SOUTH BAYLO UNIVERSITY

THE EFFECT OF ACUPUNCTURE TREATMENT ON DEPRESSION:

A SYSTEMATIC REVIEW

By

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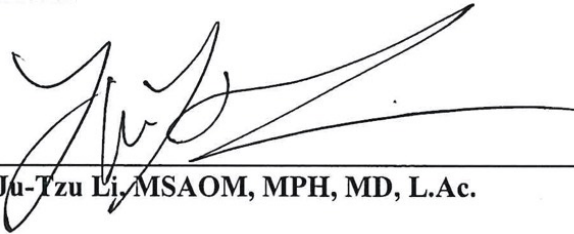# DISSERTATION OF MARYAM PARSI-KANEMOTO
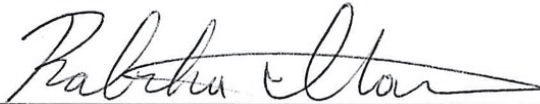
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ABSTRACT

Depression is a worldwide challenge that has caused many problems. When depression gets untreated it could affect the brain to go through early atrophy, and it could affect an individual's memory, sleep and cognitive function. Patients that have side effects from taking antidepressant, or patients who have underlying diseases such as liver disease who cannot take the antidepressant due to its side effect on liver, have an alternative treatment to use acupuncture. The aim of this systematic review is to determine the effectiveness of acupuncture on depression. The keyword acupuncture and depression were entered into the PubMed and EBSCO database. Nine articles based on Randomized Control Trial were selected for analysis for this systematic review. Acupuncture related modalities such as electroacupuncture were among the topics that were researched. The combination of acupuncture, electroacupuncture and medication were evaluated. Common acupuncture points were used to alleviate symptoms of depression including: DU20, PC6, HT7, LI4, LV3, and ST36. From the studies collected, six studies employed HAMD-17 as outcome measurement, and three used different methods. The outcomes indicated that patients in acupuncture or electroacupuncture group with or without anti-depressants showed improvement in depression status compared to the control group significantly ($p < 0.05$).

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I.   INTRODUCTION

Depression is a major problem and illness in modern society that can disrupt an individual's daily life, influencing energy levels, mood, sleep, and general well-being. It is a worldwide health concern affecting 4.4% of the world population. It is ranked as the fourth leading cause of disease, making a large impact on society (Zhang, 2009). Furthermore, depression impacts not only the individual suffering with depression, but also those around them, including their families, co-workers, and people in their communities. The standard protocol for treatment for depression includes medication and psychotherapy. The standard protocol has a 50%-70% effectiveness for those who finish their course of treatment. When evaluating the data of those who did not finish their course of treatment, it was due to the overall dissatisfaction caused by the side effects of prescribed medication (Zhang, 2009). Side effects such as nausea, headache, insomnia, irritability, weight gain, and sexual dysfunction weighed heavily on this sampling. Due to difficulties that patients face with the standard protocol treatment, individuals have sought complementary and alternative medicine. A national representative survey in the United States recorded that 53.6% of people with depression stated that they have used some sort of complementary and alternative medicine such as acupuncture in the past twelve months for their depression (Yeung, 2015). In order to understand the pathophysiology of depression, according to western medicine and traditional Chinese medicine, the following information will be presented.

Acupuncture is a 3,000-year-old traditional Chinese medicine practice that emphasizes on qi (flow of energy) throughout the human body (Yeung, 2015). In Traditional Chinese

Medicine (TCM), the root cause of the disease could manifest into an illness like depression.

Depression is a condition that can affect the flow of liver qi. In TCM, the liver is the organ that is responsible for distribution and flow of qi (energy). When the flow of qi, blood, and body fluid is disrupted it could cause liver qi stagnation. It is understood that the primary stage of depression is liver qi stagnation (Fang, 2015). The onset of depression occurs with the outermost emotions affecting the free flow of qi. The disharmony in other organs, especially the liver, spleen, and heart results in dysregulation of qi and blood. Depression disrupts the flow of qi, which affects the spleen which leads to consumption and damage of heart qi. When the heart is not nourished, it is not able to control the spirit and the emotions, which will lead to a depressed emotional state.

According to *Diagnostic and Statistical Manual of Mental Disorders-DSM*, five or more symptoms for the duration of two weeks needs to be present to diagnose depression. When evaluating the patient's symptoms, at least one of the symptoms should be present, including depressed mood or lack of interest or pleasure. Secondary symptoms of depression that are observed and reported are a change in appetite or weight, sleep difficulties, hypersomnia, fatigue, loss of energy, inability to process thoughts and concentrate, feelings of worthlessness, feelings of excessive guilt, and suicidality (Tolentino and Schmidt, 2018). The severity of depression is measured by the Hamilton Depression Rating Scale (HAMD). It is understood that serotonin, dopamine, and norepinephrine are key factors in the physiological etiology of depression. When evaluating individuals who had undergone medication treatment, it was noted that a lack of motivation and participation were a factor when discontinuing their treatment. Clinical manifestations of major depression are present with somatic and non-somatic factors.

