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Impact of Meditation in Memory of Health Science Students

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ABSTRACT
Aim: *The present study is to examine the changes in memory of health science students with meditation.*
Materials and Methods*: Fifty healthy health science students in the age group of 17-23 were considered for the study. They were trained to practice meditation technique for 12 weeks and their memory was assessed using PGI (Post Graduate Institute) Memory scale before and after intervention at Annapoorana Medical College, Salem, Tamilnadu, India.*
Result and Conclusion*: Results suggest that after practicing meditation there was a significant improvement in memory comparing with memory level before meditation. These results may be due to personality development, higher concentration and reduction of distraction thoughts (mind wandering) due to meditation training.*
Keywords: *Meditation, Memory, Cognitive function.*

INTRODUCTION

The practice of mediation has a pre-historical origin. Some of the earliest references to meditation were found in the Hindu Vedas during the Vedic period [Iron Age India- George S. et al (2002)]. The word meditation was used to describe practices that self-regulate the body and mind, thereby affecting mental events, by engaging a specific attention.[B. Rael Cahn et al(2006)].The word "meditation" stems from the Latin *meditari*, which means to participate in contemplation or deliberation. Meditation includes a variety of practices aimed at focusing attention and awareness. Two general forms of meditation were focused attention and open monitoring. Mindfulness training also involves meditation. Mindfulness meditation practice is the framework used to develop the state, or skill, of mindfulness.[Lutz et al (2008)]. Meditation is seen by a number of researchers as potentially one of the most effective form of stress reduction. All the brain based skills were cognitive abilities. There are various cognitive abilities like memory, attention, language, visual and spatial processing, logics and reasoning, interpersonal skills, intrapersonal skills etc[M Singh et al (2014)].The term " Memory" has a dual meaning. It refers to the process or processes whereby we store and preserve newly required information for later recall. According to CrooksMemory is used to store and recall information [Crooks et al (1991).The research done by Mind/Body Institute, Harvard Medical

School and Bruce D' Hara and his team at the university of Kentucky in Lexington, U.S. revealed a positive influence of meditation on brain functioning, performance and concentration. [Motluk et al (2005)].

Memory is classified into two types: short term memory (or working memory), and long term memory. Working memory have limited storage capacity, it can hold seven items in not more than 20 to 30 seconds. Lack of working memory leads to many problem- looking again and again the text, while copying, reading the same lines etc. Transcendental meditation reduces stress and improves memory. [Michaels RR,(1992)]. A number of physiological changes during the TM technique predict cognitive improvement, such as increased blood flow to the brain and increased EEG coherence in parameters that are correlated with cognitive improvement.[Kam-Tim So et al (2001)].Meditation energizes the pre-frontal lobes of the human brain and in time, the limbic system becomes harder to arouse. This results in behavioural changes including better ego, integrity, fewer minor psychological problems, less depression and anxiety and better social skills [Houten&Van(2003)].

MATERIALS AND METHODS

Fifty healthy students in age group of 17-23 were selected from various heath science coursesfor the study. The participants were recruited from those who were interested in learning meditation and who had no prior meditation experience. The participantswith current or previous mental or neurological diseases, psychiatric, cardiovascular, respiratory orsystemic illness, smokers, and alcoholics were excluded. The study was conducted in the Department of Physiology, Annapoorana Medical College, Tamilnadu, India, during June - August, 2013. Meditation training was shared with the help of trained yoga teacher in six days for 45 minutes in the morning for 12 weeks. Participants practised meditation in a quiet room which was maintained at a comfortable temperature (25 ± 2ºC). Study was commenced after obtaining approval from the Institute's scientific advisory committee and human ethics committee. Memory assessment was done by Post Graduate Institute- Memory Scale (PGI-MS) by Dwarka Pershad & N.N.Wig, 1976 which is a battery to assess the memory. The study design was explained to the volunteers and made them aware that their participation would remain anonymous .The data was collected between 2-4 pm before and after intervention. Typical sessions of meditation were as follows and the data was statistically analysed.

