Indonesian Journal of Medicine (2022), 07(01): 51-60
Masters Program in Public Health, Universitas Sebelas Maret

Meta-analysis

Meta-Analysis the Effect of Acupressure in Lowering Pain of Dysmenorrhea

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ABSTRACT

Background: Dysmenorrhea is the most common cause of lower abdominal pain and has a negative impact on women's quality of life resulting in activity limitations. Non-pharmacological management can be used as an intervention in the management of dysmenorrhea. Acupressure is a therapy that is given by massaging or pressing certain points. The purpose of this study was to analyze the effect of acupressure therapy on reducing dysmenorrhea pain.
Subject and Method: This study was a meta-analysis with the following PICO, population: Women aged 16-30 years old with primary dysmenorrhea. Intervention: administration of Acupressure Therapy. Comparison: Acupressure therapy was not performed. Results: Decreased pain in primary dysmenorrhea. The articles used in this study were obtained from three databases, namely Google Scholar, Pubmed, and Science Direct. Keywords to search for articles "Acupressure" OR "Acupressure Therapy" AND "Sanyinjiao Point (SP6)" AND "Hequ Point (LI4)" AND "Dysmenorrhea" OR "Primary Dysmenorrhea" OR "Menstrual Pain" AND "Randomized Controlled Trial". The articles included are full-text English with a Randomized Control Trial study design from 2007 to 2022. The articles were selected using PRISMA flow diagrams. Articles were analyzed using the Review Manager 5.3 application.
Results: Meta-analysis of 9 randomized controlled trial articles from Asia and Europe concluded that acupressure therapy can reduce pain in primary dysmenorrhea (SMD= -0.66; 95% CI = -0.96 to -0.36; $p < 0.001$).
Conclusion: Acupressure therapy can affect pain reduction in women with complaints of primary dysmenorrhea.

Keywords: Acupressure, pain relief, primary dysmenorrhea

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Cite this as:
Rahmawati AF, Prasetya H, Murti B (2022). Meta-Analysis the Effect of Acupressure in Lowering Pain of Dysmenorrhea. Indones J Med. 07(01): 51-60. https://doi.org/10.26911/theijmed.2022.07.01.06.

BACKGROUND

In every month, women in reproductive age who are not pregnant and not menopausal will generally experience menstruation. Menstruation is a sign of the maturity of the female reproductive organs. Menstruation occurs periodically every month with a span of 28 days and the menstrual period is between 3 to 7 days (Rahayu et al., 2017). The problem that can be experienced by many women during menstruation is pain in the lower abdomen so that it can cause discomfort in carrying out daily activities which is also known as dysmenorrhea. Dysmenorrhea can occur due to contractions of the uterus. Furthermore, if there are strong con-

tractions during menstruation in the uterus, it can cause the oxygen supply to the uterus to decrease so that it can cause pain (Novitasari et al., 2020).

Dysmenorrhea is the most common gynecological condition -as revealed by the high rate of menstrual pain among women in reproductive age. Global prevalence affects about 45-95% of menstruating women (Durand et al., 2021). This condition is more common in women aged 17-24 years old and will decrease with age. The prevalence in older women is 25% while in younger women is 90% (Calis et al., 2021). Dysmenorrhea is known as a disorder that is not a disease, but one of the indications that arise that can cause discomfort and an inability to carry out activities (Fitria, 2020).

Based on the World Health Organization (WHO), it was found that in 90% of women who experience dysmenorrhea, 10-15% of them experience severe dysmenorrhea and cause limited activity. The average incidence of dysmenorrhea is experienced by young women with a prevalence between 16.8% to 81%. The prevalence of dysmenorrhea in Bangladesh was reported by 59.8%; in Egypt was 35% and in Australia was 60%. A study in Italy showed the prevalence of dysmenorrhea was 84.1% with 55.2% of the perceived pain requiring treatment, 32% requiring rest and 25.3% requiring both (Ju et al., 2014; Wulanda et al., 2020; Sulistyorini et al., 2017).

