

## RESEARCH ARTICLE

### Role of yoga in attention, concentration, and memory of medical students

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#### ABSTRACT

**Background:** The processes of attention, concentration, and memory are the main factor in learning. Yoga is an ancient technique which is claimed to enhance physical and mental well-being. **Aims and Objectives:** The aim of this study is to evaluate the influence of yoga in attention, concentration, and memory of medical students. **Materials and Methods:** A total of 100 healthy medical students in the age group of 17–23 were considered for the study. They were trained to practice yoga technique for 12 weeks, and their attention, concentration, and memory were assessed using Postgraduate Institute memory scale before and after intervention at Annapoorana Medical College, Salem, Tamil Nadu, India. **Results:** The results showed statistically significant improvement in attention, concentration, and memory of yoga group ( $P < 0.001$ ) when compared with the control group. **Conclusion:** This study suggests that after practicing yoga there was a significant improvement in attention, concentration, and memory. These changes may be due to personality development, higher concentration, and reduction of distraction thoughts (mind wandering) due to yoga training.

**KEY WORDS:** Yoga; Memory; Attention; Concentration and Cognitive Function

#### INTRODUCTION

These days anxiety, mental tensions, and stress have become almost an inevitable companions of medical students. The negative impact of this leads to lack of attention, concentration, and memory. To have good concentration and attention, one has to be relaxed first, this can be achieved by yoga. The relaxation response of yoga can improve attention, concentration, and memory. Yoga is an ancient science and way of life which includes physical movements; postures, meditation, and pranayamas. It shows that yoga practice could improve the participants to focus on their mental resources, information processing more quickly and more accurately and also learn, hold, and update information

effectively. Yoga has shown a positive impact on mental health and well-being, attention - concentration, memory, and physical fitness. Yoga can increase student's ability to concentrate, focus, and improve memory.<sup>[1]</sup>

Researches done exploring the effects of practicing yoga in educational settings on young adolescences have shown potential benefits in various domains. Brain activity is associated with different cognitive processes and plays a critical role in different yogic practices. Yoga is the best lifestyle modification, which aims to attain the unity of mind, body, and spirit through Asana (exercise), Pranayama (breathing), and meditation.<sup>[2]</sup> Various studies in adult populations have proved the importance of yoga which is better than exercise in its ability to improve psychological outcomes.<sup>[3]</sup> There are studies which compared physical education and yoga and proved yoga has better benefits in schoolchildren.<sup>[4]</sup> Some studies suggest that there is a positive relationship between fitness level and concentration of attention and memory among children.<sup>[5]</sup> Two important components of cognition that can be readily assessed are

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attentional control and working memory. Working memory forms a core component of the executive function of the brain. They form a part of the central executive functions, along with planning, abstract thinking, and task coordination. Both single bouts of exercise and prolonged physical activity have been found to impact cognition and executive functions.

Many of the published studies have been exploratory in nature and have been limited by various methodological and statistical weaknesses. In addition, although yoga is making its way into school and extracurricular programs, there is very few research on the impact of yoga on adolescents, and much of this small body of research is limited by poor methodological quality.<sup>[6]</sup> Yoga has an important role in improvement of a cognitive task of attention and concentration.<sup>[7]</sup> This study has pointed out that yoga has a role on reducing distractibility and improving ability to concentrate.<sup>[8]</sup>

With this background, the objective of this study was to study the effect of yoga on attention, concentration, and memory of the medical students with questionnaire Postgraduate Institute memory scale and to compare the effects of these interventions on human cognition.

## MATERIALS AND METHODS

This study was conducted at the Department of Physiology, Annapoorana Medical College, Salem, Tamil Nadu. Yoga modules were shared daily for 30 min in the morning for 12 weeks. A study was commenced after obtaining approval from the Institute's Scientific Advisory and Ethics Committee of Annapoorana Medical College, Salem.

