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Evaluating the Effectiveness of Self-Applied Acupressure on Zanzhu (BL-2) for Relief from Sinus Congestion, Headache and Eyestrain

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Abstract: ***This study investigates the feasibility and effectiveness of a self-applied acupressure technique targeting the Zanzhu (BL-2) point in alleviating symptoms associated with sinus congestion, headache, and eyestrain. A total of 28 volunteers aged 18–60 participated after receiving training on identifying the Zanzhu (BL-2) point and applying a gentle circular pressure using the index finger and thumb for one minute. Discomfort levels were recorded pre- and post-intervention using the Visual Analogue Scale. Statistical analysis revealed a significant reduction in symptom severity following the intervention. These findings support the potential of self-administered acupressure as a low-cost, non-invasive strategy for symptom management.***

Keywords: Acupressure, Zanzhu point, sinus congestion, headache relief, self-care therapy

1. Introduction

The human body consists of interconnected nerves that rest close to the skin and are sensitive to pressure. These points are referred to as pressure points [1]. Pressure points are located on several areas of the body, including the human face. They are areas in the body that are sensitive to pressure and a reaction is triggered when a specific level of pressure is applied. The reaction triggered could be in the form of pain, relief, tickle or unconsciousness in some cases [2].

Pressure points are commonly used in the practice of reflexology and acupressure. Some pressure points are known as areas of vulnerability, especially used in self-defense [3]. An example is the Renying (ST-09) pressure point located at the side of the neck close to the shoulder where the Vagus nerve is located, a sudden intense pressure on this sensitive area could lead to unconsciousness in humans [2].

According to Traditional Chinese Medicine (TCM), specific points on the body, including the face that can be manipulated by pressure to provide pain relief, promote healing or enhance overall well-being in the body is called acupressure point. Acupoints are points in the body identified by Traditional Chinese Medicine for acupressure or acupuncture. The main difference between these two techniques is that acupressure involves using fingertips or tools to apply pressure in a defined manner to promote healing and provide relief [4] while acupuncture involves inserting tiny fine needles on targeted acupoints. Acupoints fall along 12 bilateral meridians and midline channels, namely the Du and Ren Meridians connected to vital internal organs in the body [5].

Common acupoints on the face include Yin-Tang, also called the Third Eye located at the middle of the eyebrows, applying pressure on this spot helps to relieve anxiety and stress, thereby providing calmness to the body [6]. Also, Sizhukong (TE-23) is an acupoint which is located at the lower end of the eyebrows, used in relieving eye pain and irritation [7]. In addition to acupoints on the face, there are two points located at the inner ends of the eyebrows close to the eyes called the Zanzhu (BL-2) point. Figure 1.1 shows various acupoints on the face.

We will focus on the Zanzhu (BL-2) acupoint for the purpose of this study. This study aims to evaluate the effectiveness of self-applied acupressure on the Zanzhu (BL-2) point for alleviating discomfort caused by sinus congestion, headache, and eyestrain. The study is significant as it addresses the lack of empirical data on self-administered acupressure's effectiveness in treating sinus-related discomfort, offering a low-risk, accessible alternative to conventional treatments.

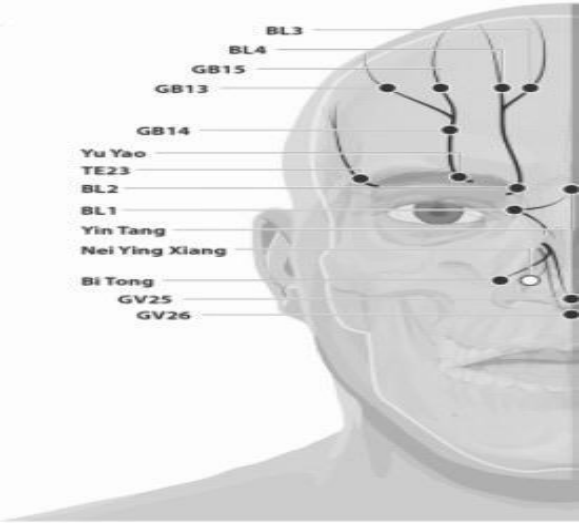

Figure 1.1: Acupoint on human face [7]