In Indonesia, the incidence of dysmenorrhea ranges from 50-90% among women in reproductive age consisting of 73% primary dysmenorrhea and 22% secondary dysmenorrhea. Sari and Listiarini (2021) in their research reported that every month there were students at SMK PAB 5 Klambir Lima who did not attend school on the because of menstrual pain. Furthermore, interviews were conducted with 10 students, it was found that 7 students experienced dysmenorrhea and could not participate in the learning process at school and interfered with daily activities during menstruation.

In this study, the authors focused on the management of primary dysmenorrhea. Pharmacologically, primary dysmenorrhea can be treated with analgesic therapy which is the most common method used to relieve pain. Although analgesics can relieve pain effectively, they will have harmful side effects such as digestive tract disorders and severe kidney damage if it is used in high doses, therefore non-pharmacological management or complementary therapies that have minimal side effects are needed.

Non-pharmacological management can be considered as a safe way to treat primary dysmenorrhea because of its higher level of safety and more affordable costs. One alternative way is by giving acupressure therapy. Acupressure is a therapy given by massaging or pressing certain points on the body using body parts such as fingers, palms or elbows and blunt objects. Acupressure is a simple, effective, safe and economical method to reduce pain in dysmenorrhea (Yati, 2019). The purpose of this study was to analyze the effect of acupressure therapy on reducing dysmenorrhea pain.

SUBJECT AND METHOD

1. Study Design

This study was a systematic and meta-analysis study. The articles used in this study were obtained from several databases, namely Google Scholar, Pubmed, and Science Direct between 2007 and 2022. The selection of articles was carried out using the PRISMA flow chart. The keywords to search for articles are “Acupressure” OR “Acupressure Therapy” AND “Sanyinjiao Point (SP6)” AND “Hequ Point (LI4)” AND “Dysmenorrhea” OR “Primary Dysmenorrhea” OR “Menstrual Pain” AND “Randomized Controlled Trial”.

2. Inclusion Criteria

The inclusion criteria in this study article were: full-text articles with randomized control trial design, study subjects were women aged 16-30 years old with complaints of primary dysmenorrhea, the results of the study were a decrease in dysmenorrhea pain, multivariate analysis with Standardized Mean Difference (Mean – SD) to measure the expected effect.

3. Exclusion Criteria

The exclusion criteria in this study article were: articles published in languages other than English, statistical results reported in the form of bivariate analysis, articles published before 2007.

4. Operational Definition

The article search was carried out by considering the eligibility criteria determined using the PICO model. Population: Women aged 16-30 years old with complaints of primary dysmenorrhea. Intervention: giving acupressure therapy. Comparison: not given acupressure. Result: decreased primary dysmenorrhea pain.

Acupressure Therapy is a therapy performed by applying manual pressure using fingers, other body parts or blunt tools at certain acupuncture points for 3 to 5 minutes.

Primary Dysmenorrhea Pain is pain during menstruation that occurs due to contractions of the uterus or uterine muscles that occur in the lower abdomen.

5. Study Instrument

The study was guided by the PRISMA flow chart and quality assessment using Critical Appraisal. In table 2, the researchers assessed the quality of study using Critical Appraisal Tools Randomized Controlled Trial (RCT) published by CEBM University Of Oxford 2014 :

a. Does the research address clearly focused statements/problems? ?
b. Is the Randomized Controlled Trial research method appropriate to answer the research question?
c. Are there enough subjects in the study to establish that the findings did not occur by chance?
d. Are the subjects randomly allocated to the experimental and control groups? If not, could this be biased?
e. Are inclusion/exclusion criteria used?
f. Are the two groups comparable at the start of the study?
g. Are objective and unbiased outcome criteria used?
h. Are objective and validated measurement methods used in measuring the results? If not, will the results be graded by someone who does not know the group assignment (ie. was the assessment blinded)?
i. Is effect size practically relevant?
j. How precise is the estimate of the effect? Is there a confidence interval?
k. Could there be confounding factors that have not been taken into account?
l. Are the results applicable to your research?