### Participants

In this study, 100 healthy 1<sup>st</sup> year MBBS students in the age group of 18–22 years were recruited. The participants who had practiced yoga in the past 1-year and those with current or previous mental or neurological diseases were excluded from the study. The study design was explained to the participants and made them aware that their participation would remain anonymous and that they had the freedom to withdraw from the study at anytime.

### Study Design

The participants were divided into two groups, 50 experimental group and 50 control group. They were blind to the experimental conditions. The test scales were briefed to them. On the day of assessment, they reported to the Department of Physiology, Annapoorana Medical College, between 9 and 10 am. The data were collected before and after interventions to all the participants ( $n = 100$ ).

### Intervention

The students were trained with yoga technique for 1 week, before the intervention period starts. The participants were

made to practice yoga with a help of a certified yoga trainer for about 30 min, for 5 days a week, and for a duration of 12 weeks. A quiet and comfortable room which was maintained at a temperature ( $25 \pm 2^\circ\text{C}$ ) was provided for yoga practice. Typical sessions of yoga were as follows:

- Surya Namaskar - 4 min
- Padmasana - 4 min
- Paschimottanasana - 4 min
- Padahasthasana - 4 min
- Sarvangasana - 4 min
- Superbrain yoga - 1 min
- Vajrasana - 2 min
- Vrikshasana (tree stand pose) - 1 min
- Shavasana (corpse pose) - 6 min.

### Statistical Analysis

Comparison between pre-intervention and post-intervention scores of each group was carried out by paired *t*-test. All the quantitative variables are summarized using descriptive statistics such as mean and standard deviation.

## RESULTS

Comparison between before and after intervention PGMI memory scores of control group and intervention group was done. Results suggest that the group practicing yoga had significant improvement in attention, concentration, and memory in comparison to that of the control group. This result may be due to personality development, better attention, and concentration achieved due to yoga training. Comparison between before and after intervention of memory, attention, and concentration scores of control group was done using paired *t*-test, and the results along with mean and standard deviation are given in Table 1. This result shows non-significant at 0.05 level in control group. Table 2 shows that a significant change in memory, attention, and concentration in experiment group was the  $t = 2.801$  which gives  $P < 0.01$  in case of memory and  $t = 4.277$  which gives  $P < 0.001$  in case of attention and concentration.

## DISCUSSION

In this study, role of yoga in attention, concentration, and memory of medical students was done in a short duration of 3 months. A comparison was done between yoga group and control group using PGMI memory scale. The results suggest that the group practicing yoga had significant improvement in attention, concentration, and memory in comparison to that of the control group. This result may be due to personality development, better attention, and concentration achieved due to yoga training.

A 2012 study showed that practicing yoga and meditation reveal higher levels of gyrification - the “folding” of the cerebral cortex as a result of growth may allow the brain to process the information

**Table 1:** Comparison of memory, attention, and concentration scores before and after yoga in control group

Dimension	Mean±SD		t-value	P-value
	Before	After		
Memory	9.55±1.06	9.52±1.02	1.271 <sup>ns</sup>	0.209
Attention and concentration	17.18±2.57	16.97±2.64	1.897 <sup>ns</sup>	0.063

<sup>ns</sup>Non-significant at 0.05 level

**Table 2:** Comparison of memory, attention, and concentration scores before and after yoga in experiment group

Dimension	Mean±SD		t-value	P-value
	Before	After		
Memory	9.58±1.03	10.02±1.10	2.801**	<0.01
Attention and concentration	17.10±2.61	19.10±3.01	4.277**	<0.001

