SOUTH BAYLO UNIVERSITY

A LITERATURE REVIEW OF THE EFFECTIVENESS OF ACUPUNCTURE ON INSOMNIA

by

FAKHTEH KHALAJHEDAYATI

A RESEARCH PROJECT SUBMITTED

IN PARTIAL FULFILLMENT OF THE

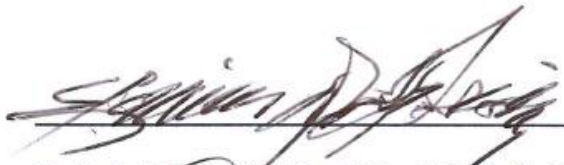
REQUIREMENTS FOR THE DEGREE

Doctor of Acupuncture and Oriental Medicine

ANAHEIM, CALIFORNIA

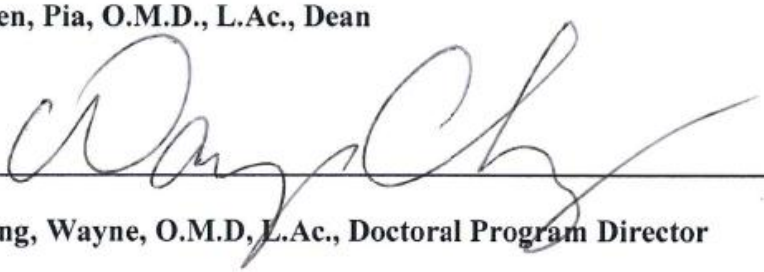
MARCH 2016

APPROVED BY RESEARCH PROJECT COMMITTEE



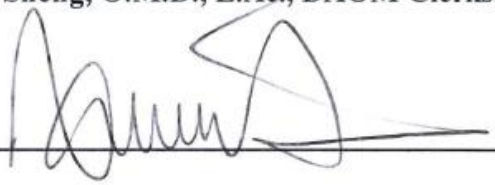
Follick, Edwin, Ph.D., DTheol, J.D., D.C., Director of Libraries and ADA Officer

Melen, Pia, O.M.D., L.Ac., Dean



Cheng, Wayne, O.M.D, L.Ac., Doctoral Program Director

Li, Sheng, O.M.D., L.Ac., DAOM Clerkship Coordinator



Sun, Xuemin, M.D.(China), Ph.D., L.Ac., DAOM Research Coordinator

SOUTH BAYLO UNIVERSITY

ANAHEIM, CALIFORNIA

March 16, 2016

ACKNOWLEDGEMENTS

I would like to thank Dr. Tieulinh Dinh, Dr. Wayne Cheng, Dr. Xuemin Sun and Dr. Sheng Li for their advice and guidance on the content and format of this research paper. This review would not have been completed without their effort, time and hard work. Another thank you goes to my family and friends who have supported me through this doctoral research paper.

A LITERATURE REVIEW OF THE EFFECTIVENESS OF ACUPUNCTURE ON INSOMNIA

Fakhteh Khalajhedayati

SOUTH BAYLO UNIVERISTY AT ANAHEIM, 2016

Research Advisor: Tieulinh Dinh, OMD, L.Ac.

ABSTRACT

The aim of this literature review is to explain the effectiveness of acupuncture on insomnia, a common sleep disorder in modern society. Lack of enough sleep may lead to fatigue, irritability and impaired daytime functioning. The keywords *acupuncture* AND *insomnia* were entered in Medline database, and 13 articles based on randomized controlled studies were selected for comparison and analysis. Acupuncture and related modalities such as ear acupuncture or acupressure, moxibustion, cupping, electro-acupuncture, Chinese *Tuina* and needle-rolling therapy were used in different groups of the people such as patients with depression, college students, patients with malignant tumor, pregnant woman and hemodialysis patients that suffer from insomnia. Most of the studies showed plenty of effectiveness of acupuncture in treating insomnia. The results are consistent with those of past literature reviews. Most of the studies showed that acupuncture and related modalities have a short-term effect on insomnia. Limitation included small sample sizes and limited time. Due to lack of studies, more research is required in the future to see if acupuncture is really effective in treating insomnia.

TABLE OF CONTENTS

I. INTRODUCTION

Insomnia is a major problem in modern society, and can interfere with life, study and work of people. It is associated with reduced quality of life, an increased risk of having a motor vehicle crash, impaired job performance and absenteeism. Insomnia has been defined as inability to obtain an adequate amount or quality of sleep. The difficulty can be falling asleep, remaining asleep or both[1]. Insomnia can be triggered or aggravated by stress, illness, emotional or physical discomfort and some medications.

Insomnia is highly prevalent problem that is associated with increased use of health care services and products, as well as functional impairments. Direct costs of insomnia include visits to doctors and sleep diagnostic centers and medications (both prescription and over the counter). Indirect costs include making other illnesses worse, increased accident risk and lost workplace productivity[2]. The high cost is one of the reasons for patients suffering from insomnia seeking complementary and alternative medicine, including acupuncture, the use of which has been rising. A number of studies have shown that acupuncture is effective in treating insomnia, sometimes even more than western drugs.

