

The Effectiveness of Acupressure in Reducing the Pain Intensity of Dysmenorrhea

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Abstract: *Dysmenorrhea, experienced by about 64.25% of Indonesian women, is a common gynecological disorder that can be disruptive at school, work, or home. It is caused by several factors, one of which is the increase in the production of prostaglandins. For the treatment of dysmenorrhea various methods have been suggested such as acupressure and sacral plexus massage. For this reason, this study sought to obtain the evidence of the effectiveness of acupressure in reducing dysmenorrhea pain. By employing the experimental design using pretest and posttest with control group, students of SMA (Senior High School) Pahlawan Jember afflicted with dysmenorrhea were purposively selected as samples. The data were garnered from questionnaire asking the respondents to determine the intensity of their pain using NRS (Numerik Rating Scale). The samples were divided into four groups of five respondents each. The first group was the control group; the second group received sacral plexus massage; the third group received warm compress treatment; and the fourth group received acupressure. The intensity of pain of each respondent before and after treatment was recorded. The data obtained were analyzed using One Way Anova test. The results of the p-value and f-value showed significant mean difference of changes of dysmenorrhea pain intensity before and after intervention between control group and treatment group. In addition, the significant value of LSD Post Hoc was less than 0,05 which means there was a significant difference of change in dysmenorrhea pain intensity between control group and treatment group. Post-hoc test results showed that there was a significant mean difference of dysmenorrhea pain of respondents in each treatment group. The mean difference in after-intervention explained that the most effective method in reducing dysmenorrhea pain intensity was acupressure compared to warm compress or sacral plexus massage.*

Keywords: *Acupressure, Sacral Plexus Massage, Warm Compress, Dysmenorrhea Pain*

I. Introduction

Dysmenorrhea is associated with painful menstrual period caused by uterine muscle spasms (Price & Wilson, 2006). Some menstrual disorders and cycles are premenstrual tension, vicarious menstruation, mittelschmerz, and dysmenorrhea (Prawirohardjo, 2005). This pain usually afflicts young women and develops 1 or 2 years after menarche. According to the International Association for Study of Pain (IASP), pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Due to its subjectivity which may differ from one person to another, the dysmenorrhea pain intensity is relatively difficult to assess. Moreover, although the incidence of dysmenorrhea is quite high and the disease has long been known, until now its pathogenesis has not yet been solved satisfactorily.

Dysmenorrhea at a lower level symptoms such as nausea and stomachache affects almost all women before and during menstruation. The term dysmenorrhea is attributed to the severe painful menstruation that forces the sufferer to rest and leave the work for several hours or days (Marion, 2000). The incidence of menstrual pain to women in the world is relatively high on the average of more than 50% in every country. In the United States the percentage of women suffering from dysmenorrhea is about 60% and 72% in Sweden, while in Indonesia it reaches to 55% (Proverawati and Misaroh, 2009). The study by Wong and Khoo in Malaysia found as many as 74.5% of teens who have reached menarche experienced dysmenorrhea. According to Kumbhar et al, of 183 teenagers aged 14-19 years in India, as many as 119 or 65% of them were found experiencing dysmenorrhea (Kusmiran, 2012). Based on the preliminary study at Department of Midwifery Health Polytechnic of Malang, of 105 students 40% experienced dysmenorrhea and 35% consumed analgesic drugs to relieve the menstrual pain at a regular basis. Effective means are necessary to alleviate dysmenorrhea pain so that the consequences can be lowered down. Generally treatment options for dysmenorrhea include both pharmacological and non-pharmacological therapeutic methods. Pharmacological methods were performed with sedative and analgesic administration. Non-pharmacological methods are performed by behavioral physical actions and cognitive actions including distraction and relaxation techniques (Alphatino, 2009). Some common non-pharmacological treatments to overcome dysmenorrhea pains are; hot temperatures such as heating pads, compresses, warm drinks, warm baths; adequate sleep and rest; regular exercise; concentration visualization; aroma therapy; music therapy; and massage on the lower back area (Maryadi, 2009).

