

Sound Frequency of Chanting Om and Gayatri Mantra for the Treatment of Mental Health

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Abstract: This document explores the impact of chanting OM and the Gayatri Mantra on mental health, focusing on how sound frequencies produced by these mantras can be used as therapeutic tools. Mental health, an essential aspect of overall well-being, is increasingly challenged by the modern world's fast-paced lifestyle, leading to heightened levels of stress, anxiety, and depression. Meditation, specifically mantra-based practices, has gained recognition as a non-pharmacological method for addressing these mental health issues. The ancient practice of mantra meditation, through repetitive chanting, generates specific sound frequencies that resonate with the body's energy systems and neural pathways, bringing about psycho-physiological changes. ॐ (OM), often referred to as the universal sound, vibrates at a frequency of 432 Hz and is known for its calming and harmonizing effects on the mind and body. Similarly, the Gayatri Mantra, with a vibrational frequency of 110,000 Hz, invokes divine energy that fosters mental clarity and emotional stability. This document reviews scientific studies and traditional perspectives, highlighting how these practices improve brainwave patterns, stimulate the vagus nerve, and reduce symptoms of anxiety, depression, and stress. By synchronizing brain hemispheres and enhancing oxygen flow to the brain, chanting these mantras can also contribute to better focus, memory, and cognitive function. The therapeutic use of sound frequencies for mental health is a promising area of holistic wellness, merging ancient wisdom with modern scientific research.

Keyword: Meditation, ॐ(OM), Gayatri Mantra, Stress, Anxiety, Sound, Frequency.

INTRODUCTION

A sound mental condition is a crucial element of comprehensive well-being. According to World Health Organization, health is defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." Mental wellness encompasses surpassing just the lack of cognitive illnesses and physical and mental challenges. This represents a condition of overall wellness where a person recognizes their potential,

manages daily life stresses effectively, engages in productive work, and makes meaningful contributions to the community. Good mental health is essential for a fulfilling life. In today's world, mental health issues are significant, representing approximately 15 percent of the global disease burden. Approximately one for every eight individuals globally experiences mental health disorders, with anxiety and depressive disorders being the most prevalent among these conditions. (Kesar 2023) Impaired mental health heightens the likelihood of developing various other conditions, such as sleep disorders, diabetes, and cardiovascular issues, while ongoing medical conditions can also exacerbate mental health disorders. (Antarip Kundu 2024)

Anxiety can be characterized as a perceived threat to one's self-esteem, arising from the uncertainty surrounding ambiguous stimuli. (Sang Ayu Ketut Chandrawati 2018) Anxiety and depressive disorders rank as the most prevalent mental health issues among both men and women. The rise in the number of individuals affected by major depressive disorder has surged from 193 million to 246 million, while those experiencing anxiety disorders have risen from 298 million to 374 million, presenting a significant challenge to mental health globally. (Antarip Kundu 2024)

The prevalence of stress has reached unprecedented levels owing to the quick tempo and ever-changing nature of contemporary life. Various factors contribute to stress, including challenges in managing work demands, economic uncertainties, and familial conflicts. These stressors can result in negative emotional states such as anxiety, fear, anger, or depression. Over time, persistent stress can have detrimental effects on both cardiovascular and cognitive health. (Tseng. 2022) Psychological distress, as defined by the Diagnostic and Statistical Manual of Mental Disorders, encompasses a wide array of non-specific mental health symptoms. These

symptoms may include anxiety, depression, difficulties in functioning, confusion, and various behavioral issues. Additionally, it is characterized by emotional pain that manifests through feelings of depression, anxiety, and physical discomfort. (Shradhanjali Tripathi and Santosh Vishvakarma 2024)

What is Meditation:

Meditation is an age-old practice that has been embraced for millennia by various cultures and religions around the globe. (Nitesh Sharma 2024) Meditation serves as a method for calming the mind and reaching a heightened state of awareness. It represents a transcendent level of consciousness. This practice involves concentrating or gently attending to a thought, sound, object, visualization, or breath, with the aim of fostering self-awareness in the current moment, alleviating stress, encouraging relaxation, and facilitating both personal and spiritual development. (Dudeja 2017)

Meditation practices have demonstrated positive effects on cognitive abilities and the enhancement of an individual's mental well-being. Meditation can be divided into two primary categories: open-minded meditation and concentrative meditation. Open-minded meditation, which includes techniques such as Zen, Vipassana, and mindfulness, emphasizes awareness of the ongoing flow of images, thoughts, emotions, feelings, and sensations without attachment to them. In contrast, concentrative meditation, such as mantra meditation or Transcendental Meditation (TM), centers on a specific sound, phrase, or word to foster deeper awareness. (Sharma. n.d.)

A Range of Meditation Techniques:

- a) The realm of Hindu Meditation includes a variety of practices such as Mantra Meditation, which is the primary focus of this paper, alongside Transcendental Meditation, Third Eye Meditation, Chakra Meditation, Gazing Meditation (Trataka), Kriya Yoga, Sound Meditation (Nada Yoga), Tantra, Pranayama, Sahaj Yoga, Raj Yoga, Kundalini Meditation, and Self-Enquiry or "I Am" Meditation.
- b) Buddhist Meditation includes techniques like Zen Meditation (Zazen), Vipassana Meditation, Mindful Meditation, and Metta Meditation, which emphasizes Love and Kindness.

