

## Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery

Mr. Anjan N. Patel<sup>1\*</sup>, Dr. D.J Panchal<sup>2</sup>

### ABSTRACT

“Mentally challenged children's performance comparison to evaluate their brain's motor function - by applying finger tapping subtest test of neuropsychological battery” this is a research problem to know that mental retardation is affecting their motor co-ordination function or not”. Neuro-psychological assessment test battery which was developed by NIMHANS, Bangalore in the year of 2004 and its sub-test Finger tapping test was administered for research. By random sampling method, samples were collected from B.M Institute of Mental Health, Ahmedabad in the year of 2012. Based on Government Civil hospital's IQ certificate 75 mild category of MR children of above and below graduate parents were taken for research with prior permission. Mental Retardation based on various diagnosis like; Down syndrome, microcephaly, hydrocephaly, trisomy-13, trisomy-18 or multiple disabilities are included. Flowingly, Children's age group and gender are also kept different to compare their performance on finger tapping test. The results shows the “t” value of Neuropsychological functions of finger tapping test (Right hand) of mild children of different educational level of parents is 0.12. The mean scores of finger tapping test (Right hand) of mild children of above and below graduate parents were found 36.08 and 36.38 respectively with SD 8.50 and 12.56. The results indicate that significant difference does not exist between mild children of below and above graduate parents with regard to finger tapping test (Right hand). In the light of the hypothesis that there will be no significant difference between mild children of below and above graduate parents on finger tapping test (Right hand). It implies that mild children of below and above graduate parents have no significant difference of performance on finger tapping test (Right hand). Based on the result it depicts that mild children of below and above graduate parents' children have similar performance on finger tapping test (Right hand). The results shows the “t” value of Neuropsychological functions of finger tapping test (Left hand) of mild children of educational level of parents is 0.55. The mean scores of finger tapping test (Left hand) of

<sup>1</sup> PhD, Research Scholar, Rai University, Saroda, Dholka, Ahmedabad

<sup>2</sup> Associate Professor, Rai University, Saroda, Dholka, Ahmedabad

\*Responding Author

Received: August 19, 2017; Revision Received: September 25, 2017; Accepted: September 30, 2017

## Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery

mild children of above graduate parents were found 34.49 and 35.92 respectively with SD 9.18 and 13.03. The results indicate that significant difference exist between mild children of below graduate parents and mild children of above graduate parents with regard to finger tapping test (Left hand). In the light of the hypothesis that there will be no significant difference between mild children of below and above graduate parents on finger tapping test (Left hand). It implies that mild children of below and above graduate parents have no significant difference on finger tapping test (left hand). Mild children of above and below graduate parent's children have similar performance on finger tapping test (left hand). On the basis of result it is concluded that Mild MR category of above and below graduate parent's children have similar performance on Finger tapping test in both Right and Left hand. It depicts that these children are fair in their motor function of motor speed and co-ordination. 75 children's mental retardation does not affected on their brain's motor function performance.

**Keywords:** *MR-Mentally retardation*

**M**ental retardation/challenge is a term for a pattern of persistently slow learning of basic motor and language skill ('milestones') during childhood, and a significantly below- normal global intellectual capacity as an adult. One common criterion for diagnosis of mental retardation is a tested intelligence quotient (**IQ**) of **70** or below.

In England and Waled the Mental Health Act 1983 defines mental impairment and severe mental impairment as "a state of arrested or incomplete development of mind which includes significant/severe impairment of intelligence and social functioning and is associated with abnormally aggressive or seriously irresponsible conduct on the part of the person concerned". As behavior is involved, these are not necessarily permanent conditions; they are defined for the purpose of authorizing detention in hospital or guardianship. Unfortunately, English statute law uses "mental impairment" elsewhere in a less well-defined manner implying that mental retardation is meant.

People with mental retardation may be described as having **developmental disabilities**, **goal developmental delay**, or **learning difficulties**.

