
**THE SCIENCE OF OMKAR: UNVEILING THE VEDIC INSIGHTS OF MANTRA
CHANTING ON PSYCHOLOGICAL AND PHYSIOLOGICAL WELL-BEING**

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Abstract:

Mantra chanting, being a timeless practice in Vedic literature, has fascinated scholars and practitioners alike in diverse traditions. The review article explores the multifaceted background of the Omkar mantra by tracing its significance. This article delves into the Vedic literature bridging its relevance in contemporary research. Through historical text analysis and recent scientific studies, the study aims to understand the potential benefits of the Omkar mantra. According to previous studies, regular practice of Omkar mantra chanting leads to improvement in mood, and cognitive functioning by promoting greater alignment between gross and subtle states. On the physiological front, Mantra chanting affects heart rate variability, respiratory dynamics, neural activity, cognition, social cohesion, and many more in diverse ways, as evidenced by recent scientific inspections.

Analysis of the mantra chanting on psychological aspects reveals convincing studies demonstrating its ability to reduce stress, rehabilitate anxiety, and depression, promote emotional regulation, and enhance mindfulness. In the last decades, acoustic methods have successfully aided differential diagnosis by using vowels and speech, evaluating the effectiveness of treatment approaches. In this article, we also cover the relevant work done in the acoustic analysis of Omkar chanting along with the future scopes for the research.

Keywords: Omkar chanting, psychological well-being, physiological well-being, resonance, Healthy voice, Voice features.

Introduction:

"Mantra" refers to a word or sound believed to have psychological and spiritual power. The spiritual value of a mantra is realized through hearing, seeing, or when it is present in thought. Mantra adds more concentration to the meditation.

Mantras are currently present in different schools of Hinduism, Jainism, Buddhism, and Sikhism. According to (Gaumond, 2007) a mantra is a collection of sounds, a relationship of frequencies. Every mantra has an innate ability to affect human consciousness. (Farquhar, 1984) believes that mantras are religious utterances with supernatural power, functioning as spells or weapons. According to Zimmer, a mantra is a verbal tool that helps to create a particular state of mind (Zimmer, 1946). In the context of Tibetan Buddhists, Mantras act as a medium to combine the micro-cosmos of humans with the all-embracing and divine macro-cosmos (Baltgalve, (2017).). Jan Gonda defines mantra as a sequence of words containing praise in prose, verses and sequences are believed to have spiritual efficiency, which are meditated upon, and arranged in ancient texts of Hinduism methodically (Alper,1989).

One can learn to quiet the mind by focusing on specific sounds or phrases repeated and can minimize the adverse effects of external stressors from affecting mental and emotional well-being. Moreover, mantra chanting can cultivate a deeper sense of greater self-awareness and self-regulation, by managing challenging emotions. The Omkar mantra represents the harmony between ancient wisdom and modern inquiry. even though omkar is a symbol associated with Hinduism, the scientific studies, which are objects in nature, show promising benefits at various levels, like physical, mental, physiological, etc. Hence this paper tries to bring out a practice which originally rooted in the Hindu tradition but has far-reaching health benefits for people at large.

1. Historical Roots Describing AUM chanting -

According to Vedic literature, the matter is said to be manifested from sound and Aum is considered as a primordial and sacred sound. Tracing its origin to the Rigveda, the oldest Veda, the layers of meaning embedded in this primordial sound are unraveled. It is said to be the "root" syllable (mula mantra), that binds the gross individual consciousness and universal consciousness together. The elaboration of the mantra in other Vedic texts, such as in the Bhagavad Gita and Upanishads elucidates its significance for millennia. The Upanishads state that AUM represents God in the form of sound. The Upanishads, a collection of philosophical texts that form the culmination of Vedic thought, provide deeper insights into the Omkar Mantra. Aum is enunciated with the syllables "a", "u", and "m". These three letters are the foundation of all languages. A mute person also tries to express with these three syllables. So, the mantra is the voice of consciousness.

1.1. Chandogya Upanishad emphasizes that Omkara should be worshiped as Udgita, Aditya to remove all fear and to attain immortality which is the ultimate essence of all essences (1.1.3,4,6)

tadetanmithunamomityetasminnakṣare saṁsṛjyate yadā vai mithunau samāgacchata āpayato vai tāvanyonyasya kāmam || 1.1.6 ||

The dual combination of speech and breath merge into each other in this syllable Om. The pair fulfill each other's desires whenever they come together.