Problem Formulations

1. To what extent do the sacral plexus massage, warm compresses, and acupressure influence the intensity change of dysmenorrhea pain?
2. Which is the most effective treatment among the sacral plexus massage, warm compress, and acupressure to reduce dysmenorrhea pain?

General purpose

To determine the effectiveness of sacral plexus massage, warm compress and acupressure in reducing the intensity of dysmenorrhea pain.

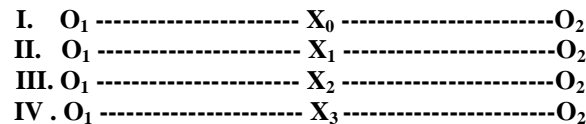
Special purposes

1. To analyze the influence of the sacral plexus massage, warm compress, and acupressure on the intensity changes of dysmenorrhea pain.
2. To analyze the effectiveness of sacral plexus, warm compresses and acupressure in the intensity changes of dysmenorrhea pain.

II. Research Methods

Research Design

This study employed experimental design to determine a symptom or influence arising as a result of a particular intervention. The main objective of the research was to investigate possible causal interactions by giving intervention to the treatment group, and then the results were compared to other variable groups. This experiment used the pretest and post test with control group design (Nursalam, 2008:87). The research design is shown in figure (1):



Notes:

- O1: Pain level test before treatment
- O2: Pain level test after treatment
- X0: control group (without treatment)
- X1: treatment group using sacral plexus massage (Group I)
- X2: treatment group using warm compresses (Group II)
- X3: treatment group using acupressure (Group III)

Figure (1): The diagram of the research design

Population and Sample

A purposive sampling was used to select seventy one female students of SMA (senior high school) Pahlawan Jember who complained of primary dysmenorrheal and twenty of whom met the inclusion criteria and were divided into four groups consisting of five students as follows:

- Control group : without treatment
- Group I : the treatment used sacral plexus massage
- Group II : the treatment used warm compress
- Group III : the treatment used acupressure

Sampling Technique

Purposive sampling technique was utilized to select respondents who met the inclusion criteria and were available in accordance with a predetermined research schedule (Notoatmodjo, 2005).

Research Variables

1. Independent variables; the intervention variables were sacral plexus massage, warm compresses, and acupressure applied to the respondents.
2. Dependent variables; the dependent variables was the intensity change of dysmenorrhea pain before and after the intervention of sacral plexus, warm compress, and acupressure.

Data Analysis

The data generated from pain intensity tests before and after the intervention of sacral plexus massage, warm compresses and acupressure were then analyzed using *Anova One Way*. While to know the difference of intensity change of dysmenorrhea pain between intervention groups *LSD Post Hoc* test was used.

Ethical Issues

1. This research has received recommendation of "Ethical Clearance" from Medical Research Ethics Commission of Health Politechnic of Malang, register number: 221 / KEPK-POLKESMA / 2016.
2. Informed consent has been made to all respondents
3. Maintain confidentiality of respondent's data.

III. Results

Table (1) Respondents' profiles (students of Senior High School Pahlawan Jember)

No.	Age	x	%
1	15 years	10	50,00%
2	16 years	10	50,00%
	Total	20	100

Table 1 indicates that there were no significant differences with respect to the ages of respondents who were between 15 to 16 years old and were equal in numbers of 10 students (50%) aged 15 and 10 (50%) students aged 16.

