



A PILOT STUDY ON THE EFFECT OF MIND SOUND RESONANCE TECHNIQUE (MSRT) ON COGNITIVE FUNCTIONS IN WORKING POPULATION RANGING BETWEEN 30 -60 YEARS OF AGE.

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Abstract: Background: Yoga “*chitta vritti nirodha*” said by *Maharishi Patanjali* means that yoga removes the fluctuations of the mind and helps balance the mind by developing harmony and inner peace. Recent studies showed the rise of psychological stress and a decline in cognitive functions, a trend recently observed in younger and middle-aged adults. Mind Sound Resonance Technique (Yoga-based mindfulness technique) is a tool developed by Swami Vivekananda Yoga Anusandhana Samsthana(S-VYASA) to balance the disharmony of the mind.

Methods: Twenty working participants from urban Kolkata underwent MSRT for 45 min, every alternate day for 50 days. All participants were assessed before and after completion of 50 days of intervention, through Mini-Mental State Examination and Digital Span Test.

Results: An overall improvement in the variables were observed, with significant results in MMSE, Orientation, Language and Digital Span Test.

CONCLUSION:

A significant increase in the overall cognitive health was observed.

Index Terms - Yoga, Mind Sound Resonance Technique, cognitive functions.

Introduction

Yoga “*chitta vritti nirodha*” said by *Maharishi Patanjali* which means that yoga removes the fluctuations of the mind and helps in balancing the mind by developing harmony and inner peace. Today’s technological and scientific advancements in the medical fields have led to a significant increase in the middle age and elderly Life span. Also, a substantial rise in neurodegenerative diseases has been reported, such as mild cognitive impairment, Alzheimer’s disease, and other types of dementia. ^[1] Cognitive aging has been extensively studied with its focus on old age. ^[2] However, factors affecting the brain structure and function exert continuous and cumulative influence throughout the whole life- span. ^[3]

Accumulation of age-related pathology in the brain may reach a certain threshold, usually during middle-age, triggering different biological changes or chronic diseases that may lead to cognitive decline in old age. ^[4] For this reason, research is now focusing more on middle-aged with the hope of uncovering mechanisms that allow initiating interventions as early as possible. ^[5]

Middle age is often considered a period of little or no cognitive decline, ^[2] although individual variability is observed in cognitive functions in middle age. ^[5] A study conducted on memory, reasoning, vocabulary, phonemic and semantic fluency, assessed three times over 10 years in 10308 participants, of five age

categories (age 45-49, 50-54, 55-59, 60-64, and 65-70) showcased decline in cognitive functions in middle age participants.^[5]

In today's lifestyle, the speed of our lives goes with more work and less time for self, building stress. With more severe and prolonged stress, one can have deteriorating effects upon broader aspects of cognition. Recent evidence suggests that probably these effects can be attributed to reversible changes in the morphology of neurons within the hippocampus, a portion of the brain, central to learning and memory.^[6]

According to research, the mere functioning of the organ Brain is called the Mind. It is a set of cognitive faculties such as memory, judgment, imagination, thinking, language, and consciousness^[7]

According to sage Patanjali, the mind is a conglomeration of thoughts(that are manifested and unmanifested in wakeful, dream, and deep sleep states),the intelligence, the ego and the consciousness.^[8]

Yoga is an ancient science that has evolved over thousands of years and is currently popular as complementary and alternative medicine. Regular practice of yoga can help in many health-related conditions, such as asthma, diabetes, osteoarthritis, fatigue. It has also shown positive influence on several mental health-related conditions, such as anxiety, schizophrenia, depression. It is a well-known stress buster, and it can alleviate the effects of stress on health^[9]. The effect of different meditation practices on various aspects of mental and physical health is receiving growing attention^[10] where the main goal is developing voluntary control over mental processes to achieve a higher overall level of well-being and also to achieve peace and concentration^[10] There is evidence that meditation enhances attention^[11] improves verbal fluency, memory, and cognitive flexibility.^[10] Various Neuroimaging studies have explored the neural mechanisms underlying mindfulness meditation practice with advanced techniques such as EEG.^[12] But there is no specific study which speaks about the practice of MSRT in cognitive function among healthy working individuals.