1.2. Mundaka Upanishad explains the usage of "Om" as a means of meditation for achieving self-realization.

praṇavo dhanuḥ śāro hyātmā brahma tallakṣyamucyate |
apramattena veddhavyaṃ śaravattanmayo bhavet || 4 || (Mundaka Upanishad 2.2.4)

In the Upanishads, this Omkar is considered a bridge to immortality. Meditating on Omkar one can successfully move to the light the knowledge by crossing the darkness, the truth.

2. Philosophical Significance of the AUM mantra-

Within Vedic Philosophy, the Omkar mantra has different philosophical dimensions across various schools of Vedic thought. Starting from Advaita Vedanta to Samkhya and Yoga, each branch provides a unique lens to see and understand the mantra.

2.1. Advaita Vedanta: The Brahman

The Omkar mantra is discussed and linked to, the concept of Brahman- the formless, ultimate reality existing under all the phenomena. The prominent Advaita philosopher, Adi Shankaracharyaji draws attention to the "Om" which is the sound of the absolute, encompassing the entirety of existence. In the world of non-duality, Brahman is the ultimate reality of collective consciousness from where the whole universe emanates, lives in, and again dissolves into it. So, chanting and meditating on the Omkar mantra is considered to realize the Brahman, transcending the illusion of individuality (Kalita, 2019).

2.2 Samkhya and Yoga: Creation and Dissolution

Samkhya reveals the basic elements of the macrocosm and microcosm. Samkhya explains the components of the body, mind, and spirit, from the physical to the more subtle elements of mind and consciousness revealing 25 elements (tattvas) or evolutes of the individual.

It revolves around two of the sources one is Purusha the Brahman and the other is Prakriti with its 24 tattvas having mahagunas, Satva representing knowledge, and balance; rajas representing desire, and momentum; and tamas representing inertia, decay.

In the syllables of 'AUM',

A represents sattva guna – light. Purity, the goodness

U stands for rajas – the action, the passion

M represents tamas- the ignorance

2.3 Patanjali Yoga Sutra (PYS):

Samkhya philosophy is connected with the philosophy of yoga to unclutter the mind and body for self-realization and to merge individual consciousness with the universal consciousness.

Sage Patanjali refers AUM as the ‘Pranava’ in Patanjali Yoga Sutras. In PYS, there is a single verse mentioning Pranava (OM).

“Tasya vachakah pranavah” (Ch: I; V: 27).

Which means the Omkar is the word of God. Again verses 28 and 30, refer to the need and process of getting into the chanting process of omkar. It says, to attain concentration and overcome false perceptions, mental lethargies, and bodily diseases one can focus and practice the chanting of Pranava.

“Tajjapastadarthabhavanam” (Ch: I; V: 28).

3. Symbolism of A, U, M kara-

The Omkar is symbolized as ‘AUM’ called Pranava which defines the process of creation and dissolution in the whole universe. Where ‘A’ represents the creation, the beginning, ‘U’ defines preservation and sustenance or action, and ‘M’ signifies dissolution. ‘Pranava’ can also be defined as ‘prana+va’ which means it contains the ‘prana’ or the life force energy in it.

‘Akara’ is the primary element pronounced as ‘Ah’ starts vibrating in the mouth and resonates in the lower and central portions of the body. It denotes the normal waking consciousness. This is relatable to the lower three chakras connecting to the realm of logic, reasoning, and science. It creates awareness on a gross level of the matter showing stability.

Then ‘Ukara’ is pronounced as ‘uuu’/’uh’, transferring the vibration to the back of the mouth, resonates in the chest, and throat, and shifts the awareness to the dream state of consciousness. Here gross matter converts to a subtle form showing more fluidity and rapidly changing form. This connects with the realm of imagination, dreams, divinity, and the inner world.

The third element is ‘Mkara’ is created by humming gently with the lips closed. This sound starts in the mouth and resonates throughout the head. Here subtle matter further converts to the form of a causal state. This sound connects with the realm of dreamless deep sleep. Pure consciousness reveals its unseen, pristine, and latent form. In this state, the individual’s consciousness turns inward and connects with the cosmos (Dwivedi, & Singh, 2016).

