menstrual symptoms through increased local metabolism, increasing local blood flow to the pelvis, and increasing endorphin hormone production. Endorphins are endogenous peptide opioids that act as neurotransmitters. Endorphins have the same structure as morphine, a drug used to relieve pain. Endorphins are produced in the body by the pituitary gland [3].

In the peripheral nervous system, endorphins produce analgesics by binding to opioid receptors in both the pre and post synapse neural terminals. When binding, there will be a cascade of interactions that cause the inhibition of tachycin release, especially the P substance involved in pain transmission. In the central nervous system, endorphins direct their primary action to the presynaptic nerve terminals. However, endorphins do not inhibit the substance of P, but inhibit the release of gamma-amino butyric acid (GABA). The inhibition will lead to increased dopamine production associated with pleasure [3].

The hormone endorphins generated during exercise are then flowed throughout the body. Endorphin hormone acts as a natural analgesic in the body. This causes a decrease in menstrual pain after being given an abdominal exercise. In addition, the hormone endorphins will control the condition of blood vessels back to normal and keep the blood flow can flow without a hitch. Increased blood flow metabolism in the pelvis that appears during exercise may affect dysmenorrhea. Increased blood flow can reduce ischemic pain during menstruation [3]. Exercises such as moving the pelvis, with the knee-chest position, and breathing exercises can be useful for reducing dysmenorrhea [2].

Exercise will reduce the levels of prostaglandins, releasing blood-borne endorphins away from the uterus where the endorphin hormone is released in circulation during exercise [8]. Endorphins work as neurotransmitters in the brain to reduce the distribution and perception of pain. The pituitary releases endorphins in response to exercise and during pain (Corwin, 2009). Thus, the more exercise will be the higher endorphins. This is supported by the theory that at the time of exercise, the body will also stimulate the brain to send implus to the hypothalamus through HPA (Hypothalamus Pituitary Adrenal) axis so that it can stimulate endorphin hormone expenditure, especially β -endorphin. Endorphin hormone acts as a natural analgesic in the body. Increased blood flow metabolism in the pelvis that appears during exercise can affect dysmenorrhea. Increased blood flow may reduce ischemic pain during menstruation [9].

The addition of kinesio taping to the abdominal exercise results in a greater pain change in which kinesio taping has a recoil effect that makes the skin lifted because of the taping flexibility it creates more space between the skin and muscles, which improves blood circulation and drainage of lymphatic fluid in areas taped so as to reduce menstrual pain [10]. This is supported by Tomás-Rodríguez, Palazón-Bru [11] that psychogenic excitation of the central analgesic system may be involved when taping is in contact with the skin thus releasing

a sensory tactile beat that achieves the same effect.

Based on the results of the research in table 3 showed that giving warm compresses and kinesiio tapping can produce significant decrease in menstrual pain (dysmenorrhea). Provision of warm compresses can cause physiological effects that can reduce the scale of pain in patients. As Perry and Potter [12] suggests that heat can stimulate thick, thick bermyelin nerve fibers that close the gate so that implus transmission of pain to the spinal cord and brain can be inhibited.

The reduction of pain through transmission in accordance with the Gate Control theory that if there is an impulse transmitted by large diameter fibers because of the stimulation of the skin, touch, vibration, warm and cold and soft touch, this impulse will inhibit the impulse carried by small diameter fibers in the SG area (Substansia Gelatinosa) so that the sensations carried by small fibers will be reduced or even not delivered to the brain by the SG, hence the body cannot feel the pain [13].

According to Perry and Potter [12], the mechanism of the reduction of pain/dysmenorrheas is that when heat is received by the receptor, the impulse is passed to the posterior hypothalamus resulting in a sympathetic inhibitory reflex reaction that will make blood vessels dilate, this condition will help increase blood flow to the lower abdomen with pain/dysmenorrhea, where heat eases pain by removing inflammatory products such as bradykinin, histamine and prostaglandins that cause local pain [13]. In addition, sedative heat stimulates thick nerve fibers where the activity of the nerve fibers closes the gate so that the transmission of pain impulses to the spinal cord and to the brain is inhibited, which in turn will decrease [14].

The addition of kinesiio taping after a warm compress application can facilitate a large reduction of pain, as kinesiio taping applied to the lower abdomen will stimulate the tactile nerve fibers in the skin that can suppress prostaglandin action in the spinal cord, thus reducing menstrual pain [5]. The application of abdominal exercise will decrease menstrual pain through endorphins in the body where the endorphin can more quickly block pain with its analgesic effect [15]. Increased levels of endorphins in the body can relieve pain during contractions. Exercise / physical exercise proved to increase levels of endorphins four to five times in the blood, so the more exercise will be higher endorphin levels. When a person exercises, the endorphins will come out and be captured by receptors in the hypothalamus and limbic system that serves to regulate emotions. Increased endorphins are shown to be closely related to decreased pain, increased memory, improved appetite, sexual ability, blood pressure and respiration [15].

While giving warm compresses to make the circulation and blood vascularization smoothly, which conductionally occurs the transfer of heat from the jar into the lower abdomen so that vasodilation occurs that makes the muscle relaxation. This heat compresses the occurrence of vasodilation in the pubic symphysis area which can open the bloodstream and make the blood circulation smooth again so that muscle relaxation occurs and pain is reduced [16].

Compresses using warm water can relieve pain by getting rid of inflammatory products, such as bradykinin, histamine, and prostaglandins that cause local pain. In addition, sedative heat stimulates thick nerve fibers where

the activity of the nerve fibers closes the gate so that the transmission of pain impulses to the spinal cord and to the brain is inhibited so that the pain is reduced [13]. Differences in the effects of abdominal exercise and warm compresses resulted in a decrease in different menstrual pain, which proved that the effect of endorphin production through abdominal exercise resulted in significantly greater decrease in menstrual pain than the effects of locally and spinal modulation of pain through warm compresses.

5. Conclusion

Abdominal exercise and kinesio taping resulted in significant dysmenorrhea changes. Giving of warm compresses and kinesio taping results in significant dysmenorrhea changes. Abdominal exercise and kinesio taping were significantly more influential than warm compresses and kinesio taping on dysmenorrhea changes.

Conflict Interest

The author declares there is no conflict interest.

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