Mind Sound Resonance Technique is a mindfulness-based, yogic relaxation technique that includes the generation of an internal vibration and resonance all over the body after chanting the Maha mrityunjaya mantra and syllables such as A, U, M, and OM, repeatedly. It can be practiced in a sitting or supine position.^[8]

A controlled longitudinal study to investigate the changes observed through MRI scan in 16 naïve participants who underwent the intervention of Mindfulness-Based Stress Reduction showed an increase in grey matter concentration in regions of the brain involved in learning, memory process, and motion regulation.^[13]

A study conducted for 15-days on MSRT on quality of sleep in a geriatric population, reported reduction in time taken to fall asleep and increase in total sleep time by reducing physiological arousal, and manifestations of anxiety.^[14]

A pilot study conducted by on the immediate effects of MSRT on cognitive functions In type 2 diabetes, indicates a potential enhancement of psychomotor functions like visual scanning, mental flexibility, sustained attention, psychomotor speed, and speed of information processing^[15]. A self-controlled pilot study conducted on the immediate effects of MSRT on anxiety disorder, suggests that MSRT may reduce the state of anxiety and enhance psychomotor performance^[16]. A randomized control trial on psychological states, sleep and cognitive functions of sixty female teachers, aged between 30 and 55 years showed reduction in stress levels, anxiety, and fatigue and increase in self-esteem and quality of sleep.^[9]

Viewing the various benefits and effects of MSRT and lack of studies available on the benefit of MSRT on healthy working individuals, a pilot study was conducted to observe the effects of MSRT on the cognitive functions on healthy working individuals of 30-60 years of age among the urban population of Kolkata.

Subjects and Methods:

Participants:

The details of the study were circulated to healthy working individuals of 30-60 years of age among urban population living in South Kolkata through messages on social media (WhatsApp) and door to door information. Three Demo sessions were conducted before the beginning of the study, explaining the procedure of the Mind Sound Resonance Technique.

Sixty participants volunteered for the study. Considering the following inclusion and exclusion criteria, twenty-five were selected for the study and ethical consent was taken from all the twenty-five participants.

The inclusion criteria were:

- (1) between the age range 30 and 60 years of both the genders i.e male and female.
- (2) had no serious illness (metabolic or neurological) or psychological disorder at present.
- (3) were willing to participate in the pilot study.

Procedure:

Twenty-five sessions of MSRT were conducted every alternate day for about 40 mins during the daytime from 3-4 pm in supine posture. All participants with a hundred percent attendance were considered for the study. In such case, there were five dropouts making the final sample size as twenty.

Intervention:

The Steps of MSRT are:

Mind Sound Resonance Technique	
Prayer – salutation to the divine (Maha Mrityunjaya Mantra)	1 minute
Quick relaxation technique – observe the abdominal breathing internally with closed eyes	3 minutes
Loud chanting (Ahata) of A, U, M, and AUM (three rounds)	16 minutes
Ahata of a long chant invoking fearlessness – Maha Mrityunjaya Mantra (three rounds)	
Alternate loud (Ahata) and mental (Anahata) chanting of A, U, M, and AUM (three rounds)	3 minutes
Alternate Ahata–anahata of Mahamrityunjaya mantra (three rounds), Anahata of AUM (three rounds)	10 minutes
Silence	
Resolve	
Closing prayer for peace	

Assessment Tools:**The Mini-Mental State Examination (MMSE):**

The Mini-Mental State Examination (MMSE) was developed by Folstein, and McHugh (1975), is the most widely used cognitive screening tool. Scores range from 0 to 30. A score of 24 and higher purports to identify cognitively intact individuals. Scores of 23 and lower are indicative of cognitive impairment.^[17] Cognitive Health, Orientation, Registration, Attention-calculation, Recollection, Language skills and copying skills were assessed.

Digital Span Test Forward: A digit-span test is used to measure working memory's number storage capacity. Participants see or hear a sequence of numerical digits and are tasked to recall the sequence correctly, with increasingly longer sequences being tested in each trial.

The exam was conducted on a computer screen using this application:

<https://www.memorylosstest.com/digit-span/>

Data extraction:

The data was collected from all the participants who attended the intervention for the entire duration of 50 days. The researcher was available during the collection of pre-data and post data for any query regarding language-oriented issues.

Analysis:

The data analysis was performed on the open-source software R. The Shapiro-Wilks test was used to check for normality. As data was not distributed normally, The Wilcoxon Signed Ranks Test was done to find the difference between the pre and post sample. Significance required $P < 0.05$.

RESULTS

Demographic data of the sample.

The total sample size was 20 (3 males and 17 females).

