

Role of Pranayama and Meditation in Anxiety and Depression Management

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Abstract: Millions of people worldwide suffer from common mental health conditions like anxiety and sadness. Even while traditional therapies like medicine and counselling work, many people look for supplementary methods to improve their mental health. With roots in traditional Indian traditions, pranayama (yogic breathing) and meditation have demonstrated encouraging outcomes in the treatment of anxiety and depression. Pranayama promotes relaxation and lowers tension by assisting in nervous system regulation. Meditation promotes emotional equilibrium, lessens negative thought patterns, and increases self-awareness. When combined, these techniques can enhance mood, reduce cortisol levels, and promote mental wellness in general. They provide helpful assistance in efficiently managing anxiety and depression since they are accessible and non-invasive. **Objective:** the function of meditation and pranayama in treating depression and anxiety, evaluate how well they work to lessen symptoms, and emphasize how they can be used in conjunction with other therapies. The goal of this research is to advance non-pharmacological, holistic methods of mental health treatment that raise quality of life and emotional well-being. **Material and methods:** For 90 Days, participants with depression and anxiety engaged in daily meditation and pranayama. Before and after the intervention, changes were measured using standardised instruments such as the Beck Depression Inventory and Hamilton Anxiety Rating Scale. To assess the efficacy of these methods, results were contrasted with those of a control group. **Result:** Participants in the study who practiced pranayama and meditation reported significantly lower levels of anxiety and depression. The intervention group reported better emotional stability, lower stress levels, and greater general well-being in comparison to the control group. These results provide credence to pranayama and meditation as useful adjunctive therapies for depression and anxiety. **Conclusion:** According to the study's findings, frequent pranayama and meditation practice considerably lessens depressive and anxious symptoms. These methods support mental balance and emotional well-being by providing a secure, affordable, and easily available alternative to traditional therapies. They can improve general mental health and quality of life when incorporated into regular activities.

Keywords: Pranayama, Meditation, Anxiety, Depression, BDI scores, HAM-A scores Yoga..

INTRODUCTION

The science of pranayama is precise. It is Ashtanga Yoga's fourth anga, or limb. "Pranayamah Tasmin Sā Svāsa prasvasayorga vicchedah"—The cessation of inhalation and exhalation is known as breath regulation or Prana control. This comes after maintaining that seat or posture stability, or Asana. In Chapter II-49 of the Patanjali Yoga Sutras, Pranayama is defined as follows. "Prasvasa" refers to expiratory breath, and "Svasa" refers to inspiratory breath. Prana, the life energy, manifests externally as breath. Prana, breath like electricity is disgusting. Breath is disgusting, Sthula. Subtle, Prana is Sukshma. You may regulate the subtle Prana inside by practicing control of this breathing. Mind control is equivalent to Prana control. Without Prana's assistance, the mind cannot function. Prana's vibrations alone cause thoughts to arise in the mind. The mind is moved by Prana. Prana is the one who puts the mind in motion. The Sukshma Prana, also known as the Psychic Prana, is inextricably linked to the mind. This breath is a representation of an engine's crucial flywheel. When the Yogi stops breathing, other organs stop functioning,

much as the other wheels stop when the driver stops the flywheel. You can easily manage the other wheels if you can control the flywheel. Similarly, you can easily regulate the inner life energy, Prana, if you can control the exterior breath. Pranayama is the method by which the external breath is regulated to control the Prana.

The Yogic learner eliminates the impairs of the body and the Indiya's by blowing his lungs, or by practicing Pranayama, in the same way as a goldsmith removes the impairs of gold by heating it in a hot furnace and blowing hard through a blowpipe. The main goal of Pranayama is to bring the Prana and the Apana together and gradually guide the combined Pran Apana towards the direction of the head. Pranayama's result is Udghata, or the waking of the dormant Kundalini.

Diaphragmatic breathing: There are a lot of people in our culture who don't breathe well. The diaphragm, the membrane separating the lungs from the visceral cavity, should be the first thing one does in order to breathe correctly. The diaphragm descends when we inhale when

we breathe normally. The diaphragm's downward motion somewhat pulls the abdomen out. You are not breathing diaphragmatically if your belly does not swell with each inhalation.

Although diaphragmatic breathing is not used in all yoga breathing exercises, it is recommended for those who breathe naturally while engaging in daily activities.