- c) Jain Meditation features practices such as Preksha Meditation, Leshya Meditation, Kayotsarga Meditation, Pindasthana Meditation, Padasthana Meditation, Rupastha Meditation, Rupatita Meditation, and Savirya Meditation.
- d) In Sikhism, meditation is practiced through Nam Japa or Nam Simran.
- e) Parsi Meditation in Zoroastrianism includes meditation as described in the Gathaa, meditation on Fire, and Prayer Meditation.
- f) Christian Meditation is also a significant practice, while Chinese Meditation comprises Taoist (Emptiness) Meditation, Taoist (Breathing) Meditation, Taoist (Neiguan) Meditation, and Qigong (Chi Kung).
- g) Guided Meditation encompasses various methods such as Traditional Meditation, Guided Imagery, Relaxation and Body Scans, Affirmations, and Binaural Beats. (Dudeja 2017)

What is Mantra-Meditation:

Mantra meditation is a type of concentrative meditation that involves the repetitive chanting of specific sounds, referred to as mantras, to cultivate inner tranquility and enhance spiritual consciousness. (Nitesh Sharma 2024) Mantra is a term derived from the ancient Sanskrit language, where 'man' stands for mind and 'tra' indicates release. Thus, a mantra comprises transcendental sounds that are intended to liberate the mind from the anxieties of a materialistic life. (Dudeja 2017) The practice of mantra meditation focuses on soothing the mind employing particular words or phrases referred to as mantras. In Sanskrit, the definition of mantra is "Mananāt trāyatē iti mantrah," which translates to the idea that the persistent recitation of a mantra can free one from the pains associated with ignorance and the cycles of reincarnation. (Sharma. n.d.) Individuals have used the mantra as a powerful tool for an extended period to promote optimal mental health through a holistic and spiritually enriching approach. It influences multiple aspects of life, including the body, mind, and soul. (Kesar 2023)

The practice of chanting mantras involves repetition to foster inner awareness, and their significance lies in their sonic power, which brings about psycho-physiological transformations that can lead to transcendental experiences. (Sharma. n.d.) Individuals have utilized meditation for its various health advantages, including reducing anxiety, managing pain, alleviating depression, relieving stress, and addressing insomnia. Numerous scientific

investigations have provided supporting evidence that mindfulness meditation should be considered a non-pharmacological approach to enhance both mental and physical health in the general population. The evidence outlined focuses on four critical health domains stress, anxiety, hypertension, and immunity highlighting the diverse and nuanced health benefits associated with the practice of mindfulness meditation. (Tseng. 2022) Prior research indicates that meditation practices can lead to notable small-to-moderate improvements in alleviating anxiety, depression, stress, post-traumatic stress disorder, and the overall quality of life related to mental health. (Antarip Kundu 2024) Mantras can be recited in a variety of ways, including silently, softly, or with volume, utilizing either active or passive breathing techniques. (Tseng. 2022) The mantra serves to convert into potential energy. It can even consist of a nonsensical sound, where the frequency facilitates the user's elevation to a higher state of consciousness. (Dudeja 2017)

MEDITATION UTILIZING MANTRAS

Mantra meditation involves calming and concentrating the mind by using a sound, word, or phrase known as a 'mantra,' which can be recited either aloud or in silence. This practice aims to foster spiritual development and promote mental relaxation. Often referred to as 'japa' meditation, a term derived from the Sanskrit word for "muttering," it allows practitioners to reach a state of "restful alertness." Everything in existence vibrates, and maintaining a natural, harmonious vibration is essential for good health. When any part of the body vibrates at an incorrect frequency, energy can become stagnant, leading to illness. Through the practice of 'mantric' chanting, individuals can release this trapped energy, restoring their natural resonance and facilitating healing. Research indicates that chanting specific mantras can lead to synchronization between the left and right hemispheres of the brain. This practice not only enhances oxygen flow to the brain but also contributes to a decrease in heart rate and blood pressure, fostering a state of calm brainwave activity. There is a significant reason why vocalization is prevalent in prayer and meditation across cultures: sound amplifies our intentions. By utilizing positive, intentional sound, we can unlock remarkable effects. Each sound we produce consists of a fundamental frequency along with its geometric multiples, known as harmonics or overtones. These harmonics, represented by whole number ratios such as 1:1, 2:1,

and 3:2, contribute to the 'timbre' or the tonal quality of our voices, shaping their unique characteristics. This realm is filled with potential, allowing us to forge new neural connections in the brain through vocal harmonics. Additionally, harmonics can enhance our vocal quality, improve our auditory perception, alter our brain patterns, and elevate our consciousness. (Dudeja 2017)

DIFFERENT FORMS OF SOUNDS EMPLOYED IN MANTRA MEDITATION

During mantra meditation, individuals use a vast array of significant and insignificant sounds. Some of these sounds may be universal or shared among all practitioners.

❶ THE OM MANTRA:



(Figure 1: OM)

The OM Mantra is not simply a construct of human culture or specific groups; it represents profound truths that are inherently present. The components of gross (A), subtle (U), and causal (M) correspond to the states of waking (A), dreaming (U), and deep sleep (M), which exist independently of the symbolic representation found in the AUM Mantra. Even when the OM Mantra is recited without any particular significance, the experience can still be enjoyable, soothing, and harmonizing. (Ajay Anil Gurjar 2009) Om is regarded as a sacred syllable or "mantra," perceived as a universal sound and the essence of all words, transcending specific religious or divine affiliations. Pronounced as AUM, OM consists of the three consonants: A, U, and M. It embodies the continuum of time past, present, and future representing the cycles of creation, preservation, and dissolution within the universe. Ancient Indian texts highlight OM as the most potent of all mantras, known for its positive and beneficial impacts on individuals. It is viewed as a primordial cosmic sound, encompassing all sounds and alleviating psychological burdens and worldly distractions. The practice of chanting OM serves as a meditative technique, allowing for mental focus through either silent contemplation or vocal repetition. The audible

recitation of OM generates sound vibrations that resonate with specific areas of the body, yielding various physical and psychological advantages. This practice fosters an inward journey characterized by tranquility, pleasure, calmness, and balance. Regular chanting of OM is effective in reducing anxiety and depression, promoting relaxation that enhances both mental and physical well-being. (Ganagarajan Inbaraj 2022) OM or AUM is a revered term that has its roots in Hinduism, Buddhism, Jainism, Sikhism, and Zoroastrianism. Recognized as the most prominent mantra, it is often referred to as the pranava mantra, signifying the origin of all mantras. Additionally, it is regarded as a primordial sound, distinct from other mantras. The sound of AUM comprises three letters, each representing a unique and significant concept. The first letter, A, symbolizes the beginning; the middle letter, U, signifies growth; and the final letter, M, represents dissolution. Collectively, these letters embody the principles of creation, preservation, and resolution. (Kadri. 2024)

