Meta Analysis: Effectiveness of Electroacupuncture in Reducing Anxiety and Depression

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ABSTRACT

Background: Anxiety and depression can happen to anyone, especially in patients with certain diseases. Anxiety and depression can affect activity, reduce quality of sleep, and life. Electro-acupuncture is one of the therapies with small side effects to reduce anxiety and depression and provide a sedative effect. This study aims to analyze and estimate the effectiveness of electroacupuncture therapy to reduce anxiety and depression in patients based on the results of similar studies.

Subjects and Method: This study used a systematic review and meta-analysis based on PICO, Population: Patients. Intervention: Electroacupuncture. Comparison: Non-Electroacupuncture. Outcome: Decreased anxiety and depression. Data were obtained from Google Scholar, PubMed, Science Direct Hindawi, BMC, and Spinger Link databases from 2010 to 2023. The search process used the keywords "electroacupuncture" AND "anxiety" OR "depression" AND "RCT". Article selection used the PRISMA flowchart and the results were analyzed using Review Manager 5.3 software.

Results: 9 articles from Brazil, Spain, Hong Kong and China with a sample size of 458 subjects were used in a meta-analysis of the effectiveness of electroacupuncture to reduce anxiety. And as many as 11 articles from Brazil, Spain, Hong Kong, and China with a sample size of 555 subjects were used for a meta-analysis of the effectiveness of electroacupuncture to reduce depression with an RCT study design. The results of the meta-analysis showed that patients who received electroacupuncture therapy intervention experienced an average of 0.68 units lower in anxiety (SMD=-0.68; 95% CI= -1.04 to -0.33; p=0.001) and 0.51 units lower in depression (SMD =-0.51; 95% CI= -0.86 to -0.16; p=0.004) compared to the group without electroacupuncture therapy.

Conclusion: Electroacupuncture therapy reduces anxiety and depression.

Keywords: acupuncture, electroacupuncture, anxiety, depression

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BACKGROUND

Psychic or mental is a part of health besides the physical of every human being that plays a role in the process of thinking, regulating emotions, feelings, self-control, and motivation (Gross et al., 2019; WHO, 2022). As living beings who have reason and feelings, psychological problems cannot be separated from human life. At least every human being has experienced stress, anxiety, sadness, and emotional instability in dealing with a problem. This

condition is normal if it can be controlled and balanced with motivation, self-confidence and self-efficacy to improve psychological conditions (Gross et al., 2019). Anxiety and depression are part of mental health disorders. Anxiety is a condition of decreased self-confidence, fear and excessive anxiety which is marked by panic in dealing with something (Cao et al., 2021). Meanwhile, depression is a condition when a person begins to lose enthuseasm for life, happiness, and has a desire to hurt himself (Malgaroli et al., 2021). Other health problems include Post Traumatic Stress Disorder (PTSD), Panic Disorder, Traumatic Disorder, Social Anxiety Disorder (SAD), Major Depressive Disorder (MDD), and Schizophrenia (Amorim et al., 2018; Erskine et al., 2023; Kim and Park, 2019).

Because it is not physically visible, mental health conditions are often ignored, handled late, and detected when they are severe (Hartini et al., 2018). WHO data for 2019 is that 301 million people experience anxiety and 280 million people experience depression (Malgaroli et al., 2021; WHO, 2022). An increase in mental disorders also occurred in 2020 which was affected by the presence of COVID-19. There was an increase of about 26% cases of anxiety and 28% cases of depression. In Indonesia, society's negative stigma about mental health disorders is still an obstacle to treating mental disorders (Hartini et al., 2018). The prevalence of depression in Indonesia is 6.1% out of 700 thousand people and as many as 9.8% experience emotional disorders (Riskesdas, 2018).

Mental disorders are influenced by several factors such as trauma, mental pressure, disease, physical/mental disabilities, phobias, and over-thinking which occurs continuously and goes untreated (Malgaroli et al., 2021; Nurhayati et al.,

2021; Wang et al., 2018). Therefore, patients with certain diseases often experience mental disorders (Zarse et al., 2019). Not only affecting the psyche, anxiety and depression can reduce physical conditions such as fatigue, dizziness, weight loss, muscle tension, palpitations, dizziness and insomnia so that it interferes with physical activity and reduces the patient's quality of life (Prasetya and Yatmihatun, 2023).