### ***Etymology***

The origin of the word "retard" comes from intensive *prefix re-* and the Latin word *tardus* meaning "slow", e.g., being tardy. Mental retardation thus derives from the idea that someone is mentally slow.

### ***Alternative terms***

The term "**Mental retardation**" has acquired pejorative and shameful connotations over the last few decades and is now used almost exclusively in technical or scientific contexts where exactness is necessary.

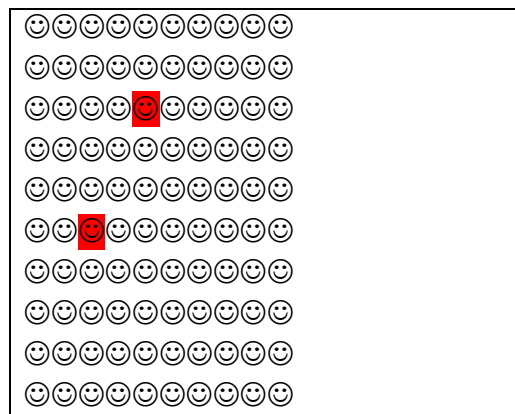
## Mentally Challenged Children’s Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery

In North America the broad term *developmental delay* has become an increasingly preferred synonym by many parents and direct support professional. Elsewhere, however, *developmental delay* is generally used to imply that appropriate intervention will improve or completely eliminate the condition, allowing for “catching up”. Importantly, this term carries the emotionally powerful idea that individual’s current difficulties are likely to be temporary.

In the UK, “**mental handicap**” had become the common medical term, replacing “mental sub-normality” in Scotland and “mental deficiency” in England and Wales, until Stephen Dorrel, Secretary of State for Health in England and Walse from 1995-7, changed the National Health Service’s designation to “*learning disability*”. The new terms is not yet widely understood, and is often taken to refer to problems affecting schoolwork (the American usage): which are known in the UK as “*learning difficulties*”. British social workers may use “*learning difficulty*” to refer to both people with MR and those with conditions such as dyslexia.

### **Prevalence**

It is generally considered that 2 % of the populations constitute persons with mental retardation. However, there is no systematic National Survey conducted to determine the prevalence of mental retardation in India. Recently, it established that in India, there are about 20 million persons who are mentally retarded and about 4 million persons who are moderately and severely retarded. Below table gives the details of various prevalence studies conducted in India. It can be observed from the table that the figures for prevalence of mental retardation in India vary from 0.22 to 32.7 per thousand populations. This is because the methodology, the time, the type of population and the sample size were not uniform in all the studies and the operational definition of a case of mental retardation varied from one study to the other. In addition, these surveys were carried out with the intention of finding out the psychiatric morbidity and not mental retardation per se. (Manual for Psychologist: Mental Retardation- By: NIMH)



*Mental Retardation in India- 2%*

### **Definitions**

Incomplete development of mental endowments before the age of 18 years. This results in failure of development of sufficient intellectual and cognitive capacity to cope up with the

## **Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery**

demands of the environment and to establish an independent social existence and in personality limitation. There is impairment of maturation, learning and / or social adjustment. The common manifestations are delay or failure in sequential evolution of motility, language, control and evacuation of bladder and bowel, inability to interact with other children, inability to acquire and retain knowledge.

### ***Mental retardation***

1. "Mental retardation is a state of arrested or incomplete development of intellectual functions characterized by impairment in cognitive, language, motor and social skills manifested at birth or early childhood."
2. "Mental retardation is a term commonly used in the United States. Amerntia (Without a mind) and Oligophrenia (Small mindedness) are synonyms derived from Greek and are little used today."
3. The severely Subnormal child is defined as being "Incapable of living an independent life or for guarding himself against serious exploitations.
4. Subnormal child is in "A state of arrested of incomplete development of mind not amounting to sever sub normality. In general mild sub normality is equivalent to the old term "Feeble minded."
5. The American Association on mental deficiency (AAMD) defines retardation as, "Significantly sub average general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period."
6. The American psychiatric association 1994 in DSM II defines mental retardation as, "Significantly sub average general intellectual functioning"
7. Intelligence: According to Wechsler, "It is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with the environment. Thus, intelligence is an overall ability of an individual which is expressed through his goal-directed activities, though his thinking and through the ways he handles the environmental situations." (Psychiatry in India API Text Book of Medicin, Vol II P.No.1427)