According to UPANISHADS, Om is both the name and symbol of the divine. It encompasses the entirety of human experience across three dimensions. The three letters A, U, and M form this sacred sound. The letter "A" signifies the physical realm, while "U" denotes mental and astral dimensions, which include the realm of intelligent beings and various heavens. The letter "M" corresponds to the profound state of deep sleep, a state that remains largely mysterious even during our waking hours. The Mandukya Upanishad elaborates on Om as the syllable that embodies the past, present, and future. The Svetasvatara Upanishad illustrates that Om resembles fire, which, although inherently contained within firewood, remains invisible until two sticks are rubbed together. Similarly, the self is akin to that fire; it becomes apparent through the continuous awareness of the sacred syllable Om. According to BHAGVAD GITA, The Bhagvad Gita presents Krishna's guidance to Arjuna on the eve of the monumental battle at Kurukshetra. Central to Krishna's teachings on spiritual life and practice is the concept of Om, which he articulates from the standpoint of the infinite being, detailing his principal manifestations and forms. Om represents the ultimate consciousness, signifying that there is nothing more significant or paramount than it. The assertion exemplifies that "a person who dedicates themselves to the practice of concentration, consistently reciting the syllable Om (the essence of Brahman or

consciousness), ultimately achieves the highest goal." (Sanjay Kumar 2010)

One can practice mantra meditation through four distinct techniques: vocal AUM chanting, soft mental chanting, listening to AUM chanting, and the processes of witnessing and merging. Additionally, the sound of AUM can be categorized into four stages: waking, dreaming, deep sleep, and turiya. Turiya signifies a refined state for the practitioner, representing transcendental meditation where the body is entirely at rest, while the mind remains fully aware. Furthermore, AUM can be chanted during various rituals, performances, sacraments, sacrifices, meditation sessions, and other worship activities. As a form of meditation, AUM chanting is often integrated into yoga and pranayama, or breathing exercises. Numerous studies indicate that the sound of AUM serves as a pathway to self-realization, impacting mental consciousness, spirituality, psychology, and overall health benefits. (Kadri. 2024)

The chant of Om resonates at a frequency of 432 Hz, a vibrational rate that permeates all aspects of nature. Consequently, AUM represents the fundamental sound of the universe, and by engaging in this chant, we symbolically and physically recognize our bond with nature and all living entities. When performed properly, chanting Om infuses the body with positivity, tranquility, and vitality. This practice can be viewed as an expression of collective consciousness. Regularly chanting Om can elevate your vibrational state and enhance your overall energy and frequency. (Srivastava. n.d.) The entire universe is in a state of constant motion and vibration nothing remains completely still. The sound "Om" is often regarded as the fundamental tone of the universe, representing the original sound of creation. Notably, astrophysicists have recently identified echoes from the "Big Bang," which occurred at the dawn of time. This detected sound resembles a hum, akin to the vibration of "Om." When chanted, the sound "Om" resonates at a frequency of 136.1 Hz, which aligns with the vibrational frequency present in all aspects of nature. Remarkably, this frequency also corresponds to the 32nd Octave of the Earth Year. (Dudeja 2017)

Research in the Sciences:

Scientific research utilizing measurable physical metrics began to grow in the 1990s as laboratories examined the impact of OM meditation on individuals. This exploration involved various

parameters, including Electroencephalography, Neuroimaging, evoked potentials, and additional techniques. These investigations have indicated that chanting OM may lead to a range of physiological changes, including heightened awareness, enhanced sensitivity to sensory input, improved concentration, decreased stress levels, and alterations in heart rate, blood pressure, and skin resistance. (Ganagarajan Inbaraj 2022)

Practice Approaches:

Swami Jnaneshvara Bharati suggests that body and mind exhibit numerous rhythms, both in their gross and subtle forms. The sound of OM can vary in its tempo, rising and falling at a pace that feels natural and comfortable. This can manifest as a rapid sequence, with several cycles occurring each second, or it may be slower, taking several seconds for each repetition of the OM Mantra. In some instances, the sound may extend to a very slow pace, with the prolonged mmmmmmm... resonating in the mind for extended durations, yet still maintaining a gentle pulse. This can be likened to various vibrations:

OMmmOMmmOMmm...

OMmmmmOMmmmmOMmmmm...

OMmmmmmmmmOMmmmmmmmmOMmm... (Ajay Anil Gurjar 2009)

There are several techniques for AUM chanting.

The first technique involves visualizing the sound of the AUM mantra internally, focusing solely on it within the mind without producing any audible sound. Simultaneously, allow the mantra to synchronize with your breath and engage in continuous chanting

Breath Out: "OMmmmmmmmm..."

Breath In: "OMmmmmmmmm..."

Breath Out: "OMmmmmmmmm..."

Breath In: "OMmmmmmmmm..."

Breath Out: "OMmmmmmmmm..."

Breath In: "OMmmmmmmmm..."

The second technique consists of alternating between chanting the mantra and periods of silence. It is recommended to visualize the OM mantra only during the exhalation to enhance comfort.

Breath Out: "OMmmmmmmmm..."

Breath In: "(silence)"

Breath Out: "OMmmmmmmmm..."

