

Effects of Brain Gym Exercises in Improving Memory among Adults

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Received September 26, 2023; Revised October 06, 2023; Accepted November 09, 2023

ABSTRACT

Background: Brain Gym Exercises can significantly improve the cognitive function of the adults. The positive impact of Brain Gym on the adult, after two weeks of implementation there has been an increase in memory, cognitive function, concentration, attention and alertness to reduce senility or dementia. Exercise influences the brain in ways in protection of memory and thinking. Physical exercise training has greater impact on spatial memory, working memory and executive attention.

Aim and Objective: The aim of study was to assess the effects of Brain Gym Exercises in improving memory among adults.

Need of the Study: Lack or loss of memory can be considered as one of the causes of frustration. Memory loss due to older age is not the same as in case of dementia. Enhancement of cognitive skills, prevention of memory loss, and protection of the grey matter can be hastened by Brain Gym exercises in adults.

Method: 30 Subjects of age 30-40 years suffering were separated into two groups. 15 subjects, who were included in the control group were given regular breathing exercise and the remaining 15 subjects who were included under the experimental group were treated with brain gym exercises for a period of six weeks, one hour per day for 5 days per week. The outcome measure used was Memory Functioning Questionnaire (MFQ).

Result: Statistically analysis was done by paired t-test. From the result of the statistics, the loss of memory of subjects was prevented.

Conclusion: The study concluded that brain gym exercise was more effective in improving memory among adults.

Keywords: Brain gym exercise, Cognition, Memory, Memory function, Memory function questionnaire

INTRODUCTION

Memory is defined as the procedure of recalling event, learn earlier [1]. Ability to remember and to recall the past incidence will be a difficult task for few people, as the subtle changes in memory occur naturally. Memory capabilities only occur in human learning, which is a crucial process for humans by flowing information captured by the senses, forwarded, reduced, collaborated, rediscovered, and utilized [2].

Brain Gym describes a set of exercises which influences the areas of concentration and memory [3]. It helps to improve academics, coordination, organization and attitude [4]. It is based on principle of training the person through movements.

Brain Gym Exercises [5] was originally framed to improve learning through mind body exercises [6]. Exercise improves the circulation and stimulates changes in the brain that improves learning. Brain Gym Exercises can significantly

improve the cognitive function of the adults [7,8]. The positive impact of Brain Gym on the adult, after two weeks of implementation, has shown a great increase in memory, cognitive function, concentration, attention and alertness to reduce senility or dementia [9,10]. Physical exercise training has greater impact on memory [11]. It improves the learning skills of students [12].

Brain Gym helps students to achieve their target easily. It is also used by athletes, in promoting their skill. Brain Gym is

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Citation: Manjula S & Selvam SP. (2024) Effects of Brain Gym Exercises in Improving Memory among Adults. Int J Clin Case Stud Rep, 6(1): 237-244.

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considered as a useful tool, enhancing people to influence changes in areas and thereby recall the memory which was stagnated [13,14].

In middle- aged people, memory is a cognitive function that often tends to decline. Long-term memory is rarely changed, while short-term memory can be instantaneously deteriorating in 0-10 min. Some studies stated that brain gym and memory games therapy can prevent dementia [15]. Brain Gym can be used to stimulate cognitive function at every stage of the game, and are proven effective in improving cognition function in the elderly [16]. The benefits of brain gym include reducing emotional stress, improving the relationship between humans and learning atmosphere/work more relaxed and happier, increasing the language and memory skills, causing people become more enthusiastic, more creative and efficient. People will feel healthier because of reduced stress and improving their learning and work performance [17].

AIM AND OBJECTIVE

The aim of study was to assess effects of Brain Gym Exercises in improving memory among adults.

RESEARCH DESIGN AND METHODOLOGY

An experimental study design was conducted with 30 patients within the age group ranging between 30 and 40 years who fulfilled the inclusion and exclusion criteria.

Inclusion Criteria

- Age group - 30 to 40years
- Both male and female
- Mild cognitive impairment
- Dementia
- Low physical activity

Exclusion Criteria

- Diabetes
- High blood pressure
- Alcohol addiction
- Visual and Auditory impairment
- Psychiatric problem

Outcome Measures

- Questionnaire (MFQ) Memory Functioning

PROCEDURE

Sample selection was done based on the inclusion and exclusion criteria. Consent form was received from the subjects in written format. Study consists of 30 subjects

ranging within the age group between 30-40years. They were divided into 2 groups, namely Group A and B. After explaining subjects about the treatment, assessment was taken prior to the commencement of treatment with outcome measure. The total population group of (n= 30) was divided into 2 groups.

