



Effect of Super Brain Yoga on Concentration and Memory in Children in a Selected Private School, Kelambakkam, Kanchipuram Dt, Tamilnadu, India

V. S. Viji^a, S. Subbulakshmi^{a*} and L. Uma Devi^b

^a Department of Child Health Nursing, Chettinad College of Nursing, Chettinad Academy of Research and Education, Kelambakkam, Chengalpattu, TamilNadu, India.

^b Department of Paediatrics. Chettinad Hospital & Research Institute, Kelambakkam, Chengalpattu, TamilNadu, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: The Sigmund Freud's psychosexual theory says that the school age is the important stage in the development of self-confidence. Many studies reveals that physical exercise has a positive effect in the cognitive intellectual areas of the children. Regular practice of simple exercise will makes the children more sharp minded and helps to give a better learning outcome

Material & Methods: The main aim of the study was to evaluate the efficacy of super brain yoga by measuring the changes in concentration and memory in children.. A quantitative evaluative approach was used for this study with a one group pretest and posttest design. The purposive sampling technique was used to select 120 students aged between 10 to 12 years who were studying in 6th and 7th standard. The practice of super brain yoga was given 20 times over 10 minutes per day for a period of one month. The Digit Cancellation Test and the Knox Cube Test was used to was used to assess the pretest and posttest level of concentration and memory in children.

Results: The pretest mean and standard deviation of concentration was 33.64±5.43 with a standard error of 0.496. The first posttest (at the end of second week of practice of super brain yoga) mean and standard deviation was 33.55± 5.378 with a standard error of 0.491 and the t-

*Corresponding author: E-mail: ksubbulakshmi@gmail.com;

value was 0.749. The second posttest (at the end of fourth week of practice of super brain yoga) mean and standard deviation was 33.67 ± 5.393 with a standard error of 0.492 and the t-value was 0.240. The pretest mean and standard deviation of memory was 33.67 ± 4.696 with a standard error of 0.429. The first posttest (at the end of second week of practice of super brain yoga) mean and standard deviation was 33.66 ± 4.654 with a standard error of 0.425 and the t-value was 0.080. The second posttest (at the end of fourth week of practice of super brain yoga) mean and standard deviation was 33.68 ± 4.700 with a standard error of 0.420 and the t-value was 0.074. The present study result shows that statistically there was no significant effect of super brain yoga on concentration and memory of children and no association between posttest level of concentration and memory of children with their selected demographic variables.

Conclusion: Hence the study concludes that the super brain yoga has no significant effect on concentration and memory of children with a duration of four weeks of practice. The study recommended that to bring the desired positive effect on children's concentration and memory the study can be conducted for a long period of time.

Keywords: Effect; super brain yoga; concentration; memory; children.

1. INTRODUCTION

The brain is one of the vital organs in the humans and animals. It is a most complex part of the body by anatomically and physiologically. Brain carries out many functions including cognitive, sensory, motor and integrative functions. The Sigmund Freud's psychosexual theory says that the school age is the important stage in the development of self-confidence [1]. He states that during this school age the sexual energy is directed into areas such as intellectual pursuits and social interactions [2,3]. This stage is also important in the development of communication and social skills. Many studies reveal that physical exercise has a positive effect in the cognitive intellectual areas of the children. Regular practice of simple exercise will makes the children more sharp minded and helps to give a better learning outcome. Super brain yoga is a simple exercise [4,5,6]. A study conducted among 56 middle school students who are experiencing problems in the academics and behaviour. They had been given super brain yoga practice for a minimum of two weeks [7-9]. After the practice of super brain yoga their academic performance increased by more than 21 percentage. The results showed a significant reduction in frustration and increased participation in students and also the fear and anxiety of the students were lowered and there was an improvement in the scores of standardized test and collaboration with peers [10].

Recent studies claims that this will increase the memory power, concentration, attention, creativity and reduce the psychological stress [11,12].