Acupuncture is a component of traditional Chinese medicine (TCM), which stimulates the flow of Qi throughout the body. In TCM, a primary concept is finding root and branch of the disease. Symptoms like insomnia are considered to be the braches of a disease. The root of a disease is a dysfunction or imbalance of the fundamental substances (Qi, blood, Yin, Yang, Jing and Shen), or of the major organ systems (Lung, Heart, Spleen, Liver and Kidneys). When a person suffers from insomnia, the two organs

most often out of balance are the Heart and the Liver. Each of these two organs houses a specific aspect of the spirit. If these organs are out of balance, they will not be able to house the spirit properly, and the spirit will wander. A wandering spirit, or Shen disturbance, can manifest in a number of ways, including mood disorders and Heart palpitations, but insomnia is one of the commonest symptoms[3]. In TCM, insomnia is often a symptom of Liver Qi stagnation leading to heat or fire, Stomach disharmony and phlegm heat, Heart blood and Spleen deficiency and Heart and Gallbladder Qi deficiency.

Though the mechanisms of acupuncture treatment of insomnia are unclear, there are many studies suggesting acupuncture may improve insomnia by acting on the nervous systems and modulate the activities of neurotransmitters. It has been suggested that both the central nervous system (CNS) and the autonomic nervous system are involved in the pathology of insomnia. There is evidence showing multiple neurotransmitters may be involved in the pathophysiology of insomnia including sympathetic, GABAergic, opiate and melatonin[4]. These findings provide further supports to acupuncture in the treatment of insomnia.

There is a link between sleep and depression. Sleep problems may cause or contribute to depressive disorders and depression may cause sleep problems. Acupuncture has been shown to improve sleep and mood with patient with depressive disorder[8].

Insomnia in pregnant woman is very common. Insomnia in pregnancy is caused by hormonal imbalance, which leads to chronic insomnia. Some studies show the effectiveness of acupuncture on pregnant woman who suffer from insomnia[10].

Insomnia among college students is very common. Insufficient sleep can result in lowering grade point average, increased risk of academic failure, compromised learning, impaired mood, and increased risk of motor vehicle accidents[6].

Insomnia is common among cancer patients. Lack of enough sleep in cancer patients can lead to fatigue, mood disturbances and contribute to immunosuppressant, which can have a profound impact on quality of life and perhaps affect the course of disease[7].

Insomnia is one of the most common sleep problems of patients with chronic kidney disease, especially those undergoing hemodialysis. Auricular acupressure or acupuncture helps improve sleep quality of these patients[9, 10].

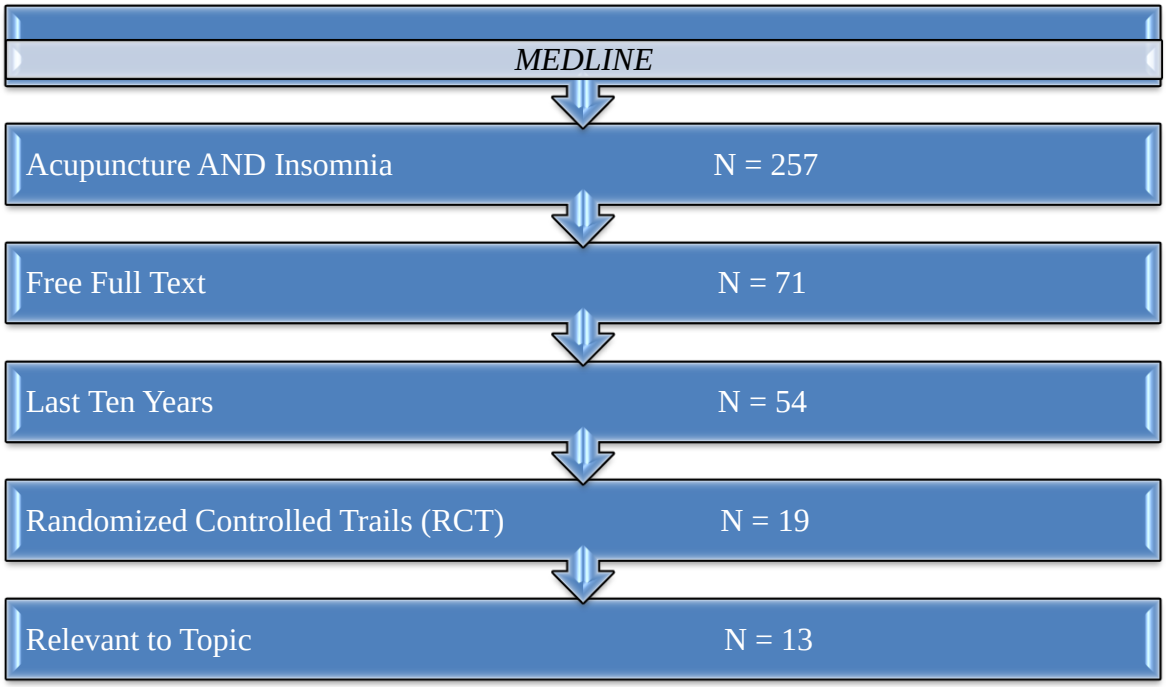
This literature review will discuss studies on the effectiveness of acupuncture in insomnia. The results of acupuncture treatment on subjects with insomnia will be compared and analyzed. It is hypothesized that acupuncture is effective in reducing insomnia.