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The somatic factors that are related to moderate depression manifest in sleep difficulties, appetite or weight changes, poor concentration, and fatigue. The non-somatic factors related to more severe depression manifest into a depressed mood, loss of interest, feelings of worthlessness, and suicidal thoughts. In addition, clinical depression has been associated with the dysfunction or imbalance of neurotransmitters. Studies identified serotonin levels to be responsible for depression. In addition, a deficiency of norepinephrine could increase the risk of suicide. It has been identified that symptoms such as: loss of interest, suicidal thoughts, feelings of worthlessness, and excessive guilt may be related to decreased levels of norepinephrine. Dopamine levels are associated with motivation and pleasure (Tolentino and Schmidt, 2018).

In Arvidsdotter et al. 2013, their study concluded that acupuncture may influence secretion of neurotransmitters such as serotonin and norepinephrine by stimulating sensory nerves. Their study found that acupuncture had an analgesic effect and positively influenced the autonomic nervous system. In addition, serotonin and norepinephrine are two key neurotransmitters that have been linked to major symptoms of depression. Therefore, acupuncture could be effectively used to improve a patient's overall mood and lessen depressive symptoms. Furthermore, Lu et al. (2019) stated that symptoms of depression could be relieved by decrease of cortisol levels from acupuncture treatments.

Lai. et al. (2019) found that acupuncture had a positive effect on the nervous system on multiple factors: synaptic plasticity by increasing the level of neurotrophic factor which results in neuroprotection, cell proliferation, anti-apoptosis, antioxidant activity, anti-inflammation, and the brain barrier maintenance. At the molecular level, acupuncture has shown promising effects on depression by balancing neurotransmitters and neuroinflammatory cytokines.

This systematic review aims to collect the current randomized control trials (RCT) regarding the effectiveness of acupuncture for depression. The results of randomized control trials of acupuncture treatment on the participants with depression will be summarized and analyzed in this systematic review. The reason for conducting this systematic review is because there are not enough systematic reviews described using the English language about the effectiveness of acupuncture on depression, over the past five years. In other words, most comprehensive studies have been illustrated in the Chinese language. Therefore, there is a need to conduct a systematic review of acupuncture for depression against other English language studies and those of Western medicine. In addition, more and more people are suffering from depression throughout in the world. Since anti-depression medication causes side effects, there is a need for a drug-free alternative such as acupuncture, for those who suffer from depression and perhaps experience side-effects.

II. METHODOLOGY

1. Strategy of Literature Search

The sources of the related articles were collected from PubMed and EBSCO with key words: acupuncture and depression. The data was streamlined and analyzed through an English database using articles only from January of 2009 to December of 2019 in EBSCO Medline and PubMed (figure 1). The selection of the articles was as follows.

2. Inclusion Criteria

The primary criteria that was included in this review were randomized control trials (RCT). An additional, criterion included the RCT with the intervention in the treatment group was acupuncture or electro acupuncture as well as the intervention in the control group treatments were placebo, sham acupuncture, along with or combined with antidepressants. Subjects were eighteen to seventy years old adults with depression. In addition, depression associated or not associated with other psychiatric symptoms such as drug related, or drug withdrawal symptoms cases were also included. Blinding and nonblinding studies with only human subjects were included for this systematic review. Furthermore, all articles were further narrowed down by using English as the language of choice and available text was included. Key factors that were excluded: Study protocol, qualitative studies, non-randomized clinical trials, and case series.

3. Data Analysis and Assessment of Risk of Bias

The available text of selected studies was collected and printed out and the following information was extracted.

A comparison table was generated, the data analysis, descriptive statistics of mean, standard deviation, frequency, range and percentage were evaluated.

The following information was extracted from each study: name of first author and year of publication, sample size, blinding or non-blinding, intervention in the treatment group, intervention in the control group, acupuncture points, medication used, course of treatment, outcome measurement, follow ups after treatment, adverse effects, and assessment of bias. JADAD scale was used in order to assess the level of bias of the articles in this study.

4. Data Selection

Data selection was completed by categorizing the nine articles in this systematic review into three groups: A, B and C. The three groupings of A, B, and C were based upon the common experimental treatments and control treatments. The experimental treatment for group A was acupuncture or electroacupuncture and their control treatment was no acupuncture or sham acupuncture. The experimental treatment for group B was acupuncture or electroacupuncture and the control treatment used was different anti-depressants. The experimental treatment for group C was acupuncture or electroacupuncture with anti-depressants and their control treatment was only anti-depressants.

Selection of Studies

The studies were screened and selected based on inclusion and exclusion criteria.

The selection of the studies is shown on *Figure 1*.

The Effect of Acupuncture

This systematic review investigated the effect of acupuncture on depression.

The sample size of studies was based on nine articles with a total sample size of 766 subjects,

with a mean of 89.88 and standard deviation of 65.35. The ratio of women was 68.27% more

than men with 31.72%. From the nine studies, seven studies included men and eight studies

included women. When evaluating intervention treatment groups, four of nine studies used

regular body acupuncture (44.44%) and five of nine studies (55.55%) used electroacupuncture.

