

## Comparing Acupuncture Therapy and Butterfly Pea Flower Herbal Tea Consumption in Sleep Quality in Adolescents: Randomized Controlled Trial

Shafa Latifah<sup>1)</sup>, Hanung Prasetya<sup>2)</sup>, Bhisma Murti<sup>1)</sup>

<sup>1)</sup>Master's Program in Public Health, Universitas Sebelas Maret

<sup>2)</sup>Faculty of Medicine, Universitas Sebelas Maret

Received: May 06, 2024; Accepted: June 17, 2024; Available online: July 10, 2024

### ABSTRACT

**Background:** Reduced sleep quality will have impacts such as decreased concentration, emotional disturbances, health and daily activities. There are several factors outside of puberty (hormonal) that cause the percentage of insomnia sufferers to be higher among adolescents, including lifestyle and environment so that it is the cause of insomnia in adolescents. Positive findings have been found in a study reporting that acupuncture and herbal telang flower tea can improve patient health and sleep quality. This study aims to find out the comparison of acupuncture therapy and herbal telang flower tea.

**Subjects and Method:** Randomized Controlled Trial (RCT) was conducted at SMKN 5 Merangin in March-April 2024. A sample of 120 students was selected by simple random sampling. The dependent variable in this study was sleep quality in insomnia cases. The independent variables in the study were acupuncture therapy and herbal telang flower tea.

**Results:** The best intervention to improve sleep quality was acupuncture (Mean = 3.65; SD= 1.12), which is better than telang tea (Mean= 2.13; SD= 1.09) or given nothing (Mean= 0.20; SD= 1.20), and the difference in pairs of these groups was statistically significant ( $p < 0.001$ ).

**Conclusion:** The best intervention to improve sleep quality is acupuncture compared to telang flower tea herb.

**Keywords:** acupuncture, telang flower herbs, sleep quality, insomnia.

### Correspondence:

Shafa Latifah. Master's Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami, 36A, Surakarta 57126, Central Java. Email: ifahlatifah1031@gmail.com. Mobile: +6281291563962.

### Cite this as:

Latifah S, Prasetya H, Murti B (2024). Comparing Acupuncture Therapy and Butterfly Pea Flower Herbal Tea Consumption in Sleep Quality in Adolescents: Randomized Controlled Trial. *Indones J Med*. 09(03): 398-405. <https://doi.org/10.26911/theijmed.2024.09.03.14>.



© Shafa Latifah. Published by Master's Program of Public Health, Universitas Sebelas Maret, Surakarta. This open-access article is distributed under the terms of the Creative Commons Attribution 4.0 International (CC BY 4.0). Re-use is permitted for any purpose, provided attribution is given to the author and the source is cited.

### BACKGROUND

Everyone has basic needs, one of which is sleep. Sleep patterns in individuals can be influenced by various factors such as gender, psychosocial disorders, anxiety, anxiety, and other comorbidities are risk factors that can affect sleep patterns (Fauzi et al. 2020). Reduced sleep quality will have impacts such as decreased concentration, emotional

disturbances, health and daily activities. There are adverse effects if a person experiences sleep disorders, starting from mood, cognitive function, executive function which causes a person's mind and work to become slower, make many mistakes, and have difficulty remembering things (Gusasi et al. 2022).

Insomnia, if not treated, will have a detrimental impact. Insomnia has an impact on daily functioning and quality of life. The immediate impact includes reduced energy and stamina, poor mood, and reduced functional capacity. The indirect impacts include reduced social interaction and increased isolation because they try to compensate for fatigue or reduce social activities in the hope of improving sleep quality thereby reducing productivity. One of the effects of insomnia is increased stress and anxiety due to concerns about the impact of sleep deprivation on the health and functioning of the body (Berkley et al. 2020).

Adolescence is the beginning where individuals have many activities that have an impact on draining energy. Teens typically need between 8 and 10 hours of sleep each night, but this time can be reduced due to school activities and social activities. As a result, insomnia is one of the most common sleep problems (Sari et al. 2021). Adolescents have difficulty falling asleep during puberty due to biological changes in the circadian and homeostasis systems, which alter the body's internal clock. As a result, the more soluble hormone melatonin is released at night resulting in adolescents having difficulty falling asleep (Galván 2020).