1. Follow own breathing,
2. Repeat a mantra (om)
3. Concentrate on simple visual object-(Buddha)
4. Practice visualization-create a new space
5. Do a body scan

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RESULTS

There was significant difference in memory level after meditation (comparing before and after level of memory).The distribution of studentsat different memory levelwasconsiderably different in the before and after readings.By using KolmogrovSmirnov test it wasvalidated as Dn= 0.28 withP value<0.05

Fig:1 Distribution of 50 cases before and after meditation

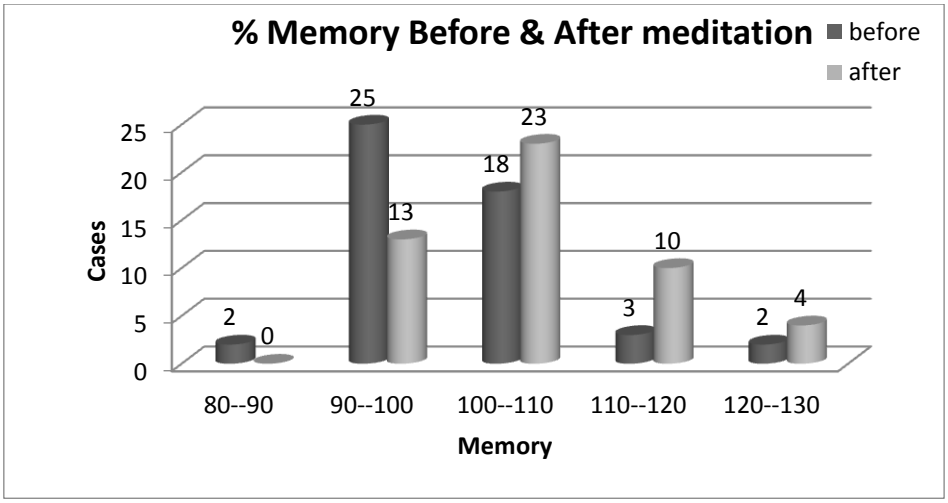

Table:2 Memory before and after meditation

Memory	Before	After
Mean	100	106.168
SD	8.5138	8.0377
t	4.946898194	
p value	9.27936E-06<005	

There was significant difference in the average memory before and after meditation.

Using **t test P <0.05** indicates the difference**.**

Fig:2 Characteristics of memory B /A

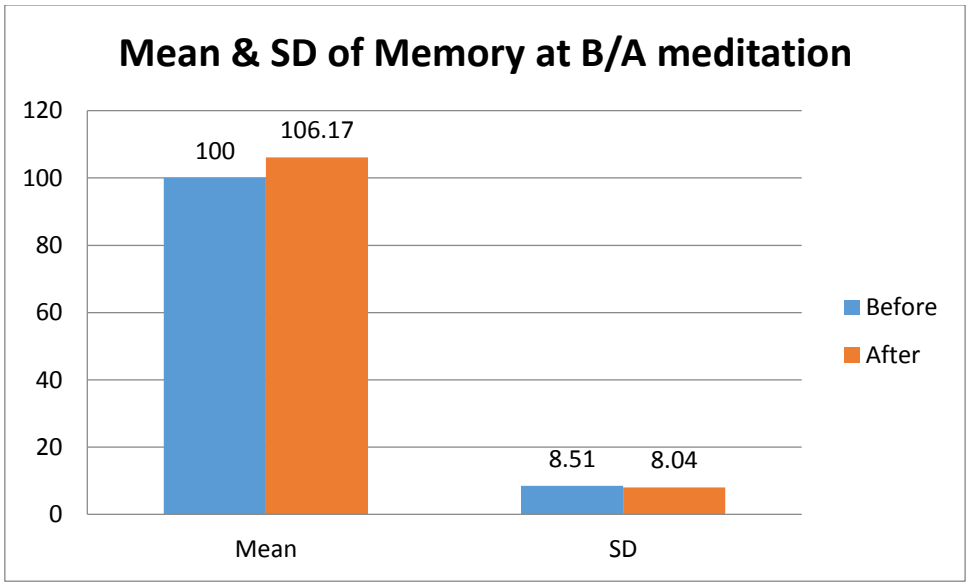

Table:3 Distribution of Memory B/A meditation

Before/After	90--100	100--110	110--120	120--130	Total
80--90	0	2	0	0	2
90--100	10	9	4	2	25
100--110	3	11	4	0	18
110--120	0	0	2	1	3
120--130	0	1	0	1	2
Total	13	23	10	4	50

The correlation coefficient of Memory B/A meditation is r=0.383854 with p value = 0.000728<0.05 showing that there was significant correlation between memory readings before and after meditation.