Joseph Ivin Thomas conducted a comparative study on effect of super brain yoga and aerobic exercise on cognitive functions. The study was conducted among 40 healthy medical students from MS Ramaiah Medical College, Bengaluru. The students were divided into two groups. Super brain yoga group and simple squats groups were practiced their respective exercises for four weeks. Audio- visual reaction time and visual working memory were assessed over a 4 weeks by using a portable response analyser device and n-back task respectively. The super brain yoga groups scores were $83.75 \pm 7.65\%$, week-4: $94.50 \pm 66.42\%$ and scores for simple squats groups were baseline: $84.80 \pm 7.53\%$, week-4: $88.75 \pm 7.60\%$. The more improvement scores shown in super brain yoga group than simple squats group [13].

In the current century the parents are very prone to provide extra nutritional supplementation by giving artificial drinks, which they think it can improve the memory power and concentration, but actually it may results in side-effects also [14-16]. Recently many studies claimed that this simple exercise of super brain yoga has the effect to improve the memory and concentration in children [17,18]. Hence to evaluate the efficacy of super brain yoga in concentration among children the researcher selected this study.

1.1 Objectives of the Study

1. To assess the pre-test level of concentration among children.
2. To assess the pre-test level of memory among children.
3. To evaluate the effectiveness of super brain yoga on concentration among children.

4. To evaluate the effectiveness of super brain yoga on memory among children.
5. To find out the association between the concentration of children and their selected demographic variables.
6. To find out the association between the memory of children and their selected demographic variables.

1.2 Hypothesis

Research Hypothesis

H₁: There is a significant difference in concentration and memory of children before and after super brain yoga.

H₂: There is a significant association between concentration and memory of children with their selected demographic variables.

2. MATERIALS AND METHODS

A quantitative analysis was used for this study to evaluate the effectiveness of super brain yoga on concentration and memory in children. A pre experimental one group pre and posttest design has been adopted for this research study. The study was conducted at Bhuvana Krishna Matriculation Higher Secondary School. This school is located at Kelambakkam, Kanchipuram District, TamilNadu. The school has classes from LKG to 12th standards with the strength of around 1000 students. The population for the study was school going children. The school children in the age of 10-12 years, studying in 6th and 7th standards and who met the predetermined inclusion criteria were the sample for this study. The sample size in this study was 120 children. The inclusion criteria in this study were the children aged between 10-12 years, able to do simple exercise, willing to participate and able to understand Tamil / English. The exclusion criteria were the children who were sick, with joint pain, with physical disabilities such as special children, who had super brain yoga induced pain continuously for more than 3 days and the children who are with ear lobe infection. Samples were selected by the purposive sampling technique. The samples were selected based on predetermined inclusion criteria of the suitability of super brain yoga.

2.1 Techniques of Super Brain Yoga

Super brain yoga were defined as a the simple exercise which consist of 11 steps. 1.Remove any jewellery , face east 2. Roll the tongues in the inward direction and press it firmly towards the roof of the mouth .3. Raise the left arm in

front of you 4. Fold at the elbow and reach the right earlobe.5.Hold the right earlobe with the left hand so that the thumb is on the outside and two fingers are on the inside, behind the ear. 6.Extend the right arm. 7.Fold at the elbow and reach left earlobe . The right arm will cross over the left one .8. Position the thumb and forefinger in the same manner as on right earlobe 9. Inhale deeply through the nose.10. Simultaneously squat down gently to a sitting position , with the arms as above . 11.Exhale gently and rise to standing position as exhaling. Repeat the exercise six times in 10 minutes (20 times) daily in the morning(except Sunday and holidays) for one month will helps to improve the concentration and memory of children.

2.2 Sample Size Estimation

The sample size of the present study was 120 children, calculated by 50% effect size, 5% confidence interval and 95% of confidence level by using open epi formula.

$$N = t_2(p) \times (q) / d^2.$$

Confidence interval 5%,

Effect size 50%

Confidence level 95%

Calculated sample size was 108

Considering a attrition rate of ten percentage, the sample size considered for the main study was 120.

2.3 Research Instrument

There were three sections in the research instrument.

2.3.1 Section 1: demographic variables

Selected demographic variable of children such as age, gender, education, monthly income, religion, type of family, hobbies in leisure time and performance at school.

2.3.2 Section 2: digit cancellation test

The digit cancellation test was used to measure the concentration of the children. Three trials were given and then average of the score has been taken. The desired response was obtained by scanning the arrays of digits and crossing out the notified digits. The scoring interpretation is as follows.