4. Contemporary Research and Application on AUM chanting-

Contemporary research on the Omkar Mantra has extended beyond traditional religious and philosophical contexts, encompassing scientific, psychological, and therapeutic perspectives.

Connecting to Scriptural data several scientific researches are going on and chanting Omkar adds its benefits to the physical and psychological state of human beings. Here is a review of the experimental studies done in this particular area to find the effects on the human body.

According to different techniques used and different outcomes found during the inspection, the studies can be subcategorized under, physiological changes and psychological changes.

4.1. Physiological changes-**4.1.1 Neuroscientific Studies-**

Different techniques are being used to explore the significant changes found in physiological parameters, such as EEG (Electroencephalograph), neuroimaging, evoked potentials, etc.

The studies listed are done with mental and loud omkar chanting exploring the effects on the brain and other parts of the body promoting physical health in the form of blood pressure, brain activity or cognitive process, heart rate, cardiac health, lung capacity, improved memory, etc.

Table- 1. Studies based on Physiological and neuropsychological Changes Measured in Omkar chanting

	Subjects taken	Tool used in the study	Findings during Om chanting
Telles et al., 1994	18 males (9 of experienced +9 of naïve subjects)	AEP-MLR	Reduced respiratory rate
Telles et al., 1995	7 males committed meditators	Model 10, Polyrite, for autonomic & respiratory variables, QRS per 40-sec intervals for heart rate, silver chloride disc electrodes for SR, photo-electric plethysmograph for Skin blood flow, Benedict-Roth apparatus for Oxygen consumption	Reduced heart rate, an increase in peripheral vascular resistance was found as a sign of increased mental alertness.
Telles et al., 1998	12 practitioners (4 males +8 females)	MLR	Reduced skin resistance, Reduced heart rate, and respiratory rate.
Kalyani et al., 2011	12(males+3 females) of 22-39 years	fMRI	Deactivates amygdala, anterior cingulate gyrus, insula, hippocampus, orbitofrontal cortex and thalamus
Das & Anand, 2012	20 females of 18 to 24 years	GSR on a computerized polygraph	Increase in GSR value

Joshi, 2012	50 males of age group between 20-35 years	P.G.I. memory scale	Nadishodhana Pranayama & Om chanting cause a significant positive effect on the memory of the students
Harne, 2014	10 (Eight healthy boys and girls aged between 21 to 22 and two females of age between 40 to 41)	EEG signal with HFD	Reduced complexity of EEG signal
Naidu et al., 2014	60 healthy and willing females aged 12-15 years	Spatial and verbal memory test	Significant improvement in both spatial and verbal memory was observed in the intervention group when compared to the control group.
Mooventhan et al., 2014	79 randomized, SG(n=40) +CG(n=39)	PFT	significant increases in PEF, FEF, and MVV. Bhramari pranayama and OM chanting improve pulmonary function
Khode, V. 2014	study group (n= 40) and control group (n= 39)	peak expiratory flow (PEF), forced expiratory flow (FEF) and maximal voluntary ventilation (MVV)	An improvement in (PEF), (FEF)25% and (MVV) was seen resulting in improved pulmonary function
Kumar et al., 2015	21 males with a mean age of 32.3 years	fMRI	Activation in the Dorsal medial frontal cortex, and supramarginal gyrus
Deepeshwar et al., 2015	22 male volunteers with ages between 18 and 30 years	fNRIS	Increased oxygenation in the PFC (pre-frontal cortex)
Bhargav et al., 2016	20 (eight males and 12 females) in the age range of	fNRIS	A stimulating effect on the vagus nerve in the ear canal

	18.25 ± 0.44 years		
Metri K et al., 2020	20 females ranging between 50-70 years	B.P (systolic and diastolic)	Decreased systolic & diastolic B.P by improved sleep quality, insomnia
Inbaraj et al., 2022	36 (19 yoga practitioners (9 females and 10 males; mean age 25.9 ± 3.2 years) and 17 naïve persons (8 females and 9 males; mean age 24.8 ± 3.6 years)	HRV (Time and frequency domain)	HRV rises to its most significant level. Vagus nerve stimulation alters the neurotransmitters and electrical signals. Resonance in heart rate and breath occurs when the breathing happens with a frequency of 0.1 Hz, or about six breaths per minute.
Naveen et al., 2022	20 (nine men and 11 women) age range of 25–55 years	Spatial and Verbal Memory test, Auditory and Visual Reaction Time (RT) apparatus	Significant improvement in the spatial memory scores, significant improvement seen in the auditory reaction time for high and low pitch sounds, and also visual reaction time for the red and green light in the intervention group.