Breath In: "(silence)" (Kadri. 2024)

This synchronization greatly enhances the experience of meditation. Embrace the OM Mantra as it flows seamlessly with each breath in and out. Ensure there is no interruption, no gap, and no pause between inhaling and exhaling, or vice versa. The essence of the word OM encompasses the entirety of the universe as a unified whole, incorporating all levels of reality gross, subtle, and causal—both in their manifested and unmanifested forms. It signifies wholeness, as if it were a singular entity. (Ajay Anil Gurjar 2009)

The Oscillating Experience of OM:

The effective practice of chanting OM is linked to the sensation of vibrations around the vocal cords during sound production and in the ears during sound perception. It is anticipated that these vibratory sensations are conveyed through the laryngeal and auricular branches of the vagus nerve, which stimulates vagal centers. This stimulation leads to the deactivation of the limbic system (specifically the hypothalamic pituitary adrenal axis) and promotes modulation of the autonomic nervous system towards a parasympathetic state. These effects, akin to those observed with vagus nerve stimulation, may influence neurotransmitter levels and electrical signals, thereby modulating the activity of brain centers associated with the traditional fight, flight, or freeze responses, shifting the balance in favor of rest and digestion. The findings of this study also indicate an enhancement in vagal nerve function, as evidenced by an increase in high-frequency power. (Ganagarajan Inbaraj 2022)

The Frequency of Breaths Taken While Chanting OM:

The human body exhibits numerous physiological processes that are inherently rhythmic, occasionally aligning to improve overall health and efficiency. When the heart rate aligns with the breath, heart rate variability (HRV) reaches its peak. This synchronization occurs when breathing is at a frequency of 0.1 Hz, which translates to approximately six breaths per minute. The high-frequency (HF) a component of Heart Rate Variability (HRV), often referred to as the respiratory band (0.15–0.40 Hz), is predominantly associated with parasympathetic nervous system activity. During the inhalation phase, the cardiovascular center suppresses the vagal outflow, while during the

exhalation, it reinstates vagal outflow through the release of acetylcholine. A slower respiratory rate, such as six breaths per minute, typically promotes positive effects on both cardiovascular and respiratory functions, enhancing respiratory sinus arrhythmia, which indicates increased parasympathetic or rest-and-digest activity. In this study, OM chanting is conducted at a respiratory rate of six breaths per minute. The chanting initiates during the exhalation phase, allowing for an extended exhalation period, which enhances vagal outflow and results in increased high-frequency (HF) power. The researchers found that OM Chanting with deliberate breathing activates the cardiac autonomic nervous system (ANS) by increasing HF power, without changing the LF/HF ratio. This indicates that HF oscillations align with the respiratory frequency of six breaths per minute (0.1 Hz), whereas LF oscillations are believed to relate to cardiac feedback mechanisms that operate independently of respiration. Additionally, research indicates that heart rate variability (HRV), particularly around respiratory sinus arrhythmia (RSA), reaches its peak when breathing is slowed to approximately six breaths per minute. Furthermore, existing literature has established a correlation between reduced HF power and conditions such as stress, panic, anxiety, or worry. The regulation of vagal tone is crucial for maintaining the dynamic autonomic balance necessary for cardiovascular health, and insufficient vagal inhibition is linked to increased morbidity. (Ganagarajan Inbaraj 2022)

2 THE GAYATRI MANTRA:



(Figure 2: Gayatri Mantra)

The Vedic scriptures highlight the Gayatri mantra as one of the most significant hymns. It serves as a collective appeal for understanding and compassion. (Sharma. n.d.) Recognized as the oldest and most significant divine mantra, the Gayatri Mantra is derived from Rigveda and Yajurveda. with its teachings attributed to Maharshi Vishvamitra. This mantra is chanted in honor of the Divine, represented

by the Sun, and is intended for the entire human race, invoking the gifts of virtue and enlightened understanding. (Kesar 2023) The essence of this text is a reflection on the highly revered Supreme Lord, the creator, whose radiant light brightens all dimensions of existence physical, mental, and spiritual. We seek that this divine illumination enhances our understanding. (Dudeja 2017)

The term 'Gayatri' consists of two components: 'Gaya,' which represents essential energies, and 'Trayate' or 'tri,' denoting one who provides security, liberation, and freedom. Mantras directed towards 'the Universal Being or the Absolute' ultimately align our entire consciousness. Those who recite the Gayatri Mantra receive the protection of Goddess Gayatri.

ॐ भूर्भुवः स्वः तत्सवितुर्वरेण्यं भर्गो देवस्य धीमहि धियो यो नः प्रचोदयात् ।

Om bhūr bhuvaḥ svaḥ

tat savitur vareṇyam bhargo devasya dhīmahi

dhiyo yo naḥ prachodayāt

The Gayatri Mantra is a comprehensive invocation composed of twenty-four letters, each contributing to a subtle field of conscious energy and a magnetic aura surrounding our being. It is structured into three segments: the first segment includes the pranava (Om) and the mahavyahriti (Bhūr, Bhuvah, Svah), which symbolize the three realms of existence earth, heaven, and intermediary spaces. The second segment is “Tat savitur vareṇyam bhargo devasya dhīmahi,” while the third segment is “Dhiyo yo naḥ prachodayāt.” This mantra conveys the essence of seeking guidance from the divine, acknowledging the supreme energy that alleviates worldly suffering and embodies bliss, luminosity, and purity, urging us to internalize these divine attributes. (Kesar 2023)

Chanting the Gayatri Mantra creates a frequency of 110,000 Hz, which is greater than 20 kHz. The design of mantra chanting patterns is such that they inherently embody the essence of music and the vital energies that flow from the cosmic energy center linked to each mantra. The Gayatri mantra represents this center as the sun. The vibrations generated through the recitation of the Gayatri Mantra are known to be soothing for the human mind and beneficial for all plant and animal life. (Dudeja 2017)

The Influence of the Gayatri Mantra:

The remarkable influence of the Gayatri Mantra on physical life is linked to its distinct syllables. The act of vocalizing these syllables has a positive effect on 24 key points in our bodies, fostering resonance in the nadis. This resonance, coupled with the magnetic or electromagnetic forces surrounding us, draws in the vital energy of the Sun deity. It is believed to enhance cognitive abilities. The Gayatri Mantra is a highly potent Vedic prayer dedicated to the greater good of

all, expressing reverence for the formless Brahman, known here as Savita devta. (Kesar 2023)

The Gayatri Mantra has the potential to elevate various positive states within an individual. (Tripathi. n.d.)