Group-A: Control group- 15 SUBJECTS-(Regular Breathing exercises)

Group-B: Experimental group -15 SUBJECTS-(Brain gym exercises)

The 15 subjects in the control group were asked to perform breathing exercise and the 15 subjects in the experimental group were trained to perform the brain gym exercises for a duration of one hour per day. It was continued for 5 days per week for 6 weeks. The demographic data and pre-intervention variables of Memory Functioning Questionnaire (MFQ) were measured and documented. Data analysis was done based on their grades.

The Brain Gym exercises are:

Brain Buttons: Place one hand across the belly button and rub the brain buttons with the other hand. Then move the eye left and right (**Figure 1**).



Figure 1. Brain Buttons.

Cross Crawl: Marching on the spot touching the right knee with the left-hand and then touching the left knee with right hand (**Figure 2**).



Figure 2. Cross Crawl.

Unlocking Ears: Place the hands at the top of both ears. Gently unroll the ears from the top to the bottom (**Figure 3**).



Figure 3. Unlocking Ears.

Hook ups: Cross the leg. Extend the arms, cross them over at the wrist, lift up fingers and bring the hand above to the chest close the eyes, hold and focus on the breathing (**Figure 4**).



Figure 4. Hook ups.

Air Drawing: Pointing with both fingers, drawing in air, make sure right and left fingers are in symmetry with each other (**Figure 5**).



Figure 5. Air Drawing.

Figure Eights: Point the fingers and draw huge figure eight sideways in the air. Make sure cross over both side of the body and take turns with both hands (**Figure 6**).



Figure 6. Figure Eights.

More Hook ups: Join the finger tips together to make a tent. One at the time, tap each finger pair together (**Figure 7**).



Figure 7. More Hook ups.

METHODOLOGY

Statistical Analysis

Descriptive variables

- Mean and Standard deviation for variables like Age, MFQ
- Frequency distribution for categorical variables like Gender

Inferential Statistics

- Intra Group - Paired Sample t-test
- Inter Group - Independent Sample t-test

Hypotheses

Null Hypothesis, H_0 : $\mu_d = 0$

There is no significant effect of Control group A or Experimental group B in terms of measures such as MFQ

Alternate Hypothesis, H_1 : $\mu_d > 0$

There was significant effect of control group A or Experimental group B in terms of measures such as MFQ

μ_d = mean difference between Pre and Post-test scores;

d = difference between post and pre-Test Score

Level of significance, $\alpha = 0.05$

Test applied: Paired Sample t-test

Inferential Statistics

Testing the effect of control group-Treatment - A in increasing the value of MFQ from Week 1 (Pre) to Week 6 (Post)

H_0 : There is no significant effect of Treatment A in increasing the value of MFQ from Week 1 (Pre) to Week 6 (Post)

H_1 : There is significant effect of Treatment A in increasing the value of MFQ from Week 1 (Pre) to Week 6 (Post)

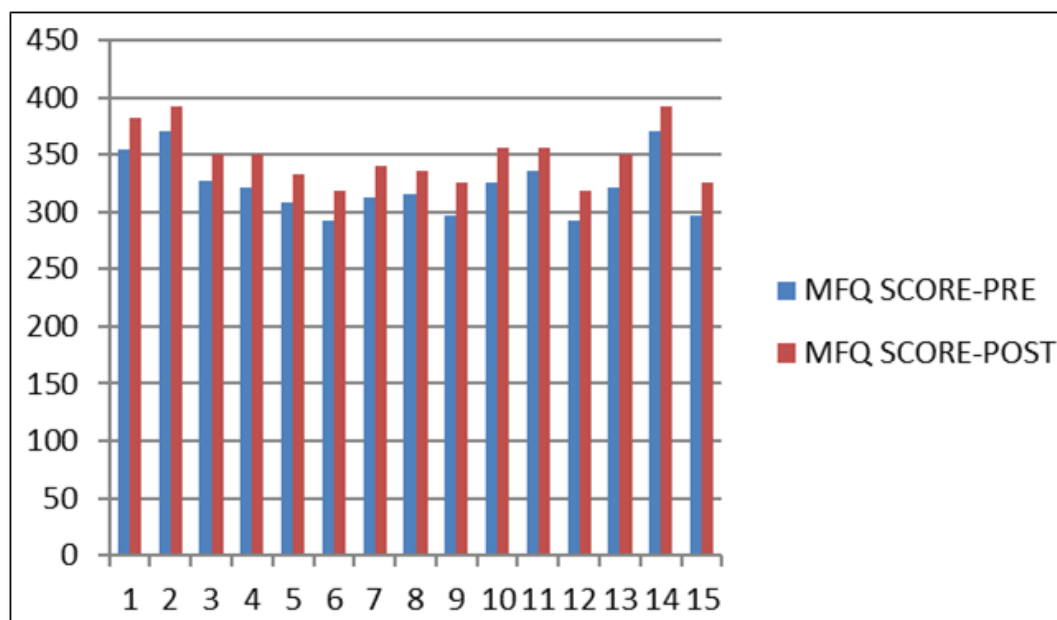
The above hypothesis is tested by use of paired t-test and the output is as follows (Output of Paired t-test):

Control Group:

t-Test: Paired Two Sample for Means (**Table 1 & Graph 1**).