There are several factors outside of puberty (hormonal) that cause the percentage of insomnia sufferers to be higher among adolescents, including lifestyle and environment so that it is the cause of insomnia in adolescents. Then there are several factors that cause insomnia in adolescents, one of which is watching television until late at night and the use of electronic devices such as cellphones and laptops (Maharani 2021).

The National Sleep Foundation (2021) reports that around 60% of children under the age of 18 complain of fatigue

during the day and 15% are sleepy at school. Women have a 40% higher risk of insomnia than men at 32.6%. About 80% of people who take sleeping pills experience effects such as oversleeping, feeling dizzy, or having trouble concentrating the next day. In the world, the prevalence of insomnia is about 9.4% in adolescents aged 13–16 years. In Indonesia, the prevalence of insomnia is 38% in adolescents in big cities (urban) and 37.7% in adolescents in suburban areas (Tyas 2022). The prevalence rate of insomnia in Indonesia is around 67%. There are several factors that can affect sleep patterns, including gender and age (Eliza and Amalia, 2022).

According to Hayat et al. 2021, the management of insomnia therapy can be carried out with pharmacological and non-pharmacological therapies. Acupuncture is a traditional Chinese medicine therapy that uses sterile needles to penetrate points in the body to treat a disease. In Traditional Chinese Medicine (TCM), insomnia is known as "Bu Mei" or "Bu Ming". Studies have shown that acupuncture can regulate some insomnia by regulating several neurotransmitters such as norepinephrine, serotonin, dopamine, acetylcholine, and  $\gamma$ -aminobutyric acid and reducing glutamate levels (Xu et al. 2019). Positive findings were found in a study on telang flowers. In his study, he reported that the administration of telang flowers can help reduce insomnia in post-COVID-19. The content contained in telang flowers (*Clitoria ternatea* L) includes saponins, alkaloids, flavonoids, fatty acids, phenols, and beta-sitosterols which can produce a sedative effect (Solihati and Kusumastuti 2023).

Based on a preliminary survey conducted by researchers through a google form at SMKN 5 Merangin, out of 290 students at SMKN 5 Merangin, 132 students experienced insomnia. Based on the description

above, the researcher is interested in conducting research and seeing the effectiveness of acupuncture therapy on changes in sleep quality in the case of insomnia of students of SMKN 5 Merangin, Jambi, Indonesia.

## SUBJECTS AND METHOD

### 1. Study Design

A Randomized Controlled Trial (RCT) was conducted at SMKN 5 Merangin, from April to May 2024.

### 2. Population and Sample

The study population was 299 students of SMKN 5 Merangin. A sample of 120 students was randomly selected with simple random sampling.

### 3. Research Variables

The dependent variable was sleep quality. The independent variables were acupuncture therapy and telang flower herbs.

### 4. Variable Operational Definition

**Sleep Quality** is a condition in which a person has the ability to regulate the amount of sleep they need.

**Acupuncture Therapy** Inserting or inserting needles into the body to perform manipulations at specific points to achieve therapeutic goals.

**Telang Flower Tea Herb** is an herb that contains bioactive herbs that are efficacious for health.

### 5. Data Analysis

Comparison between interventions were tested using independent t test on Stata 13.

### 6. Research Ethics

Research ethics include consent sheets, anonymity, confidentiality, and ethical feasibility. The ethical feasibility of this study comes from the Health Research Ethics Committee of Dr. Moewardi Surakarta with number: 767/III/HREC/2024.

## RESULTS

### 1. Univariate Analysis

Table 1 shows that the measurement of the age variable has a mean value = 16.28 and SD= 9.01 with the lowest age variable of 15 and the highest of 18. The acupuncture group had a mean= 3.65 and SD= 1.42 with the lowest score decrease of 1 and the highest decrease of 7. The Telang tea herbal group had a mean= 2.12 and SD= 1.09 with the lowest score decrease value of 0 and the highest score decrease of 4. The Control Group had a mean= 0.2 and SD= 1.20.