6. Data Analysis

The data in the study were analyzed using the Review Manager application (RevMan 5.3). Forest plots and funnel plots were used to determine the size of the relationship and the heterogeneity of the data. The fixed effects model is used for homogeneous data, while the random effects model is used for heterogeneous data across studies.

RESULTS

The article search process is carried out through several journal databases, including Google Scholar, Pubmed, and Science Direct. The review process for related articles can be seen in the PRISMA flow chart in figure 1. Research related to the effect of

Acupressure therapy on reducing dysmenorrhea pain consists of 9 articles from the initial search process yielding 419 articles, after the deletion process, 270 articles were published with 63 of them meeting the requirements for further full text review. A total of 9 articles that fulfill the quality assessment were included in the quantitative synthesis using a meta-analysis. It can be seen in Figure 2 that the study articles come from two continents, namely the European continent (Turkey and Germany) and the Asian continent (Hong Kong, Taiwan and Iran).

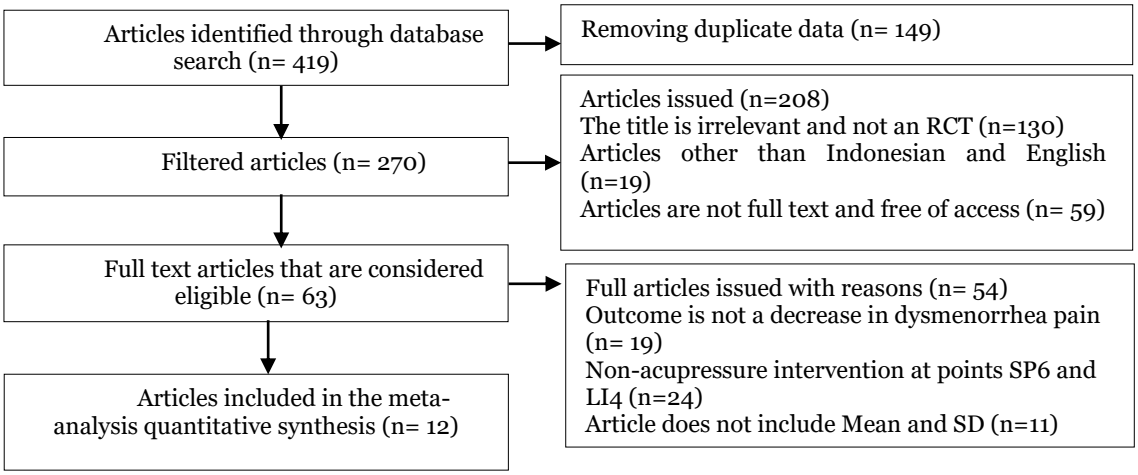

Figure 1: PRISMA Diagram

Figure 2. Study Area Map of the Effect Of Acupressure to Dysmenorrhea Reduction

Table 1. Description of the primary studies included in the meta-analysis

Author (Year)	Country	Study Design	Sample		P	I	C	O	Mean		SD	
			IG	CG	Population	Intervention	Comparison	Outcome	IC	CG	IC	CG
Dinzer *et al.*, (2021)	Turkey	RCT	34	33	Woman with dysmenorrhea aged 18 years old	Acupressure on point SP6	No acupressure	Decrease in primary dysmenorrhea	1.41	1.73	1.4	1.23
Blödt *et al.*, (2018)	German	RCT	102	107	Women with dysmenorrhea aged 18-25 years old	Acupressure on point LI4	No acupressure	Decrease in primary dysmenorrhea	3.5	5	3.55	4.95
Wong *et al.*, (2010)	Hong Kong	RCT	19	21	Women with dysmenorrhea aged under 25 years old	Acupressure on point SP6	No acupressure	Decrease in primary dysmenorrhea	2.79	4.3	1.58	1.74
Gharlogi *et al.*, (2012)	Iran	RCT	21	21	Women with dysmenorrhea aged 18-30 years old	Acupressure on point SP6	No acupressure	Decrease in primary dysmenorrhea	2.89	4.47	1.36	0.99
Chen *et al.*, (2010)	Taiwan	RCT	33	35	Women with dysmenorrhea aged under 20 years old	Acupressure on point LI4	No acupressure	Decrease in primary dysmenorrhea	2.87	4.45	1.79	1.94
Ajorpaz *et al.*, (2011)	Iran	RCT	15	15	Women with dysmenorrhea aged 18-30 years old	Acupressure on point SP6	No acupressure	Decrease in primary dysmenorrhea	1.66	4.8	1.98	1.37
Bazarganipour *et al.*, (2017)	Iran	RCT	30	30	Women with dysmenorrhea aged 18-21 years old	Acupressure on point LI4	No acupressure	Decrease in primary dysmenorrhea	3.26	3.73	1.81	2.21
Kashefi *et al.*, (2010)	Iran	RCT	40	41	Women with dysmenorrhea aged 18-28 years old	Acupressure on point SP6	No acupressure	Decrease in primary dysmenorrhea	5.67	7.04	1.64	1.58
Charandabi *et al.*, (2011)	Iran	RCT	17	18	Women with dysmenorrhea aged 18-22 years old	Acupressure on point SP6	No acupressure	Decrease in primary dysmenorrhea	6.7	6.8	1.4	1.4