On the contrary, when evaluating control groups: three of nine studies (33.33%) used regular

body acupuncture, two of nine studies (22.22%) used sham electroacupuncture, and one of nine

studies (11.11%) did not receive any acupuncture or electroacupuncture treatment. The

acupuncture points that were commonly used were DU20, YT, PC6, HT7, LI4 and LV3, ST36,

SP6. For outcome measurement, HAMD-17 was commonly used in six studies (66.66%).

 To measure the severity of side effects of treatment, two of nine studies (22.22%) used the

SERS (rating scale for side effects).

The effect of acupuncture is shown on *Table 1*.

The Adverse Effects

The adverse effects of acupuncture were needle related pain and temporary edema that diminished in a short time. The adverse effects from Escitalopram (western medicine) were dizziness, palpation and stomachache. Paroxetine also had an adverse effect such as palpitation, stomachache, and blurry vision. The common side effects from fluoxetine were dizziness, postural hypotension, dysuria, tachycardia, fatigue, dry mouth, sleep disturbance and constipation.

The adverse effects of acupuncture were shown on *Table 1* and *Table 4*.

Blinding

Among nine studies, four studies (44.4%) were single blinded, one study was double blinded (11.1%), one study (11.1%) was non-blinding, four of the studies (44.4%) did not mention blinding of study.

The blinding of the studies was shown in Table 5.

Follow up

All of the nine studies did have follow up.

The follow up of the studies are shown on Table 6.

Assessment of Bias

The maximum score of five and minimum score of zero is measured by JADAD score. None of the studies received a score of five (0.0%). Three of nine studies (33.33%) received a score of three, six of nine studies (66.66%) received a score of two. The lowest score of the JADAD score was two, and the maximum score of the JADAD score was three.

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In the assessment of bias, JADAD score was used, it is shown on Table 2.
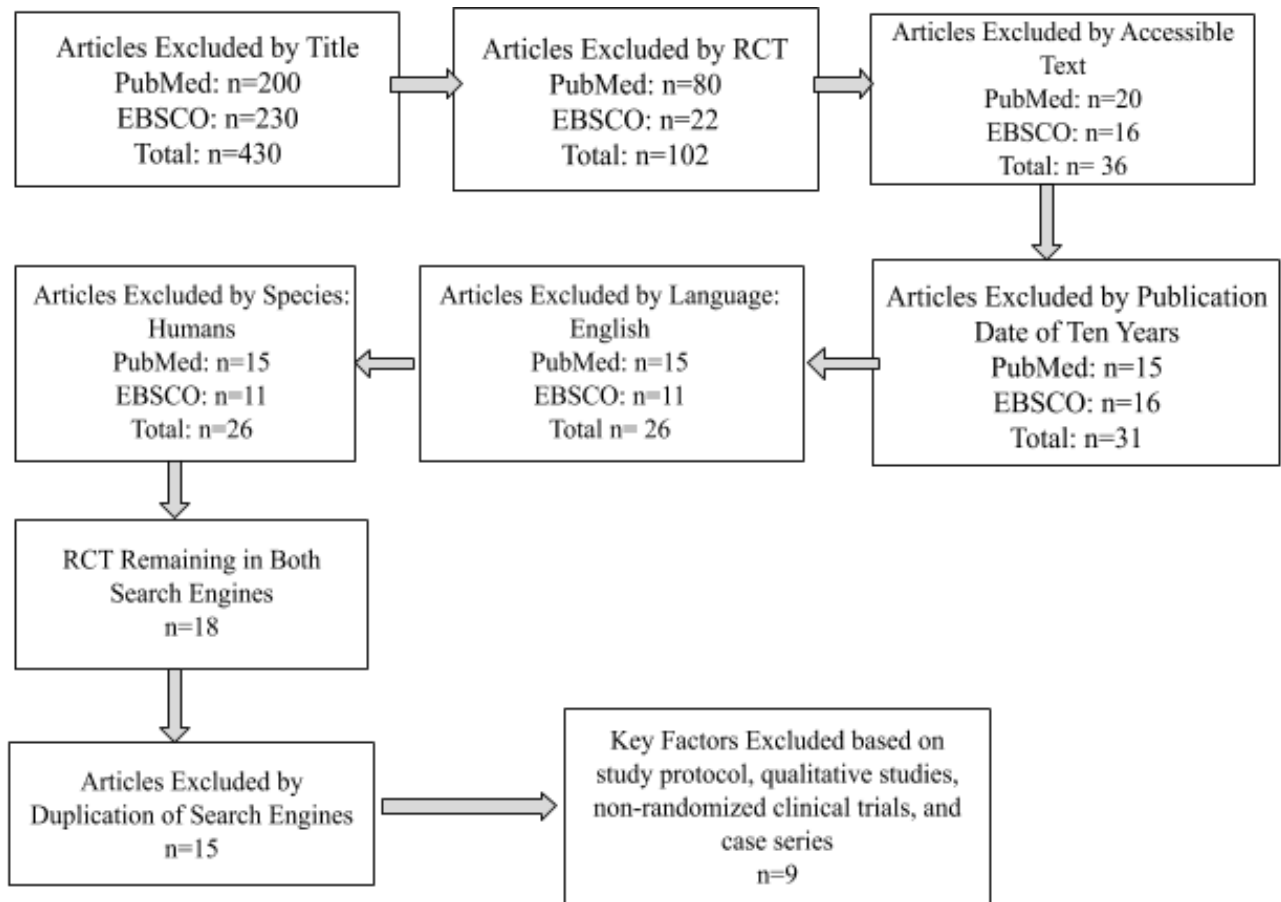
Figure 1. Flow chart of study selection.