Diaphragmatic breathing, sometimes referred to as slow, smooth, belly breathing, is a potent stress-reduction method. According to studies, just practicing proper breathing techniques may have a profound impact on your entire body. The heart rate slows, blood pressure drops, muscles relax, anxiety subsides, and the mind settles as air is brought down into the lower part of the lungs, where oxygen exchange is most effective. Breathing diaphragmatically creates a natural release of stress. As your diaphragm activates the vagus nerve, your heartbeat will naturally slow down. Additionally, your circulation will get better overall.

A baby's breathing is the best example of natural breathing as their tummy rises and falls with each breath. Babies appear to breathe with their entire body, as though each component moves in tandem with the breath. By resting on their backs and seeing the natural rise and fall of their belly with the breath, your pupils may learn to watch their own diaphragmatic breathing.

Breathing Anatomy and Physiology:

The respiratory system's main goals are to: 1) Offer a channel for gas exchange between the body and the outside world. A person's respiratory system gives them the ability to replenish oxygen in their blood and eliminate carbon dioxide (Figure 1). 2) Assist in preserving the blood's acid-base equilibrium (pH).

The cardiovascular and respiratory systems work together and are interconnected. The respiratory system removes carbon dioxide from the lungs and delivers oxygen to them.

The circulatory system transports carbon dioxide back to the lungs for expiration and distributes oxygen to the cells and tissues.

The respiratory system has a robust defence mechanism that cleans, warms, and lubricates the air before it reaches the lung tissue as a result of its interaction with the outside world.

The following are among the respiratory organs:

1) The nose 2) Pharynx (the back of the throat that joins the respiratory system and nose) The voice box at the top of the trachea is called the larynx. 4) The cartilage-based trachea, which joins the throat and lungs. 5) Bronchial Tree (consisting of terminal bronchioles, bronchi, secondary bronchi, and

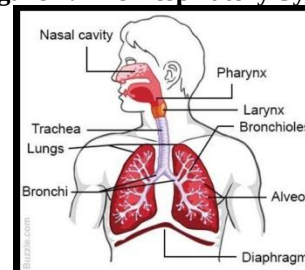
bronchioles) 6) Alveoli (between 150 and 300 million alveoli, which comprise 540 square feet of lung tissue surface area) 7) The lungs

Among the respiratory muscles are the following:

1) The diaphragm, a narrow, dome-shaped muscle that connects to the lumbar vertebrae and lower ribs and divides the abdominal and chest cavities, as well as the respiratory and digestive systems. The central tendon, costal part, and crural portion make up the diaphragm. It is the sole skeletal muscle deemed necessary for life and the most significant muscle of inspiration. 2) The ribs are raised outward and the contents of the abdomen are forced forward and downward as the diaphragm contracts. The result is a decrease in intrapleural pressure, which leads to the expansion of the lungs. Airflow into the lungs is made possible by the decrease in intrapulmonary pressure below atmospheric caused by this lung expansion.

The diaphragm muscle depends on the contraction and expansion of the abdominal muscles. When you exhale, your abdominal muscles, such as the rectus abdominus and the internal oblique, contract. The diaphragm is pushed higher and the ribs are drawn lower as these muscles flex. As a result, expiration (exhalation) takes place and intrapulmonary pressure rises. 3) Intercostal muscles, which allow the chest cavity to expand laterally and vertically, are located between the ribs. 4) Sternocleidomastoids (which raise the rib cage and reach from the top of the sternum and collar bones to the base of the head behind the ears) 5) The long back muscles called erector spinae support the spine and provide flexibility in the front of the body.

Figure 1: The Respiratory System



METHODOLOGY:

Methods: Using the quota sampling technique, a sample of 20 patients from Uttarakhand, India, ages 20 to 50, was chosen. Each participant was split evenly between the experimental and control groups. While the control group did not receive any intervention, the experimental group frequently engaged in pranayama and meditation. Both before and after the session, psychological evaluations were carried out.

Study Setting: Twenty patients from Uttarakhand, India, ranging in age from 20 to 50, were chosen for the study using a quota sampling technique. Participants were divided into two equal groups at random: control (n

= 10) and experimental (n = 10). While the control group got no intervention during the study period, the experimental group received a structured intervention that included frequent pranayama and meditation practice. Psychological assessments were performed on all participants at baseline (pre-test) and following the intervention period (post-test) in order to gauge the effectiveness of the intervention.