S. No.	Score	Percentage	Inference
1	0-24	<50	Less concentration
2	25-30	50-60%	Moderate concentration
3	31-35	61-70%	Good concentration
4	36-40	71-80%	Very good concentration
5	41-50	>80%	Excellent concentration

2.3.3 Section 3: knox cube test

The Knox cube test was used to measure the memory of the children. In this test five one inch cube blocks of the same colour were used. Four blocks were placed in a row in front of the participant about 2 inches apart. The examiner taped the blocks in a prescribed definite order and asked the participant to do the same. The examiner proceeded till 25 times and gave two points for each line correct. The scoring interpretation is as follows.

2.4 Data Collection Procedure

The main study data collection started on 26th November and ended on 26th December of 2019. Before conducting the main study the researcher met the school authorities and obtained permission to conduct the study. Obtained oral consent from the parents and written consent from legally accepted representatives. Obtained informed consent from the each study participants. Samples were selected based on the inclusion and exclusion criteria by using purposive sampling technique. A pretest was conducted to assess the concentration and memory level of children by using Digit Cancellation Test and Knox Cube Test. After the pretest, the researcher demonstrated the super brain yoga to the study participants and they practiced super brain yoga 20 times over 10 minutes daily in the morning for one month. The first posttest were conducted at the end of the 2nd week and second post test conducted at the end of the 4th week to assess the concentration and memory level of the participants by using Digit Cancellation Test and Knox Cube Test.

3. RESULTS and DISCUSSION

3.1 Demographic Variables N-120

In this present study 50.0% of children were female and 50.0% of children were male. The children participated in the study were 50.0% of children from sixth standard and 50.0% of children from 7th standard. The most of the

children's (43.3%) family monthly income was >20000 Rs/- . Majority of children (81.7%) participated in this study was from Hindu religion. Among the children 68.3% were belongs to nuclear family. Regarding the hobbies at leisure time 42.5% of children have the hobby of playing carroms. Academic performance of most of the children (75.8%) was average.

Table 1 shows that the pretest mean and standard deviation for concentration were 36.64±5.43 and standard error was 0.496 and in first posttest, the mean and standard deviation was 36.55±5.378 and the standard error was 0.491. The calculated t value was 0.749 and which is not significant.

In second posttest on concentration, the mean and standard deviation was 33.67±5.393 and standard error was 0.492 and the calculated t value was 0.240 which is also not significant. The Cohen's d value is 0.01 for first post observation and 0.06 is for second post observation. This shows there is no significant difference between before and after intervention of super brain yoga on concentration of children. Hence the research hypothesis H₁ is strongly rejected.

A similar study was conducted on effect of super brain yoga on cognitive tasks by Genovese et al. Two experiments was carried out in this study. In the first experiment 30 adults were provided with standard squats, super brain yoga and a rest trial. Before and after the intervention a Number Facility Test was applied. The nonparametric Quade test showed no significant difference in the cognitive tasks before and after the practice (p=0.99, Kendall's W=0.005). The second experiment done with 30 adults. They were provided with practice of standard squats and two alternative forms of super brain yoga. Number Facility Test administered before and after intervention. The Quade test result showed no significant difference in the pre and post results (p=0.19, Kendall's W=0.086) [19].

S. No.	Score	Percentage	Inference
1	0-24	<50	Less memory
2	25-30	50-60%	Moderate memory
3	31-35	61-70%	Good memory
4	36-40	71-80%	Very good memory
5	41-50	>80%	Excellent memory