**Table 1. Sample characteristics on continuous variables of age and sex.**

Variable	N	Mean	SD	Min.	Max.
Age	120	16.28	9.01	15	18
Decline Score	120	1.99	1.88	-2	7
Acupuncture Group	40	3.65	1.42	1	7
Telang Tea Herbal Group	40	2.12	1.09	0	4
Control Group	40	0.2	1.20	-2	3

Table 2 shows that two-third (67.50%) of sample was female. The mean

of age was 16 years old. 6 person (5%) were 18 years old.

**Table 2. Sample characteristics on categorical variables of age and gender**

Variable	Frequency	%
<b>Gender</b>	39	32.50%
Male	81	67.50%
Female		

Variable	Frequency	%
<b>Age</b>		
15 years	17	14.17%
16 years	58	48.33%
17 years	39	32.50%
18 years	6	5.00%

## 2. Bivariate Analysis

**Table 3. Bivariate Analysis**

Variable	N	Mean	SD	p
<b>Before Treatment</b>				0.011
Acupuncture Group	40	13	2.6	
Telang Telang Herbal Tea Group	40	11	2.4	
Control Group	40	11	2.6	
<b>After Treatment</b>				0.010
Acupuncture Group	40	13	2.6	
Telang Telang Herbal Tea Group	40	11	2.4	
Control Group	40	11	2.6	
<b>PSQI Score Decrease</b>				<0.001
Acupuncture Group	40	3.6	1.4	
Telang Telang Herbal Tea Group	40	2.1	1.0	
Control Group	40	0.2	1.2	

Table 3 presents the results of the average difference in sleep quality between the acupuncture group, the telang tea herbal group, and the control group.

### PSQI Score Before Treatment

Table 3 shows the results of the score after the treatment even though randomization has been carried out, it turns out that the three groups show a significant difference with the average PSQI score before the intervention in the acupuncture group (Mean = 13.1; SD= 2.60).

The average PSQI score before the intervention in the herbal tea group of telang tea (Mean = 11.9; SD= 2.46). The average PSQI score before the intervention in the control group (Mean= 11.4; SD= 2.61) with a significant statistical value (p=0.011). To determine the difference in effectiveness to the three groups, statistical testing of the difference in sleep quality values before and after the intervention between the three groups was carried out.

### PSQI Score After Treatment

Table 3 shows the results on the post-treatment score with the mean value of the PSQI score after the intervention in the acupuncture group (Mean= 9.47; SD= 2.27). Mean PSQI score after intervention in the herbal group of telang tea (Mean= 9.8; SD= 1.92). The average PSQI score before the intervention in the control group (Mean = 11.2; SD= 2.59) with a statistically significant value (p= 0.010).

Although randomization was carried out, it turned out that the three groups showed significant differences which meant that the randomization failed to distribute and distribute the state of sleep quality between the three groups comparatively. Therefore, to determine the difference in effectiveness to the three groups, the method was statistically tested on the difference in sleep quality values before and after the intervention between the three groups.

## PSQI Decline Score

Table 3 shows that there is a statistically significant difference in sleep quality improvement between the three research groups.

### a. Acupuncture Group

Average improvement in sleep quality in the acupuncture group (Mean = 3.65; SD= 1.42) larger than the telang tea group (Mean= 2.13; SD= 1.09), and the difference was statistically significant ( $p < 0.001$ ). Average improvement in sleep quality in the acupuncture group (Mean = 3.65; SD= 1.42) than the control group (Mean = 0.20; SD= 1.20), and the difference was statistically significant ( $p < 0.001$ ).

### b. Telang Tea Herbal Group

Average improvement in sleep quality in the herbal group of telang tea (Mean = 2.23; SD= 1.09) than the control group (Mean= 0.20; SD= 1.20), and the difference was statistically significant ( $p < 0.001$ ).

## DISCUSSION

### 1. Effect of acupuncture therapy on sleep quality compared to telang herbal therapy

Acupuncture therapy is a traditional Chinese medicine therapy that uses sterile needles to penetrate points in the body to treat a disease (Xu et al. 2019). Acupuncture is a therapy that is based on the insertion of needles at specific points, and tangible evidence of its efficacy in Western medicine has been reported. The efficacy of acupuncture in improving sleep duration and quality has been clinically confirmed (Lee and Kim, 2023).