II. METHODOLOGY

An electronic search strategy was conducted on the EBSCO Medline using the key words acupuncture AND insomnia. The timeframe for the publication of articles was set from 2005 to 2015. Database was set to English language and timeframe was set for the last ten years. Only articles with no cost were selected due to economic constrains. Exclusion and inclusion criteria for research articles were listed in Figure 1.

This literature review was limited to randomized controlled trails (RCTs) with clear hypotheses, objectives, setting, participants (inclusion or exclusion criteria), assessments, interventions, outcomes and conclusion. The results and p-values were compared and analyzed. The authors, details, and characteristics of those RCTs are listed in Table 1. Result with p-vales of 0.05 or less are considered significant.

Figure 1. Exclusion and Inclusion Criteria of Research Articles



III. RESULTS

The total of 13 articles were selected for this case series. Out of 257 articles, only 13 of them met requirement of randomized control trails (RCTs) relevant to topic with clear explanation of the details[1, 5, 6, 7, 8, 9, 10, 11, 12, 1, 3, 14, 15, 16]. Three articles were used only for background information on acupuncture and insomnia[2, 3, 4].

Insomnia with TCM differentiation

Seven studies mentioned about the effect of acupuncture according the TCM[5, 6, 7, 9, 10, 12, 15]. One review article stated that there is a close relationship between sleep and wakefulness and defensive Qi movement in the body with the alternation of day and night and the balance of Yin and Yang heel vessels[5]. The other study mentioned that moving cupping could stimulate the Bladder meridian and regulate the functions of Zang and Fu organs and provide tranquilization[6]. The other article showed that insomnia is caused by imbalance of Yin and Yang and the disorder of Qi and blood in the Heart, Gallbladder, Spleen and Kidney, resulting in malnutrition of the Heart and mental disturbance. Therefore, insomnia should be attributed to dysfunction of the Zang Fu organs. This study was made according to the TCM theory of viscera, channels and collaterals[12]. Two studies on hemodialysis patients mentioned that treatment of insomnia should focus on regulating the imbalance between Yin and Yang of the Heart[9, 10]. Another study on malignant tumor patients discussed the use of different acupuncture points to dissolve phlegm, dispel stasis, quiet the heart and calm the mind[7]. Finally Ju *et al*. described that

insomnia is caused by derangement of Qi and blood, and imbalance between Yin and Yang[15]. TCM differentiation was not mentioned in the rest of the articles.

Methods for assessing insomnia

Insomnia can be measured by several factors. Table 2 indicates the scales that have been used in this literate review. Pittsburg Sleep Quality Index (PSQI) is widely used and is a reliable method to measure the quality and patterns of sleep. This method has been used in several studies[5, 7, 8, 9, 10, 14]. Along with PSQI, Yeung *et al*. assessed insomnia by Insomnia Severity Index (ISI) that indicates the severity of the current sleep problems[8]. In addition to PSQI and ISI, Yeung *et al*. also used Actigraphy (Octagonal Basic Motionlogger, Am-bulatory Monitoring, Inc., Ardsley, NY). Actigraph monitor human rest and activity cycles and sleep diary[8].

Zhang *et al*. also assessed insomnia with comparison of therapeutic effect and treatment numbers and comparison of self-rating sleeping scaling (SRSS) and subtracted rate[6]. Few other studies used therapeutic effect based on cured, markedly relieved, improved and failed[12, 13, 14, 15, 16].

The therapeutic effect and PSQI seemed to be the most popular methods and have being used on most of the studies to assess insomnia, with PSQI appearing to be the most valid and reliable base on the specific questions related to insomnia.

Types of acupuncture treatment and effects

As stated in Table 3, ear acupuncture or acupressure, moxibustion, cupping, electro-acupuncture, Chinese *Tuina*, needle rolling-therapy and body acupuncture were used[5, 6, 7,

[8, 9, 10, 11, 12, 13, 14, 15, 16]. Shenmen, Yintang, relaxation, and tranquilizer were used more often. All of them included a group of participants receiving real acupuncture and another group receiving either other treatments or sham acupuncture, which was usually administered on a point not known to have therapeutic effects.