On the Zanzhu (BL-2) point is located the Supratrochlear nerve. The supratrochlear nerve is a branch of the frontal nerve that runs from the ophthalmic division (V1) of the trigeminal nerve (cranial nerve V) [7]. The Supratrochlear

nerve is a sensory nerve that helps relay sensation such as touch, pain, temperature, pressure. When pressure is applied on this point, it stimulates the areas innervated by the supratrochlear nerve – eye socket, forehead and the nasal structure on the face. This stimulation influences the nerve and sends a signal to the brain, thereby increasing blood circulation, reducing pain or discomfort around those areas and improving overall well-being [8]. Figure 1.2 shows the location of the Zanzhu (BL-2) point in connection with the Supratrochlear nerve.

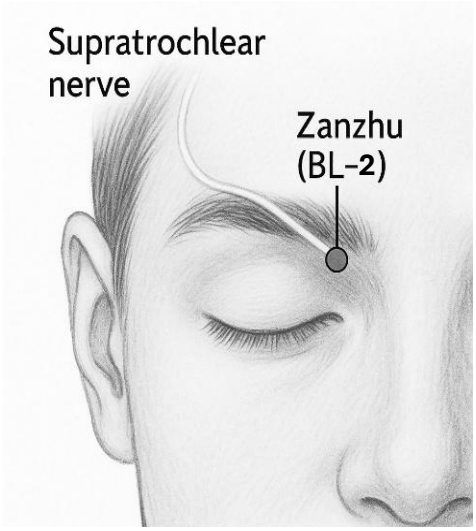

Figure 1.2: A diagram showing the connection Supratrochlear nerve to Zanzhu (BL-2) point

2. Literature Review

The gate control theory of pain, proposed by Melzack and Wall in 1965, provides a framework for understanding how non-painful stimuli, such as pressure or touch influences the perception of pain. According to this theory, the neurons in the body can regulate the transmission of pain signals to the brain. Non-painful input, like gentle pressure or massage, can close these gates to painful input, thereby reducing the sensation of pain [9]. The Zanzhu (BL-2) point on which the Supratrochlear nerve is located produces a combination of neurological, vascular, and mechanical effect when stimulated by pressure, and is expected to relieve symptoms associated with tension, stress, sinusitis, prolonged screen time which are commonly sinus congestion, headaches and eyestrain [8, 10, 11].

A study conducted by Liang et al. [12] identified self-administered acupressure on Zanzhu (BL-2) point as a low risk, non-invasive, non-pharmaceutical intervention for managing nasal congestion. The study offered a significant contribution for conducting a randomized controlled trial for self-administered acupressure on specific and non-specific points on the face due to weakness in current existing RCTs. The protocol established a standard RCT eliminating bias and heterogeneity in data by randomizing and single blinding participants. Acupressure was performed on Zanzhu (BL-2) point in an attempt to relieve nasal congestion, this study acknowledges Zanzhu (BL-2) point as a specific point on the face for acupressure technique to relieve sinus congestion and associated symptoms. However, the study focused on proposing the methodology for RCT on self-administered acupressure but failed to present findings or impact on participants.

Hence, our study will focus on understanding how participants responded to self-administered acupressure on Zanzhu (BL-2) point to manage discomfort from sinus congestion, headache and eyestrain.

3. Methodology

Objective: To understand the impact and benefit of self-administered acupressure on forehead-eyebrow pressure point - Zanzhu (BL-2). Figure 3.1 shows the flow chart of study.