Based on the results of the study, it shows that improving sleep quality in insomnia is more effective using acupuncture therapy. This is in line with research conducted by Liu et al. (2020), showed that compared to the sham group, acupuncture

significantly lowered the PSQI score ( $P < 0.0001$ ).

In a study conducted by Zhang et al. (2020), showed that compared to placebo acupuncture, active acupuncture could significantly improve insomnia, and clinical efficacy was maintained for at least 6 weeks. In this research, several acupuncture points were used, including Shenmen (HT 7), Neiguan (PC 6), Baihui (GV20), Sishencong (EX-HN 1), and Anmian (EX-HN 16). This acupuncture point is beneficial for improving sleep quality in line with Ye et al. (2023), after acupuncture Baihui (GV20), Neiguan (PC6), Shenmen (HT7) and Taichong (LR3) acupuncture is better at improving anxiety and depression. Baihui point (GV20) belongs to the Directing Container that enters the brain and has the property of awakening the brain and opening holes and calming the mind, Shenmen (HT7) is the original meridian point of the Heart, which can calm the mind and calm the mind; Neiguan (PC6) is the meridian point of the Hand Spasm Yin Perikardium, which has the effect of opening blood vessels, regulating the heart's Qi, and awakening the brain and mind.

A number of studies have shown that acupuncture improves sleep quality and prolongs sleep time in patients with insomnia by regulating the activity of sleep factors, such as neurotransmitters, hormones, and cytokines. Acupuncture affects the structure of sleep by regulating the levels of 3 types of central neurotransmitters: amines, amino acids, and peptides. Cytokines are mostly derived from immune cells and can regulate immune responses as well as sleep-wake cycles. Acupuncture can regulate sleep mechanisms by modulating immune cytokines such as interleukin (Niu and Ren, 2023).



Acupuncture interacts with the gamma-aminobutyric acid (GABA) pathway and inhibits the activity of the central nervous system. GABA, as a major neurotransmitter that has an inhibitory effect on the brain, along with several neuropeptides is involved in sleep regulation. Increased GABA levels can suppress central nervous system activity, and hypnotic agents such as benzodiazepines and non-benzodiazepines are known to operate on this pathway (Shergis et al. (2016). Acupuncture can increase levels of certain neurotransmitters, including serotonin, glutamate, gamma-aminobutyric acid (GABA), and melatonin. In addition, acupuncture can regulate cortisol production and regulate hypothalamic-pituitary-adrenal axis (Lee et al. 2020).

## **2. Effect of herbal therapy of telang flower tea on sleep quality compared to acupuncture therapy**

Based on the results of research, herbal telang flower tea can improve sleep quality. However, based on the results of the research, acupuncture therapy is more effective than herbal telang flower tea and the control group. Acupuncture and telang tea herbs are effective in improving sleep quality. In line with the research conducted by Solihati and Kusumastuti (2023), showed statistically significant ( $p = 0.001$ ). There is an effect of telang flower drink on insomnia in post-COVID-19 patients.

The benefits of herbal telang tea are secondary metabolic products to support the health of the human body. Among the secondary metabolic products it is polyphenols. Telang flowers are one of the plant sources with relatively high polyphenol levels so that they have the potential to provide health benefits for humans (Marpaung, 2020). *Clitoria ternatea* L. It has several pharmacological potentials involving its properties as antioxidants, antimicrobials, antidepressants, anthelmin-

tics, anti-cancer, and anti-diabetic. Antioxidants work to manage oxidative stress in biological systems in a variety of ways, such as capturing free radicals, inhibiting oxidative enzymes, functioning as chelates metal ions, and being coenzymes for antioxidant enzymes. The working principle of antioxidants is through the activity of capturing free radicals, so that they can prevent or protect cells from damage due to oxidative stress or lipid peroxidation due to free radical attacks. The extract in telang flowers can work by having a positive impact on the central nervous system and contains clitorienolactone and isoflavonoids in it, which can help reduce stress and depression (Solihati and Kusumastuti 2023).