In one of the studies on college students, acupuncture plus cupping were used for profiting the brain and tranquilizing the mind in treatment group while points were selected in control group based on symptoms, tongue and pulse[6]. The therapeutic effect in those who received acupuncture plus cupping was better than acupuncture only group. In another study, experiment group received needles on Governor Vessel 20, Sishencong, Urinary Bladder 62, Kidney 6 and moxibustion at Governor Vessel 20 and Sishencong. While control group had needles on Heart 7, Pericardium 6 and Spleen 6. The effective rate was higher in experiment group. The PSQI scores and the total score were lower after treatment than before treatment in both groups. However, the reduction in the experiment group was greater than that in the control group in sleep quality, time to fall asleep, sleeping disorder and day time function[5]. Feng *et al*. administered needles on the body. The treatment group received needles on Stomach 40, Spleen 9, Spleen 10, Spleen 6, Yintang, Governor Vessel 20, Sishencong, Pericardium 6 and Shenmen while the patients in the control group received Fluoxetine Hydrochloride capsule 20 mg per day. The result indicated that acupuncture could improve the sleep quality of patients suffering from malignant tumor, and the effect was better than that of Fluoxetine Hydrochloride capsule[7]. In the study by Yeung *et al.* electro-acupuncture was compared with minimal acupuncture which is superficial needling at non-acupuncture points and noninvasive placebo acupuncture which is the placebo needles placed 1 inch beside the acu-points to

avoid acupressure effect. The needles were then connected to the electric stimulator, but with zero frequency and amplitude. Compared with placebo acupuncture, the electro-acupuncture and minimal acupuncture resulted in greater improvement. No significant difference was found between electro-acupuncture and minimal acupuncture[8]. In two studies by Zou *et al.* and Wu *et al.* auricular acupressure therapy was applied to specific acu-points such as Shenmen, Sympathetic autonomic, Subcortex, Heart and Endocrine for managing insomnia in maintenance hemodialysis patients. The results showed that patient's sleep quality improved and they were less dependent on medications after one month of auricular acupressure therapy. However, these improvements were not maintained one month after the treatment ended[9, 10].

The study by Silvia *et al*. on pregnant women, Heart 7, Pericardium 6, Gallbladder 21, Anmian (bilaterally), Yintang, Governor Vessel 20 and Conception Vessel 17 were used. The change in the insomnia scores during the course of acupuncture treatment was significantly higher than that in the control group that did not receive any acupuncture treatment[11].

Li & Lu combined body acupuncture plus auricular-plaster therapy and moxibustion. The ear points for auricular-plaster therapy were Shenmen, Heart, Spleen, Kidney, Sympathetic and Subcortex. Indirect moxibustion was performed at Urinary Bladder 15, Urinary Bladder 20 and Urinary Bladder 23. In the control group the Governor Vessel 20 through Sishencong punctured and auricular-plaster therapy and moxibustion on the back-*shu* points were not used. The result showed that body acupuncture plus auricular-plaster therapy and moxibustion might show better effect for intractable insomnia[12].

In the study by Ling *et al*. the treatment group was treated by acupuncture based on visceral differentiation and the control group by the routine acupuncture points. The result indicated that the visceral differentiation-based acupuncture therapy might enhance the therapeutic effects for insomnia patients[13].

Lu & Liu compared acupuncture-moxibustion and Chinese *Tuina* with acupuncture-moxibustion. The points selected were Shenmen, Spleen 6, Spleen 9 and Urinary Bladder 14. The moxibustion was added for Urinary Bladder 15 and Urinary Bladder 20. In this group Chinese *Tuina* was applied to patients in sitting position. The control group was given only acupuncture-moxibustion therapy with the same points. No Chinese *Tuina* was applied to the control group. The result indicated that the therapeutic effect of acupuncture-moxibustion and Chinese *Tuina* was superior to the acupuncture-moxibustion[14].

In another study by Huang *et al.* needle-rolling was used along the first Bladder Channel (Urinary Bladder 13 to 23), second line of the Bladder Channel (Urinary Bladder 11 to 52) and also along the Governor Channel (Governor Vessel 4 to 14). In the control group Clonazpopan 4-6 mg was given to patients before the bedtime. The result showed that needle rolling therapy might show better therapeutic effects for chronic insomnia there was no significant difference between two groups in the effective rate after three months follow-up[15].

Finally, Ju *et al*. used suspended moxibustion at Baihui (Governor Vessel 20) as the main point and Sishencong, Taiyang, Gallbladder 20 and Pericardium 6 as adjuvant points. The control group was only treated by administration of Estazolam 1-2 mg before bedtime. It

was concluded that suspended moxibustion at Baihui (Governor Vessel 20) is as effective as Estazolam for insomnia[16].

IV. DISCUSSION

Insomnia is a major problem in modern society, can affect people's life. Sleep is very important to build up the people's health. Sleep can promote restoration and development of physical and mental abilities, and it is closely related to growth, development and metabolism of the human body[13]. While most of the RCTs in this literature review have shown acupuncture to be effective in reducing insomnia, still some others have shown no effect or minimal effect.