Tabel (2) Pain intensity of dysmenorrhea before and after the treatment

	Notes	Mean	Standard Deviation
Before the first treatment	Control	8,20	0,837
	Sacral plexus massage	6,60	1,140
	Warm Compress	7,40	1,140
	Acupresure	7,80	0,837
	Total	7,50	1,100
After the first treatment	Control	0,00	0,000
	Sacral plexus massage	5,20	0,837
	Warm Compress	6,00	1,000
	Acupresure	6,60	0,548
	Total	4,45	2,762
Before the second treatment	Control	8,20	0,447
	Sacral plexus massage	6,20	1,304
	Warm Compress	6,20	1,483
	Acupresure	7,00	1,000
	Total	6,90	1,334
After the second treatment	Control	0,00	0,000
	Sacral plexus massage	3,80	0,837
	Warm Compress	3,60	1,140
	Acupresure	4,40	0,894
	Total	2,95	1,932
Before the third treatment	Control	8,20	0,837
	Sacral plexus massage	5,80	0,837
	Warm Compress	5,40	1,140
	Acupresure	5,80	0,837
	Total	6,30	1,418
After the third treatment	Control	0,00	0,000
	Sacral plexus massage	2,40	0,548
	Warm Compress	2,00	0,707
	Acupresure	2,20	0,447
	Total	1,65	1,089

Table 2 demonstrates the mean of dysmenorrhea pain intensity before the first treatment was at a value of 7.50 and the standard deviation value of 1,100 which means the range was relatively high. After the first treatment the average dysmenorrhea pain intensity was at an average value of 4.45 and the standard deviation value of 2.762 which means the range was relatively high as well. In the second treatment the mean of dysmenorrhea pain intensity before the intervention was at a value of 6.90 and the standard deviation value of 1.334 which means the range was still high. The mean of dysmenorrhea pain intensity after the treatment was at a value of 2.95 and the standard deviation value of 1,932 that means the range was still high as well. In the third treatment, the mean of dysmenorrhea pain intensity before the treatment was at a value of 6.30 and the standard deviation value of 1.418 which means the range was now moderate. The mean of dysmenorrhoea pain intensity after the treatment was at a value of 1.65 and the standard deviation value of 1,089 which means the range was now moderate as well. The result of treatment showed that the mean of dysmenorrhoea pain intensity in group I (Control) was higher than the intervention group receiving sacral plexus massage, warm compress and acupressure.

Table (3) The Anova test result of dsymenorrhea pain intensity

Notes		F	Sig.	Notes
Before the first treatment	Between Groups	3,333	0,013	Mean differences of pain intensity between groups were observed
	Within Groups			
	Total			
After the first treatment	Between Groups	91,300	0,000	
	Within Groups			
	Total			
Before the second treatment	Between Groups	3,503	0,040	
	Within Groups			
	Total			
After the second treatment	Between Groups	28,452	0,000	
	Within Groups			
	Total			
Before the third treatment	Between Groups	9,647	0,001	
	Within Groups			
	Total			
After the third treatment	Between Groups	24,733	0,000	
	Within Groups			
	Total			

In table 3 based on the *p*-value dan *f*-value there were mean differences of dysmenorrheal pain between the control group and the treatment group receiving the first, second, and third treatment. Whereas the *Post-hoc* test on the following table showed that there was a significant difference of mean of dysmenorheal pain experienced by respondents in each group.

Table (4) The result of LSD Post Hoc test in the I-II-III Treatment

Dependent Variable	(I) group	(J) group	Mean Difference (I-J)
Before the first treatment	Control	Sacral plexus massage	1,600*
		Warm compress	,800
		acupressure	,400
	Sacral plexus massage	Control	-1,600*
		Warm compress	-,800
		acupressure	-1,200
	Warm compress	Control	-,800
		Sacral plexus massage	,800
		acupressure	-,400
	Acupressure	Control	-,400
		Sacral plexus massage	1,200
		Warm compress	,400
After the first treatment	Control	Sacral plexus massage	-5,200*
		Warm compress	-6,000*
		Acupressure	-6,600*
	Sacral plexus massage	Control	5,200*
		Warm compress	-,800
		Acupressure	-1,400*
	Warm compress	Control	6,000*
		Sacral plexus massage	,800
		Acupressure	-,600
	Acupressure	Control	6,600*
		Sacral plexus massage	1,400*
		Warm compress	,600
Before the second treatment	Control	Sacral plexus massage	2,000*
		Warm compress	2,000*
		Acupressure	1,200
	Sacral plexus massage	Control	-2,000*
		Warm compress	,000
		Acupressure	-,800
	Warm compress	Control	-2,000*
		Sacral plexus massage	,000
		Acupressure	-,800
	Acupressure	Control	-1,200
		Sacral plexus massage	,800
		Warm compress	,800
After the second intervention	Control	Sacral plexus massage	-3,800*
		Warm compress	-3,600*
		Acupressure	-4,400*