Table 1. The variables of pre-& posttest MFQ scores of control group.

Variables	MFQ SCORE-POST	MFQ SCORE-PRE
Mean	348.5333333	322.8666667
Variance	610.552381	652.552381
Observations	15	15
Pearson Correlation	0.991424839	
Hypothesized Mean Difference	0	
Df	14	
t Stat	29.28310093	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.761310136	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.144786688	



Graph 1. The pre-& post-test MFQ scores of control group.

Result: Test Statistic: $t = 29.28$, $P = 0.000 < 0.05$

Conclusion: Since the p value of the test statistics is less than 0.05, the null hypothesis is rejected at 5% level of significance ($t = 29.28$, $p < 0.05$). In addition, mean MFQ has increased from Week1-Pre-test to Week6-Post-test in Group A. Hence, it is concluded that there is significant effect of Treatment A in increasing the value of MFQ from Week 1 to Week6.

Testing the effect of Experimental Group - Treatment B in increasing the value of MFQ from Week 1 (Pre) to Week 6 (Post)

H_0 : There was no significant effect of Treatment B in increasing the value of MFQ from Week 1 (Pre) to Week 6(Post)

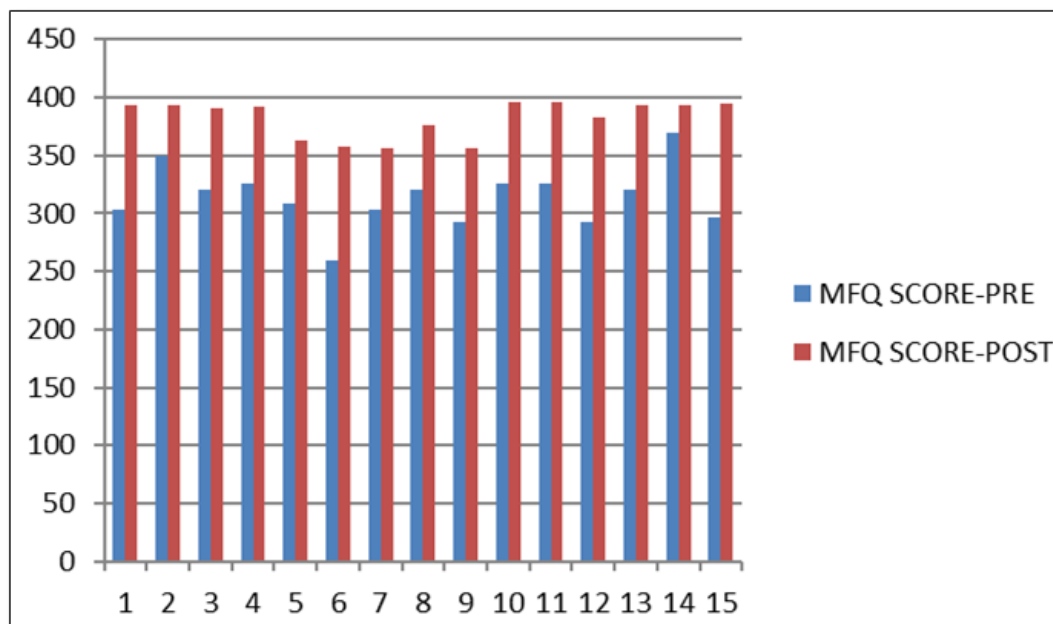
H_1 : There was significant effect of Treatment B in increasing the value of MFQ from Week 1 (Pre) to Week 6 (Post)

The above hypothesis was tested by use of paired t-test and the corresponding output is as follows (Output of Paired t-Test)

Experimental Group (Table 2 & Graph 2)

Table 2. The variables of pre-& posttest MFQ scores of experimental groups.

Variables	MFQ SCORE-POST	MFQ SCORE-PRE
Mean	382.2	314.4
Variance	252.4571429	664.5428571
Observations	15	15
Pearson Correlation	0.590442943	
Hypothesized Mean Difference	0	
df	14	
t Stat	12.61460975	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.761310136	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.144786688	



Graph 2. Pre-& posttest MFQ scores of experimental groups.

Result: Test Statistic: $t = 12.61$, $p < 0.05$

Conclusion: Since the p-value (0.000) of the test statistic is less than 0.05, the null hypothesis was rejected at 5% level of significance ($t = 12.16$, $p < 0.05$). In addition, mean MFQ has been increased from Week1-Pre-test to Week6-Post-test in Group B. Hence, it was concluded that there was significant effect of treatment B in increasing the value of MFQ from Week 1 to Week6.