Acupuncture along with related modalities seem to be more effective in reducing insomnia[5, 6, 7, 8, 9, 10,11, 12, 13, 14, 15, 16]. Acupuncture combining with related modalities is an alternative medicine in patients with insomnia and has fewer or no side effects compared to Western Medicine. In this literature review not only acupuncture but also related modalities such as ear acupuncture or acupressure, moxibustion, cupping, electro-acupuncture, Chinese *Tuina* and needle rolling-therapy have been used in patients that suffer from insomnia. Gao *et al*. found acupuncture-moxibustion could improve the total effective rate of patients with insomnia. This article also mentioned that moxibustion can resist insomnia, improve sleep quality, reduce awakening at night and ensure normal functioning in daytime by stimulating the brain activities[5]. Lu & Liu also showed that the combination of acupuncture-moxibustion and Chinese *Tuina* is better than acupuncture-moxibustion only[14]. Zhang *et al*. discussed that moving cupping can stimulate the Bladder Meridian and Jiaji points to regulate the functions of Zang and Fu organs and provided tranquilization and allay excitement. Therefore, therapeutic effect in acupuncture plus cupping was better than only acupuncture group[6]. Auricular acupressure

in two studies showed that auricular acupressure therapy has better result than sham auricular acupressure therapy[9, 10]. However, these improvements were not maintained one month after the treatment. In the study of insomnia associated with major depressive disorder. Yeung *et al*. mentioned that electro-acupuncture and minimal acupuncture resulted in greater improvement compared to placebo acupuncture[8]. Li & Lu discussed that the body acupuncture plus auricular-plaster therapy with indirect moxibustion may show better result than body acupuncture only in patients with intractable insomnia[12].

Silvia *et al*. also compared acupuncture with no acupuncture treatment in pregnant patients. The result showed that acupuncture alleviated insomnia during pregnanacy[11].

In this literature review, three studies compared acupuncture and related modalities with oral medication. In the study by Feng *et al.* acupuncture points were selected to dissolve phlegm, dispel stasis and quiet the heart and calm the mind in the patients with malignant tumor. The result indicated that the effect of acupuncture was better than oral medication[7]. In another study by Huang *et al*. oral medication was compared with needle-rolling therapy. The result indicated that needle-rolling therapy might show better result compared with oral medication[15]. Finally Ju *et al.* compared suspended moxibustion with oral administration of Estazolam. The result concluded that suspended moxibustion is effective as Estazolam for insomnia[16].

Most of these studies showed that acupuncture and related modalities have better effect in patients with insomnia.

Acupuncture and oriental medicine is still one of the new concepts in many countries. Not many studies, especially randomized controlled have been conducted. This means

further research with larger sample sizes, longer study time, and randomized control trial is required.

V. CONCLUSION

The RCTs analyzed in this study have mostly shown acupuncture and related modalities such as ear acupuncture or acupressure, moxibustion, cupping, electro-acupuncture, Chinese *Tuina* and needle-rolling therapy often used in patients with insomnia. The result of this literature review is mostly consistent with past reviews. The therapeutic effects seem to reduce with time, so it is not known whether the effects are temporary or permanent, or if patients need more frequency or longer time for treatments. Further research with larger sample sizes, longer study time, randomized control trials, and comparison between Western Medicine and TCM theories is required.

VI. REFERENCES

1. Han, Kyung-Hun, Sang-Young Kim, and Sun-Yong Chung. "Effect of Acupuncture on Patients with Insomnia: Study Protocol for a Randomized Controlled Trial." *Trail* 15.1 (2014): 403. Http://www.ncbi.nlm.nih.gov/pubmed/25342100.
2. Daley, Meagan, Charles M. Morin, Melanie LeBlanc, Jean-Pierre Gregoire, and Jesse Savard. "The Economic Burden of Insomnia: Direct and Indirect Costs for Individuals with Insomnia Syndrome, Insomnia Symptoms, and Good Sleepers." *National Center for Biotechnology Information.* U.S. National Library of Medicine, Jan. 2009. Http://www.ncbi.nlm.nih.gov/pubmed/19189779.
3. Liu, Wei, and Changzhen Gong. "Traditional Chinese Medicine/TCM and Insomnia." The American Academy of Acupuncture and Oriental Medicine, n.d. Http://www.tcmpage.com/hpinsomnia.html.
4. Zeng, Bai-Yun, Kaicun Zhao, and Fan-rong Liang. *Neurobiology of Acupuncture*. Burlington: Elsevier Science, 2013. International Review of Neurobiology.
5. Gao, Xiyan, Cuixiang Xu, Peiyu Wang, Shan Ren, Yanli Zhou, Xuguang Yang, and Ling Gao. "Curative Effect of Acupuncture and Moxibustion on Insomnia: a Randomized Clinical Trail." *Journal of Traditional Chinese Medicine* 33.4 (2013): 428-32. Http://www.ncbi.nlm.nih.gov/pubmed/24187860.
6. Zhang, Yue-Feng, Gui-Fang Ren, and Xiu-Chun Zhang. "Acupuncture plus Cupping for Treating Insomnia in Collage Students." *Journal of Traditional*

Chinese Medicine 30.3 (2010): 185-89. Http://www.ncbi.nlm.nih.gov/pubmed/21053624.