AEP = Auditory Evoked Potentials; MLR = middle latency response method.

SG= Study Group, CG= Control Group, SR= Skin resistance

HFD =Higuchi Fractal Dimension, fNIRS= Functional near-infrared spectroscopy

fMRI=Functional magnetic resonance imaging, GSR= Galvanic Skin Response

HRV= Heart Rate Variability, PFT= pulmonary function test, PEF= peak expiratory flow,

MVV= maximal voluntary ventilation, FEF = forced expiratory flow

4.1.2 Acoustic decoding of AUM Sound –

Acoustic parameters are the representatives of the emotional expression with the units.

Few studies are also there investigating the acoustic features of Omkar chanting as the Voice is the chief instrument for the expression of the emotion of an individual. Though the research on sound OM is boundless, this paper has covered the literature related to OM sound in these areas.

As mentioned in the literature the resonance that occurs by Omkar recitation has an immense effect on the physical and mental states. In the Omkar chanting, the first pronunciation “A” creates the

vibrations, which act on the spinal cord balancing the pranic flow. The “U” pronunciation creates vibrations in the throat and affects the Thyroid Glands balancing the major hormonal secretion, while the “M” pronunciation, brings the vibrations to the brain, thereby activating the pituitary, pineal gland, and brain centers (Dwivedi, & Singh, 2016). These sound vibrations help in harmonizing our body and mind.

Hence, acoustic analysis of mantra chanting helps to find out the basic vocal parameters, diagnose the vocal disorder, and track the recovery uplifting the consciousness to a higher extent.

Spectral analysis of Om chant-

The speech that comes from the glottis through the voice is a blend of sounds. The Mantra, an acoustic signal, is a composition of sound, breath, and rhythm and the fundamental frequency of that sound is called overtones or harmonics. Spectral analysis is the analysis of frequencies or energies. These harmonics are the ratios of, 1:1, 2:1, 3:2, (the whole numbers), etc (Bain, 2003). By practicing the mantra chant, harmonics can improve the vocal quality, it changes our brain pattern by building new neural synaptic connections, hearing, and even heightening our consciousness (Dudeja, 2017). Apart from other research on Omkar here we cover the spectral analysis done on Omkar chanting. Researchers have done the spectral dissection of the acoustic signal of Omkar chanting which may lead to future research in the direction of acoustic parameters analysis and may establish a significant tool for the differentiation of pathological conditions from healthy physical and psychological conditions.

Table: 2 Studies on Spectral analysis of Om chanting and changes observed in the mental state

Article reference	Subjects	Method	Findings of Aum chanting
Jina devi et al., 2004	4 (2 male voices and 2 female voices)	digitizing the analog waveforms	The periodic nature of the signals shows improved calmness and stability of the mind.
Gurjar et al., 2008	One Om chanting person	DWT-TF	Reduced the stress from the mind improving calmness.
Gurjar et al., 2009	2 of age group 30 to 40 years	FFT	Flat PSD concluded minimized stress level

DWT-TF= Discrete wavelet Transform for time-frequency analysis

FFT= Fast Fourier Transform analysis, PSD= power spectral density

4.2. Psychological changes:

Omkar is the initial soundwave from where the whole creation began, evolved, and maintained its rhythm. Om chanting has been taught and used as a daily practice since the Gurukul time to the stress management program of the current era. Because physical health is connected with mental and emotional health (Salovey et al., 2000), mental health can be attained through Omkar's recitation by promoting physical health. Some of the research has been done on Omkar chanting

showing the significant development in stress, anxiety, depression, insomnia, and restlessness of mind. This article reviews the effects of chanting "OM" on the central nervous system and emotional level (Rao et al., 2018). To analyse and understand the significant changes found in psychological parameters, this article reviews the studies in **Table 3**.