Inter-Group Analysis (Between Group Analysis)

Comparing the effect of Treatments, A and B in terms of

changes in MFQ from Week 1 (Pre) to Week 6(Post)

H0: There was no significant difference between Group A and B in terms of average change in MFQ

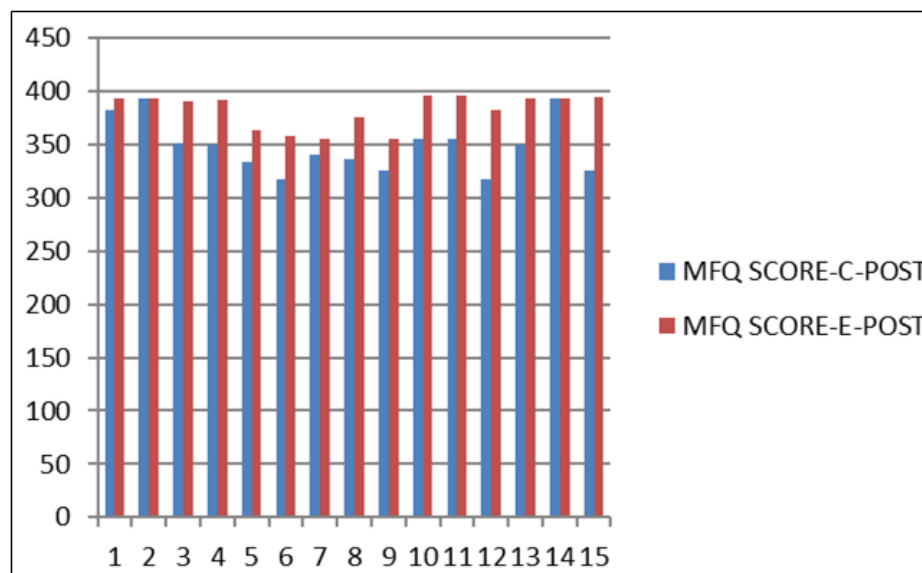
H1: There was significant difference between Group A and B in terms of average change in MFQ

The above hypothesis is tested by the use of Independent Samples t-test.

Output of Independent Sample t-test (Table 3 & Graph 3)

Table 3. The variables of posttest MFQ scores of control and experimental group.

Variables	MFQ SCORE-E-POST	MFQ SCORE-C-POST
Mean	382.2	348.5333333
Variance	252.4571429	610.552381
Observations	15	15
Pooled Variance	431.5047619	
Hypothesized Mean Difference	0	
df	28	
t Stat	4.438517682	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.701130934	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.048407142	



Graph 3. The posttest MFQ scores of control and experimental group.

Result: $t = 4.43$, $p < 0.05$

Conclusion: Since the p-value of the test statistic is less than 0.05, the null hypothesis is rejected at 5% level of significance at $p < 0.05$. In addition, value of MFQ from Week 1(pre) to Week 6 (post) by Treatment B is more than that of Treatment A. Hence, it is concluded that the experimental group (Group-B) subjects who were given brain gym exercise is more effective than control group (Group-A) in increasing the value of MFQ from Week1 (pre) to Week 6 (post).

DISCUSSION

Brain exercise can significantly improve the cognitive function of the adults [18]. In this study, experimental research was done to find effect of Brain Gym exercises in improving memory [19,20]. 30 subjects were recruited for the study. Intervention was given for 6 weeks. The result concluded that the data collected was statistically analyzed by paired t-test. The result revealed that the memory span of the subjects has increased more in experimental group, where the subjects performed brain gym exercises than that of control group. Brain Gym energy exercise helps to re-establish neural connection between body and brain [21]. Brain Gym can improve self- confidence, self-esteem, co-ordination and memory. It plays a crucial role in exercising day-dreaming, stress release and achievement of goals [22,23]. The Brain Gym exercise influences the attention and ability to retain memory [24]. Deninson in 1986 stated that they are sample and enjoyable exercise to enhance whole brain learning. They are skills which can be used to enhance students learning as stated by Deninson in 1984. Brain Gym exercises are suggested to be used to bring out the full potential of the students. Freeman-Koestar-2000, a leading expert on Brain Gym suggested that brain Gym should be performed for 15 min spread out over the course of the study. Templeton and Jensen- (1996) mentioned that the Brain Gym exercise gives the sense of hope in improving the behavior.

CONCLUSION

From the result of the statistics, it was evident that the memory span of the subjects has been increased in the experimental group who performed brain gym exercises. Hence, the study concluded that brain gym exercise was more effective in improving memory among adults.

CLINICAL SIGNIFICANCE

Brain gym exercise stimulates the chemicals in the brain and neuroplasticity by boosting growth factors and thereby improves memory. It plays a vital role in improving memory among adults.

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