There are various kinds of anxiety and depression treatment both pharmacologically and non-pharmacologically. Although pharmacological treatment is often used as a sedative, it has higher side effects (Poelgeest et al., 2021; Zhao et al., 2019). Until it began to develop various non-pharmacological therapies with small side effects. The types of cognitive behavior therapy, psychotherapy, hypnotherapy, meditation, and acupuncture play a role in regulating negative thoughts by focusing on positive suggestions, self-perception, and motivation (Celano et al., 2019; Prasetya and Yatmihatun, 2023; Wielgosz et al., 2019; Yin et al., 2020). Electroacupuncture is a therapy using needles and an electrostimulator as a support that delivers electrical waves. Not only does it play a role in reducing pain, electroacupuncture also plays a role in reducing psychological disorders (Yin et al., 2020).

Research on acupuncture in mental disorders to reduce the pathopsychological and physiological symptoms of mental disorders is still being developed. Several studies have concluded that electroacupuncture has almost the same effect as antidepressants with small side effects (Yang et al., 2020).

Other studies also say that electroacupuncture can improve sleep quality, sleep efficiency (SE), improve mood and reduce stress through the activity of the Trigeminal Sensory Nuclear Complex

(TSNC) (Yin et al., 2017; Zhang et al., 2021). Piercing of acupuncture points and electrical stimulation of the forehead area will connect to the trigeminal sensory pathway. Through this pathway acupuncture stimuli transmit sensory information to the TSNC (Zhang et al., 2021). Acupuncture also works on the central and autonomic nervous systems, and modulates neurotransmitters to reduce insomnia in patients with anxiety or depression (Zhang et al., 2021).

SUBJECTS AND METHOD

1. Study Design
This study uses a systematic review and meta-analysis method. Data were obtained from Google Scholar, PubMed, Science Direct Hindawi, BMC, and Spinger Link databases from 2010 to 2023. The search process used the keywords "electroacupuncture" AND "anxiety" OR "depression" AND "RCT".

2. Steps of Meta-Analysis
Meta analysis was carried out in 5 steps as follows:
1) Formulate research questions in the PICO format (Population, Intervention, Comparison, Outcome).
2) Comprehensive search for primary study articles from Google Scholar, PubMed, Science Direct Hindawi, BMC, and Spinger Link databases.
3) Assess the criticality of the primary study based on the specified inclusion and exclusion criteria, as well as carry out screening with a critical appraisal.
4) Analyzing data quantitatively using RevMan 5.3 software
5) Draw conclusions from the results of the research.

3. Inclusion Criteria
The article used is full paper, hhe article uses a Randomized Controlled Trial (RCT) study design, articles published in English or Indonesian, articles published in the range of 2010-2023, has an appropriate title and relates to the effectiveness of electroacupuncture therapy to reduce anxiety and depression, the article includes the results of the study in the form of the number of respondents, the mean value and the standard deviation (SD) value, the research subjects were patients with an age range of 15-80 years, intervention on research subjects in the form of electroacupuncture, intervention in the control group in the form of electroacupuncture sham, or no treatment

4. Exclusion Criteria
Research conducted by non-randomized controlled trial (RCT), RCT research using acupressure, herbs, and moxibustion in the experimental group, Article published before 2010.

5. Operational Definition of Variables
Depression is the amount of depression score decreased after the patient received electroacupuncture therapy.

Electroacupuncture therapy is a therapeutic procedure by inserting fine needles (filiform needles) at acupuncture points on the body with additional stimulation using an electrostimulator.

6. Study Instruments
Screening of primary study articles used the PRISMA flowchart and critical appraisal to assess the quality of the studies based on the Center for Evidence-Based Medicine (CEBM).

7. Data Analysis
Data results from the primary study article searches were collected and calculated using the Review Manager (RevMan 5.3) to quantitatively assess the results and conclude the research results.

RESULTS
The data used in the meta-analysis research were obtained from primary study

articles from the Google Scholar, PubMed, Science Direct Hindawi, BMC, and Spinger Link databases from 2010 to 2023. The search process used the keywords "electro-acupuncture" AND "anxiety" OR "depression" AND "RCT". And the process of filtering articles uses the PRISMA flowchart as shown in (Figure 1). A total of 11 primary study articles with RCT research designs were used in this meta-analysis study.

From the results of the initial search for articles in the database, 1300 articles were found. The selection process continues to be carried out to filter out duplicate articles and 939 articles are obtained. And at the 901 screening stage, as many articles were discarded because they did not meet the criteria in the form of irrelevant research, non-RCT study design or study protocol, control group other than sham/placebo acupuncture or

no treatment so that 38 articles were obtained. There are 11 articles used in the meta-analysis research. These articles come from the continents of Europe and Asia in the countries of Brazil, Spain, Hong Kong and China which are depicted in Figure 2.