In the results of this study, it was found that acupuncture therapy is better in improving sleep quality than herbal therapy of telang flower tea, this can be explained in a study conducted by Wang et al. (2023) that there are many mechanisms related to acupuncture therapy on improving sleep quality, including the impact of acupuncture on central neurotransmitters. Various central neurotransmitters in the brain affect sleep, and acupuncture affects the structure of sleep by regulating the levels of 3 types of central neurotransmitters: amines, amino acids, and peptides. Then acupuncture can regulate sleep mechanisms by modulating immune cytokines such as interleukin and acupuncture can affect sleep architecture, improve sleep quality, and treat insomnia by regulating hormones related to the sympathetic-adrenomedullary system and the hypothalamic-pituitary-adrenal axis.

For mechanisms related to herbal therapy, telang flowers can also improve sleep quality from several studies, one of which is research conducted by Solihati and Kusumastuti (2023) the extract in telang flowers can work by having a positive

impact on the central nervous system and contains clitorienolactone and isoflavonoids in it, which can help reduce stress and depression where one of the factors that cause insomnia is stress.

#### **AUTHORS CONTRIBUTION**

This article was written by Shafa Latifah, with significant contributions from Dr. Hanung Prasetya as the main supervisor who provided strategic guidance and thorough supervision, as well as Porf Bhisma Murti who provided critical input and methodological support throughout the research.

#### **FINANCIAL SUPPORT AND SPONSORSHIP**

This study is self-funded.

#### **ACKNOWLEDGEMENT**

The researcher expressed his gratitude to SMKN 5 Merangin for allowing this research to be carried out. Thank you also to all respondents who have been willing to help become research subjects.

#### **CONFLICT OF INTEREST**

There is no conflict of interest in this study.

#### **REFERENCE**

- Berkley AS, Carter PA, Yoder LH, Acton G, Holahan CK (2020). The effects of insomnia on older adults' quality of life and daily functioning: A mixed-methods study. *Geriatr Nurs.* 41(6): 832–838. DOI:10.1016/j.gerinurse.-2020.05.008
- Eliza A (2022). Pengetahuan insomnia pada remaja selama Covid 19 (Knowledge of insomnia in adolescents during Covid 19). *Borneo Student Res.* 3(2): 1941–1946. at: <https://journals.umkt.ac.id/index.php/bsr/article/view/2838>
- Fauzi A, Chotimah C, Barkah A (2020). Terapi relaksasi otot progresif untuk mengatasi insomnia di masa pandemi Covid-19 (Progressive muscle relaxation therapy to overcome insomnia during the Covid-19 pandemic). *J Antara Abdimas Keperawatan.* 3(2): 56–62. DOI:10.37063/abdimaskep.v-3i2.492.
- Galván A. (2020). The need for sleep in the adolescent brain. *Trends Cogn Sci.* 24(1): 79–89. DOI: 10.1016/j.tics.-2019.11.002.
- Gusasi IA, Fitria Y, Fadhilah S, Audhah N. (2022). Hubungan tingkat kecemasan dengan derajat insomnia dan kualitas tidur (The relationship between anxiety levels and insomnia and sleep quality). *Homeostatis.* 6(1): 125–134. DOI: 10.20527/ht.v6i1.8798
- Hayat N, Alba AD, Rahmadeni S (2021). Pengaruh terapi relaksasi otot progresif terhadap tingkat insomnia pada lansia di wilayah kerja Puskesmas Batu Aji Kota Batam tahun 2019 (The effect of progressive muscle relaxation therapy on the level of insomnia in the elderly in the working area of the Batu Aji Health Center, Batam City in 2019). *J. Ilmiah Indonesia.* 1(4): 403–413. at: <http://cerdika.publikasiindonesia.id/index.php/cerdika/index>.
- Lee B, Kim BK, Kim HJ, Jung IC, Kim AR, Park HJ, Kim JH. (2020). Efficacy and safety of electroacupuncture for insomnia disorder: A multicenter, randomized, assessor-blinded, controlled trial. *Nat.Sci Sleep.* 12: 1145–1159. DOI: 10.2147/NSS.S281231.
- Lee S, Kim SN (2023). The effects of acupuncture on sleep disorders and its underlying mechanism: a literature review of rodent studies. *Front. Neurosci.* 17(8): 1–7. DOI: 10.3389/fnins-