IG : Intervention Group, CG : Control Group

Table 3. Results of Quality Assessment of Randomized Control Trial

Author (Year)	Criteria												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Dinzer *et al.* (2021)	1	1	1	1	1	0	1	1	1	1	0	1	10
Blodt *et al.* (2018)	1	1	1	1	1	0	1	1	1	1	0	1	10
Wong *et al.* (2010)	1	1	1	1	1	0	1	1	1	1	0	1	10
Gharlogi *et al.* (2012)	1	1	1	1	1	1	1	1	1	1	0	1	11
Chen *et al.* (2010)	1	1	1	1	1	0	1	1	1	1	0	1	10
Ajorpaz *et al.* (2011)	1	1	1	1	1	1	1	1	1	1	0	1	11
Bazarganipour *et al.* (2017)	1	1	1	1	1	1	1	1	1	1	0	1	11
Kashefi *et al.* (2010)	1	1	1	1	1	0	1	1	1	1	0	1	10
Charandabi *et al.* (2011)	1	1	1	1	1	0	1	1	1	1	0	1	10

Description : 1=Yes, 0=No

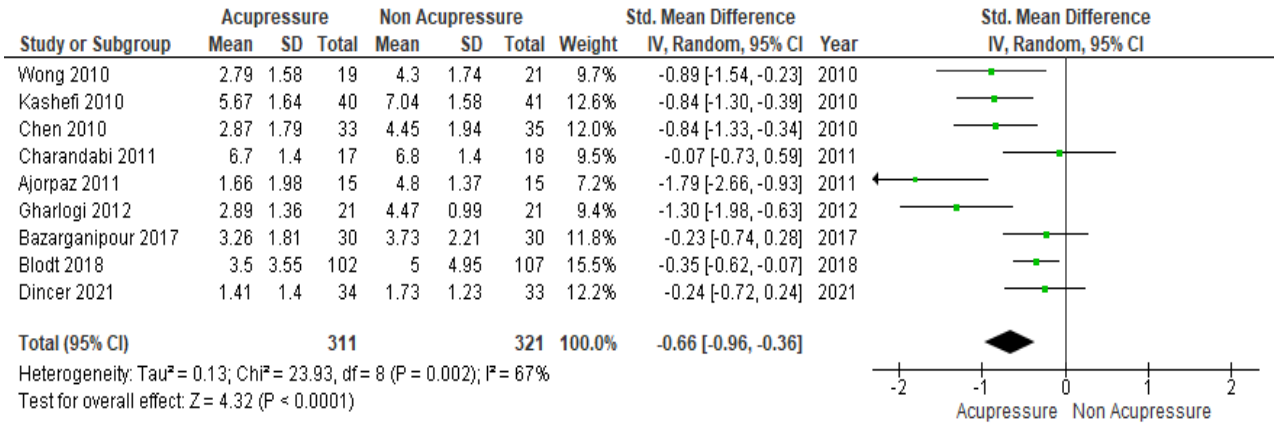

Figure 3. Forest Plot of the Effect of Acupressure on Reducing Dysmenorrhea

1. Forest Plot

The interpretation of the results of the meta-analysis process can be seen through the forest plot in Figure 3 which shows that there is an effect of acupressure on reducing dysmenorrhea pain. Women with dysmenorrhea who received acupressure therapy intervention experienced a decrease in pain of -0.66 units lower than women who did not receive acupressure therapy and the effect was statistically significant (SMD = -0.66; 95% CI = -0.96 to -0.36; p < 0.001). This meta-analysis contained heterogeneity. The estimated effect between studies was large with I^2= 67%, thus combining the effect estimates from all studies using the Random Effect Model approach.