Table 1 shows the assessment of the quality of primary articles using CEBMa used in this study. Based on the results obtained, the total score of the 11 selected articles is 12. This indicates that the quality of the primary articles used is feasible for meta-analysis.

Table 2 presents a summary of the source articles, which obtained 9 articles with a randomized controlled trial study design used for a meta-analysis on the effectiveness of electro-acupuncture therapy to reduce anxiety. The total sample is 458 samples.

Articles identified through database search (n=1,300)

↓

Articles after duplicates were removed (n =361)

↓

Filtered articles (n= 939) →

Issued articles (n = 901)
- Irrelevant title
- Not an RCT
- Articles are not in Indonesian or English
- Not full text

↓

Full Text articles that are considered eligible (n= 38) →

Artikel yang dikeluarkan (n=27)
- Kelompok kontrol bukan sham/-placebo akupunktur dan no treatment (n= 17)
- Study protocol (n= 1)
- Tidak ada mean dan SD (n= 9)

↓

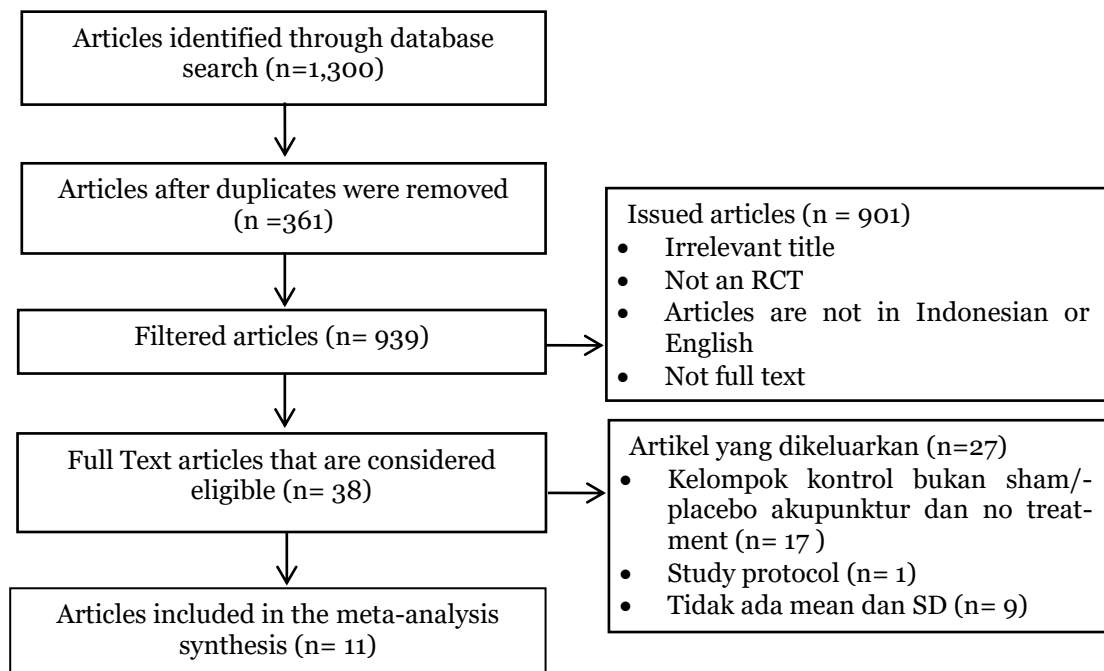**Articles included in the meta-analysis synthesis (n= 11)**

Figure 1. PRISMA flowchart diagram of the effectiveness of electroacupuncture in reducing anxiety and depression

Figure 2. Map of the research area on the effectiveness of electroacupuncture in reducing anxiety and depression

Table 1. Critical appraisal checklist for randomized control trial (RCT) studies in meta-analysis