Table 1. Summary of basic characteristics of the nine included studies that were systematically reviewed.

First author (year)	Sample size (M/F)	Blinding	Intervention TG (n)	Intervention in CG (n)	Acu Points/ Medication	Assessment	Course	Outcome measurements	Follow up	Adverse Effect	Assessment Of Bias
Zeng (2018)	64/0 (64)	Single (Participant)	TG: EA (31)	CG: Sham EA (33)	TG: EA PC6,HT7 ST36, HTJJ (T5,L2) CG: Sham EA	Baseline W-1 W-2 W-3 W-4	4WKS (3 times a week times)	PANSS; HAMA; HAMD-17	Y	N (AC)	1-0-1 (2)
Li (2018)	0/221 (221)	Single (Assessor)	TG: EA(116)	CG: Escital-Opram (105)	TG: EA RN4,Zigong ST25SP6 LI4, LV3, DU20, Yintang CG: Escitalopram: One times daily 10 mg for 12 Wks	Baseline W-4 W-8 W-12 W-16 W-24	12WKS (3 times a week)	HAMD-17 MENQOL; Sexual Hormone (FSH,LH)	Y	Y (EA: Hematoma. (Escitalopram ram: Dizzy, stomachache palpitation.)	1-0-1 (2)
Ling (2016)	61/81 (142)	Single	TG: AC(47)	CG1:(47) Superficial insertion on acupoint CG2: (48) Superficial insertion on non-acupoint	TG: AC LI4,LV3,DU20,YT,(UB15 UB19 Embedded needle) CG1: LI4,LV3, DU20, YT,(UB15, UB17,Embedded needle) CG2: LI4,LV3,DU20,YT,(UB15,UB17, Embedded needle)	After Treatment 1 month after treatment 3 months after treatment	12WKS (two times a week)	SF-36	Y	NM (AC)	1-0-1 (2)
Kim (2015)	0/21 (21)	NM	TG: AC (10)	CG: No AC (11)	TG: AC PC6,SP4 HT7,YT LI4, LV3 CG: NO AC	Baseline W-2 W-4	4WKS (3 times a week)	NCC	Y	N (AC)	1-0-1 (2)

Table 1 Continued.

First author (year)	Sample size (M/F)	Blinding	Intervention TG (n)	Intervention in CG (n)	Acu Points/ Medication	Assessment	Course	Outcome measurements	Follow up	Adverse Effect	Assessment Of Bias
Qian (2015)	47/18 (65)	single	TG: Body AC (32 + Placebo	CG: Non-Traditional AC (33) + Fluoxetine	TG: Body AC+ Placebo DU26,PC6 ST36 CG: Non- Traditional AC +20mg Fluoxetine daily	W-2 W-6 M-3	TG: 6 Wks., 7 days a WK + Starch pill CG: 6Wks, 7days a Wk. Non-Traditional AC +20mg Fluoxetine	HAMD-17; SERS	Y	Y (AC: Hematoma). (Fluoxetine: Dry mouth, Fatigue, constipation, Insomnia)	1-1-1 (3)
Wang (2013)	15/33 (48)	Non-Blinded	TG: EA (24)	CG: Paroxetine (24)	TG1: EA DU20,YT Sishencong, PC6,HT7, SP6 CG: Paroxetine 20mg every day After W-2 adjust 10mg increment Max dose, 60mg	M-6	24WK (3 times a week)	MARDS; SDS; SAS MMPI	Y	(EA: Arm pain, Unspecified hypertension) (Paroxetine: Stomachache Palpitation, Blurry vision)	1-0-1 (2)
Duan (2011)	26/49 (70)	NM	TG: EA + Fluoxetine (36)	CG: Fluoxetine (34)	TG: EA+ Fluoxetine DU20, YT The second part was selected according to individual symptoms + Fluoxetine: 20md daily CG: Fluoxetine: 20mg daily	M-3	6Wks (6times a week)	HAMD-17	Y	NM (EA) (Fluoxetine: Dizzy, dysuria)	1-0-1 (2)
Sun (2011)	14/47 (61)	NM	TG1: EA(20). TG2: Fluoxetine (25)	CG: EA(16)	TG1: EA DU20, ST36 TG2:Fluoxetine 20 mg daily CG: EA LV3, SP6, PC6, HT7	Baseline W-2 W-4 W-6	6Wks (5 times A week)	HDRS; GDNF Concentration	Y	NM	2-0-1 (3)
Zhang (2009)	27/53 (74)	Double-Blinded	TG: AC (40) + Fluoxetine 10mg)Qd 1 Placebo Qd	CG: Sham AC+ Fluoxetine (40) (20-30mg)Qd	TG: AC+ Fluoxetine (10mg), 1 Placebo CG: DU20, Sishencong, Yintang, DU 26, PC6, HT7, LV3, LI4	Baseline W-2 W-4 W-6	6WKS (5 times a week)	HRSD; HRSA; SERS	Y	N	1-1-1 (3)