Syllable	The gentle energy nucleus of the body	Resultant effect
Tat	Tapini	Safalta (Achievement)
Sa	Safalta	Parakram (Valor)
Vi	Vishwa	Paalan (Foster)
Tur	Tushti	Kalyaan (Vitality)
Va	Varda	Yog (Cohesion of mind)
Re	Rewati	Prem (Affection and Empathy)
Ni	Sukshma	Dhan (Wealth of the soul)
Yam	Gyana	Tej (Transcendent aura)
Bhar	Bhargava	Raksha (Defence)
Go	Gomti	Buddhi (Intelligence)
De	Devika	Daman (Capacity to confront challenges)
Va	Varahi	Nishtha (Devotion)
Sya	Singhania	Dharna (Concentration)
Dhee	Dhyana	Praan (Crucial energy)
Ma	Maryada	Satyam (Self- regulation)
Hi	Sffuta	Tap (Stamina)
Dhi	Medha	Dur Darshita (Proactive vision)
Yo	Yogmaya	Jagriti (Awareness)
Yo	Yogini	Utpadan (Creativity)
Nah	Dharini	Sarasota (Clarity)
Pra	Prabhava	Aadarsh (Prime)
Cho	Ushma	Sahas (Durability)
Da	Drihsya	Vivek (Acumen)
yat	niranjana	Sewa (Helpfulness)

(Table 1: Various positive states)

Studies Concerning the Impact of the Gayatri Mantra:

a. Impact On Depressive Symptoms:

Depression is an emotional condition defined by low self-esteem and feelings of guilt, leading to a diminished ability to experience pleasure in life. It is a leading cause of disability globally and significantly impacts the overall disease burden. According to researchers, depression affects approximately 5% of adults worldwide. Studies have shown that engaging in practices such as Gayatri Mantra Chanting, along with other yogic methods

like Loosening Exercises, Suyanamaskara, Breathing Techniques, Asana, and Pranayama, can be beneficial in preventing and managing depression, especially in those with hypothyroidism.

The benefits of mantras extend to students as well. In prestigious universities, many students experience high levels of pressure and report feelings of depression. Chanting mantras may serve as a valuable tool for alleviating their stress. Notably, those who engage in chanting the Gayatri Mantra have shown marked improvements in their overall happiness and mental clarity. The effectiveness of mantras in combating depression is further

underscored by the absence of suicidal tendencies among individuals who are spiritually engaged. (Kesar 2023)

b. Impact on Anxiety Levels:

Anxiety disorders are recognized as some of the most common mental health disorders worldwide. They typically manifest as a response to unresolved stressors, resulting in various physical and psychosocial complications. Individuals with anxiety disorders often face overwhelming and exaggerated fears and worries. Current estimates suggest that about 4% of the global population experiences anxiety-related challenges. Research has shown that incorporating mindfulness techniques with Gayatri Mantra can effectively reduce anxiety among elderly Hindus, serving as an alternative therapy to help prevent anxiety from recurring in older individuals. Additionally, the Gayatri Mantra has demonstrated significant benefits for memory, anxiety, and mental health. Consistent chanting and listening to the Gayatri Mantra can enhance memory, improve health, and elevate the quality of life, as well as positively influence mental well-being. (Kesar 2023)

In Bali, Indonesia, a pre-post quasi-experimental study was performed with 34 elderly individuals, who underwent a five-week mindfulness intervention featuring the Gayatri mantra. The findings revealed a notable decrease in anxiety levels, achieving a p-value of 0.000 on the Geriatric Anxiety Scale (GAS) after the intervention.

A pre-post study involving a single group assessed the effects of the five-finger relaxation technique, paired with the Gayatri mantra, on the anxiety levels of 22 individuals from families with schizophrenia. Participants engaged in the five-finger relaxation technique by touching each finger in succession with the thumb while envisioning relaxation, health, connection with loved ones, receiving praise, and being in a favorable setting. The researchers played Gayatri mantra music at a slow tempo for 15 minutes to complement the mental imagery. The intervention was conducted up to six times, with data gathered over a month-long period. Results demonstrated a notable decrease in anxiety scores following the intervention ($p=0.004$), evaluated using the Hamilton Rating Scale for Anxiety. (Sharma. n.d.)

c. Impact on Stress Levels:

Stress can be understood as a state of anxiety or mental pressure triggered by challenging situations. This response is a fundamental aspect of human

nature, motivating us to tackle obstacles and threats. In the context of the rapid changes and accelerated pace of modern life, stress has become more pronounced. Strong evidence supports the effectiveness of Mantra meditation in reducing stress. One study found that hypertensive patients experienced lower stress levels after participating in Gayatri Mantra meditation. (Kesar 2023)

In a research study, 200 adolescents aged between 14 and 17 years, who exhibited elevated stress levels as measured by the Educational Stress Scale for Adolescents, were randomly divided into two groups: an experimental group ($n=100$) and a control group ($n=100$). The experimental group participated in a three-month intervention that involved chanting the Om mantra along with 108 repetitions of the Gayatri mantra each morning, while the control group continued with their standard activities. Post-intervention analysis revealed a significant reduction in educational stress and its various aspects, including self-expectation stress, anxiety about grades, workload, feelings of despondency, and societal pressure, in the experimental group relative to the control group. (Sharma. n.d.)

d. Impact on Anger:

Anger is characterized as a negative emotion, often felt as a heightened sense of hostility directed at an individual or situation viewed as the cause of an unpleasant experience. Research indicates that reciting the Gayatri Mantra for 15 minutes can effectively diminish both state and trait anger, as well as expressions of anger, while enhancing self-regulation of anger and promoting overall psychological and physiological well-being. (Kesar 2023)