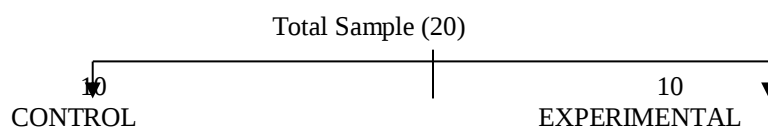
Study participants: A total of 20 participants were recruited from Uttarakhand, India, using the quota sampling technique. Eligible participants were between the ages of 20 and 50 years. After recruitment, they were equally divided into two groups: the experimental group (n = 10) and the control group (n = 10). Participants in the experimental group engaged in regular sessions of pranayama and meditation, while those in the control group did not receive any intervention during the study period. All participants underwent psychological assessments at baseline and post-intervention to evaluate changes resulting from the intervention.

Sample size and sampling technique: Twenty individuals in all, aged between twenty and fifty, were chosen from Uttarakhand, India, for the study. Because the study was intended to be a small-scale exploratory trial, the sample size was determined by the practicality and availability of participants during the study period. Participants were chosen using a quota sampling technique, which guaranteed representation within the specified age range. Participants were split into two equal groups after recruitment: The experimental group

(n = 10) received a regular intervention that included meditation and pranayama exercises. No intervention was given to the control group (n = 10) during the research period. Standardised psychological instruments, specifically the Hamilton Anxiety Rating Scale (HAM-A) for assessing anxiety and the Beck Depression Inventory (BDI) for measuring depression, were used to evaluate participants both before and after the intervention in order to gauge its efficacy.

Study Tolls and operational definitions: The Beck Depression Inventory (BDI) is a popular 21-item self-report tool used to gauge depression severity. A 4-point (0–3) scale is used to rate each item; higher scores correspond to higher levels of depression symptoms. The 14-item Hamilton Anxiety Rating Scale (HAM-A), which is administered by clinicians, evaluates both psychological and physical symptoms of anxiety. A 5-point rating system (0–4) is used for each item, and higher scores indicate more severe anxiety. Pranayama: For the purposes of this study, pranayama is the regular, supervised practice of particular controlled breathing methods intended to regulate psychological and physiological conditions. Meditation is a disciplined practice of mindfulness and focused attention that is done in a calm setting with the aim of improving emotional balance and relaxation. Participants in the experimental group were given pranayama and meditation as an intervention during the study period. Participants in the control group carried on with their regular daily routines without receiving any kind of intervention.

Data Analysis: Descriptive and inferential statistics were used to code, tabulate, and analyse the gathered data. The participants' demographic and baseline information were compiled using descriptive statistics, such as mean, standard deviation, and percentage. To determine whether the intervention was successful: Pre-test and post-test results for anxiety (HAM-A scores) and depression (BDI scores) were compared within each group (experimental and control) using the paired t-test. Following the intervention, the mean differences between the experimental and control groups were compared using an independent t-test. P-values less than 0.05 were regarded as statistically significant.



Yogic Intervention for the Present Study-
Time Duration for Yogic Practice- 90 Day (45) Min

Table 1: Yogic Intervention

Activity	Time Duration
Nadi shodhana pranayama	5min
Ujjayi Pranayama	2.5 min
Shitali pranayama	2.5min
Bhramari pranayama	5min
Sthula meditation	10 min
Jyotir meditation	10min

Sukshma meditation	10 min
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Table 3: Pre-test & Post-test Scores (HAM-A & BDI)
Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Control	54.0000	10	16.87865	5.33750
Experimental	45.9000	10	.99443	.31447