### ***Objective of the study***

"Mentally challenged children's performance comparison to evaluate their brain's motor function - by applying finger tapping sub test of neuropsychological battery" this is an objective of research to know that mental retardation is affecting their motor co-ordination function or not".

### ***Hypothesis***

1. There will be no significant difference in the performance between mild mentally retarded children of below and above graduate parents on finger tapping test (**Right hand**).

## **Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery**

2. There will be no significant difference in the performance between mild mentally retarded children of below and above graduate parents on finger tapping test (**Left hand**).
3. Mental retardation can affect on child's brain motor function performance level.

### **METHODOLOGY**

Rapport established with children consequently Interview technique used for test administration. Neuropsychological battery is standardized on Indian population and it consists reliability and validity. By random sampling method 75 samples are taken for research.

#### ***Sampling***

Random sampling method was used to collect 75 samples from B.M Institute of Mental Health, Ahmedabad. Mild category of MR children of above and below graduate parents were decided on the base of child's IQ certificate provided by Government Civil hospital. Children's age group and gender are also kept different to compare their performance on hand tapping test. Randomly 39 mild children of below graduate parents and 36 mild MR children of above graduate parents taken for analysis. Male and female children are mixed sample analyzed.

#### ***Tools***

1. **Neuropsychological battery for children:** The primary aim of neuropsychological assessment is to draw inference about the structural and functional characteristics of a person's brain by evaluating an individual's behavior in defined stimulus-response situation (Benton, 1994). The Neuro-psychological assessment battery which was developed by NIMHANS, Bangalore in the year of 2004. This test battery was standardized on Indian population. It consists 21 sub test to assess Intelligence, Motor function, sustained attention, focused attention, clinical rating of attention, verbal fluency, verbal working memory, visuospatial working memory, planning, visuo-perceptual ability, visuo-conceptual ability, visuo-constructive ability, visual recognition, apraxia, somatosensory perception, reading, writing and calculation. In this research only one sub test finger tapping test is taken to assess motor function of the children.
2. **Finger tapping test:** This test has been found to be sensitive to the presence and laterality or brain lesion (Bigler & Tucker, 1981). Later Finger tapping test is used by (Spreen and Strauss, 1998) to measures motor function of the developing brain and mature brain. Given the crossed nature of the motor system, performance tends to be worse in the hand contralateral to the lesion (Bornstein, 1985). Reliability coefficients range from 0.58 to 0.93 reported with both normal and neurologically impaired subjects (Ruff & Parker, 1993). As research tool an electrical finger tapping instrument and stopwatch was used. Subject has given five consecutive trials of 10 second each with

## Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery

preferred and non-performed hand. A practiced trial given before the test begins. Number of taps for each of the 10-second trial is recorded for data analysis.

### Variables

1. Neuropsychological battery for children and Finger tapping test is as independent variables.
2. Result (Scores) of Finger tapping test are dependent variables.

### Data analysis

Data analyzed by SPSS software. In this analysis "t" test, Mean, Standard deviation and Level of significant checked on 0.01 and 0.05 level.