2. Funnel Plot

Based on Figure 4, The funnel plot graph showed a more or less symmetric distribution of the estimated study effect around the average value of the estimate. Therefore, the

funnel plot does not indicate publication bias, thus the estimated results of the meta-analysis are not confused by publication bias.

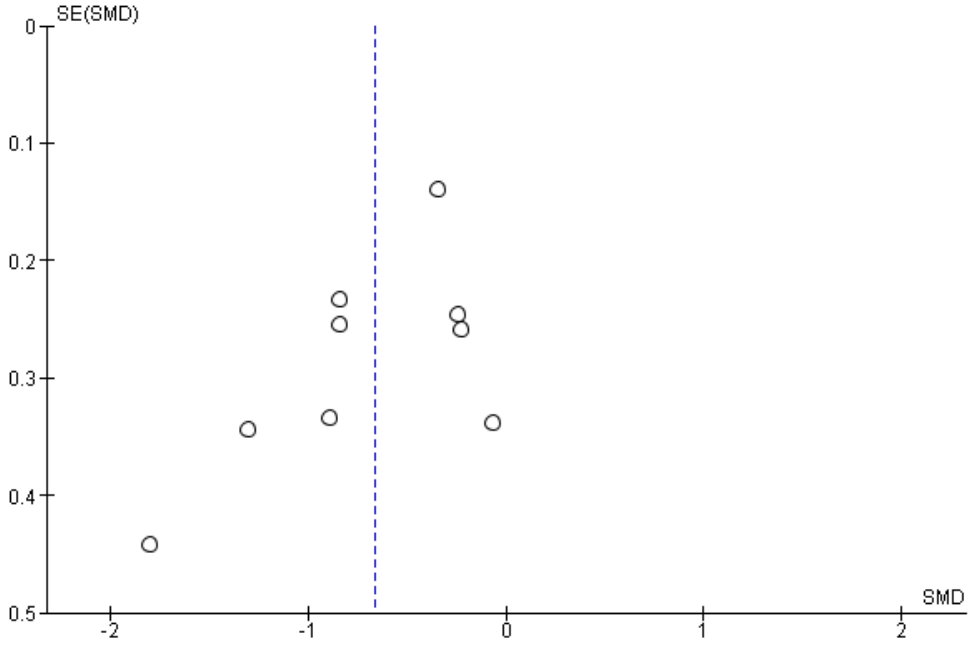

Figure 4. Funnel Plot of the Effect of Acupressure on Reducing Dysmenorrhea

DISCUSSION

In this study, the researchers focused on non-pharmacological treatments, one of them was by giving acupressure therapy. Research related to the effect of acupressure on reducing dysmenorrhea pain consists of several primary studies spread across 2 continents, namely the Asian continent and the European continent. The primary research included in this meta-analysis synthesis is 9 articles from Germany, Taiwan, Hong Kong, Turkey and Iran.

Based on the results of 9 primary studies conducted by systematic reviews and meta-analyses, it shows that there is heterogeneity between experiments as indicated by the I^2 value of 67%, so the analysis uses the Random Effect Model. Heterogeneity is based on the existence of diversity between populations as seen from the number of samples that different between the intervention group and control group in each article and there is a diversity of age ranges between women in the population in each article.

