



**ORIGINAL RESEARCH PAPER**

**Physiology**

**A STUDY ON DIFFERENCE IN SORT TERM MEMORY CAPACITY BY VISUAL TASK IN HALTHY YOUNG FMALES AND MALES**

**KEY WORDS:** Short term Memory, Alphabetical test, Numerical test.

**Ms. Shweta Kanwar**

Msc. Med., Student, Department of Physiology , J.L.N. Medical College, Ajmer (Rajasthan), Rajasthan University of Health Sciences, Jaipur

**Dr. Garima Bafna**

Professor & Head, Department of Physiology, J.L.N. Medical College, Ajmer (Rajasthan), Rajasthan University of Health Sciences, Jaipur

**Dr. Poonam Gogania**

Associate Professor, Department of Physiology, J.L.N. Medical College, Ajmer (Rajasthan), Rajasthan University of Health Sciences, Jaipur

**Mrs. Bharti Maan**

Senior Demonstrator, Department of Physiology, J.L.N. Medical College, Ajmer (Rajasthan), Rajasthan University of Health Sciences, Jaipur

**ABSTRACT**

short-term memory has a duration of about half a minute and a limited capacity of approximately 5 to 10 items. Short term memory is highly vulnerable to distraction, requiring attention and vigilance to maintain the content. It is often tested at the bedside by asking the patient to recall several digits forward and backward. **Materials and Method:** Fifty (50) young healthy adults age group of 17 to 24 years in Ajmer were randomly selected for this study (50 males and 50 females). Our study we have used free recall tasks of Alphabets and Digits. We have asked the subjects to recall the displayed Alphabets and digits. Number of correct items were measured. Descriptive statistics included computation of percentages, means and standard deviations. Level of significance was set at  $P \leq 0.05$ . **Results:** The result of present study suggests that statistically decrease in short term memory status in higher tasks of test. Short term memory status for Numerical test was significantly greater than Alphabetical test. Statistically significant gender difference was observed in Alphabetical test and numerical test in which female having better short term memory. There was significant improvement in memory status after applying of memory enhancing methods in all subjects and more so in females. **Conclusion:** In present study progressive decrease in memory status in higher tasks of Alphabetical and numerical test is due to increase in number of items more than seven as an individual can hold 7+2 bits of information. IN our study were have observed that females are having more short term memory for Alphabetical and numerical test due to high attention, participation in tasks. Short term memory for Numerical test was significantly higher than Alphabetical test which may be due to numbers are commonly used like phone no. Birthday Etc.

**INTRODUCTION**

Memory is of two types, short term and long term memory. Short term memory is generally confined to less than twelve items and lasts only a few minutes<sup>1</sup>. Memory is the ability to recall past events at conscious or unconscious level. It is relatively permanent retention and storage of learned information<sup>2</sup>.

Memory is a complex function of the brain that has fascinated philosophers and scientists for centuries. Memory is currently viewed as a mental process using several storage buffers of differing capacity and duration. Sensory memory lasts for about 250 ms in the visual mode (iconic memory) and 1 to 2 s in the auditory mode (echoic memory). Immediate (short-term or primary) memory has a duration of about half a minute and a limited capacity of approximately 5 to 10 items. Immediate memory is highly vulnerable to distraction, requiring attention and vigilance to maintain the content. It is often tested at the bedside by asking the patient to recall several digits forward and backward. Recent, or secondary, memory has been called both "short-term" and "long-term." It has a duration of minutes to weeks and exhibits a larger storage capacity than immediate memory. On entering this buffer, the information undergoes a process of consolidation of variable duration.

Recent memory is commonly tested in the clinical setting by asking a patient to recall three words after 3 to 5 minutes. Remote, or long-term, memory stores information lasting weeks to a lifetime and contains most of our personal experiences and knowledge. Some information appears to be stored accurately for an indefinite time, whereas other items fade or become distorted. Memory function includes registration (encoding or acquisition), retention (storage or consolidation), stabilization, and retrieval (decoding or

recall). Registration and retrieval are conscious processes.<sup>3</sup> Therefore the present study was undertaken to observe normal short term memory status in young adults.