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Note for table interpretation. AC: acupuncture; EA: electroacupuncture; SERS: rating scale for side effects; NM: not mentioned; TG: treatment group; CG: control group; PANSS: Positive and Negative Syndrome Scale; HAMA: Hamilton Anxiety Scale; HAMD: Hamilton Depression Scale; (HAMD-17 or HAMA): 17-item Hamilton Depression Rating Scale; (MENQOL): menopause-specific quality of life; SF-36: Quality of Life Scale; NCC: National Cancer Center: MARDS: Montgomery-Asberg Depression Rating; SDS: Self-rating Depression Scale; SAS: Self-rating Anxiety Scale; MMPI: The Minnesota Multiple Personality Inventory; HRSD: Hamilton Depression Rating Scale Score; GDNF concentration: Glial Cell line-derived neurotrophic factor.

Table 2. Data analysis evaluating JADAD score of collective studies.

		Frequency	Percent	Valid Percent	Cumulative Percent
			JADAD score		
Valid	2	6	66.66	11.1	11.1
	3	3	33.33	66.7	77.8
	Total	9	100.0	100.0	

Table 3. Data analysis evaluating blinding of collective studies.

			Blinding		
Valid	No blinding	1	11.1	11.1	11.1
	Single blinding	4	44.4	44.4	55.6
	Double blinding	1	11.1	11.1	66.7
	Not mentioned	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Table 4. Data analysis evaluating adverse effects of collective studies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	33.3	33.3	33.3
	Yes	3	33.3	33.3	66.7
	Not mentioned	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Table 5. Data analysis evaluating adverse effects of collective studies

Follow up				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	9	100.0	100.0	100.0

Zeng, et al (2018) Conducted a randomized control trial and blinding study with single male participants (n=68) with methamphetamine addiction. Their experimental design included two interventional treatment groups: one group used sham electroacupuncture (n=34) and the other group used electroacupuncture (n=34). Among sixty-eight patients, four patients were withdrawn: from those two were eliminated due to criminal cases and fainting from acupuncture needles. The total number of patients who completed the studies was (n=64), With thirty electroacupuncture, and (n=33) sham electroacupuncture. Interventional treatment group was treated for four weeks with treatment given three times a week with a specific set of acupuncture points: PC6, HT7, ST36, HTJJ (T5-L2). Patients were assessed at their baseline, week one, two, three, and four. Outcome measurements were evaluated by Positive and Negative Syndrome Scale (PANSS), Hamilton Anxiety Scale (HAMA), and the Hamilton Depression Scale (HAMD-17).

All participants followed up and acupuncture treatment did not have adverse effects such as hematoma, bleeding or infection. The assessment of bias was a 1-0-1 raw score. The study found that patients who received electroacupuncture treatment had a significant improvement compared to patients who did not receive any intervention. They concluded that electroacupuncture could potentially be used as a combined therapy for addicts during the phases of withdrawal.

Li, et al (2018) conducted a randomized control trial and blinding study with single accessor, females (n=242) in perimenopause between the ages of 45-55 years old with mild-moderate depression. From Two hundred forty-two patients, twenty patients dropped out of the studies. The total number of participants who did complete the treatment were (n=221). Their experimental design was a control group who was given Escitalopram (n=119), from this group (n=13) did not finish the treatment due to lack of participation, lost visits, and withdrawal without any explanation. The final subject numbers in the Escitalopram group were (n= 105). The interventional treatment group was given electroacupuncture (n=123), from this group, seven subjects did not complete the treatment, due to lack of participation, lost visits, and imputed mistakes. The final subject numbers in the Electroacupuncture group were (n=116). The control group was given 10 mg of escitalopram one time daily for twelve weeks. On the other hand, the treatment group was treated for four weeks with treatment given three times a week with a specific set of acupuncture points: RN4, Zigong, ST25, SP6, LI4, LV3, DU20, and Yintang. Patients were assessed at their baseline, week four, eight, twelve, sixteen, and twenty-four. Outcome measurements were evaluated by the Hamilton Depression Scale (HAMD-17), Menopause-Specific quality of life (MENQOL), and sex hormones levels (FSH, LH, E2) that were measured by chemiluminescence.

All participants followed up and did have adverse effects from the treatment. In the intervention treatment group from the electro acupuncture group hematoma was reported. In the intervention control group from anti- depressant Escitalopram, dizziness, stomachache and palpitation was reported. The assessment of bias was a 1-0-1 raw score. The study found that patients who received both electroacupuncture and escitalopram had a significantly reduced HAMD-17 score. However, the HAMD-17 score was more significant in the interventional electroacupuncture group which is suggestive that electroacupuncture can be used as a treatment for depression for perimenopause with depressive symptoms.