Table: 3 Studies based on psychological changes to Om chanting

Article reference	Subjects	Methods	Findings of Om chant
Verma et al., 2010	20 criminal males	Neurotic Measurement Scale	significantly reduction of the neurotic problems of criminals through Om chanting
Singh et al., 2014	134(67meditators, age 23.96 ± 3.25 years; 67non-meditators, age 21.72 ± 3.44 years)	STAI, FMI	The practice of Om meditation was associated with higher levels of mindfulness and lower levels of psychological anxiety.
Amin et al., 2016	40 Elderly women (age 50–60 years)	DASS, MMSE	followed by six months of chanting, depression, anxiety, and stress scores decreased followed by a decrease in blood pressure, pulse rate
Perry et al., 2017	45 inexperienced chanters of 37 females and 8 males of 18 to 68 years	DLST, PANAS, MME, SRA, SCQ	chanting increases positive mood, decreases negative mood, and improves attention. Furthermore, altruism increased
Mishra et al., 2017	8 female school teachers of aged 27-40 years	perceived stress scale, AVRTA	Improves stress management and cognitive functions.
Rankhambe et al., 2020	100 bus drivers were divided into study and control group	Hamilton Anxiety Rating Scale	A highly significant reduction in Anxiety levels was seen after weeks of Om chanting in drivers
Pothugunta et al., 2020	26 Middle-aged females of 30 to 50 years of age)	HAMA, SDS	Om meditation affects autonomic functions, inducing psychophysiological calm. Significant decrease in depression, anxiety, and stress levels
Archana et al., 2021	Willing Male and Female adults of age 19 years to 60 years of age		Effective reduction in stress, anxiety, depression and improving the quality of life and quality of sleep in asymptomatic COVID-19 patients.

Simpson et al., 2021	117 (gender not mentioned)	STAI, PANAS, SCQ, IOS	Chanting online resulted in a significant decrease in stress and a positive mood.
Aalasyam et al., 2021	80 pre-hypertensives women between the ages of 25 and 40 years	Depression, anxiety, and stress scale 21	significant decrease in depression, anxiety, and stress was found by the practice of Om chanting
Bajappanavar et al., 2021	80 (46 males and 34 females) students of age 17-20 years	Perceived Stress Scale	A significant difference was found in the stress level of students during exam
Verma et al., 2022	50 (18-25 years) male and female Experimental group (N=25) and Control group (N =25)	SCAT	A significant reduction in anxiety levels in young adults
Rajagopalan et al., 2022	65 (34 subjects in the experimental group and 31 subjects in the control group)	DASS, PSQI, HRV	Om chanting and Yoga Nidra reduces depression, anxiety, stress and improving sleep quality and autonomic functions in hypertensive patients
Kar et al., 2023	36 engineering students in the age range of 18 to 25 years	DASS-21	effectively a reduction in depression, anxiety, and stress levels of engineering college students with time

DLST= Digit-letter Substitution task, PANAS= Positive Affect Negative affect Schedule
MME= Multidimensional Measure of Empathy, SRA= Self-Report Altruism Scale,
SCQ= Social Connectedness Questionnaire, SCAT= Sinha's comprehensive Anxiety test,
DASS= Depression Anxiety Stress Scale, PSQI= Pittsburgh Sleep Quality index,
HRV= Heart rate variability, DASS 21= Depression, Anxiety and Stress Scale - 21 Items
STAI= State-Trait Anxiety Inventory, FMI= Freiburg Mindfulness Inventory
STAI= State-Trait Anxiety Inventory, IOS=Inclusion of Self in Other Scale
AVRT= auditory and visual reaction time apparatus, HAMA= Hamilton Anxiety Rating Scale
SDS= Self-Rating Depression Scale

5. Discussion-

5.1. Interpretation of Findings:

Vedic Insight:

The ancient texts of the Vedas emphasize the resonance associated with the Omkar Mantra. the vibrational qualities of the AUM mantra create resonance and harmony within the body, leading to holistic well-being at physical, mental, and spiritual levels, aligning with the frequency of the universe. This concept aligns perfectly with the Vedic understanding of how everything, in existence is interrelated. The Omkar mantra is a central and revered aspect of Hinduism, but its

significance extends beyond religious practice to encompass spiritual, physiological, and psychological well-being. The synthesis of several studies suggests a consistent positive impact of the Omkar chanting on mental well-being and cognitive functioning aligning with the profound insights derived from Vedic philosophy. This convergence of empirical findings with ancient wisdom underscores the holistic nature of the mantra's effects. in the aspects of mental wellbeing,

5.2. Findings within the Studies conducted:

Comparing Omkar mantra chanting outcomes across previous studies provides insights into the consistency and variations in reported effects. Here, we explore key empirical findings and highlight similarities and differences.