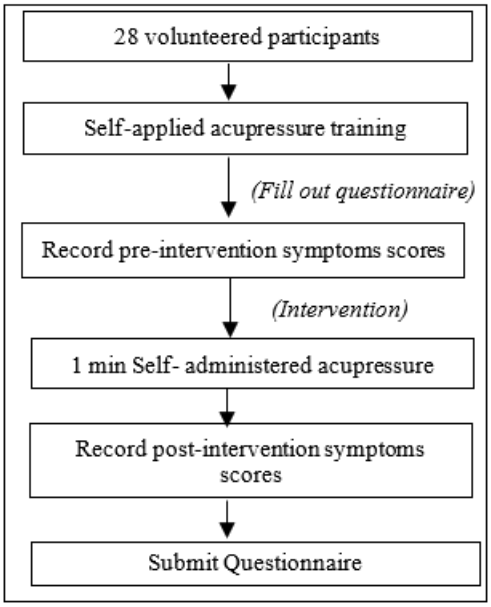

Figure 3.1: Flow chart of study

Study Registration: The protocol used in this study was pre-registered on Open Science Framework (OSF) (Registration DOI: https://doi.org/10.17605/OSF.IO/QZYDF**)**

Participants and Inclusion criteria: Participants aged between 18 and 60 experiencing sinus congestion, headache or eyestrain regardless of gender were included in this study. Participants were volunteers sourced from neighborhood, colleges and workplace. Individuals with chronic sinusitis, headache, eye pain, recent nasal surgery were excluded.

Sample size: A total of 28 participants (N=28) were used to carry out this study. The sample size was determined using G*Power statistical power analyses by Faul et al. [13] considering one subject group aimed at achieving 80% power at a significant level of 0.05 ($\alpha < 0.05$). A total of 34 individuals were assessed for eligibility considering a drop out of rate of 20%. While the study design provides a practical framework for evaluating the effects of self-administered acupressure, the relatively small, convenience-based sample may limit generalizability. Future research should consider randomized controlled designs with larger samples to validate these findings.

Ethical Consideration: This study was reviewed and approved by the Institutional Review Board (IRB) at Stanton

University. All participants provided informed consent, and the study was conducted in accordance with ethical standards involving human participants. Participation was voluntary, and participants were informed of their right to withdraw at any time without penalty. No personally identifiable data was collected.

Informed Consent: All participants provided informed consent prior to their involvement in the study. The consent process included a clear explanation of the study's purpose and procedures.

Study Design and Duration: Each individual session lasted approximately three minutes. One minute of self-applied acupressure and one minute each to record pre and post intervention discomfort level using the VAS. The duration of the intervention was determined following the protocol of a similar study reviewed, conducted by Liang et al. [12]. Participants were advised to refrain from extra activity when completing the study.

Intervention: Participants were trained on how to locate the Zanzhu (BL-2) point as its location varies from one facial structure to another. During discomfort from sinus congestion, headache or eyestrain, participants recorded the severity of discomfort using the VAS, then proceeded to apply gentle pressure on the Zanzhu point (BL-2) in a circular manner using the index finger and thumb for one minute. After the therapy, participants were asked to record discomfort level using the same scale.

4. Result & Discussion

Table 1 shows the descriptive statistics of the collected data, summarizing the distribution and key characteristics of discomfort severity pre and post the intervention.

Table 1: Descriptive statistics of collected data

Description	Pre_intervention	Post_intervention
count	28	28
Mean	6.321429	4.785714
Std	1.21879	1.595297
Min	4	2
25%	5	4
50%	6	4
75%	7	4
max	9	8

Data collected from participants was analyzed using Paired T-Test to compare the pre-intervention and post-intervention discomfort level from symptoms. A null hypothesis is rejected using a level of significant less than 0.05 ($\alpha < 0.05$). There was a significant decrease in scores from Pre-intervention ($M = 6.32$, $SD = 1.21$) to Post-intervention ($M = 4.78$, $SD = 1.59$); $t = 3.5315$, $p = 0.0015$. These results suggest that the intervention had a significant effect in reducing the participants' discomfort levels. This shows that the relief observed from intervention is statistically significant, hence we reject the null hypothesis. Figure 4.1 is a box plot showing the distribution of pre and post intervention discomfort level from symptoms.