**MATERIALS & METHODS**

The present study was conducted in Department of Physiology , J.L.N. Medical College, Ajmer (Rajasthan). Fifty (50) young healthy adults of either gender of age group of 17 to 24 years in Ajmer were volunteers for this study.

In our study we use free recall task of Alphabets and Digits (number) in six sessions.

At the beginning we take their general Information Age, gender and do they have any neurological disorder or brain injury.

For testing short term memory of the subjects, we performed our study in three sessions.

In First session we displayed three Alphabets and three digits was shown to subjects for 15 seconds.

In second session we displayed six Alphabets and six digits was shown to subjects for 20 seconds. In third session we displayed nine Alphabets and nine digits was shown to subjects for 30 seconds. Numbers of the correct items recalled were measured in percentage.

After 20 minutes of rest we used same tests which repeated with different sets of Alphabets and digits after asking them to applying some standard methods for enhancing short term memory.

Firstly asked the subjects to make a Chunk of Alphabets (2 or

3) in alphabetical test of no. 5, A, G, J, K, S, M, C, T, D asked them to make sets of 3 or 4 alphabets like AGJ, KSM, CTD etc. this is called Chunking method which is used for enhancement of alphabetical test.

Now we used Chunking method for enhancement of Numerical test. Similarly, for numerical test trail no. 6 (1,9,9,9,2,0,8,9,1,5,6,7) asked them to make sets of 3 or 4 numbers like 1999,2089,1567 etc.

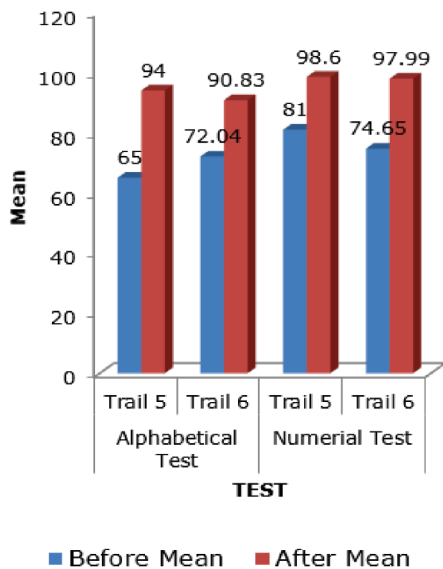
**Statistical Analysis**

Descriptive statistics included computation of percentages, means and standard deviations. Level of significance was set at  $P \leq 0.05$ .

**RESULT**

**Table 1: Comparison Of Memory Status Before And After Application Of Memory Improvement Methods In Trail 5 And 6 Of Alphabetical Test And Numerical Test**

Test	Trail	Before Mean + SD	After Mean + SD	t test, p value & Significant
Alphabetical Test	Trail 5	65 + 19.38	94 + 10.50	t = 9.3, p value 0.0001, Highly Significant
	Trail 6	72.04 + 17.90	90.83 + 9.85	t = 6.503, p value 0.0001 Highly Significant
Numerical Test	Trail 5	81 + 15.29	98.6 + 4.57	t = 7.79, p value 0.0001 Highly Significant
	Trail 6	74.65 + 17.07	97.99 + 5.47	t = 9.20, p value 0.0001 Highly Significant

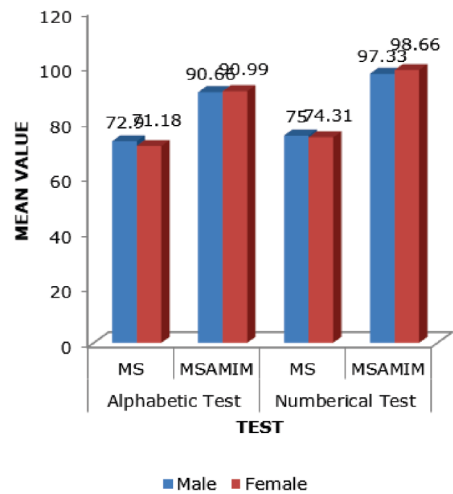


**Graph 1 : Comparison Of Memory Status Before And after Application Of Memory Improvement Methods In Trail 5 And 6 Of Alphabetical Test and Numerical Test**

The above table shows the comparison of memory status before and after application of memory Enhancement methods in Trail 5 ( $P=0.0001$ ) and Trail 6 ( $p=0.0001$ ) of alphabetical test and Trail 5 ( $P=0.0001$ ) and Trail 6 ( $p=0.0001$ ) of numerical test.