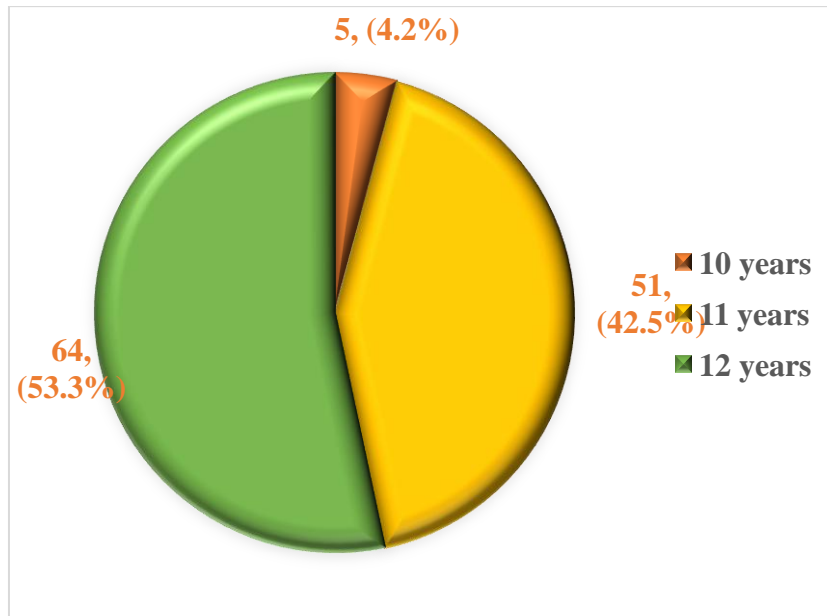


Fig. 1. Frequency and Percentage Distribution of Age of children

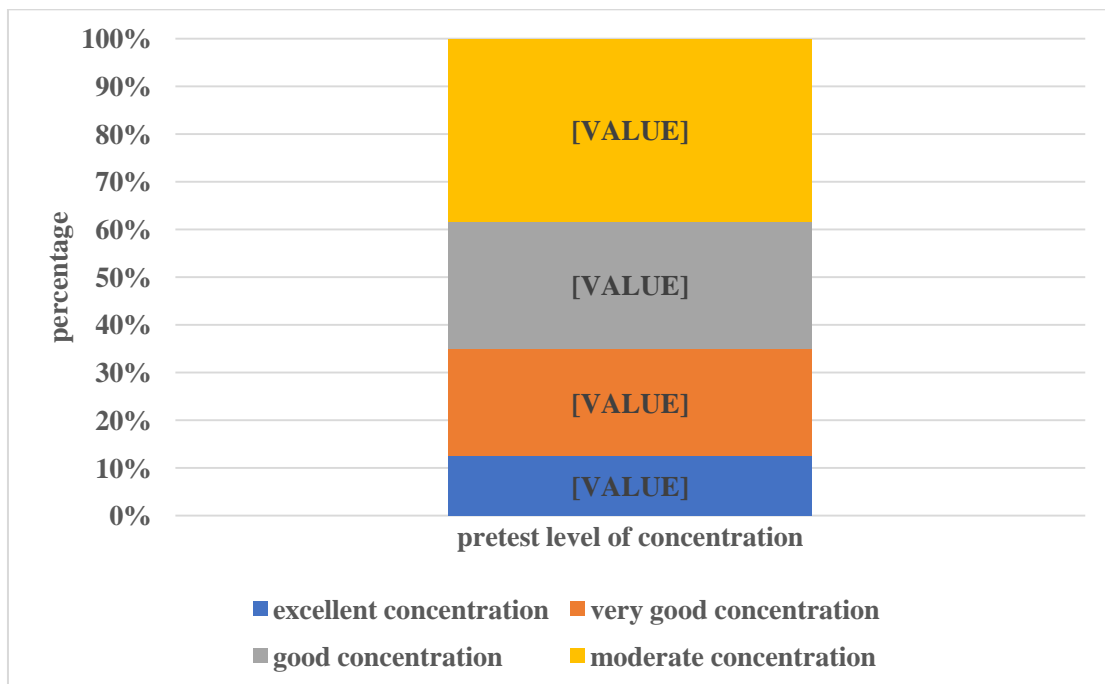


Fig. 2. Frequency and Percentage Distribution of Pretest Level of Concentration in Children N-120