This study utilized a quasi-randomized controlled trial design to investigate the effects of the Gayatri mantra on the expression of anger and the psychophysiological state among youth aged 18 to 25 years. A total of 60 participants were recruited and assessed at the baseline before being split into two groups: an experimental group and a control group, each consisting of 30 participants. The experimental group participated in a 15-minute session of chanting the Gayatri mantra, synchronized with an audio playback of the mantra, for 21 consecutive days. Meanwhile, the control group continued with their normal routines. The findings revealed a significant reduction in both state and trait anger expression, as well as an improvement in the psychophysiological

state of the experimental group, with no significant changes noted in the control group. (Sharma. n.d.)

e. Impact on Cognitive Abilities:

Cognitive abilities can be viewed as vital tools for mental development. Regularly chanting the Gayatri Mantra is thought to foster improvements in mental capabilities such as learning efficiency, concentration, prosperity, enduring strength, peace of mind, and overall life quality. A significant increase in mental skills was documented in a twelve-week study that employed Bull's mental skill inventory, assessing various aspects including relaxation, imagination, anxiety control, focus, and self-confidence. (Kesar 2023)

A pre-post study involving a single group evaluated the effects of a meditation intervention on the mental skills of 36 female student athletes. The intervention included breath awareness, Gayatri mantra chanting, and inner visualization, conducted for 40 minutes each day, five days a week, over a period of twelve weeks. The findings indicated a significant enhancement ($p < 0.007$) in mental skills as measured by Bull's mental skill inventory, which encompasses various aspects such as relaxation ability, imagery ability, anxiety and worry management, concentration ability, and self-confidence. (Sharma. n.d.)

f. Impact on Memory Retention and Concentration:

Memory is an essential element of cognitive processes, encompassing the ability to store and retrieve information for later application. Attention acts as the filter that organizes incoming data for further analysis. The interplay between memory and attention is significant for promoting mental well-being. Studies have demonstrated that participants who practice Gayatri Mantra chanting show marked improvements in both attention and memory functions. A comparative investigation found that the Gayatri Mantra exerted a significantly stronger influence on attention scores in females than poem chanting. Vedic chanting is believed to bolster attention and memory recall. Furthermore, chanting is known to enhance blood flow to the brain regions responsible for memory, thereby improving the organization of memories. Research indicates that the medial frontal gyrus is engaged during Mantra chanting, correlating with heightened concentration and visuospatial attention. Furthermore, activation has been observed in the left lateral middle frontal gyrus, the right angular gyrus, and the right

supramarginal gyrus, all of which contribute to improved visuospatial attention. It is suggested that reciting the Gayatri Mantra can enhance cognitive abilities and significantly influence attention, memory, learning potential, prosperity, inner strength, tranquility, mental well-being, and overall life quality. (Kesar 2023)

A single-group pre-post study investigated the impact of chanting the Gayatri mantra on memory improvement. The study involved thirty hostel students aged 11 to 14, who were evaluated for their spatial and verbal memory skills before and after a 16-week intervention that included the Gayatri mantra. Following a week of training, the students chanted the mantra for 10 minutes each morning, five days a week, under the guidance of a Vedic expert throughout the intervention. The findings indicated a significant enhancement in both spatial and verbal memory scores after the 16-week duration.

A self-comparison study assessed the immediate impact of chanting the Gayatri mantra and reciting Om on selective concentration, evaluated through the Stroop task. The research involved 30 participants from a university, aged between 18 and 30 years. On the first day, participants chanted the Gayatri mantra, followed by the Om mantra on the second day, each for fifteen minutes. Concentration levels were measured before and after the chanting sessions. Both interventions resulted in a statistically significant increase in post-intervention concentration scores ($p = 0.001$). Additionally, the analysis indicated that the Gayatri mantra had a slightly more pronounced effect on concentration, with an improvement of 16.16%, compared to the 9.26% improvement associated with the Om mantra. (Sharma. n.d.)

g. Impact on Emotional Regulation:

Emotion regulation is the practice of attempting to modify our emotions or those of others. Utilizing mantra chanting can be beneficial in addressing negative or stressful emotional states. This practice generates significant brain activity and responds effectively to negative stimuli. Moreover, the repetitive nature of mantra chanting may lead to changes in the brain's structural organization related to memory processing. Evidence indicates that chanting mantras can cultivate positive emotions, thereby mitigating the effects of negativity. (Kesar 2023)

h. Impact on Neurological Activity:

The practice of mantras has a profound healing impact concerning the physical, mental, and spiritual aspects is triggered through chemical alterations within the brain. This results in the relaxation of brainwaves, mental detoxification, and the elimination of cellular toxins through the modulation of synaptic channels. The phonetic qualities of Sanskrit resonate with various reflex points on the palate, stimulating energy flow in numerous meridians and activating previously dormant regions of the brain, which enhances overall energy circulation. Research has demonstrated that listening to the Gayatri Mantra engages several key areas of the brain, including the right Insula, the right temporal lobe, left inferior parietal lobule, bilateral superior temporal gyri, lateral globus pallidus, and the Culmen of the cerebellum. Additionally, this mantra listening experience increases gamma wave activity in the brain and influences energy patterns in the limbic system, including the amygdala, hippocampus, and thalamus. It also has notable effects on cognitive processes and blood flow dynamics in the brain. Further studies indicate that chanting the Gayatri Mantra activates brain cells, leading to improved focus and concentration. (Kesar 2023)

Studies have demonstrated that chanting the Gayatri mantra for a duration of 2 to 5 minutes each morning can support cognitive development. The vibrations generated by this mantra activate different glands, which in turn enhances intellectual abilities. This concept is reflected in the line 'May God guide our intellect' from the Gayatri mantra. Furthermore, the practice of reciting this mantra can eliminate negative thoughts, paving the way for a more positive and happier mindset. (Kadri. 2024)

i. Impact on Cardiovascular and Respiratory Systems:

A recent study focused on examining the effects of various led meditation techniques on the cardiorespiratory system and physiological characteristics of young female athletes. The research involved 36 participants aged 21 to 25, athletes were selected at random from multiple sporting categories, teams and divided into four groups of nine. Three groups served as experimental, while one group acted as control. Group 1 engaged in breath awareness meditation, Group 2 practiced Gayatri mantra chanting, and Group 3 participated in visualization meditation, all under the guidance of a meditation instructor for five days a week over the course of a year. In contrast, the control group 4 remained in a

lying position for the same duration without engaging in any meditation practice. Assessments were conducted to measure resting heart rate, systolic blood pressure, respiration rate, and alpha brain waves, both at the beginning and conclusion of the study. The findings indicated that both breath awareness meditation and Gayatri mantra chanting were similarly effective in significantly reducing ($p < 0.05$) heart rate, systolic blood pressure, and alpha brain frequency. While breath awareness and visualization meditation led to a decrease in respiratory rate, the mantra chanting and control group did not show any significant changes. (Sharma. n.d.)

STRATEGIES FOR EFFECTIVE CHANTING

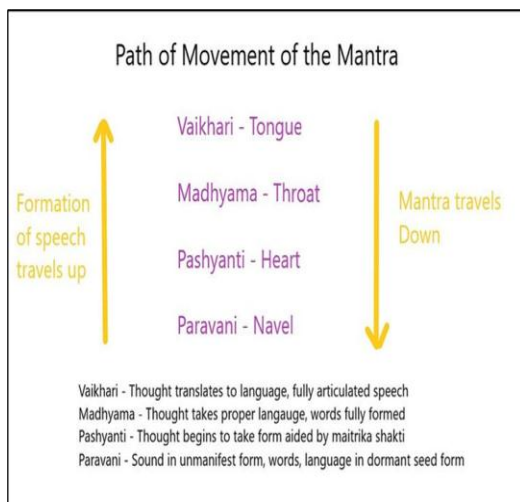
The profound influence of Mantras is well acknowledged, and their activation is achieved through precise chanting. When a Mantra is chanted correctly, it generates an internal sound vibration. The length and rhythm of the chant are crucial in creating this vibration. A specific chanting technique known as Chanda is employed to ensure the correct rhyme is maintained. This technique involves the rhythmic arrangement of syllables within poetic meters. There are multiple types of Chanda, categorized by the number of sections and letters they encompass, with commonly used forms including Gayatri, Anushtup, Trishtubh, and Jagati. The correct articulation of vowels and consonants is essential for effective Mantra chanting. This accuracy is necessary to express the intended meaning; otherwise, the chant may become a verbal force that can adversely affect the chanter. It is commonly believed that if Mantras are not recited correctly, their effectiveness may be compromised. Therefore, it is recommended that Mantras remain non-translated, as their power is rooted in their specific sound patterns. Moreover, complete focus and participation are critical during the chanting process. Concentrating on the Gayatri Mantra is said to activate dormant spiritual potentials. Mantras are energy-infused sounds, which is why Vedic Mantra therapy serves as a valuable method for treating both physical and mental ailments. This approach is natural and does not rely on pharmaceuticals or therapies, but it is crucial to chant them in a systematic manner. (Kesar 2023)

SOUND FREQUENCIES OF MANTRAS EXPLORED

The Vedas identify four progressive stages in the evolution of sound:

- a) Vaikhari the most concrete form, encompasses everyday audible sounds, including speech.
- b) Madhyama represents a more subtle form, characterized by whispers that do not produce audible effects.
- c) Delving further inward, one encounters Pashyanti which consists of mental sounds like songs playing in mind or dreams. This phase also encompasses the visualization of sound, which may involve quietly contemplating thoughts or the mental recitation of a mantra.
- d) The concluding phase is known as Para, or transcendental sound, representing the most refined form of pre-manifest sound, akin to light or absolute silence. This stage is viewed as the origin or potential of all sounds, often described as the "unstuck sound."

During the shift from Vaikhari to Para, the characteristics of sound, including its intensity and frequency, may change, aligning with the sympathetic nervous system of the individual meditating. (Dudeja 2017)



(Figure 3: Path of Movement of the Mantra)

THE INFLUENCE OF ULTRASONIC FREQUENCIES ON BIOLOGICAL SYSTEMS

Ultrasonic frequency waves, defined as those exceeding 20 kilohertz, are primarily recognized as acoustic sound waves that fall outside the audible range for humans, which spans from 20 Hz to 20 kHz. Research in behavioral and neuropsychological fields across various animal species has shown that these acoustic waves are produced and employed for communication and environmental awareness. A significant amount of research exists regarding the interactions between ultrasonic waves and biological systems. The potential effects of these frequencies on

biological entities vary depending on the specific segment of the ultrasonic spectrum being examined, such as low-range versus high-range frequencies. While not all ultrasonic frequencies are advantageous particularly those in the mid-range, which may pose risks frequencies in the lower range of the ultrasonic spectrum have been associated with various healing properties. As a result, numerous studies focused on therapeutic and healing applications have identified and classified these effects according to the mechanisms they activate, whether thermal or non-thermal. We will focus on exploring the potential effects of low-range ultrasonic frequencies on various mental and emotional states, as well as their impact on the physiological functions of the human body. Recent studies suggest that cell types beyond auditory hair cells, specifically non-auditory cells, can also respond to certain audible sounds and frequencies. As a result, these frequencies appear to influence various morpho-functional characteristics, including cell size, activity levels, granularity, and cell cycle processes. Additionally, some frequencies are known to stimulate the release of various hormones and cytokines that are typically associated with human well-being. (YV Suseela 2017)

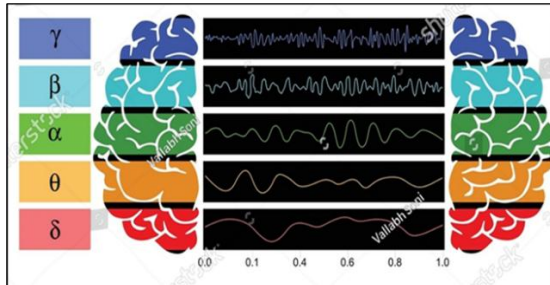
BRAINWAVES

The fundamental purpose of meditation, regardless of its type, is to create specific sympathetic frequencies within the oscillation of neurotransmitters. This process, which is both coherent and synergistic, seeks to foster desirable results, including a sense of calm, stable blood pressure, clear thinking, immunity to external disturbances, restful alertness, and the experience of joy, tranquility, contentment, and awareness. Numerous neurotransmitters generate brainwave patterns by communicating with one another and sending coordinated electrical impulses at the same time.