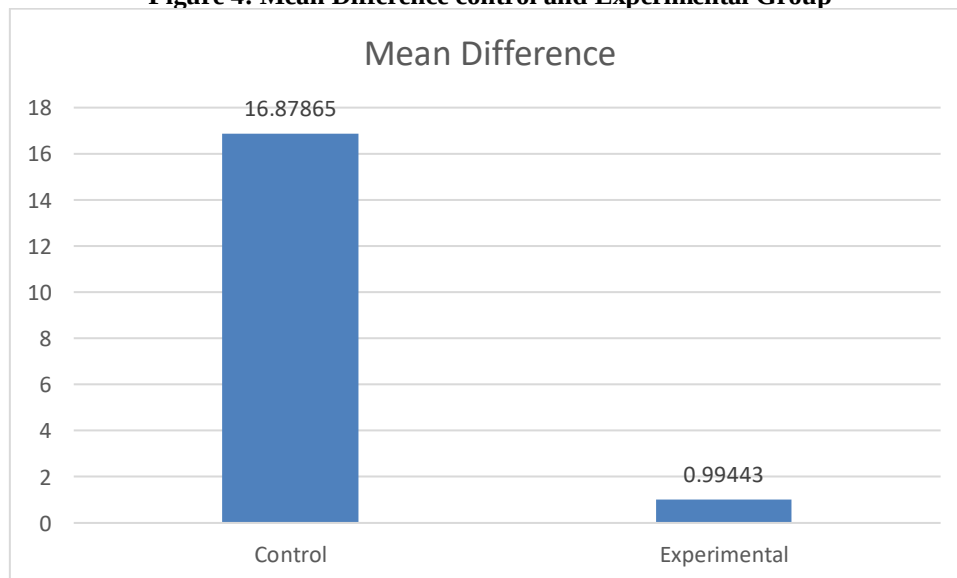
Paired Samples Correlations

	N	Correlation	Sig.
Control & Experimental	10	.291	.414

Paired Samples Test

	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Control & Experimental	8.10000	16.61626	5.25452	3.78655	19.98655		1.542	9	.158

Figure 4: Mean Difference control and Experimental Group



Nadi Shodhana: Frequent Nadi Shodhana pranayama practice dramatically lowered anxiety and despair levels. Better focus, emotional stability, and serenity were reported by the participants. Reduced stress response and regulated autonomic function were among the physiological advantages. All things considered, the technique worked effectively as a straightforward, non-pharmacological method of improving mental health and lowering psychological discomfort.

ujjayi pranayama: Practicing ujjayi pranayama increased emotional stability, decreased anxiety, and promoted relaxation. Participants reported less stress, improved respiratory control, and improved focus. It decreased blood pressure and heart rate by encouraging parasympathetic activity. Overall, it worked effectively for managing anxiety and sadness by promoting mental health and calming the mind.

Shitali pranayama: Shitali pranayama greatly reduced tension, irritation, and emotional restlessness by demonstrating cooling and soothing effects. Participants reported feeling happier, more relaxed, and having more mental clarity. Benefits

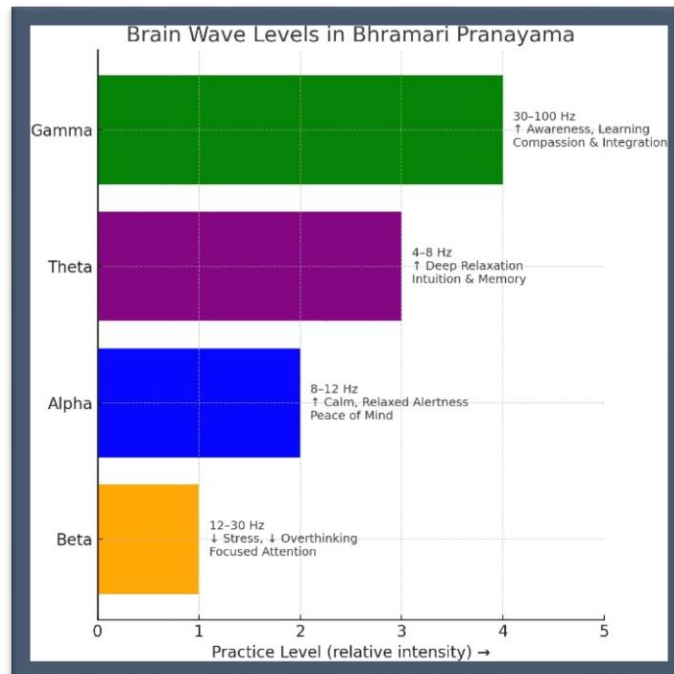
to the body's physiology included a drop in blood pressure, body temperature, and sympathetic hyperactivity. It supported the successful management of anxiety and depression by acting as a natural tranquilizer.