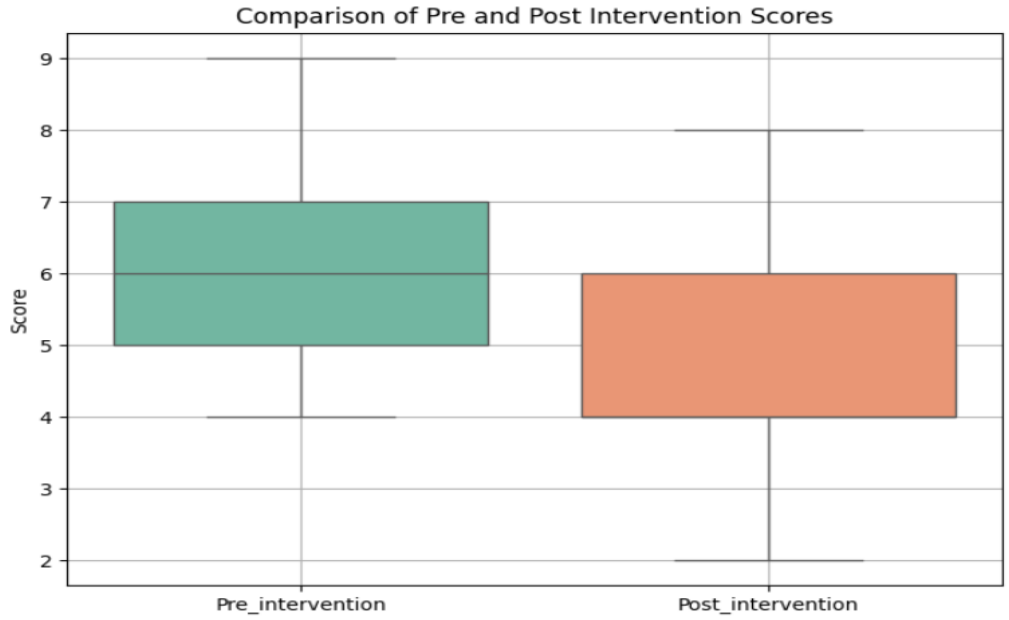

Figure 4.1: Box plot showing the distribution of pre and post intervention discomfort scores

We furthered our analysis from data collected to monitor the progress of each participant from their pre-intervention discomfort scores to the post intervention symptoms scores as shown in figure 4.2 below.

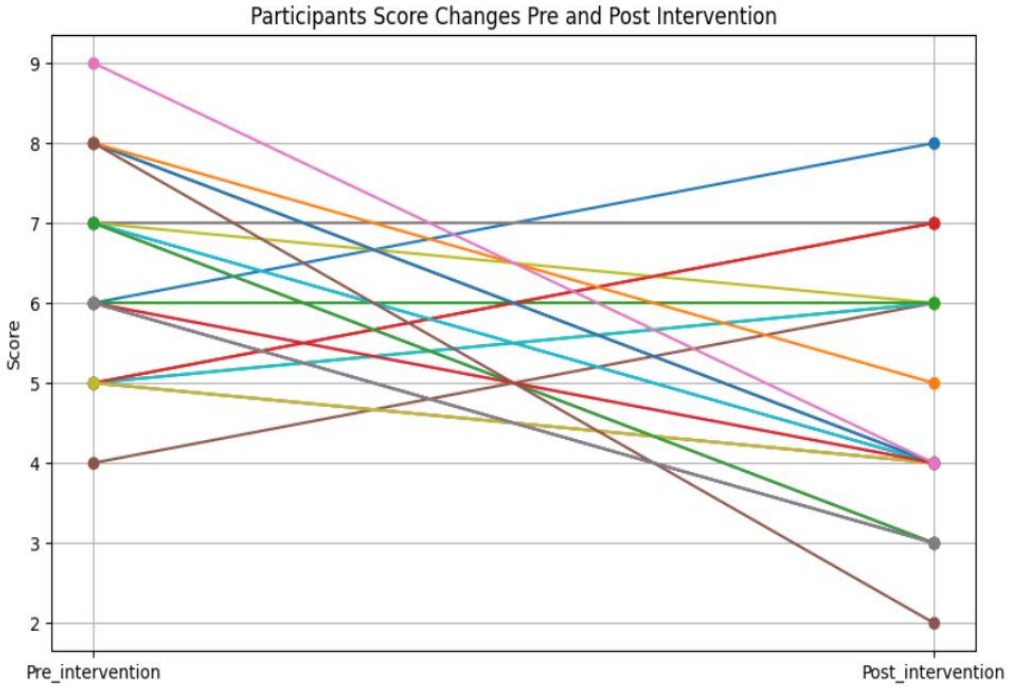

Figure 4.2: Line graph to monitor each individual's discomfort level pre and post intervention