	Masase pleksus sacral	Control	3,800*
		Warm compress	,200
		Acupressure	-,600
	Warm compress	Control	3,600*
		Sacral plexus massage	-,200
		Akupresure	-,800
	Acupressure	Control	4,400*
		Sacral plexus massage	,600
		Warm compress	,800
Before the third treatment	Control	Sacral plexus massage	2,400*
		Warm compress	2,800*
		Acupressure	2,400*
	Sacral plexus massage	Control	-2,400*
		Warm compress	,400
		Acupressure	,000
	Warm compress	Control	-2,800*
		Sacral plexus massage	-,400
		Acupressure	-,400
	Acupressure	Control	-2,400*
		Sacral plexus massage	,000
		Warm compress	,400
After the third treatment	Control	Sacral plexus massage	-2,400*
		Warm compress	-2,000*
		Acupressure	-2,200*
	Sacral plexus massage	Control	2,400*
		Warm compress	,400
		Acupressure	,200
	Warm compress	Control	2,000*
		Sacral plexus massage	-,400
		Acupressure	-,200
	Acupressure	Control	2,200*
		Sacral plexus massage	-,200
		Warm compress	,200

Table 4 presented the mean difference of after treatment. The study found the most effective treatment to shorten the pain intensity of dysmenorrhea was acupressure compared to warm compress or sacral plexus massage. This finding points out that acupressure is the most effective treatment among the three methods to reduce the pain intensity of dysmenorrheal. The repetition of treatment II and III and based on the mean difference after the treatment, acupressure was more effective than warm compress or sacral plexus massage to alleviate the pain intensity of dysmenorrhea.

IV. Discussion

The Effect of Sacral Plexus Massage, Warm Compress and Acupressure on the Intensity Change of Dysmenorrhea Pain

The analysis of Anova of the p-value and f-value explained statistical differences of mean change of the dysminorrhea pain intensity between control group and intervention group given on repetition I, II and III. Potter & Perry (2006) states that coetaneous stimulation is a skin stimulation performed to relieve pain. Massage is a simple step in reducing the perception of pain. It is attributable to the releases of endorphins which then block the pain stimulus. According to Meek (in Potter & Perry, 2006) touch and massage is a sensory integration technique that affects the activity of the autonomic nervous system. Melzack and Wall (in Potter & Perry, 2006) states that gate-control theory points out that pain impulses can be regulated or even inhibited by defense mechanisms along the central nervous system. In this theory it is explained that the gelatinous substance (SG) at the dorsal end of the spinal cord has the role of gating mechanism. This gate-control mechanism can modify and alter the sensation of pain that comes before they reach the cerebral cortex and cause pain. Pain impulses can pass if the gates open and the impulse will be blocked when the gate is closed. Closing the gate is the basis of therapy to overcome the pain. Based on this theory health workers make use of it to regulate dysmenorrhea pain. Neuromodulator can close the gate by inhibiting the formation of substance P. According to this theory, massage treatment is believed to close the gate of pain. Brunner & Suddarth (2002) states that massage is a general coetaneous stimulation of the body, often centered on the back and shoulders. Massage can make patients more comfortable because massage makes muscle relaxation. Massage in relieving this dysmenorrhea pain in the waist area and focused on the area of the processus sacralis to stimulate the parasympathetic nerves. Prawirohardjo (2008) states that the parasympathetic system is derived from the sacral nerves 2, 3, and 4 as the sacralis plexus. The parasympathetic fibers prevent contractions and cause vasodilatation which results in an increase in blood circulation (decreases ischemia) along with increased cell

metabolism so that the pain may subside or decrease. According to Potter & Perry (2006) the correct use of coetaneous stimulation can minimize the perception of pain and help reduce muscle tension (uterus). Conversely, this uterine tension can increase pain. The advantage of massage is that this treatment can be administered at almost anywhere and every time someone afflicts dysmenorrhea pain.