Author (Year)	Criteria of Questions												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
Chung et al. (2012)	1	1	1	1	1	1	1	1	1	0	1	1	11
Dias et al. (2012)	1	1	1	1	1	1	1	1	1	0	1	1	11
Dias et al. (2013)	1	1	1	1	1	1	1	1	1	0	1	1	11
Horta et al. (2020)	1	1	1	1	1	1	1	1	1	1	1	1	12
Li et al. (2020)	1	1	1	1	1	1	1	1	1	1	1	1	12
Liu et al. (2021)	1	1	1	1	1	1	1	1	1	0	1	1	11
Man et al. (2014)	1	1	1	1	1	1	1	1	1	0	1	1	11
Yeung et al. (2011)	1	1	1	1	1	1	1	1	1	0	1	1	11
Yin et al. (2020)	1	1	1	1	1	1	1	1	1	1	1	1	12
Zeng et al. (2018)	1	1	1	1	1	1	1	1	1	0	1	1	11
Zhao et al. (2020)	1	1	1	1	1	1	1	1	1	0	1	1	11

Description of the question criteria:

1 = Does this objective clearly define the focus of the research problem?
2 = Is the research design suitable for answering the research questions?
3 = Is the method of selecting research subjects written clearly?
4 = Does the sampling method cause bias (selection)?
5 = Does the sample taken represent the designated population?
6 = Was the sample size based on pre-study considerations?
7 = Was a satisfactory response achieved?
8 = Is the research instrument valid and reliable?
9 = Was statistical significance assessed?
10 = Are confidence intervals given for the main outcome?
11 = Are there any confounding factors that have not been taken into account?

12 = Are the results applicable to your research?
Description of the answer score:
0 = No
1 = Yes

Table 2. Summary of primary study articles included in the meta-analysis

Author (Year)	Country	Sample	P	I	C	O
Chung et al. (2012)	Hong Kong	20	Postpartum patient/mother with depression	EA therapy	Non-invasive Sham EA	Reduce anxiety (HADS)
Dias et al. (2012)	Brazil	25	Students with symptoms of stress	EA therapy	No treatment	Reducing anxiety (BAI)
Dias et al. (2013)	Brazil	52	Students with symptoms of stress	EA therapy	Sham TENS	Reducing anxiety (BAI)
Horta et al. (2020)	Spain	36	IBD patient with anxiety symptoms	EA therapy	Sham EA	Reducing anxiety (HAMA)
Li et al. (2020)	China	84	Patients with perimenopausal insomnia (PMI)	EA therapy	Sham Acupuncture	Reduce anxiety (SAS)
Liu et al. (2021)	China	58	Patients with chronic insomnia	EA therapy	Sham Acupuncture	Reducing anxiety (HAMA)
Yin et al. (2020)	China	60	Patients with depression and insomnia	EA therapy	Sham EA	Reduce anxiety
Zeng et al. (2018)	China	64	Anxiety and depression patients	EA therapy	Sham EA	Reduce anxiety
Zhao et al. (2020)	China	61	Addict patients with mental disorders	EA therapy	Sham EA	Reduce anxiety

Table 3. Effect estimates (Mean SD) of all primary studies included in the meta-analysis of electroacupuncture for anxiety reduction

Author (Year)	Electroacupuncture		Non Electroacupuncture	
	Mean	SD	Mean	SD
Chung et al. (2012)	8.3	3.2	7.3	3.3
Dias et al. (2012)	5.7	2.9	14	13.6
Dias et al. (2013)	7.9	6.9	11	6.5
Horta et al. (2020)	8.3	12.1	5.8	6.8
Li et al. (2020)	44.98	3.85	48.1	6.04
Liu et al. (2021)	7.17	2.29	10.48	1.72
Yin et al. (2020)	14.27	6.73	22.43	9.14
Zeng et al. (2018)	5.77	2.53	8.79	4.46
Zhao et al. (2020)	17.02	1.76	19.3	2.35

1. Forest Plot

Study or Subgroup	Electroacupuncture Mean	SD	Total	No Electroacupuncture Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Chung 2012	8.3	3.2	10	7.3	3.3	10	8.2%	0.29 [-0.59, 1.18]
Dias 2012	5.7	2.9	12	14	13.6	13	8.8%	-0.80 [-1.62, 0.02]
Dias 2013	7.9	6.9	34	11	6.5	18	11.5%	-0.45 [-1.03, 0.13]
Horta 2020	8.3	12.1	18	5.8	6.8	18	10.6%	0.25 [-0.41, 0.91]
Li 2020	44.98	3.85	42	48.1	6.04	42	13.3%	-0.61 [-1.05, -0.17]
Liu 2021	7.17	2.29	29	10.48	1.72	27	11.2%	-1.60 [-2.21, -1.00]
Yin 2020	14.27	6.73	30	22.43	9.14	30	12.2%	-1.00 [-1.54, -0.46]
Zeng 2018	5.77	2.53	31	8.79	4.46	33	12.4%	-0.82 [-1.33, -0.30]
Zhao 2020	17.02	1.76	31	19.3	2.35	30	12.0%	-1.09 [-1.63, -0.55]
Total (95% CI)			237			221	100.0%	-0.68 [-1.04, -0.33]