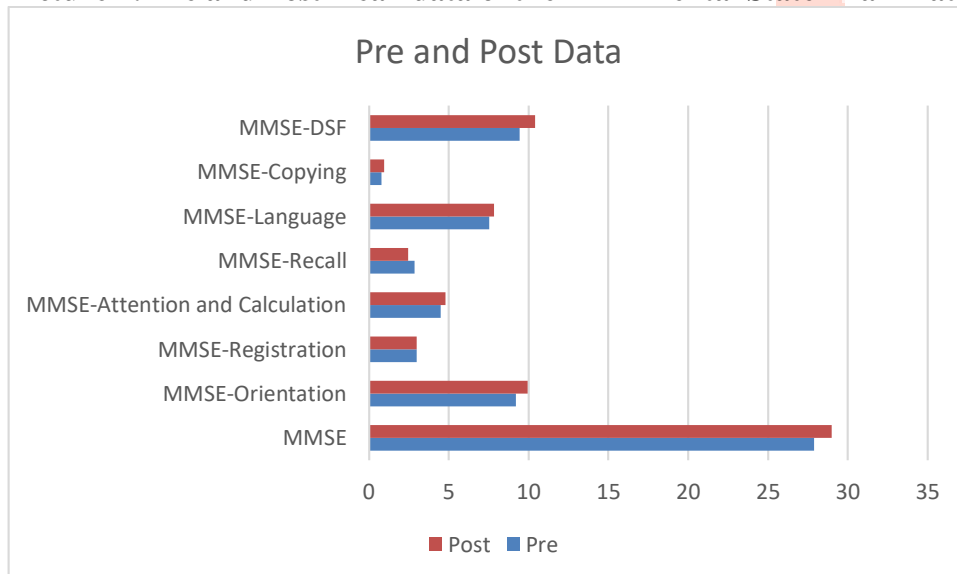
The age (Mean \pm Standard Deviation) is 44.75 ± 7.65 .

Table 1: Results of all the variables:

Variables	Pre (Baseline) (Mean \pm SD)	Post Intervention (Mean \pm SD)	% Change	P-value
MMSE	27.9 \pm 1.62	29 \pm 1.07	3.94	0.005 ^a
MMSE-Orientation	9.2 \pm 1.19	9.95 \pm 0.23	8.15	0.016 ^a
MMSE-Registration	3	3	0	1.000
MMSE-Attention and Calculation	4.5 \pm 1.23	4.8 \pm 0.53	6.67	0.340
MMSE-Recall	2.85 \pm 0.48	2.45 \pm 0.68	-14.03	0.033
MMSE-Language	7.55 \pm 0.51	7.85 \pm 0.36	3.973	0.034 ^a
MMSE-Copying	0.8 \pm 0.41	0.95 \pm 0.23	18.75	0.083
DSF	9.45 \pm 2.18	10.4 \pm 2.01	10.05	0.017 ^a

^aSignificant Change from Pre-Intervention to Post Intervention.

Picture 1: Pre and Post mean data of the Mini-Mental State Examination and Digital Span Test scores.



DISCUSSION:

The present study aimed to measure the change in cognitive health through MSRT in healthy middle-aged group participants. After 25 days of intervention, the results show an increase in overall cognitive health and memory although only significant for the variables MMSE ($P < 0.005$), Orientation ($P < 0.01$), Language ($P < 0.03$), and DSF ($P < 0.01$). The variable Recall had a negative result in the post-assessment. The current study shines light to the power of the practice and has the potential to improve the cognitive health of individuals.

In one study, the practice of MSRT reduced state anxiety, and improved cognitive function immediately after the intervention, in anxiety disorder patients^[16] In another study, 10 days of MSRT intervention helped reduce chronic neck pain, state- trait anxiety, blood pressure, pulse rate while improving neck flexion and extension as compared to conventional physiotherapy^[18] In a third study, improvements in cognitive function were observed immediately after MSRT practice in patients with type 2 diabetes mellitus.^[15]

Another study was conducted on geriatric patients, to check for the effect of MSRT on the quality of sleep. The results found in the study are like those found in the various literature studied on this subject.

Conclusion:

The Practice of MSRT regularly can increase the overall cognitive health of healthy working individuals of Urban South Kolkata. The practice will further enhance their quality of life as well as well-being. It is easy to practice, cost effective

Appraisal: Strengths

It gives us an insight into the relative cognitive improvement in the healthy working individuals.

Limitation:

The absence of a control group and short duration study.

Further study:

The same study with a larger sample size, longer duration, more assessment tools and a robust methodology can be further studied.

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