7. Feng, Yu, Xin-Yu Wang, Shao-Dan Li, Yin Zhang, Hai-Ming Wang, Min Li, Ke Cao, Yu-Fei Ye, and Zhao Zhang. "Clinical Research of Acupuncture on Malignant Tumor Patients for Improving Depression and Sleep Quality." *Journal of Traditional Chinese Medicine* 31.3 (2011): 199-202. Http://www.ncbi.nlm.nih.gov/pubmed/21977863.
8. Yeung, Wing-Fai, Ka-Fai Chung, Kwok-Chu Tso, Shi-Ping Zhang, Zhang-Jin Zhang, and Lai-Ming Ho. "Electro-acupuncture for Residual Insomnia Associated with Major Depressive Disorder: A Randomized Controlled Trail." *Sleep* 34.06(2011): 807-15. Http://www.ncbi.nlm.nih.gov/pubmed/21629370.
9. Zou, Chuan, Lihong Yang, Yuchi Wu, Guobin Su, Shuhui Chen, Xinfeng Guo, Xiuqing Wu, Xusheng Liu, and Qizhan Lin. "Auricular Acupressure on Specific Points for Hemodialysis Patients with Insomnia: A Pilot Randomized Controlled Trial." *PLOS ONE PLoS ONE* 10.4(2015): n. pag. Http://www.ncbi.nlm.nih.gov/pubmed/25874938.
10. Wu, Yuchi, Chuan Zou, Xusheng Liu, Xiuqing Wu, and Qizhan Lin. "Auricular Acupressure Helps Improve Sleep Quality for Severe Insomnia in Maintenance Hemodialysis Patients: A Pilot Study." *The Journal of Alternative and Complementary Medicine* 20.5 (2015): 356-63. Http://www.ncbi.nlm.nih.gov/pubmed/24571603.
11. Silvia, J. B. Guerreiro Da, M. U. Nakamura, J. A. Cordeiro, and L. Kulay. "Acupuncture for Insomnia in Pregnancy- a Prospective, Quasi-randomized,

Controlled Study." *Acupuncture in Medicine* 23.2(2005): 47-51. Http://www.ncbi.nlm.nih.gov/pubmed/16025784.

12. Li, Ling-Feng, and Jian-Hua Lu. "Clinical Observation on Acupuncture Treatment of Intractable Insomnia." *Journal of Traditional Chinese Medicine* 30.1 (2010): 21-22. Http://www.ncbi.nlm.nih.gov/pubmed/20397457.
13. Ling, Li, Xin-Mei Jiang, Jin-Wei Xue, Miao Wang, and Rui Ke. "Clinical Study on the Visceral Differentiation-Based Acupuncture Therapy for Insomnia." *Journal of Traditional Chinese Medicine* 28.4 (2008): 270-73. Http://www.ncbi.nlm.nih.gov/pubmed/19226897.
14. Ming, Lu, and Liu Xiaoyan. "Insomnia due to Deficiency of both the Heart and Spleen Treated by Acupuncture-Moxibustion and Chinese *Tuina*." *Journal of Traditional Chinese Medicine* 28.1 (2008): 10-12. Http://www.ncbi.nlm.nih.gov/pubmed/18416075.
15. Huagn, Li-Sha, Dan-Lin Wang, Cheng-Wei Wang, You-Ping Hu, Jian-Wei Zhou, and Ning Li. "The Needle-Rolling Therapy for Treatment of Non-organic Chronic Insomnia in 90 Cases." *Journal of Traditional Chinese Medicine* 29.1 (2009): 19-23. Http://www.ncbi.nlm.nih.gov/pubmed/19514183.
16. Ju, Yan-Li, Xu Chi, and Jian-Xin Liu. "Forty Cases of Insomnia Treated by Suspended Moxibustion at Baihui (GV20)." *Journal of Traditional Chinese Medicine* 29.2 (2009): 95-96. Http://www.ncbi.nlm.nih.gov/pubmed/19663092.

APPENDIX

Table 1. Characteristics of the RCTs on Insomnia Used in This Review

Author and Year	Sample Size and Subject Data	Research Methods	P-values or Total Effective Rate	Results
Gao *et al.* (2013) [5]	• n= 120 (3 dropouts) • Experiment group: n=60, mean age: 39±13 years • Control group: n=60, mean age: 40±13 years • Insomnia patients that had not taken Chinese or Western medicine in the past week	• Single-blinded • Acupuncture and moxibustion vs. acupuncture • Patient's insomnia assessed by PSQI	• Experiment vs. control group: P<0.01 • Total effective rate in experiment group is 87.7% and in the control group is 76.3%	• Acupuncture and moxibustion improved insomnia compared to only acupuncture
Zhang *et al.* (2010) [6]	• n=92 (no drop out) • Treatment group: n=52, mean age: 19 to 25 years • Control group: n=40, mean age 18 to 25 years • Healthy college students with no history of sever systemic disease, alcoholic nor drug dependence and had not been treated by sleeping pills	• Single-blinded • Acupuncture plus cupping vs. acupuncture • Patient's insomnia assessed by comparison of therapeutic effect and treatment numbers and comparison of SRSS and subtracted rate	• Total effective rate in the cases with moderate insomnia was better in the treatment group: P<0.05 • Average treatment number in the cases with slight to moderate insomnia was less in the treatment group: P<0.01 • SRSS was very significantly reduced in treatment group: P<0.01 and significantly reduced in the control group:	• The therapeutic effect in acupuncture plus cupping was better than only acupuncture, showing superiority in the cases with moderate insomnia with less treatments and more improved and cured rates