In general terms, the five categories of brain waves pertinent to the current discussion are as follows:

- a) Gamma waves enhance motivation, facilitate advanced education, and improve concentration, with vibrations exceeding 40 Hz.
- b) Beta waves are crucial for maintaining awareness, attention, and cognitive processes, operating within 13 to 40 Hz frequency range.
- c) Alpha waves aid in visualization, relaxation, and fostering creativity, occurring between 7 and 13 Hz.

- d) Theta waves are beneficial for meditation, intuition, and memory retention, with frequencies from 4 to 7 Hz.
- e) Delta waves are associated with detached awareness, healing, and sleep, with frequencies falling below 4 Hz.



(Figure 4: Brainwaves)

- I. Gamma Waves (40-100 Hz) represent the fastest and most recently identified brainwave state, characterized by high frequency. They are associated with the simultaneous processing of information across various regions of the brain. These waves play a crucial role in advanced cognitive tasks and overall cognitive functioning, making them essential for learning, memory retention, and information processing. An excess of Gamma Waves can lead to conditions such as anxiety, heightened arousal, and stress, while a deficiency may contribute to ADHD, depression, and learning disabilities. Optimal levels of Gamma Waves facilitate the integration of sensory information, cognitive processes, learning, perception, and REM (Rapid Eye Movement) sleep.
- II. Beta Waves (12-40 Hz) are affiliated alongside a state of alertness and normal waking consciousness, promoting logical reasoning and critical thinking. Maintaining an appropriate level of beta waves is essential for effective concentration in various settings, including classrooms, workplaces, and sports fields. However, an excess of beta wave activity can lead to increased stress. High levels of beta waves can result in anxiety, heightened arousal, difficulty in relaxation, and stress-related issues. On the other hand, low levels of beta waves may be linked to ADHD, which stands for Attention-Deficit/Hyperactivity Disorder, daydreaming, depression, and cognitive challenges. Ideally, balanced beta wave activity supports focused attention, memory retention, and problem-solving skills.
- III. Alpha Waves (8-12 Hz) are primarily present during moments of calm contemplation, profound tranquility, or when an individual is transitioning into a pleasant Fantasize or engaging in gentle mindfulness practice. This vibration serves as a bridge between conscious thought and the subconscious mind, representing a Light Meditation State. An excess of Alpha Waves can lead to daydreaming, difficulty concentrating, and excessive relaxation. Conversely, a deficiency in Alpha Waves may contribute to tension, elevated stress levels, sleeplessness, and compulsive behavioural disorder. The ideal balance of Alpha Waves promotes encourages tranquillity and a natural progression of thoughts.
- IV. Theta Waves (4-8 Hz) are the most common occurrence during sleep, yet also significant during profound contemplation. This brain wave state allows for vivid dreams, enhanced intuition, and access to insights beyond typical conscious awareness. The presence of Theta Waves can significantly boost creativity and foster a sense of ease. However, an overabundance of these waves may contribute to issues such as ADHD, depression, hyperactivity, impulsivity, and inattentiveness. On the other hand, a deficiency in Theta Waves can lead to anxiety, limited emotional awareness, and heightened stress levels. Achieving an optimal balance of Theta Waves can lead to a flow state, increased creativity, deeper emotional connections, enhanced intuition, and a sense of relaxation.
- V. Delta Waves (0-4 Hz) represent the slowest and most powerful brainwaves, characterized by their low frequency. These waves are generally linked to deep, dreamless slumber and significant levels of transcendental meditation. They are predominantly observed in infants and young children. Deep sleep plays a crucial role in the process of recovery, as it currently stands closely associated to significant restoration and renewal. An excess of Delta Brain Waves can lead to issues such as neurological injuries, challenges in learning, cognitive impairments, and severe ADHD. Conversely, a deficiency in Delta Waves may result in an inability to rejuvenate the body, poor brain revitalization, and inadequate sleep. Optimal levels of Delta Waves contribute to a robust immune system, natural healing, and restorative deep sleep. (Dudeja 2017)

CONCLUSION

Chanting the OM and Gayatri Mantras offers a scientifically validated approach to improving mental health and overall well-being. The sound vibrations produced during these chants align with the body's natural frequencies, influencing neurological and physiological functions in a positive way. Through regular practice, individuals can experience reductions in anxiety, depression, and stress, as well as improvements in memory, concentration, and emotional regulation. The OM mantra, with its universal resonance, helps harmonize the body's energy, activating the parasympathetic nervous system and promoting a state of calm and balance. The Gayatri Mantra, revered in Vedic tradition, not only enhances cognitive and emotional health but also connects individuals with a higher spiritual consciousness, further reinforcing its mental health benefits.

Scientific research supports these claims, showing that mantra meditation activates specific brainwave patterns, reduces heart rate, and lowers blood pressure, all of which contribute to a more relaxed and focused mental state. Moreover, the use of mantras as non-pharmacological interventions presents a promising alternative for managing mental health disorders without the side effects of medication. The healing potential of sound frequencies, especially those produced by ancient mantras like OM and Gayatri, offers a holistic approach that integrates mind, body, and spirit, providing a powerful tool for mental health treatment in today's stress-filled world. These practices invite further exploration and application as therapeutic methods for enhancing mental wellness, emotional balance, and spiritual growth.

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