- .2023.1243029.
- Liu C, Xi H, Wu W, Wang X, Qin S, Zhao Y, Zheng S, et al. (2020). Placebo effect of acupuncture on insomnia: A systematic review and meta-analysis. *Ann. Cardiothorac. Surg*, 9(1): 19–29. DOI: 10.21037/apm.2019.11.15
- Maharani AP (2021). Aroma terapi lavender untuk mengatasi insomnia pada remaja (Lavender therapeutic scent to overcome insomnia in adolescents). *J Res Perawat Profesional*. 3(1): 159–164. DOI: 10.37287/jppp.v3i1.372.
- Maharani AP (2021). Aroma terapi lavender untuk mengatasi insomnia pada remaja (Lavender therapeutic scent to overcome insomnia in adolescents). *J Res Perawat Profesional*. 3(1): 159–164. DOI: 10.37287/jppp.v3i1.372.
- Marpaung AM. (2020). Tinjauan manfaat bunga telang (*clitoria ternatea* l.) bagi kesehatan manusia (Review of the benefits of telang flower (*Clitoria ternatea* l.) for human health). *J. Funct. Food Nutraceutical*. 1(2): 63–85. DOI: 10.33555/jffn.v1i2.30
- Niu S, Ren L (2023). Treatment of obesity by acupuncture combined with medicine based on pathophysiological mechanism: A review *Med. (United States)*, 102(48): 1-11 DOI: 10.1097/-MD.00000000000036071
- Sari E, Dewi AP, Karim D (2021). Pengaruh terapi SEFT terhadap kualitas tidur remaja dengan insomnia (Effect of SEFT therapy on sleep quality in adolescents with insomnia). *J Ilmu Keperawatan*. 9(2): 1–14. <https://jurnal.usk.ac.id/-JIK/article/view/21493>
- Shergis JL, Ni X, Jackson ML, Zhang AL, Guo X, Li Y, Chuanjian L, Xue CC. (2016). A systematic review of acupuncture for sleep quality in people with insomnia. *Complement Ther Med*. 26: 11–20. DOI: 10.1016/j.ctim.2016.02.007.
- Sleep Foundation (2021). Sleep Statistics - Facts and Data About Sleep 2022. <https://www.sleepfoundation.org/-how-sleepworks/sleep> Accessed: 25 December 2023.
- Solihati NAK (2023). Effect of telang flower (*Clitoria ternatea*) drink to reduce insomnia in post COVID-19 patients. *J Heal Promot Behav*. 08(01): 13–21. DOI: 10.26911/thejhp.2023.
- Tyas LW (2022). Hubungan Depresi, Kecemasan dan Stres dengan Kejadian Insomnia pada Remaja (The Relationship between Depression, Anxiety and Stress with the Incidence of Insomnia in Adolescents). Tadulako University. 13: 540–547. DOI:10.22487/preventif.v13i3.405
- Xu H, Shi Y, Xiao Y, Liu P, Wu S, Pang P, Deng L, et al (2019). Efficacy comparison of different acupuncture treatments for primary insomnia: a bayesian analysis. *Altern Med*. 1-13. DOI: 10.1155%2F2019%2F8961748
- Ye Y, Wei Y, Jia J, Yan X. (2023). Efficacy of needling baihui (GV20), neiguan (PC6), shenmen (HT7) and taichong (LV3) on cerebral cortical blood oxygen level in rats with insomnia. *J Tradit Chinese Med*. 43(3): 523–532. DOI: 10.19852/j.cnki.jtcm.20230404-.005.
- Zhang L, Tang Y, Hui R, Zheng H, Deng Y, Shi Y, Xianjun X, et al (2020). The effects of active acupuncture and placebo acupuncture on insomnia patients: a randomized controlled trial. *Psychol Heal Med*. 25(10): 1201–1215. DOI: 10.1080/13548506.2.