Heterogeneity: Tau² = 0.20; Chi² = 25.64, df = 8 (P = 0.001); I² = 69%
Test for overall effect: Z = 3.78 (P = 0.0002)

Figure 3. Forest plot of electroacupuncture to reduce anxiety

The forest plot in Figure 3 shows that the effect of electroacupuncture therapy can reduce anxiety and is statistically significant. Patients who were given electroacupuncture therapy experienced anxiety 0.68 units lower than those who were not given electroacupuncture therapy (SMD= -0.68; 95% CI= -1.04 to -0.33; p= 0.001). The results also show significant heterogeneity of effect estimates between studies (I2= 69%; p<0.001). Thus calculating the estimated effect using the Random Effect Model (REM) approach.
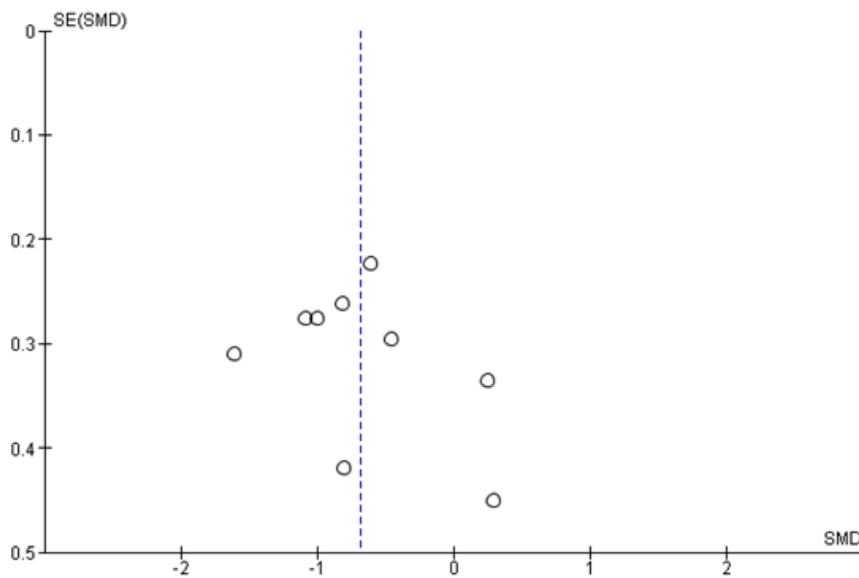
2. Funnel Plot

Figure 4. Funnel plot of electroacupuncture to reduce anxiety

The funnel plot in Figure 4 shows the symmetrical distribution of effect estimates between studies to the right and left of the vertical line of mean estimates. This funnel plot demonstrates that there is no publication bias in a meta-analysis of the effectiveness of electroacupuncture therapy to reduce anxiety. mean of the estimate, so this meta-analysis indicates no publication bias.

Table 4. Results of randomized controlled trials (RCT) of primary study articles according to PICO

Author (Year)	Country	Sample	P	I	C	O
Chung et al. (2012)	Hong Kong	20	Postpartum patient/mother with depression	EA therapy	Non-invasive Sham EA	Reducing depression (HADS)
Dias et al. (2012)	Brazil	25	Students with symptoms of stress	EA therapy	No treatment	Reduce depression (BDI)
Dias et al. (2013)	Brazil	52	Students with symptoms of stress	EA therapy	Sham TENS	Reducing depression (HADS)
Horta et al. (2020)	Spain	36	IBD patient with anxiety symptoms	EA therapy	Sham EA	Reduce depression (BDI)
Li et al. (2020)	China	84	Patients with perimenopausal insomnia (PMI)	EA therapy	EA therapy	Reducing depression (SDS)
Liu et al. (2021)	China	58	Patients with chronic insomnia	EA therapy	EA therapy	Reducing depression (HAMD)
Man et al. (2014)	Hong Kong	43	Post Stroke Depression Patients	DCEAS therapy	DCEAS therapy	Reducing depression (HAMD)
Yeung et al. (2011)	China	52	Patients with insomnia and MDD	EA and Auricular Therapy	EA and Auricular Therapy	Reducing depression
Yin et al. (2020)	China	60	Patients with depression and insomnia	EA therapy	EA therapy	Reducing depression
Zeng et al. (2018)	China	64	Anxiety and depression patients	EA therapy	EA therapy	Reducing depression
Zhao et al. (2020)	China	61	Addict patients with mental disorders	EA therapy	EA therapy	Reducing depression

Table 4 presents a summary of the source articles, which obtained 11 articles with a randomized controlled trial study design used for a meta-analysis on the effectiveness of electro-acupuncture therapy to reduce depression. The total sample is 555 samples.