\*\*Significant  $P < 0.01$  level. SD: Standard deviation

quickly. This was not directly proved, but the scientists suspect that gyrification may be reason for making the brain more active at forming memories improving attention, processing information, and making decisions.<sup>[9]</sup> Yoga helps the student in the healing process, by playing an important role in their journey of health, and proves that healing comes from inside, instead of an outside source, and a greater sense of autonomy is attained. Yoga can increase sensitivity of postsynaptic membrane and the effective inhibition of the distracting signals, which may be responsible for the improved cognitive performance.<sup>[10]</sup> It is common that mind and body control techniques have potential beneficial impact on cognition. There are studies which have shown that the yoga practice elevates attention on breathing and specific muscles, referring to improvement in attention.<sup>[11]</sup> A study shows that yoga requires focusing on a particular point by which the person learns to control conscious thoughts which can help to improve concentration.<sup>[12]</sup>

In this study, the mean gain in memory attention and concentration has increased significantly in intervention group as compared to control group, and the result of the  $t$  value showed significant difference between the intervention and control group students. Attention and concentration are highly necessary for brilliant performance and that is possible only through yoga which is well proved here. The observed improvement can be attributed to the activation of neural pathways with enhanced formation and release of neurotransmitters and also may be due to higher level of gyrification due to yoga training. This may also contribute to personality development, higher concentration, and reduction of distracting thoughts (mind wandering). This important result may be considered in the light of some study limitations and further progressed with many more new studies with the help of more sophisticated techniques.

## CONCLUSION

This experimental study suggests that daily yoga practice for a short duration helps to improve attention, concentration, and memory of medical students. The authors suggest that one of the best strategies for improving academic performance is expanding the use of yoga techniques in medical colleges.

## REFERENCES

- Galantino ML, Galbavy R, Quinn L. Therapeutic effects of yoga for children: A systematic review of the literature. *Pediatr Phys Ther* 2008;20:66-80.
- Ganpat TS, Nagendra HR, Selvi V. Efficacy of yoga for mental performance in university students. *Indian J Psychiatry* 2013;55:349-52.
- Ross A, Thomas S. The health benefits of yoga and exercise: A review of comparison studies. *J Altern Complement Med* 2010;16:3-12.
- Noggle JJ, Steiner NJ, Minami T, Khalsa SB. Benefits of yoga for psychosocial well-being in a US high school curriculum: A preliminary randomized controlled trial. *J Dev Behav Pediatr* 2012;33:193-201.
- Hillman CH, Motl RW, Pontifex MB, Posthuma D, Stubbe JH, Boomsma DI, et al. Physical activity and cognitive function in a cross-section of younger and older community-dwelling individuals. *Health Psychol* 2006;25:678-87.
- Birdee GS, Yeh GY, Wayne PM, Phillips RS, Davis RB, Gardiner P, et al. Clinical applications of yoga for the pediatric population: A systematic review. *Acad Pediatr* 2009;9:212-200.
- Luders E, Kurth F, Mayer EA, Toga AW, Narr KL, Gaser C, et al. The unique brain anatomy of meditation practitioners: Alterations in cortical gyrification. *Front Hum Neurosci* 2012;6:34.
- Thomas JI, Venkatesh D. A comparative study of the effects of superbrain yoga and aerobic exercise on cognitive functions. *Natl J Physio Pharm* 2017;7:895-900.
- Oken BS, Zajdel D, Kishiyama S, Flegal K, Dehen C, Haas M, et al. Randomized, controlled, six-month trial of yoga in healthy seniors: Effects on cognition and quality of life. *Altern Ther Health Med* 2006;12:40-7.
- Subramanya, P. & Telles, S. Effect of two yoga-based relaxation techniques on memory scores and state anxiety. *BioPsychoSocial Medicine*.2009;(3):3-8.
- Prakash R, Dubey I, Abhishek P, Gupta SK, Rastogi P, Siddiqui SV, et al. Long-term Vihangam yoga meditation and scores on tests of attention. *Percept Mot Skills* 2010;110:1139-48.
- Abadi MS, Venkatesan JM. Effect of yoga on children with attention deficit/hyperactivity disorder. *Psychol Stud* 2008;53:154-9.

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