Ling, et al (2016) conducted a randomized controlled trial with single blinding (n=163). The total drops out of the studies were twenty, the final number in the studies were (n=142) with male subject (n=61) and female subject (n=81). The experimental design of this study consisted of three different groups: the experimental group that was given acupuncture (n=53), from these group six subjects were eliminated due to fainting after acupuncture treatment. The final subjects of this group were (n=47). In the control group one, superficial insertion on acupoint (n=56), eight cases were dropped out of the study. Four subjects could not complete the study due to their work, two subjects took unauthorized antidepressant, and two subjects were not able to follow up due to lost contact phone number and address. The final subjects of control group one was (n=47). In the control group two that were given superficial insertion on non-acupoint (n=54), six cases were eliminated. Out of six subjects, five subjects did not take the authorized antidepressant, and one subject's contact information was lost. The final number for control group two was (n=48). Five of the subjects did not take the authorized antidepressant and one subject could not be reached because of lost contact.

All subjects were given treatment over the course of twelve weeks for two times a week. The treatment group was treated for twelve weeks with treatment given two times a week with a specific set of acupuncture points: the treatment group were given regular acupuncture points, LI4, LV3, DU20, YT, UB17, UB19. For control group one was treated with LI4, LV3, DU20, YT, UB17, UB18, UB19. For control group two was treated with LI4, LV3, DU20, YT, UB15, UB17, UB19. Patients were assessed right after treatment, one month after treatment, and three months after treatment. Outcome measurements were evaluated by Quality of Life Scale (SF-36). Subjects did follow up for treatment and adverse effects were not mentioned. The assessment of bias ranked 1-0-1 for this study. The study found that there was a statistically significant difference when evaluating on a quality of life scale between the three groups with a ($p< 0.05$). Their data indicated that acupuncture can improve the patients with depression's overall quality of life.

Kim et. al (2015) conducted a randomized control trial with female participants with insomnia, anxiety, and depression (n=24) with chronic liver disease. There were three subjects who did not continue their studies. The total number of subjects that completed the treatment were (n=21). Blinding of study was not mentioned. Their experimental design included two groups: the control group was not given acupuncture (n=12), and one of the participants withdrew from the study (n=11). The treatment group was given acupuncture (n=12), and two participants withdrew from the study (n=10). The treatment group was treated for four weeks with treatment given three times a week with a specific set of acupuncture points: PC6, SP4, HT7, YT, LI4, and LV3. Patients were accessed at their baseline, at week two, and week four. Outcome measurements were evaluated using the National Cancer Centre (NCC) score.

Patients followed up for treatment and they did not have any adverse effects. The assessment bias score was ranked 1-0-1. The findings of this study suggest that acupuncture could serve as a treatment for insomnia, anxiety, and depression for patients with chronic liver disease without negatively affecting overall liver function.

Qian et al (2015) Conducted a randomized control trial with single participants with post-stroke depression (n=68), male subjects (n=50), female subjects (n=18). Three of the subjects were eliminated. The final participants were (n=65). The experimental design of this study includes two groups: the control group with non-traditional acupuncture plus Fluoxetine (n=34). From this group, two subjects did not complete the studies due to decline of medical condition and the other subjects withdrew from the studies. The final number of subjects in the control group was (n=32). In the treatment group body acupuncture and placebo (n=34) were selected. In this group, one patient was withdrawn from the study, because of loss of contact (n=33). The treatment group was given the following acupuncture points: DU26, PC6, and ST36. On the other hand, the control group was given 20 mg of fluoxetine daily with non-traditional acupuncture points. Patients were assessed after week two, six, and month three of the study. The treatment group was treated seven days a week for six weeks and also given starch pills, placebo. Whereas the control group was given non-traditional acupuncture with 20 mg fluoxetine. Outcome measurements were accessed HAMD-17 and Side Effect Rating Scale (SERS). Subjects did follow up and did have adverse effects. From acupuncture, Hematoma was reported and from Fluoxetine, dry mouth, fatigue, constipation and insomnia were reported. The assessment of bias was ranked 1-1-1.

The findings of the study indicated that body acupuncture improved symptoms of depression in subjects and that depression should be considered a secondary symptom of strokes.

Wang, et al (2013) Conducted a randomized control trial and non-blinded study with participants (n=60). The total number of dropouts was twelve (n=48). Male subjects (n=15), Female subjects (n=33) were focusing on personality traits in depression. The experimental design of this study includes two groups: the control group with paroxetine (n=30) and the treatment group with electroacupuncture (n=30). In the control group, six subjects withdrew from the experiment (n= 24). The subjects dropped out due to stomachache, palpitation, blurry vision, and no effect from the treatment. In the treatment group with electroacupuncture (n=30). In this group, four patients withdrew from arm pain, unspecified hypertension, work commitments, and no effect from treatment (n=26). The treatment group was given the following acupuncture points: DU20, YT, Sishencong, PC6, HT7, and SP6. Patients were accessed after six months. Outcome measurements were accessed with Montgomery-Asberg Depression Rating (MARDS), Self-rating Depression Scale (SDS), Self-Rating Anxiety Scale (SAS), and Minnesota Multiple Personality Inventory (MMPI). Subjects did follow up and adverse effects for electro acupuncture were not mentioned. The adverse effects for Paroxetine were stomachache, palpitation, and blurry visions. The assessment of bias was ranked 1-0-1. This study found that electroacupuncture was beneficial in treating depression and it has an effect on personality traits.