So a linear regression model of memory can be developed which will be useful to estimate the memory after the meditation. The equation isy=0.36329 x + 69.92904

Fig: 3 The regression estimate line of memory after meditation based on before level.

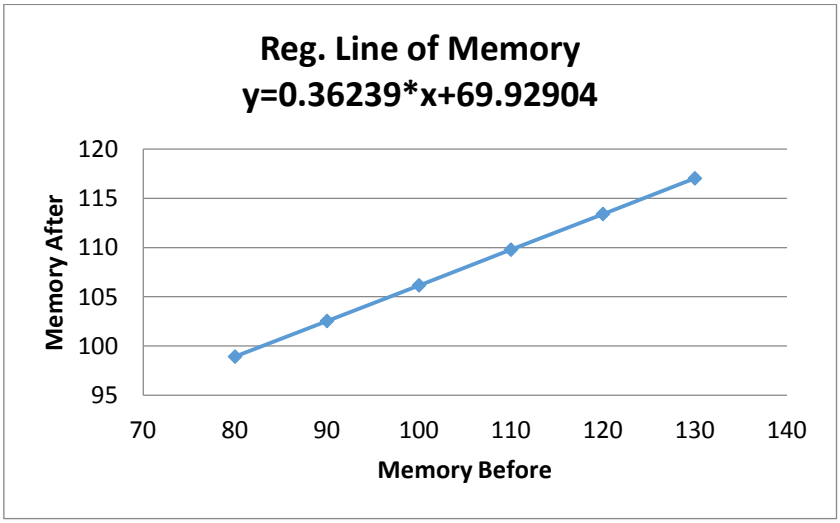

Table: 4 Change in Memory

	Change in Memory	
Change	Increase	Decrease
No.of Cases	40	10
Mean	8.935369	4.901393
SD	8.020345	3.380517

There is a significant average improvement of 4 unit of memory is found in 40 cases. Using t test, as t=0.01302 **, P value = 0.989659 >0.05.**

DISCUSSION

This study was done to observe effect of meditation on memory power of Health science students and has shown an immediate change in memory with three months practice of meditation. These results may be due to personality development, higher concentration and reduction of distraction thoughts (mind wandering) due to meditation training. Meditation is considered an effective way training attentional brain networks which has shown benefit cognitive processing in humans [Shruti Baijal et al (2009)]. Meditation is based on promoting a balance between a relaxed and vigilant state of mind. It is possible that the calming effects of mindful meditation combined with the increased capacity to focus on the present improved cognitive performance after brief training. Meditation training enhances present moment awareness by teaching participants to notice subtle distractions (feelings; thoughts; emotions) while repeatedly bringing attention back to the meditation object. This process can promote attentional stability,[Zeidan et al(2010)].Training of attention skills enhances the capability to sustain non-judgmental awareness of one's thinking patterns, emotions, and sensory perceptions,[Malinowski P et al (2011,2013)]. This awareness facilitates gain distance from thoughts and emotions such that these become less powerful and compelling. A 2012 study showed that people who meditate exhibit higher levels of gyrification — the "folding" of the cerebral cortex as a result of growth, which in turn may allow the brain to process information faster. Though the research did not prove this directly, scientists suspect that gyrification is responsible for making the brain better at processing information, making decisions, forming memories, and improving attention,[Eileen Luders et al (2012]).

CONCLUSION

It may be concluded from the findings of the study that with intervention of the meditation, the Memory improves, which may positively improvethe performance of the students.

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