Effectiveness of Sacral Plexus Massage, Warm Compress and Acupressure to Reduce Dysmenorrhea Pain

The significant value in the LSD Post Hoc test is less than 0.05 which means that there is a significant difference of changes on dysmenorrheal pain between the control group and the intervention group. The mean difference after the treatment shows that the most effective treatment is acupressure compared to warm compress or sacral plexus massage to reduce dysmenorrheal pain. The acupressure point located above the sacrum can be identified in the lower back area and the coccyx. This point is very useful in reducing pain or cramping during menstruation (Stone, 2007). Acupressure is a branch of acupuncture techniques. Both acupressure and acupuncture share the same principle of purpose depending on the type of complaint. They are used to stimulate the points that exist in the body, pressing into the nervous system. The application of acupuncture use needles, but acupressure relies more on movement and finger pressure suchh as rotary press, point press, and straight press (Harper, 2006). The principle of acupressure is associated with the existence of vital energy flowing in the body known as Chi or Qi (China) and Ki (Japan). This energy flow greatly affects health. When this flow is hampered or decreased, it may cause health problem. On the other hand, when the flow runs well, it will bring positive effects to the body. The supply and flow of vital energy travels within the body through the helps of electrical conduit called the "meridian". This meridian is highly dependent on the diet, lifestyle, environment, posture, breathing techniques, behavior, body movement, exercise, mental state, personality, and attitude of the person. Person's perspectives about staying healthy should rely heavily on those mentioned factors.

One technique for expanding vital energy is acupressure, namely: pressing a particular point to stimulate energy flow in the meridians (Turana, 2004). The area or location of this point is called acupoint. Acupoints are located all over the body, close to the surface of the skin and connected to each other through a complex network of meridians. Each acupoint has special effects on the body system, or certain organs. Stimulating and gently massaging the point will change the physiology of the body and will affect the mental and emotional state (Turana, 2004). This acupoint is quite sensitive and has certain effects that lie along the acupuncture meridians. There are currently more than 360 acupoints in the meridians all over the body. Some acupoints are located near the target organ they regulate just as the points located at the back of the body that can lessen lower back pain, whereas some are located away from the target organ. Most of these acupoints lie bilaterally on both sides of the body, therefore acupressure is performed on both sides of the body except for acupoints located in the middle of the body (Turana, 2004). For heavier pressure fists are usually used. Heavier pressure at the beginning should be administered gently, then gradually add the force as needed but not painful. In sensitive individuals such as infants, as well as parents, pressure can be made softer. (Turana, 2004). This acupressure technique is also known as shiatsu massage (Mander, 2003). Simkin (2007) states that acupressure stimulates local production of endorphins, besides acupressure closes the gate to defend against the stimulation of pain. Dysmenorrhea pain can be controlled by providing stimulus, one of which is acupressure stimulus. Administering acupressure on the acupoints related to menses to reduce dysmenorrheal pain is advisable as found on this study. Further acupressure is also applicable to the lumbosacral areas in which this treatment stimulates the mechanoreceptors which may lower down the pain (Kasmara, 1993). Giving gently pressure on the acupoint located on the area between lumbar 4 and 5 (bladder Meridian) for 3 to 5 minutes can provide comfort during dysmenorrhea.

V. Conclusion

Conclusions

1. The significant value of LSD Post Hoc which is less than 0.05 means that there is a significant difference of change in dysmenorrhea pain intensity between control group and treatment group.
2. The mean difference after the treatment shows that acupressure is the most effective treatment to decrease dysmenorrhea pain compared to warm compress or sacral plexus massage.

Recommendations

Some recommendations are expected to be useful for the following parties:

1. For researchers Using the findings of this study as a guideline for related in-depth research.
2. For health workers encouraging the adolescents on the use of acupressure which has been proven the most effective way to diminish the dysmenorrhea pain.
3. For Respondents Encouraging respondents to not rely heavily on the use of pharmacological therapy in alleviating their dysmenorrhea pain intensity but may switch to acupressure.

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