Duan, et al (2011) Conducted a randomized control trial and blinding of study was not mentioned with participants (n=75) with male participants (n=26) and female participants (n=49) with depression. The total of five subjects were dropouts from the studies (n=70).

The experimental design of this study includes two groups: the control group with fluoxetine (n=37) and the treatment group with electroacupuncture and fluoxetine (n=38). In the control group, three subjects did not complete the treatment due to adverse reactions from fluoxetine (n=34). One subject stopped due to dizziness and postural hypotension. The second subject quit due to panic and pyknosphygmia. The third subject did stop the treatment due to dysuria. In the treatment group, among thirty-six participant, two dropped out. One of the participants dropped out due to a heart attack and one of the participants dropped out due to hospitalization. The treatment group was given the treatment six days a week for six weeks. The treatment group received the following acupuncture points: DU20, YT, and other acupuncture points varied based on the patient's individual symptoms. If a patient had insomnia: Sishencong, Anmian, SP6, KI3, KI6 were added. For headache and dizziness, DU24, GB13, GB20 were added. For digestion symptoms: Ren12, ST25, ST34, ST40, ST36, ST44 were added. For heart symptoms: HT7, PC6, SP6 were added. For pain: back shu points were selected. Whereas the control group was given only 20 mg fluoxetine daily. Patients were accessed after three months and they were given treatment. Outcome measurements were accessed with HAMD-17. Subjects did follow up and adverse effects were not mentioned for electroacupuncture. The adverse effects of fluoxetine were dizziness, dysuria. The assessment of bias was ranked as 1-0-1. This study found that patients who received electroacupuncture and fluoxetine had a significant improvement in hippocampal metabolites in the cellular membrane.

Sun et al (2013) Conducted a randomized control trial (n=75). There was a total of twelve subjects that were withdrawn from the studies (n=61). With male subjects (n=14), female subjects (n=47) with depression and blinding of study was not mentioned.

The experimental design of this study includes three groups: the control group with electroacupuncture (n=25), treatment group one given electroacupuncture (n=25), and treatment group two given fluoxetine (n=25). In the control group, there were nine subjects who dropped out (n=16). Four subjects dropped out of the studies with unclear reason and five subjects from the fear of blood drawn. In the treatment group one with electroacupuncture, five cases dropped out (n=20). Four subjects dropped out of the studies with unclear reason and one subject from fear of blood drawn. In the treatment group two with fluoxetine, there was no dropout (n=25). In the treatment group one, the treatment group was given treatment five days a week for six weeks. The treatment group one received the following acupuncture points: DU20 and ST36. Whereas, treatment group two was given 20 mg of fluoxetine daily. The control group was given electro acupuncture points: LV3, SP6, PC6, HT7. Patients were accessed at their baseline, during week two, week four, and week six. Outcome measurements were assessed with Hamilton Depression Rating Scale (HRDS) and Glial cell line derived neurotrophic factor (GDNF). Subjects did follow up and adverse effects were not mentioned. The assessment of bias was ranked as 2-0-1. This study found that patients who received electroacupuncture were just as effective as fluoxetine. Electro acupuncture regulated GFNF production better than Fluoxetine, suggesting a more beneficial effect.

Zhang et al (2009) Conducted a randomized control trial with double blinding participants (n=80). The total number of subjects that dropped out were six (n=74), male subjects (n=27) and female subjects (n= 53) with depression. The experimental design of this study includes two groups: the control group with sham acupuncture and fluoxetine (n=40). The treatment group given acupuncture and fluoxetine (n=40).

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In the control group four subjects discontinue their treatment (n=36). Two subjects stopped their treatment due to lack of response to the treatment. One subject did not continue because of receiving herbal treatment. Another subject discontinued treatment due to the occurrence of arrhythmias. In the treatment group two subjects discontinued due to lack of response to the treatment and due the subject's health condition (n=38). The treatment group was given treatment five days a week for six weeks with the following acupuncture points: DU20, ST36, Sishencong, PC6, HT7, LV3, and LI4 with 10 mg fluoxetine. The control group was given sham acupuncture with the same points as the treatment group and 20-30 mg of fluoxetine per day. Patients were accessed at their baseline, during week two, week four, and week six. Outcome measurements were assessed with Hamilton Rating Scale for Depression (HRSD), the Hamilton Rating Scale for Anxiety (HRSA), and The Asberg Rating scale for Side Effects (SERS). Subjects did follow up and they did experience adverse effects. The assessment of bias was ranked as 1-1-1. This study found that patients treated with acupuncture and a low dose of antidepressant, fluoxetine could serve as a beneficial treatment for depression.