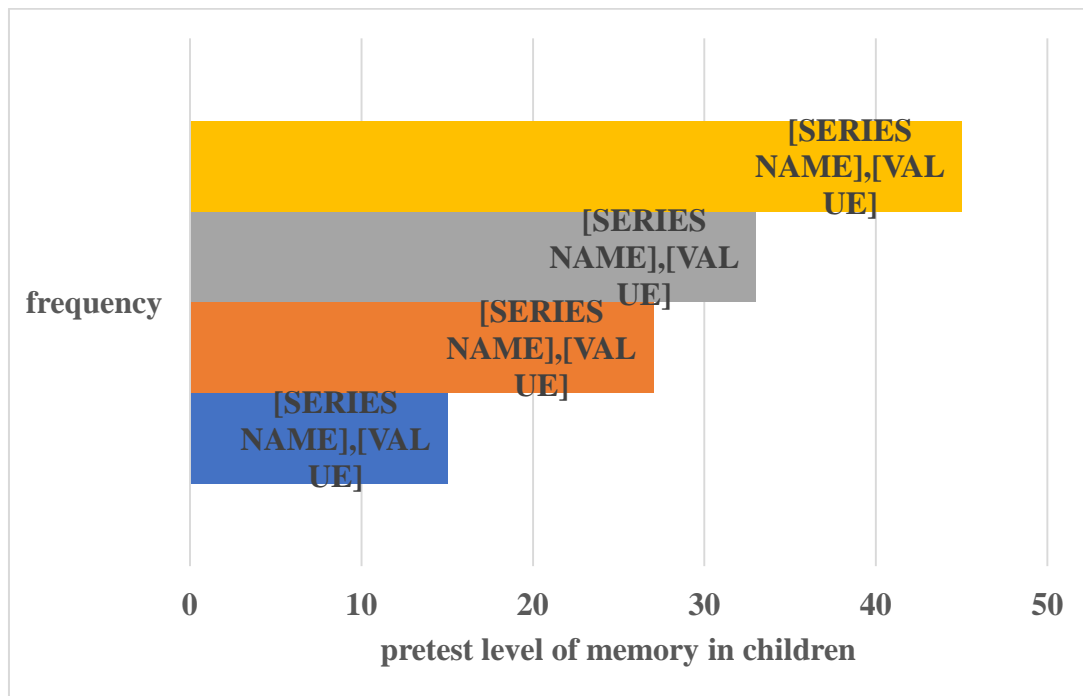


Fig. 3. Frequency and Percentage Distribution of Pretest Level of Memory in Children

Another one similar study was conducted on effects of thoppukaranam on selective attention and psychological states such as mental concentration, state anxiety and state mindfulness by Angelica Chandrasekaran, Sasidharan K Rajesh and TM Srinivasan. 30 undergraduate students who were in the age group between 17-29 years from a Residential University in Southern India were the samples. The control group were practice normal squats (108 rounds) and experimental group practiced thoppukaranam (108 rounds) in a period of ten days. By using D2 Attention Test selective attention and mental concentration were assessed, and by using Mindful Attention Awareness Test and State Anxiety Inventory assessed the psychological states like state anxiety and state mindfulness before and after the intervention, results showed a significant improvement in selective attention ($F=14.52$, $p<0.001$) and mental concentration ($F=17.98$, $p<0.001$) [20].

In this previous study the intervention of yoga was given for a period of 10 days in 108 rounds and the samples were between the age group of 17-29 years in which they have include long term yoga practitioners also. The study results showed a significant difference in the mental concentration and attention. But in the present study the researcher selected the children

between the age group of 10-12 and they practiced super brain yoga for a month 20 times over 10 minutes every morning. These children were not a long term yoga practitioner. The present study results revealed no significant difference between pre and post intervention. This might be due to the short duration of intervention for a novice group of samples. Long term duration of practice of super brain yoga may be effective, but even though short duration practice did not show any effectiveness. Hence, the researcher recommends more studies to prove the exact effect of super brain yoga on concentration in children.

The pre-test mean and standard deviation for memory were 33.67 ± 4.696 and standard error was 0.429 and first posttest reveals the mean and standard deviation of 33.66 ± 4.654 with a standard error of 0.425 and the calculated t value was 0.080 which is not significant.

Second post-test reveals the mean and standard deviation 33.68 ± 4.700 with a standard error of 0.429 and the calculated t value was -0.074 which is not significant. The Cohen's d value for first post test was .002, and for second posttest was 0.002. This showed that there is no increase in level of memory in children after the practice of super brain yoga. Hence the research hypothesis H_1 is strongly rejected.

