

## References:

- 1 Boiko DI, Kachur RV, Ajala OM, Bodnar LA, Zhyvotovska LV. Characteristics of anxiety and depressive manifestations in patients with acute myocardial infarction taking into account their personal accentuations. *Azerbaijan Med J* 2021;(2):25–31.
- 2 Cherkin DC, Sherman KJ, Balderson BH, Cook AJ, Anderson ML, Hawkes RJ, et al. Effect of Mindfulness-Based Stress Reduction vs Cognitive Behavioral Therapy or Usual Care on Back Pain and Functional Limitations in Adults With Chronic Low Back Pain. *JAMA* 2016;315:1240.
- 3 Hiyama A, Watanabe M, Katoh H, Sato M, Sakai D, Mochida J. Effect of depression and neuropathic pain using questionnaires on quality of life in patients with low back pain; cross-sectional retrospective study. *Eur Spine J* 2016; 25:2750–60.
- 4 Keefe FJ, Rumble ME, Scipio CD, Giordano LA, Perri LM. Psychological aspects of persistent pain: current state of the science. *J Pain* 2004;5:195–211.
- 5 Knezevic NN, Candido KD, Vlaeyen JWS, Van Zundert J, Cohen SP. Low back pain. *Lancet* 2021;398:78–92.
- 6 Smart KM, Blake C, Staines A, Doody C. Self-reported pain severity, quality of life, disability, anxiety and depression in patients classified with 'nociceptive', 'peripheral neuropathic' and 'central sensitisation' pain. The discriminant validity of mechanisms-based classifications of low back (±leg) pain. *Man Ther* 2012;17:119–25.

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## EFFECT OF VAGAL NERVE STIMULATION AND JACOBSON RELAXATION TECHNIQUE ON AGORAPHOBIA AMONG POST NEUROLOGICAL ILL-PATIENTS

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Dear Editor,

We would like to share our experience with the Psychiatria Danubina audience that agoraphobia is a form of phobia, often known as irritational fear. When confronted with specific things, events, or behaviors, people with phobias experience fear or anxiety (Wittchen 2008). Agoraphobia is the most common type of phobia, affecting 5-12 percent of Americans at some point in their lives (McCabe et.al 2006). An individual who suffers from anxiety has a family who suffers from agoraphobia, has been through trauma, or has lost a loved one and is at an increased risk of developing agoraphobia. Agoraphobia affects women twice as much as it does males, and it usually strikes between the ages of 15 and 35 (Manjunatha et.al. 2022).

An anxiety disorder is defined by a fear of particular situations in which the individual feels panicked, such as open areas, crowded areas, and places where rescue appears difficult. Post neurological ill patients are post-stroke, post-infectious autoimmune neurological disorders (Blackburn et. al. 2020), and postcentral and peripheral nervous disorders have agoraphobia which is need to be identified and need to be treated. The

Participants were included of both genders, Age group – 18-60 years, Participants who were diagnosed with agoraphobia by the severity measure of agoraphobia and who scores above 20. The participants who were excluded were participants who were not interested in the study, Pregnancy women, Asthma, Abuse of drugs or alcohol in the 4 weeks before enrolment, Patients with metal implants, malformation of the pinna, and all other disorders of the pinna or meatus.

The current treatments for agoraphobia are medications including Selective serotonin reuptake inhibitors and Benzodiazepines. The other treatments are psychotherapy and CBT (Adwas et.al. 2019). But these Non-invasive transcutaneous auricular vagus nerve stimulation devices, which do not require surgical implantation and are applied using external appliances such as clip electrodes, have become popular in recent years and Jacobson relaxation techniques have played a major role in reducing agoraphobia for post neurological ill-patients.

The purpose of this study was to examine the effects of a Non-invasive transcutaneous auricular Vagal nerve stimulation and Jacobson relaxation technique on reducing agoraphobia among Post neurological ill-population. The study utilized a randomized controlled trial design with 40 participants assigned to either a treatment group that received the Non-invasive transcutaneous auricular Vagal nerve stimulation and Jacobson relaxation technique or a control group that received only the Jacobson relaxation technique. The Intervention group A received the Transcutaneous auricular vagal nerve stimulation for 20 minutes (30S ON and 3 minutes OFF) and the Jacobson relaxation technique for 20 minutes, 4 days/week, and a single session per day for a duration of 4 weeks and the Pre and Post-test values of Group A obtained using SMA shown in Table 1.