Statistical analysis of group A indicated that three of the three studies had overall positive results to the experimental treatments of acupuncture or electroacupuncture in comparison to control treatments with no acupuncture or sham acupuncture. Three of the three studies had a $p < 0.05$, indicating a statistical significance in their data. Group B statistical analysis indicated that three of the three studies had overall positive results to the experimental treatments of acupuncture or electroacupuncture in comparison to control treatments with no acupuncture or sham acupuncture. Three of the three studies had a $p < 0.05$, indicating a statistical significance in their data.

Group C data analysis indicated that three studies had overall positive results to the experimental

treatments of acupuncture or electroacupuncture with fluoxetine in comparison to the control

treatment with only fluoxetine treatment.

Table 6. Representation of the different groups A, B, and C with the corresponding overall
positive results and overall p-values for the nine studies evaluated.

	Overall Positive Results	Overall P-Values
Group A	3/3	$p < 0.05$
Group B	3/3	$p < 0.05$
Group C	3/3	$p < 0.05$

IV. DISCUSSION

This systematic review evaluated the effect of acupuncture treatment on depression. One of the limitations for this systematic review was that all of the nine studies were conducted in China; therefore, there was no way of comparing different ethnicities' response to acupuncture treatment. The third limitation was the duration of treatment varied. Amongst the nine studies, the duration of treatment was from four weeks to twenty-four weeks of treatment, *Table 1*. The fourth limitation was the frequency of follow up treatment for the nine studies varied greatly, with treatment given twice, three times, five times, six times, or seven times per week, *Table 1*. The large variety of treatment frequency was inconsistent. Furthermore, an additional limitation that existed in the nine studies was the method of measuring levels of depression. Six of the nine studies used the HAMD-17 (HAMA) scale to measure levels of depression, *Table 1*. There was no measure of depression that was used in all of the nine studies, shown in *Table 1*.

The acupuncture points that were used for treatment in the nine studies varied greatly. In addition, 68.27% of the studies' participants were women, who could have been affected by hormonal fluctuations due to menstruation or menopause. Furthermore, the age of participants varied from eighteen to seventy years old, and adolescence was excluded from the studies. Evaluating the overall JADAD scores of the nine studies, only two studies had a JADAD score of three, which were considered less biased.

The seven other studies had a JADAD score of two which made the studies more biased.

Based on the statistical analysis, group A indicated a positive result with experimental treatments of acupuncture or electroacupuncture in comparison to control treatments with no acupuncture or sham acupuncture. Data analysis of group A found that acupuncture or electro acupuncture treatment was statistically significant with a p-value < 0.05, *Table 6*. Group A data suggested the patient's overall mood improved compared to placebo acupuncture and no acupuncture treatment. Statistical analysis of Group B indicated an overall positive result with the experimental treatments of acupuncture or electroacupuncture in comparison to control treatments with no acupuncture or sham acupuncture, *Table 6*. Data analysis of group B that found that acupuncture or electroacupuncture treatment were statistically significant with a p-value <0.05, *Table 6*. Overall, group B data suggested that long term electroacupuncture treatment was safe and more beneficial compared to the different antidepressants. Group C data analysis indicated that three studies had overall positive results to the experimental treatments of acupuncture or electroacupuncture with fluoxetine in comparison to the control treatment with only fluoxetine treatment. Data analysis of group C that found that acupuncture combined with fluoxetine treatment was statistically significant with a p-value <0.05, *Table 6*. The collective group C data showed that acupuncture combined with fluoxetine was more effective than Fluoxetine alone.

Normally, in systematic review two evaluators are required. But in this study, there was only one evaluator that could have affected accuracy of the article's evaluations. Due to limited budget and resources, only accessible text articles were included suggesting possible bias.

Meta-analysis was not conducted and so the influential statistics were not done. Overall the nine studies that were reviewed indicated that levels of depression improved in subjects with depression.

In order to have conclusive findings on the effect of acupuncture treatment for depression, the experimental design is better to be standardized. To further improve the experimental design, there needs to be a change including more diverse ethnicities and diverse settings. In the future, data needs to be completed with individuals of varying ethnicities. Since all of the studies were conducted in China, we want to see the generalizability that can be seen in different ethnicities. In summation, it would be beneficial to improve the overall experimental design of the experiment by evaluating ways to increase the JADAD, resulting in less risk bias.

V. CONCLUSION

It was found that many limitations existed in this review, such as an inability to compare different ethnicities because all of the nine studies were conducted in China, a small sample size, inconsistent treatment durations, follow up frequency, and standardized tests to measure levels of depression. It was found that common acupuncture points were used to alleviate symptoms of depression including: DU20, PC6, HT7, LI4, LV3, and ST36. After data analysis, it was found that overall HAMD-17 scores of patients decreased indicating improved symptoms of depression. In addition, data analysis of groups A, B, and C indicated a $p < 0.05$ indicating statistical significance in their collected data. Overall, it could be said that acupuncture is effective and beneficial treatment for depression. Future studies need to be conducted using more effective and consistent research design methods in order to further confirm that acupuncture is in fact effective and beneficial in treating depression.

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