5.2.1. Similarities in Scientific Findings-

Limbic and Autonomic functionality:

Across various studies chanting "Om" shows the deactivation of the limbic system, which controls emotions, stress, motivation, and learning processes. The beneficial effects of Omkar chanting are studied on depression, anxiety, and stress in students, elderly women, and bus drivers (Bajappanavar et al., 2021; Kar et al., 2023; Arati Amin et al., 2016; Rankhambe et al., 2020) with a recorded significant difference in lower stress levels. The influence of Om chanting calms the autonomic functions, (Pothugunta et al., 2020; Archana et al., 2021) by inducing psychophysiological improvement. Depression, anxiety, and stress levels were found to decrease significantly extending the positive symptoms at the physical level with improved quality of sleep in asymptomatic COVID-19 patients. The beneficial effects of "OM" chanting on perceived stress and auditory and visual reaction time are positively correlated to mindfulness, acceptance, and presence showing an association with higher levels of mindfulness (Deepeswar et al., 2014; Mishra et al., 2017). Om chanting along with Nadishodhan Pranayama or Yoga Nidra acts on sleep quality, memory, and autonomic functions in individuals with hypertension (Joshi, K. 2012; Rajagopalan et al., 2022). Chanting meditation on Omkar significantly reduces neurotic problems improving mood and social cohesion (Verma et al., 2022; Perry et al., 2017). Multiple studies suggest increased heart rate variability, indicating positive effects on the autonomic nervous system (Inbaraj et al., 2022). (Metri et. al. 2020), investigated the efficacy of Aum chanting on insomnia and found a significant reduction in systolic and diastolic blood pressure experiencing positive sleep quality in them.

Subjective Wellbeing-

Research consistently highlights that people experience improvement in their well-being and quality of sleep after participating in Omkar mantra chanting sessions. Many participants often report feeling more relaxed and having a deeper sleep, more content, more active and focused more energetic, and in a positive mood after the chanting sessions.

5.2.2. Differences in Empirical Findings:

Study Designs and Participants' Background:

Variations, in reported outcomes, can be attributed to differences in study designs, such, as the duration and frequency of chanting sessions. Some studies focus on short-term interventions while others delve into the effects of long-term practice. Differences, in the characteristics of participants, such as their age, demographic background, and previous experience with meditation have the potential to impact the outcomes of studies. Variations in profiles across studies may contribute to variations, in the reported effects.

5.3. Psychophysiological markers:

There have been studies that report variations, in how our body reacts, such as changes in heart rate and cortisol levels (Telles et. al. 1994; Telles et. al. 1995; Telles et. al. 1998,). Inbaraj et. al. 2022, the author found that Om chanting improves parasympathetic nervous system activity, promoting relaxation. Das & Anand, (2012), investigated Galvanic skin responses and revealed that Om meditation and prayer have an immense relaxing effect on the Psycho-physiological state.

5.4. Philosophical Implications:

The Philosophical Implications of chanting the Omkar mantra connect the findings from previous studies to the fundamental principles of Vedic philosophy. This connection helps bridge the gap, between the measurable outcomes and the underlying beliefs.

5.4.1. Mind-Body Connection:

The Vedic idea of mind and body interconnectedness is supported by modern scientific studies with the measured values and with the improvement in psychophysiological markers. The findings support that the vibrational frequency of the Omkar mantra enhances both the mental and physiological aspects of an individual reinforcing holistic well-being. Deepeshwar et. al. 2015, studied the comparison between random thinking and effortless visualization on the “Om” syllable and found oxygenation and deactivation of the PFC (prefrontal cortex) leading to the conclusion that Om meditation has a relaxing effect on the brain.

5.4.2. Transcendence and Expanded Consciousness:

Omkar chanting is a pathway to transcendence and expanded consciousness. The scientific findings align with the idea that chanting "Omkar" facilitates a shift in awareness, leading to a heightened state of consciousness by showing improved results in mindfulness, attention, and memory in the subjects who practice chanting. Joshi. 2012, attempted to see memory enhancement in students by Om chanting.