**Table 1** Pre and Post-test values of Group A obtained using SMA, indicating the improvement in reducing agoraphobia.

Parametrics	mean	SD	t value	P value
Pre-test	25	18.25	210	< 0.001
Post-test	18	26		

Group A (the intervention group) has more improvement in reducing agoraphobia in patients with post neurological ill patients, revealing a t value of 210 (TABLE 1) whereas Group B (the control group), also showed a considerable improvement in reducing agoraphobia in patients with post neurological ill patients, revealing a t value of 10.925 (TABLE 2).

**Table 2** Pre and Post-test measurements of Group B obtained using SMA, indicating the improvement in reducing agoraphobia.

Parametrics	mean	SD	t value	P value
Pre-test	26.5	4.38	10.925	<0.001
Post-test	24.8	4.40		

The clip electrode was placed in the left ear (Cymba Concha) with a pulse frequency of 25 Hz, Amplitude: of 0.1-10 mA, and Pulse width: of 250µs along with the Jacobson relaxation technique for 20 minutes, and the control group received only the Jacobson relaxation technique for the duration of 20 minutes, 4 days/week and single session per day for a duration of four weeks (Hasan A et.al. 2015) and the Pre and Post-test measurements of Group B obtained using SMA shown in Table 2. The Post-test measurements of both Group A and B obtained using SMA are shown in Table 3.

Though both groups showed an improvement, there was a more significant effect of Transcutaneous auricular vagal nerve stimulation and Jacobson relaxation technique than the conventional therapy within the 4 weeks protocol among post neurological ill-patients. The Obtained post-test values were analyzed using paired and unpaired t-tests, revealing a statistical significance of <0.001 (TABLE 3).

**Table 3** Post-test measurements of both Group A and B obtained using SMA, indicating the improvement in reducing agoraphobia.

Post-test	mean	sd	t value	p value
Group a	18	3.08	-5.6	<0.001
Group b	24.8	4.4		

While giving non-invasive transcutaneous vagal nerve stimulation to patients with post neurological ill patients we had a great

experience that we can see the good results in getting treatment in the experimental group whereas the control group has a slight improvement when compared with the experimental group. The experience that we would like to share is the study was explained to the participants and written informed consent was obtained from all the subjects before the initiation of the procedure. The pre-test measures of the severity measure of agoraphobia (SMA) were assessed. The same test was measured after 4 weeks of treatment as post-test values. The study was statistically analyzed with a p-value which is < 0.001. The results showed that the Non-invasive transcutaneous auricular Vagal nerve stimulation and Jacobson relaxation technique had a positive impact on reducing agoraphobia among Post neurological ill population.

I believe that this study will make a valuable contribution to the literature on Post neurological ill disease and Vagal nerve stimulation to treatment. The findings have significant implications for healthcare professionals working with Post neurological ill-population, and could potentially lead to the development of more comprehensive treatment strategies for this population.

**Comments for reviewers:** None

**Ethical Considerations:** Does this study include human subjects? YES

Authors confirmed the compliance with all relevant ethical regulations.

**Conflict of interest:** No conflict of interest

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## Reference

- 1 Adwas AA, Jbireal JM & Azab AE. Anxiety: Insights into signs, symptoms, etiology, pathophysiology, and treatment. *East African Scholars J Med Sci* 2019;2:580-91.
- 2 Blackburn KM & Wang C. Post-infectious neurological disorders. *Therapeutic advances in neurological disorders* 2020; 13: <https://doi.org/10.1177/1756286420952901>
- 3 Hasan A, Wolff-Menzler C, Pfeiffer S, Falkai P, Weidinger E, Jobst A et al. Transcutaneous noninvasive vagus nerve stimulation (tVNS) in the treatment of schizophrenia: a bicentric randomized controlled pilot study. *Eur Arch Psychiatry Neurosci* 2015;265:589-600.
- 4 Manjunatha N, Jayasankar P, Suhas S, Rao GN, Gopalkrishna G, Varghese M et al. Prevalence and its correlates of anxiety disorders from India's National Mental Health Survey 2016. *Indian J Psychiatry* 2022;64:138-42.
- 5 McCabe L, Cairney J, Veldhuizen S, Herrmann N, Streiner DL. Prevalence and correlates of agoraphobia in older adults. *Am J Geriatr Psychiatry* 2006;14:515-22.
- 6 Wittchen HU, Nocon A, Beesdo K, Pine DS, Höfler M, Lieb R, Gloster AT. Agoraphobia and panic. *Psychother Psychosom* 2008;77:147-57.