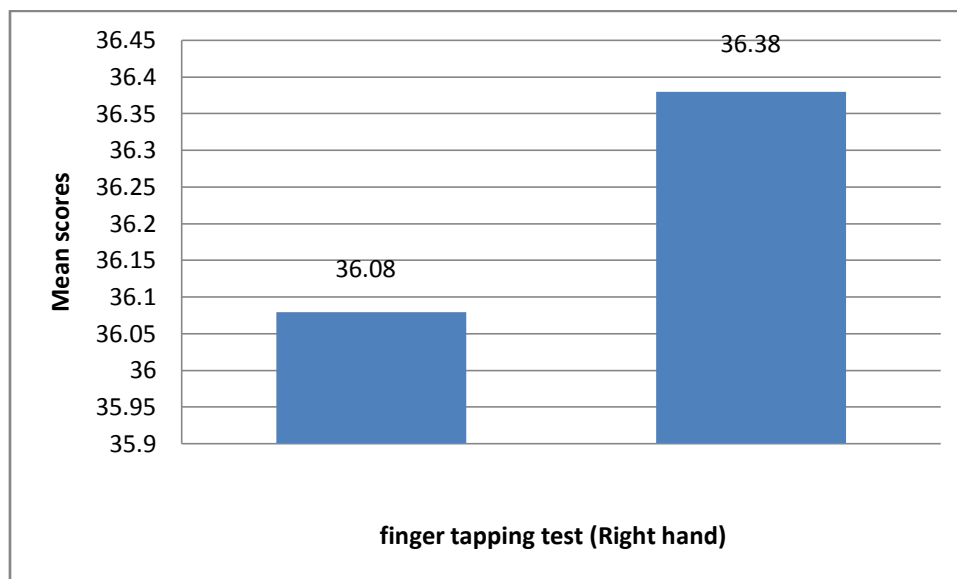
## RESULT AND DISCUSSION

### Table No. 1

*Table No. 1.1(A) Mean, SD and t value of Neuropsychological functions of finger tapping test (Right hand) of mild children of below and above graduate parents*

Group	N	Mean	SD	t value	Level of significant
Mild children of below graduate parents	39	36.08	8.50	0.12	NS
Mild children of above graduate parents	36	36.38	12.56		

*Figure no. 1.2(A) Mean value Neuropsychological functions of finger tapping test (Right hand) of mild children of below and above graduate parents*



The results of table 1.1(A) shows the t value of Neuropsychological functions of finger tapping test (Right hand) of mild children of different educational level of parents is 0.12. The mean scores of finger tapping test (Right hand) of mild children of above and below graduate parents were found 36.08 and 36.38 respectively with SD 8.50 and 12.56. The

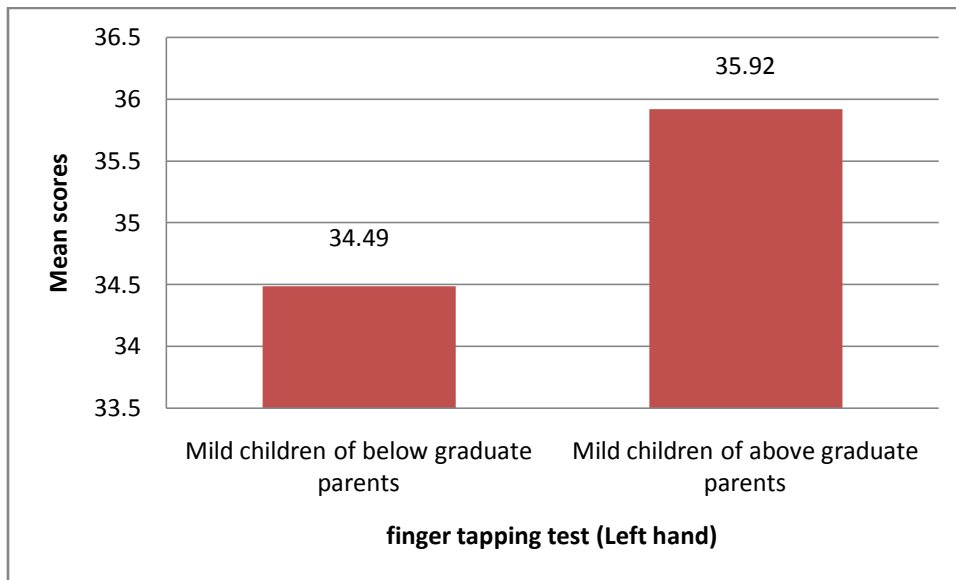
**Mentally Challenged Children’s Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery**