**Table 2: Comparison Of Mean Values Of Alphabetical And Numerical Test In Male And Female In Trail 6**

	Alphabetic Test		Numerical Test	
	MS Mean + SD	MSAMIM Mean + SD	MS Mean + SD	MSAMIM Mean + SD
Male	72.90 + 16.02	90.66 + 9.72	75 + 16.36	97.33 + 5.75
Female	71.18 + 19.90	90.99 + 10.18	74.31 + 17.64	98.66 + 5.20



**Graph 2 : Comparison Of Mean Values Of Alphabetical And Numerical Test In Male And Female In Trail 6**

In the present study, after memory Enhancement methods in males  $90.66 \pm 9.72\%$  and in females  $90.99 \pm 10.18\%$  which indicates that females are having slightly more short term memory for alphabetic test. After memory Enhancement methods in males  $97.33 \pm 5.75\%$  and in females  $98.66 \pm 5.20\%$  which indicates that females are having slightly more short term memory for numerical test.

**DISCUSSION**

In the present study, after memory improvement methods in males  $90.66 \pm 9.72\%$  and in females  $90.99 \pm 10.18\%$  which indicates that females are having slightly more short term memory for alphabetic test. After memory improvement methods in males  $97.33 \pm 5.75\%$  and in females  $98.66 \pm 5.20\%$  which indicates that females are having slightly more short term memory for numerical test.

In the study of Kumar SS et al (2013)<sup>4</sup> the mean free recall of alphabets in Trial 1 in males is  $8 \pm 1$  and in females  $9 \pm 1$  which indicates that females are having more short term memory for alphabets than males. ( $p < 0.001, S$ ). The mean free recall of numbers in Trial 2 in males is  $9 \pm 1$  and in females  $7 \pm 2$  which indicates that males are having more short term memory for number than females. ( $p < 0.001, S$ ).

Ansari S et al (2019)<sup>5</sup> found the memory status in all the subjects to be increased and was statistically highly significant ( $p < 0.001$ ) when compared to the memory status before application of memory improvement methods. The memory status in males was found to be increased which was statistically highly significant ( $p < 0.001$ ) when compared to memory status before application of memory improvement methods.

**Limitations of Study :** Our sample size was relatively small.

**CONCLUSION**

In present study progressive decrease in memory status in higher tasks of Alphabetical and numerical test is due to increase in number of items more than seven as an individual can hold  $7 \pm 2$  bits of information. In our study were have observed that females are having more short term memory for Both alphabetical and numerical test due to high attention,

participation, involvement in tasks. Short term memory for Numerical test was significantly higher than Alphabetical test which may be due to Numbers are commonly used like phone no. Birthday etc. More study is required to study the dimorphism of the brain to understand the reason for these differences.

#### REFERENCES

1. Bijlani R. I. and Manjunatha S. Understanding medical physiology, 4<sup>th</sup> ed., India: Jaypee publications; pp 99
2. Jain AK. Text Book of Physiology 4th ed. (II) .New Delhi : Avichal publication; 2012; pp 1074.
3. Fauci, Anthony S. et al. Harrison's Principles of Internal Medicine 14<sup>th</sup> ed. (II) . New York : McGraw hill; 1998; :142-143.
4. Kumar SS, Jissa G and Mukkadan JK. A study on difference in short term memory in healthy males and females of Kerala. Journal of Nobel Medical College, 2013; 2 (4) :57-61.
5. Ansari S. Short Term Memory Status by Visual Tasks using Object Test. International Journal of Physiology, 2019; 7 (1) :72-74.