Table 1. Effectiveness of super brain yoga on concentration in children N-120

S. No.	Parameter	Concentration	
1.	Pretest Level	Mean	33.64
		Standard Deviation	5.431
		Standard Error	0.496
2.	Posttest Level on Second Week	Mean	33.55
		Standard Deviation	5.378
		Standard Error	0.491
		t Value	0.749
3.	Posttest Level on Fourth Week	Mean	33.67
		Standard Deviation	5.393
		Standard Error	0.492
		t Value	0.240

Table 2. Effectiveness of super brain yoga on memory in children N-120

S. No.	Parameter	Memory	
1.	Pre-test Level	Mean	33.67
		Standard Deviation	4.696
		Standard Error	0.429
2.	Post-test Level on Second Week	Mean	33.66
		Standard Deviation	4.654
		Standard Error	0.425
		t Value	0.080
3.	Post-test Level on Second Week	Mean	33.68
		Standard Deviation	4.700
		Standard Error	0.429
		t Value	0.074

A similar study was conducted on effect of super brain yoga on concentration, memory and confidence among 1945 school children, aged between 6 to 18 years by Srikanth N Jois and Lancy D'Souza. The school teachers were taught the super brain yoga and they were asked to give practice of super brain yoga to students for three months. By using super brain yoga questionnaire the effect of practice were assessed. The results showed that 75% of children felt increase in the concentration level ($\chi^2=1299.546$, $p<0.001$) and 75.9% of children were felt memory enhancement ($\chi^2=1643.307$, $p<0.001$) and 86% of children experienced increased confidence ($\chi^2=2441.029$, $p<0.001$) after the practice of super brain yoga [21].

The previous studies showed a significant difference in the concentration, memory and confidence of children with a duration of three months practice of super brain yoga. But the present study showed no difference in the memory of children before and after the intervention with four weeks duration of practice of super brain yoga. A longer duration of practice of super brain yoga might be effective in the same age group of children. Hence, the

researcher recommends more studies to assess the exact effect of super brain yoga in memory of children.

3.2 Association between Concentration and Selected Demographic Variables in Children

In the present study the one of the objective was to assess the association between concentrations of children with their selected demographic variables. The demographic variables in this study were gender, education, monthly income, religion, type of family and hobbies at leisure time. Using chi-square test the association between the concentration and demographic variables were assessed. The χ^2 value for the age was 9.367, for the gender 1.577, for the education 6.899, for the monthly income 6.092, for religion 2.972, for the type of family 1.107 and for the hobbies at leisure time 11.771. This indicates that there is no association between the concentration and demographic variables of the children. This might be due to shorter duration of the practice of super brain yoga. Hence more studies are

needed to assess the exact effect of super brain yoga on concentration and memory in children.

3.3 Association between Concentration and Selected Demographic Variables in Children

The final objective of the present study was to assess the association between memories of children with their selected demographic variables. The researcher calculated the association by using chi-square test and the values found for the age was 10.404, for the gender was 2.144, for the education was 7.774, for the monthly income was 6.545, for religion 3.046, for the type of family was 1.502 and for the hobbies at leisure time was 10.848. This result revealed that there is no significant association between memory of children with their selected demographic variables such as age, gender, education, family monthly income, religion, type of the family, and hobbies at leisure time. Hence more studies are needed to assess the exact effect of super brain yoga on concentration and memory in children.

4. CONCLUSION

The study results also showed that there was no significant difference between before and after the practice of super brain yoga. This may be due to the short duration of the practice of intervention. There is also no significant association between the concentration and memory of children with their selected demographic variables. More study can be carried to rule out the experiment with longer duration. Hence the study concluded that practice of super brain yoga for 4 weeks has no effect to bring the desirable changes in concentration and memory among children, there by more studies can be encouraged to assess the exact effect of super brain yoga on concentration and memory in children.

CONSENT

Obtained clearance from College Research Committee of Chettinad College of Nursing, Post Graduate Committee and Institutional Human Ethics Committee from Chettinad Academy of Research and Education. Received written permission from the Bhuvana Krishna Matriculation School authority (Principal) to conduct the study. Obtained written Consent from each participant before enrolling into the

study. Obtained oral consent from the parents and written consent from the legally authorized representatives (respective class teachers).

ETHICAL APPROVAL

The study was approved by the Institutional Human Ethics Committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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