			P<0.05 with a significant difference between the two groups: P<0.05 • Subtracted rate in the treatment group was more than that in the control group: P<0.05	
Feng *et al.* (2011) [7]	• n= 80 (no drop out) • Treatment group: n=40, mean age: 63.80±5.47 years • Control group: n=40, mean age: 63.60±4.26 years • Patients with depression and different types of malignant tumor were selected	• Single-blinded • Acupuncture vs. Fluoxetine • Patient's insomnia and depression assessed by SDS, HAMD and PSQI • Insomnia and depression assessed at baseline and after treatment for 30 days	• SDS and HAMD of acupuncture group after 30 days treatment: P<0.05 • PSQI of acupuncture group after 30 days treatment: P<0.05	• Acupuncture can reduce depression and improve sleep quality in malignant tumor patients, and the effect was better than that of Fluoxetine
Yeung *et al.* (2011) [8]	• n=78 (no drop out) • Electro-acupuncture group: n=26, mean age: 47.5±8.5 years • Minimal acupuncture group (superficial needling at non-acupuncture points): n=26, mean age: 46.7±9.7 years • Noninvasive placebo acupuncture group: n=26, mean age: 50.1±9.1 years • Patients with history of Major Depressive Disorder (MDD) were selected	• Single-blinded • Electro-acupuncture vs. minimal acupuncture vs. placebo acupuncture • Patient's insomnia assessed by ISI, PSQI and 3 day Actigraphy were administered at baseline, 1 week post-treatment, and 4 week post-treatment	• ISI=0.04 • PSQI=0.03 • Actigraphy: no significant difference between groups: P>0.05	• Electro-acupuncture and minimal acupuncture resulted in greater reduction in ISI and PSQI than placebo at 1 and 4 week post-treatment; however, there was no significant difference between electro-acupuncture and minimal acupuncture at both time points

Zou *et al*. (2015) [9]	• n= 63 (5 dropped out) • Treatment group: n=32, mean age: 53.2±12.6 years • Control group: n=31, mean age: 58.5±10.0 years • Insomnia patients with history of MHD (Maintenance Hemodialysis) were selected	• Double-blinded • Auricular acupressure (AA) vs. sham auricular acupressure (SAA) • Patient's insomnia assessed by PSQI at baseline, 4,8 weeks after randomization and 4,8,12 weeks post-treatment	• PSQI declined over time in both AA group and SAA group AA group: P<0.01 SAA group: P<0.01 • Number of participants taking hypnotic or hypnotic free: before treatment between two groups: P=0.38 after treatment between two groups: P<0.01 end of follow-up between two groups: P=0.03	• AA might be a useful therapeutic approach in managing insomnia for hemodialysis patients, and may lead to minimizing or discontinuing sleep medication
Wu *et al*. (2014) [10]	• n= 22 (no drop out) • Treatment group: n=11, mean age: 57.18±9.86 • Control group: n=11, mean age: 57.18±9.86 • Insomnia patients with history of MHD (Maintenance Hemodialysis) were selected	• Double-blinded • Auricular acupressure vs. control group • Patient's insomnia assessed by PSQI at baseline, after a 4-week intervention and 1 month after completion of treatment	• PSQI Sleep quality: P<0.01 Shorter sleep latency: P<0.05 Less sleep disturbance: P<0.01 Less sleep medication: P<0.05 and less daytime dysfunction: P<0.05	• The results showed that patients sleep quality improved and they were less dependent on medications after 1 month of AA therapy. However, these improvements were not maintained 1 month after the treatment ended
Silvia *et al*. (2005) [11]	• n=30 (8 drop out) • Study group: n=17, mean age: 26.5±7.7 years • Control group: n=13, mean age: 26.5±5.6 years • Pregnant women with insomnia were	• Single-blinded • Acupuncture vs. no acupuncture • Patient's insomnia assessed by patient's ratings of sleep disturbance on numerical rating	• Based on NRS the change in insomnia scores during the course of acupuncture treatment was significantly higher than in the control	• Acupuncture alleviates insomnia during pregnancy