5. Conclusion

Applying minimal pressure on the Zanzhu (BL-2) points in a continuous circular motion for one minute, participants described the intervention as a technique that promoted overall relaxation. Many participants expressed a desire for longer acupressure sessions and reported tension release around the eyes, resulting in relief from eyestrain. Additionally, some participants noted that nasal passages began to clear during the procedure, reducing frontal head congestion and improving headache symptoms even after the session ended. They reported a change in their perception of pain or discomfort, which aligns with the Gate Control Theory of pain proposed by Melzack and Wall in 1965 [9], suggesting that pain perception can be modulated through touch, pressure, or gentle massage.

The outcomes derived from the intervention demonstrate that the reduction in discomfort levels post-intervention is statistically significant compared to pre-intervention levels. With a t-value of 3.5315 and a p-value of 0.0015, which is well below the established significance level of $\alpha = 0.05$, the null hypothesis was rejected. This indicates that the participants likely experienced relief not attributable to chance and supports the conclusion that acupressure contributed meaningfully to symptom relief.

6. Recommendations

However, due to the nature of self-administered acupressure requiring simultaneous rotation of the index finger and thumb at the Zanzhu (BL-2) points, prolonged sessions may be challenging. Participants may experience fatigue, become overly focused on the mechanics of the task, and thus may be distracted from fully experiencing the therapeutic benefits of the intervention. This highlights a potential limitation of self-applied acupressure that should be considered in future studies or clinical applications.

In the absence of an acupuncturist or masseuse to perform longer acupressure sessions as desired by many participants, it is reasonable to recommend the development of a portable acupressure device specifically targeting the Zanzhu (BL-2) points. Such a device could help relieve symptoms associated with sinus congestion, headaches, and eyestrain, while minimizing user fatigue and improving the overall therapeutic experience.

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Appendices

Acupoint: Specific points on the body originated from Traditional Chinese Medicine (TCM) for acupressure or acupuncture.

Acupressure: Acupressure involves using hands, fingers or massaging tools to stimulate pressure on the acupoints

Acupuncture: A process of inserting fine tiny needles on acupoints.

BL-2: An acupoint along the bladder meridian specifically located around the forehead-eyebrow inner ends, close to the nose bridge.

Pressure Point: Sensitive spots in the body such that when manipulated, can trigger a reaction.

RCT: Randomized Controlled Trial

TCM: Traditional Chinese Medicine

VAS: Visual Analogue Scale

Zanzhu Point: Also referred to as BL-2

Author Profile

Ifeoluwa Olla (Lead Researcher) – holds a bachelor's degree in computer science and engineering from Ladoke Akintola University of Technology, Nigeria, and recently earned a master's degree in business administration and management from Stanton University, USA. With a strong interdisciplinary background, Ifeoluwa combines technical expertise with strategic thinking to explore innovative solutions that enhance human well-being. She has participated in various scientific conferences and exhibitions, demonstrating a consistent interest in technological advancements and human-centered inventions. Her curiosity about innovation, discovery, and improving quality of life inspired her current research on acupressure and its potential for stress and headache relief through non-invasive technologies.

Dr. Desmond Ademiluyi – obtained both bachelor's and master's degrees in computer science from Ladoke Akintola University of Technology, Nigeria. He earned his doctorate degree in computer science from Aspen University, USA. With a career that spans academia and industry, Desmond has served as an educator in computer science, information technology, and systems engineering. He is currently a software engineer at a leading entertainment company in the United States and serves as an adjunct professor at Westcliff University, where he teaches science and engineering-related disciplines. A passionate research enthusiast, Desmond is committed to leveraging technology and innovation to develop solutions that improve lives and drive progress.