Table 5. Effect estimates (Mean SD) from all primary studies included in the electroacupuncture meta-analysis for reducing depression

Author (Year)	Electroacupuncture		Non Electroacupuncture	
	Mean	SD	Mean	SD
Chung *et al.* (2012)	8.8	3.8	7.3	1.6
Dias *et al.* (2012)	4.9	4.6	13.4	11.5
Dias *et al.* (2013)	5.3	5.4	9.1	6.3
Horta *et al.* (2020)	7	9.3	3.3	4.7
Li *et al.* (2020)	62.38	5.49	63.57	5.23

Author (Year)	Electroacupuncture		Non Electroacupuncture	
	Mean	SD	Mean	SD
Liu *et al.* (2021)	7.83	1.65	11.48	2.6
Man *et al.* (2014)	-11.6	2.3	-11.2	1.9
Yeung *et al.* (2011)	10.4	3.9	11.8	3.9
Yin *et al.* (2020)	17.77	6.03	25.77	6.75
Zeng *et al.* (2018)	9.68	3.08	12.76	4.75
Zhao *et al.* (2020)	13.36	2.29	14.22	1.98

1. Forest Plot
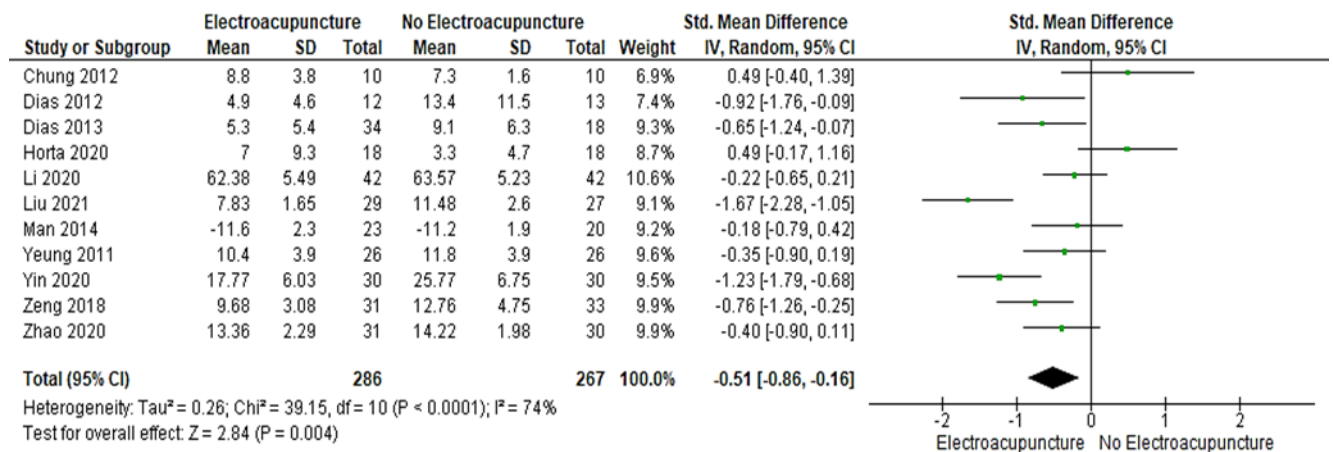
Figure 5. Funnel plot of electroacupuncture to reduce depression

2. Funnel Plot
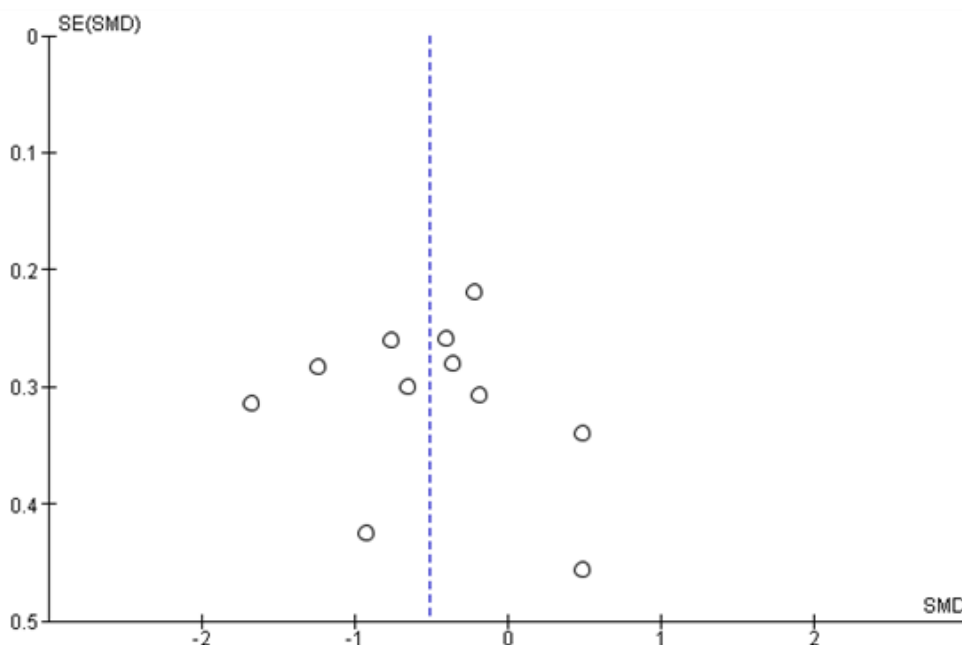
Figure 6. Funnel plot of electroacupuncture to reduce depression

The forest plot in Figure 5 shows that the effect of electroacupuncture therapy can reduce depression and is statistically significant. patients who were given electroacupuncture therapy had an average of 0.51 units lower in depression than those who were not given electroacupuncture therapy (SMD= -0.51; 95% CI= -0.86 to -0.16; p= 0.004). The results also show significant heterogeneity of effect estimates between studies (I²= 74%; p<0.001). Thus calculating the average estimated effect using the Random Effect Model (REM) approach.

The funnel plot in Figure 6 shows the symmetrical distribution of effect estimates between studies to the right and left of the vertical line of mean estimates. This funnel plot demonstrates that there is no publication bias in a meta-analysis of the effectiveness of electroacupuncture therapy in reducing depression.

DISCUSSION