Bhramari Pranayama: The Humming Bee Breath is another name for the yogic breathing practice known as Bhramari Pranayama. Because one makes a humming sound throughout the exercise that sounds like a black bee, it gets its name from the Sanskrit word "Bhramari," which means bee (Tebal 2). Take a comfortable seat on a chair with your back straight or in Padmasana or Sukhasana. Shut your eyes and let your entire body relax. Gently press your index fingers against the cartilage of your ears. Alternatively, close your eyes, ears, nose, and lips with your fingers to do the Shanmukhi Mudra (Figure 2). Take a deep breath through your nose. Make a bee-like deep humming sound ("Mmmm...") while you gently exhale. Feel the tremors throughout your face, chest, and head. Do 5–7 rounds again.

Tebal 2: Bhramari Pranayama Frequency

Level	Frequency Range	During Bhramari
Theta	4-8 Hz	increases
Alpha	8-12 Hz	increases
Beta	12-30Hz	Decreases
Gamma	30-100 Hz	Increases

Figure 2: Brain wave levels in Bhramari Pranayama



Meditation: The practice of meditation involves training one's attention and awareness while distancing oneself from reflexive, "discursive thinking" in order to achieve a state of mental clarity, emotional stability, and calmness without passing judgement on the meditation itself. self the two main categories of techniques are open monitoring methods and concentrated (or concentrative) methods. Open monitoring incorporates mindfulness and awareness of mental occurrences, whereas focused approaches concentrate on certain things, such as breath or mantras. Many religious traditions practice meditation, however because of its health advantages; meditation is also practiced without of any religious or spiritual influences. The Upanishads include the first mentions of meditation (dhyana), and meditation is a key component of Buddhism, Hinduism, and Jainism's contemplative practices. Similar methods to meditation are also used in Judaism, Christianity, and Islam as a way to remember, pray, and show devotion to God. Asian meditation practices have been adopted by various civilisations and used in non-spiritual fields including commerce and medicine. In addition to improving tranquilly, perception, self-concept, and well-being, meditation may dramatically lower tension, fear, anxiety, sadness, and pain. To learn more about how meditation affects mental, neurological, cardiovascular, and other aspects of health, research is still being conducted.

The key that unlocks that for us is meditation. All kinds of devotion, including prayers and rituals, are only early stages of meditation. You offer something, you pray. There was a belief that everything improved one's spiritual

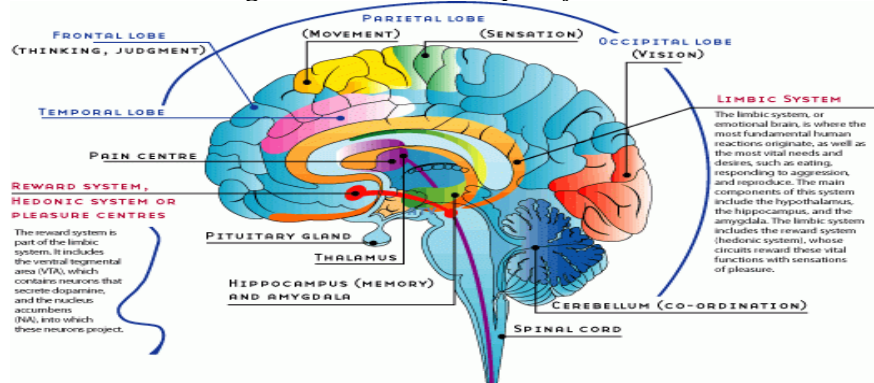
strength. That attitude is always there in the human spirit and nowhere else, but it is brought to the mind by the employment of certain phrases, flowers, symbols, temples, and rituals like the waving of lights. Everyone is doing it, but what they do unknowingly is done with knowledge. That is meditation's power.

Those of you who can afford it might be better off setting apart space just for this activity. That room has to be kept sacred, so don't sleep there. You must take a bath and be completely clean both mentally and physically before you may enter the chamber.

The finest settings for a Yogi are flowers and beautiful photos, therefore always place flowers in that room. In the morning and evening, burn incense. Avoid arguments, rage, and impure thoughts in that space. Only those who share your beliefs should be let entry (Figure 3).

Eventually, a sense of sanctity will permeate the space, bringing you peace just by moving into it whether you're feeling down, unhappy, uncertain, or mentally agitated. This was the concept behind the temple and the church, and while it is still there in some of them, the notion itself has vanished from most of them. By maintaining holy vibrations there, the location is supposed to become and stay illuminated. People who are unable to pay for a dedicated space can practise anywhere they like. (CW 1. 145) One of the best ways to manage these waves' ascent is through meditation. Through meditation, you may train your mind to suppress these waves. If you continue to meditate for days, months, or years, until it becomes second nature, rage and hatred will be managed and restrained.