	selected	scale at 14 day intervals	group: P=0.0028	
Li & Lu (2010) [12]	• n= 90 (no drop out) • Treatment group: n=50, age: 18-75 years • Control group: n=40, age: 18-75 years • Patients with intractable insomnia with no history of somatic illness or mental disorders were selected	• Single-blinded • Body acupuncture plus auricular-plaster therapy and moxibustion vs. body acupuncture • Patient's insomnia assessed by therapeutic effects in two groups	• Treatment group: n= 28 cured n=12 markedly relieved n=9 improved n= 1 failed • Control group: n= 12 cured n=8 markedly relieved n=11 improved n=9 failed • The therapeutic effect in the treatment group was much better than that in the control group: P<0.01	• The body acupuncture plus auricular-plaster therapy may show better effect for intractable insomnia
Ling *et al.* (2008) [13]	• n=70 (no drop out) • Treatment group: n=35, mean age: 17-67 years • Control group: n=35, age: 18-62 years • Insomnia patients with no history of physical and/or neurological disorders were selected	• Single-blinded • Acupuncture based on visceral differentiation vs. routine acupuncture • Patient's insomnia assessed by therapeutic effects in the groups based on cured, markedly relieved, improved and failed and also sleep quality based on grade I, II, III, IV and V	• Therapeutic effects in the treatment group were significantly better than control group: P<0.05 • Sleep quality was improved remarkably in the treatment group as compared with the control group: P<0.05	• The visceral differentiation based acupuncture therapy may enhance the therapeutic effects for insomnia patients
Lu & Liu (2008) [14]	• n= 92 (no drop out) • Treatment group:	• Single-blinded • Acupuncture-	• Treatment group: n= 41 cured	• The therapeutic effect of

	n=49, age: 18-65 years • Control group: n=43, age: 18-65 years • Patients with typical symptoms of insomnia for more than one month were selected	moxibustion and Chinese *Tuina* vs. acupuncture-moxibustion • Patient's insomnia assessed by therapeutic effects in two groups	n=6 effective n=2 improved • Control group: n= 15 cured n=13 effective n=11 improved • The therapeutic effects between the two groups: P<0.01	acupuncture-moxibustion and Chinese *Tuina* was superior to acupuncture-moxibustion
Huang *et al.* (2009) [15]	• n=180 (no drop out) • Treatment group: n=90,age: 16-75 years • Control group: n=90, age: 16-75 years • Insomnia patients with on history of somatic or mental diseases were selected	• Single-blinded • Needle-rolling therapy vs. Clonopin • Patient's insomnia assessed by therapeutic effect in two groups and PSQI after 4-week treatment and 3-month follow up	• Treatment group Therapeutic effects after 4-week treatment: n=18 cured n=56 improved n=16 failed Therapeutic effects after 3-months follow up: n=5 cured n=31 improved n=54 failed • Control group Therapeutic effects after 4-week treatment: n=10 cured n=44 improved n=36 failed Therapeutic effects after 3-months follow up: n=7 cured n=56 improved n=116 failed	• The needle-rolling therapy may show better therapeutic effects for chronic insomnia patients

			• Significant differences between the two groups in the therapeutic effects after 4-week treatment: P<0.05 • No significant differences between the two groups in the therapeutic effects in a 3-month follow-up: P>0.05	
Ju *et al.* (2009) [16]	• n=75 (no drop out) • Treatment group: n=40, age: 25-75 years • Control group: n=35, age: 25-75 years • Patients with primary insomnia without organic lesion were selected	• Single-blinded • Suspended moxibustion over Baihui (GV 20) vs. oral administration of Estazolam • Patient's insomnia assessed by therapeutic effects in two groups	• Treatment group: n= 8 cured n=16 relieved n=12 improved n=4 failed • Control group: n= 3 cured n=13 effective n=12 improved n=7 failed • The difference in therapeutic effect between the two groups: P>0.01	• The difference in therapeutic effect between the two groups was not statistically significant

Table 2. Assessment Methods for Insomnia

Author and Year	Insomnia Assessment Method
Gao *et al*. (2013)	PSQI
Zhang *et al*. (2010)	Comparison of therapeutic effect and treatment numbers and comparison of SRSS and subtracted rate
Feng *et al*. (2011)	PSQI, SDS and HAMD
Yeung *et al*. (2011)	ISI, PSQI and 3 day Actigraphy
Zou *et al*. (2015)	PSQI
Wu *et al*. (2015)	PSQI
Silvia *et al*. (2005)	Ratings of sleep disturbance on numerical rating scale at 14 day interval
Li & Lu (2010)	Therapeutic effect
Ling *et al*. (2008)	Therapeutic effects in the groups based on cured, markedly relieved, improved and failed and also sleep quality based on grade I, II, III, IV and V
Lu &Liu (2008)	Therapeutic effect
Huagn *et al*. (2009)	Therapeutic effect and PSQI
Ju *et al*. (2009)	Therapeutic effect

Table 3. Types of Acupuncture Treatments

Author and Year	Treatment Type
Gao *et al*. (2013)	Body acupuncture, moxibustion
Zhang *et al*. (2010)	Body acupuncture, cupping
Feng *et al*. (2011)	Body acupuncture
Yeung *et al*. (2011)	Electro-acupuncture, minimal acupuncture and noninvasive placebo acupuncture
Zou *et al*. (2015)	Auricular acupressure
Wu *et al*. (2015)	Auricular acupressure
Silvia *et al*. (2005)	Body acupuncture
Li & Lu (2010)	Body acupuncture plus auricular-plaster therapy, moxibustion
Ling *et al*. (2008)	Body acupuncture
Lu &Liu (2008)	Body acupuncture, moxibustion and Chinese *Tuina*
Huagn *et al*. (2009)	Needle-rolling therapy
Ju *et al*. (2009)	Moxibustion and body acupuncture