The results of a meta-analysis of 9 articles related to the effect of acupressure on reducing dysmenorrhea pain showed that acupressure could reduce primary dysmenorrhea pain in women (SMD = -0.66; 95% CI- -0.96 to -0.36; P<0.001). There are 6 primary research articles that show significant value in this study, which is marked by not touching the horizontal line in each study with the vertical line found in the forest plot image, including the study of Chen et al. 2010), Blodt et al (2018), Wong et al (2010), Kashefi et al (2010), Ajorpaz et al (2011) and Gharlogi et al (2012). The significance value is influenced by several factors, including in the 6 articles the number of samples in the intervention group and the control group is the same so that the total proportion of the two is balanced.

Acupressure is one of the ways to launch vital energy by pressing certain po-

ints known as acupoints, so that the flow of energy in the meridians will be stimulated. The purpose of acupressure therapy is to stimulate the natural ability to heal oneself by restoring the body's positive energy balance while the benefits of acupressure therapy itself are to increase stamina, improve blood circulation, reduce pain sensations so as to improve the quality of life in carrying out daily activities (Sukanta, 2008).

Acupressure at the SP6 point has been shown to reduce pain in primary dysmenorrhea as shown in several studies, one of which is in the study of Dincer et al (2021) with the number of research subjects by 67 women with complaints of dysmenorrhea. Acupressure therapy was carried out for 4 menstrual cycles by applying acupressure at the SP6 point or the Sanyinjiao point and during the study the respondents were given the opportunity for consultation by the research team. The results of this study showed that after an assessment using the VAS the severity of pain was lower in the acupressure group compared to the control group. In his research, Dincer concluded that acupressure can be used as an effective and reliable method for the management of primary dysmenorrhea.

Research results from several articles also show that acupressure therapy at the LI4 point or Hegu point can have an effect on reducing dysmenorrhea pain as well as reducing stress and anxiety during menstruation. According to a study conducted by Bazarganipour et al (2017) on 60 women with complaints of primary dysmenorrhea, the results showed that the intensity and duration of pain after acupressure therapy at the LI4 point were significantly different ($p<0.05$). Significant differences were seen across all QOL domains except for mental health, general health and mental health. In his research, Bazarganipour concluded that a simple acupressure protocol was an effective method to reduce the intensity and duration of dysmenorrhea and improve the quality of life in women.

Pressure or massage on acupressure points will affect the production of endorphins in the body which are released by the endocrine system based on the control of the central nervous system. Endorphins are pain relievers produced by the body in the form of peptide molecules or proteins made from a substance called beta-lipotropin found in the pituitary gland. Endorphins can affect pain-sensing areas of the brain in a similar way to opiate drugs such as morphine. Nervous tissue that is sensitive to pain and external stimuli then when triggered using acupressure techniques will instruct the endocrine system to release a number of endorphins according to the body's needs (Pangastuti and Mukhoirotin, 2018). As a result, the pain will be blocked and the flow of blood and oxygen to the area where the acupressure has been applied will increase. This will relax the muscles and promote healing. Acupressure blocks pain signals to the brain through light stimulation, blocking the sensation of pain through the spinal nerves to the brain. Then it can be concluded that acupressure therapy can reduce dysmenorrhea pain and reduce the use of pain medication (Azeem *et al.*, 2020).

Based on the analysis of several primary studies that have been carried out, acupressure therapy is effective for reducing dysmenorrhea pain in women with a minimum duration of therapy for 5-10 minutes per day and carried out during menstruation. Non-pharmacological management or complementary therapy to acupressure therapy can be considered as a way to treat primary dysmenorrhea because of its high level of safety, minimal side effects and more affordable costs.

AUTHORS CONTRIBUTION

Anisya Fajar Rahmawati is the main researcher who selected the topic, explored and collected the data. Hanung Prasetya and Bhisma Murti played a role in analyzing data and reviewing study documents.

CONFLICT OF INTEREST

There was no conflict of interest in this study.

FUNDIND AND SPONSORSHIP

This study is self-funded.

ACKNOWLEDGEMENT

We would like to thank to several databases, including: PubMed, Google Scholar and Science Direct.

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