Anxiety is a type of mental disorder characterized by excessive feelings of fear, nervousness and anxiety which can hinder performance and reduce quality of life. Generally, anxiety is often experienced by someone when facing a problem, but if it is not overcome by solving the problem, it becomes psychopathology. Anxiety is characterized by palpitations, cold sweat, digestive problems, and sometimes feeling short of breath and dizziness (Bohman et al., 2018). Meanwhile, depression is a condition marked by hopelessness, depression, loss of enthusiasm, and happiness, as well as feelings of sadness/fear that affect physical, psychological, and social conditions (Bohman et al., 2018; Mcelroy et al., 2018). Severe depression patients often lose enthusiasm, appetite, weight loss, insomnia, to the desire to hurt themselves and commit suicide (Malgaroli et al., 2021).

Treatment for depression is the provision of antidepressants in the form of SSRIs and SNRIs as sedatives (Zhao et al., 2019). The antidepressant effect acts directly on the emotional limbic network to decrease ACC activity, amygdala, glucocorticoid receptor release, and the HPA Axis (Hou et al., 2019; Zhao et al., 2019). However, the use of antidepressants must be in accordance with the dosage and have several side effects in certain people such as decreasing bone mineral density, hyponatremia, cognitive impairment, disrupting sleep patterns, arrhythmias, and heart toxicity, nausea, and headaches (Cai et al., 2020; Poelgeest et al. al., 2021).

Whereas non-pharmacological treatment has smaller side effects including hypnotherapy, psychotherapy, and CBT which play a role in regulating mindsets, emotions, and regulating negative thoughts (Bruijniks et al., 2018; Prasetya and Yatmihatun, 2023; Widnall et al., 2020). Another treatment is electro-acupuncture. Electroacupuncture is able to stimulate the hypothalamic neuroendocrine system to release the neuro-transmitter serotonin (Han et al., 2021). Serotonin can balance the HPA axis to reduce cortisol and ACTH levels which will modulate stress and provide a calming effect (Liu et al., 2021). Several studies state that the effect of electroacupuncture therapy is almost the same as antidepressants with small side effects. Electroacupuncture also stimulates amygdala release which plays a role in emotional regulation, memory consolidation, thought processes and reducing sleep disturbances (Li et al., 2022).