5.5. Harmony with Cosmic Vibrations:

Vedic philosophy discusses the harmony between individual vibrations and cosmic vibrations. Empirical evidence of physiological biomarkers during Omkar chanting supports the idea that the practice of the Omkar mantra aligns the individual vibrational frequency with cosmic rhythm

influencing the three levels of mind, body, and spirit and fostering a sense of well-being that extends across mental, physical, and spiritual dimensions. Harne, 2014, a German psychiatrist used the EEG (Electroencephalograph) method to see the effect of Om chanting on EEG signals and suggested a reduction in the EEG signal complexity after loud Omkar chanting stating a feeling of calmness.

5.6. Neuroscientific Insights:

Neuroscientific studies show the changes in brain activity and waves during Omkar chanting. (Telles et. al. 1994; Telles et. al. 1995; Telles et. al. 1998), conducted by Telles and her co-authors, found reduced sensory transmission time at the neural levels. Significant health benefits were found such as a reduction in respiratory rate, reduced heart rate. Kumar et. al. 2015, in their research, showed that listening to the “Om” sound activates the bilateral cerebellum, left dorsal medial frontal cortex, and right supramarginal gyrus. Bhargav et. al. 2016, studied the stimulating effects of Om chanting on a branch of the vagus nerve on frontal hemodynamics with the method of Functional near-infrared spectroscopy (fNIRS). Kalyani et. al. 2011, found deactivation of the amygdala, anterior cingulate gyrus, insula, hippocampus, and orbitofrontal cortex in their fMRI study. Studies using techniques like functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) have suggested that repetitive chanting of "Om" can induce a state of focused attention, relaxation, and altered neural connectivity. This research provides insights into the neurological mechanisms underlying the positive effects of mantra chanting.

6. Limitations and Future Directions:

6.1. Limitations-

Small Sample Sizes: Most of the studies in the field of mantra chanting have been done with small sample sizes, reducing the statistical power of the findings. To draw strong conclusions, it is essential to have larger and more diverse samples.

Long-Term Effects vs. Short-Term Studies:

Many studies are short-term, and it becomes challenging to conclude the long-term effects on the individual by consistent practice. Longitudinal studies are needed to understand the mantra chanting influences on individuals over time.

Lack of Standardization:

Mantras can vary widely across different traditions, cultures, and individual preferences. The lack of standardized protocols for mantra chanting can make it challenging to compare studies and draw generalizable conclusions. Future research should aim for more defined methodologies and larger sample sizes.

Insignificant changes:

Some studies find no significant differences in variables like forced vital capacity, FEV1/SVC, and FEF50%, between and within the group analysis of SG (study group) and CG (control group) in Khode, (2014). The conflicting results might be due to factors like the number of participants the length of the study or how accurately the measurements were taken. Similarly, when it comes

to the effects some studies suggest improvements in attention and cognitive performance while others don't find any changes. This inconsistency could be influenced by which specific cognitive abilities were assessed or differences, in the methods used during the studies.

Duration and Frequency:

Some investigations employ short-term interventions, while others explore the effects of long-term and regular practice. These variations influence the observed outcomes and the sustainability of effects over time. Variability in participant populations, experimental conditions, and measurement precision contributes to inconsistencies in reported psychophysiological outcomes.

6.2. Future Scopes-

The future scope can be, collected data of different samples from male and female subjects needs to be analyzed. The findings warrant more experimental and empirical studies in neuroimaging and EEG methods. Further an algorithm can be developed to decide the degree of correctness of OM chanting. The speech signal is considered to be an indicator of psychological stress. The healthy Om chanting voice frequency can be documented both in males and females. The future work may also involve analysis of voice parameters in terms of pitch, fundamental frequency, and Harmonic noise ratio with the ideal chanting of OM sound.

7. Conclusion-

The article underscores the potential benefits of this ancient practice from the psychological and physiological perspectives with no side effects recorded. From its positive impact on mental health to its influence on physiological markers, the review illuminates the holistic nature of Omkar chanting. Understanding the science of Omkar may not only offer insights into mind-body connections but also provide a pathway toward cultivating a harmonious and balanced life. Addressing the methodological limitations can contribute to developing a robust understanding of the effects of mantra chanting. Advancements in standardized protocols, rigorous control groups, and interdisciplinary collaboration can enhance the quality of future research in this field. The author suggests that, as many of the studies are focused on the effect of mantra chanting, more work needs to be done on the structure of the mantra forms and its characteristics to understand the mantra in detail.

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