Figure 3: meditation frequency in brain



Gheranda said: There are three types of Dhyana, or content plation: bright, subtle, and gross. It is Sthula, or gross contemplation, to think on a specific person, like one's Guru or Deity. Jyotis's contemplation is the process of thinking of Brahma or Prakriti as a mass of light. It is Sukshma, or subtle thought, when Brahma is seen as a Bindu (point) and Kundali energy

Sthula dhyana: Let him think (with his eyes closed) that there is a sea of nectar in his heart and that there is an island of precious stones in the middle of that sea, the very sand of which is crushed rubies and diamonds. That there are Kadamba trees with delicious blossoms on both sides of it; that these trees act as a rampart next to them. A row of blooming trees, including padmas, mallika, jati, kesara, champaka, parijata, and malati, are there, and their scent permeates the entire area every quarter. Let the Yogi imagine that a lovely Kalpa tree, with four branches that symbolise the four Vedas, is standing in the centre of this garden, surrounded by flowers and fruit. There, cuckoos are singing and insects are humming. Let him visualise, as his Guru instructed him, a wealthy platform of priceless diamonds beneath that tree, a pricey throne set with jewels, and his specific Deity sitting on that throne.

Let him think about that Deity's proper shape, adornment, and mode of transportation. Sthula Dhyana is the continuous contemplation of such a shape.

Jyotir dhyana: Gheranda said: "Listen to the contemplation of Light, which is how the Yogi achieves success and bees himself. I have told thee the Sthula Dhyana."

Kundalini, who takes the shape of a snake, is present in the Muladhara. Like a lamp's flame, the Jivatma is present. Think of this blaze as the Brahma of Light. This is the Jyotir or Tejo Dhyana.

Sukshmadhyana: Oh Chanda! After hearing the Tejo Dhyana, turn your attention to the Sukshma Dhyana. When the kundali is awoken by great luck, it merges with the Atma and departs the body through the two eyes' portals, enjoying itself while strolling down the royal road (Astral Light). Because of its subtlety and extreme changeability, it is invisible. However, the Yogi achieves this feat by engaging in Sambhavi Mudra, which involves staring straight ahead without blinking. He will then see his Sukshma Sartra.

This is known as Sakshma Dhyana, and even the Devas find it difficult to achieve since it is so mysterious.

DISSECTION

The results of this study unequivocally show that pranayama and meditation have a beneficial and therapeutic effect on participants' levels of anxiety and despair. There is a notable difference in the psychological results between the experimental and control groups, according to the statistical data. The mean score of 16.87865, which indicates somewhat greater levels of anxiety and depressive symptoms, was found in the control group(Table 3). On the other hand, the experimental group's mean score was 0.99443, which indicates a much lower degree of discomfort. This significant difference clearly implies that meditation and pranayama were essential in helping the subjects with their mental health issues. According to the data analysis, the much higher scores of the control group—those who did not engage in pranayama or meditation—indicate that they still had elevated anxiety and depressed tendencies. Conversely, the experimental group had a significant decrease in anxiety and depression after regularly practicing yoga breathing exercises and meditation. The difference between the two groups demonstrates how well these age-old yogic techniques work as contemporary therapeutic instruments for managing mental health.

CONCLUSION

In order to lower stress hormones and promote relaxation, pranayama regulates the autonomic nerve system, decreases sympathetic activity, and increases parasympathetic dominance. By promoting awareness, enhancing attention, and relaxing the mind, meditation enhances this impact by lowering negative thinking patterns and rumination. When combined, these methods provide a condition of resilience, emotional equilibrium, and mental clarity. Crucially, the findings also validate meditation and pranayama as durable and approachable methods of mental health treatment. They are non-invasive, side-effect-free, and appropriate for people of all ages, in contrast to pharmaceutical therapies. They improve quality of life, inner serenity, and general well-being in addition to lowering anxiety and depression.

The study offers strong proof that regular meditation and pranayama practice may greatly reduce anxiety and sadness. The significant distinction between the experimental and control groups supports their use as effective, all-encompassing strategies for treating psychological discomfort. By providing safe, affordable, and long-lasting advantages for both patients and society, their incorporation into daily activities, educational settings, and therapeutic programs has the potential to revolutionise mental health treatment.

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