This meta-analysis study takes the topic of the effectiveness of electroacupuncture therapy to reduce anxiety and depression. There were 9 articles on anxiety and 11 articles on depression that met the inclusion and exclusion criteria so they were included in the meta-analysis study. The results of the primary study in the

form of the number of samples, the mean, and the standard deviation (SD) will be combined and processed using RevMan 5.3 to obtain the final results. The mean and standard deviation (SD) values were obtained from the anxiety and depression measurement scales. The anxiety measurement instruments are the Self Rating Anxiety Scale (SAS), State Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), Hamilton Anxiety Rating Scale (HAMA/HARS), and Hospital Anxiety Depression Scale (HADS). Meanwhile, the depression measurement instruments used were the Self Rating Depression Scale (SDS), the Beck Depression Inventory (BDI), the Hamilton Depression Rating Scale (HAMD/HDRS), and the Hospital Anxiety Depression Scale (HADS).

Based on the results of an analysis of 9 primary studies on the effectiveness of electroacupuncture therapy for reducing anxiety conducted in meta-analyses and systematic reviews, it was shown that there was high heterogeneity between experiments (I^2=69%; p<0.001). And in 11 studies on the effectiveness of electroacupuncture therapy to reduce depression also showed high heterogeneity (I^2=74%; p<0.001) so the analysis used the Random Effect Model (REM).

The results of a meta-analysis of 9 primary studies showed that electroacupuncture therapy was more effective in reducing anxiety compared to the group that did not receive electroacupuncture therapy (SMD=-0.68; 95% CI= -1.04 to -0.33; p=0.001). Meanwhile, 11 studies showed that electroacupuncture therapy was more effective in reducing depression than not receiving electro-acupuncture therapy (SMD=-0.51; 95% CI= -0.86 to -0.16; p=0.004).

The results of this study are comparable to a meta-analysis study by

(Zhou et al., 2022) proving that electroacupuncture significantly reduces HAMD scores (SMD = -2.28; 95% CI = -3.16 to -1.39) and the effect of antidepressant combination electroacupuncture therapy is better than treatment alone (SMD=-1.18; 95% CI=-1.42 to -0.94). The study states that electroacupuncture can reduce HAMD scores and antidepressant combinations can increase curative effects and reduce drug side effects.

The results of a meta-analysis study by (Bae et al., 2014) proved that acupuncture reduces anxiety in preoperative patients as evidenced by the assessment of STAIs instruments that assess fear, tension, worry and activation of the autonomic nervous system in preoperative patients. The results of the meta-analysis showed that the level of anxiety in the acupuncture group was significantly lower than that of sham acupuncture (MD=5.63; 95% CI=4.14 to 7.11) and the Visual Analog Scale (VAS) assessment calculating pain levels showed a significant difference in the acupuncture group (MD =19.23; 95% CI= 16.34 to 22.12).

The side effects of acupuncture therapy are relatively minor, including minor bleeding, local pain, or redness (Cai et al., 2020). The side effects associated with acupuncture are smaller compared to drugs as evidenced by a study (Yang et al., 2020) which included 60 subjects who were divided into the electroacupuncture group and the SSRI group. The results showed that there was no significant difference in the response rate on the HAMD score but there was a significant decrease in the CGI score with fewer side effects in the electro-acupuncture group than in the SSRI group. In addition, electroacupuncture was able to improve symptoms of anxiety more than the SSRI group.

The conclusion in this study was that patients who were given electroacupuncture therapy experienced an average of 0.68 units lower anxiety than those who were not given electroacupuncture therapy. The results also show high heterogeneity in effect estimates between studies. And patients who were given electroacupuncture therapy had an average depression of 0.51 units lower than those who were not given electroacupuncture therapy. The results also show high heterogeneity in effect estimates between studies. The results of the distribution of effect estimates were more or less symmetrical indicating that there was no publication bias in this meta-analytic study. The weakness of this study is the distribution of articles used only on 2 continents. In addition, there are limitations in language, so that the articles used are only in Indonesian and English, and ignore articles in other languages.

AUTHORS CONTRIBUTION

Yessy Widhi Astuti is the main researcher who selects topics, searches, collects and analyzes research data. Bhisma Murti and Hanung Prasetya played the role of analyzing data and reviewing research documents.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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