results indicate that significant difference does not exist between mild children of below graduate parents and mild children of above graduate parents with regard to finger tapping test (Right hand). It can be seen in figure no: 1.2 (A) also. In the light of the hypothesis that there will be no significant difference between mild children of below graduate parents and mild children of above graduate parents on finger tapping test (Right hand). It implies that mild children of below graduate parents and mild children of above graduate parents have no significant difference on finger tapping test (Right hand).

**Table No. 2. (B) Mean, SD and t value of Neuropsychological functions of finger tapping test (Left hand) of mild children of below and above graduate parents**

Group	N	Mean	SD	t value	Level of significant
Mild children of below graduate parents	39	34.49	9.18	0.55	NS
Mild children of above graduate parents	36	35.92	13.03		

**Figure No. 2.1 (B) Mean value Neuropsychological functions of finger tapping test (Left hand) of mild children of below and above graduate educational level of parents**



The results of table 2. (B) shows the t value of Neuropsychological functions of finger tapping test (Left hand) of mild children of educational level of parents is 0.55. The mean scores of finger tapping test (Left hand) of mild children of above graduate parents were found 34.49 and 35.92 respectively with SD 9.18 and 13.03. The results indicate that significant difference exist between mild children of below graduate parents and mild children of above graduate parents with regard to finger tapping test (Left hand). It can be seen in figure 2.1 (B) also. In the light of the hypothesis that there will be no significant difference between mild children of below graduate parents and mild children of above graduate parents on finger tapping test (Left hand). It implies that mild children of below

## **Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery**

graduate parents and mild children of above graduate parents have no significant difference on finger tapping test (left hand). Mild children of above and below graduate parent's children have similar performance on finger tapping test (**left hand**).

### **CONCLUSION**

It is concluded that, on the basis of result of Mild MR Category of above and below graduate parent's children have similar performance on Finger tapping test in both Right and Left hand. It depicts that this 75 children are fair in their motor function like; motor speed and motor co-ordination. It is proved by this research that mental retardation of 75 children does not affected on their brain's motor function performance.

### **Acknowledgments**

The author appreciates all those who participated in the study and helped to facilitate the research process.

**Conflict of Interest:** The author declared no conflict of interest.

### **REFERENCES**

- Batchelor Jr., E.S (1996). *Neuropsychological assessment in children*. In E.S Batchelor & R.S. Dean (Eds.), *pediatric neuropsychology; Interfacing assessment and treatment for rehabilitation* (pp, 9-26). London: Allyn & Bacon.
- Benton, A.L (1994), Neuropsychological assessment. *Annual Review of Psychology*, 45, 1-23.
- Bigler, E.D. (1998). *The role of Neuropsychological assessment in relation to other types of assessments with children*. In M. G. Tramontana and S.R.Hooper, *Assessment issues in child neuropsychology* (pp. 67-92). New York: Plenum Press.
- Bornstein, R.A. (1985). Normative data on selected neuropsychological measures from a nonclinical sample, *Journal of Clinical Psychology*, 41,651-659.
- Luria, A. (1973). *The working Brain*. New York: Basic book.
- NIMHANS Publication No:61, Bangalore. First Edition-2004, by – Prof D. Nagaraja (Director: NIMHANS) *Neuropsychological Battery For Children*, Manual, pg:1, 8,12.
- Spreen, O., & Strauss, E. (1998). *A Compendium of neuropsychological tests* (2<sup>nd</sup> ed.). New York: Oxford University Press.

**How to cite this article:** Patel A N & Panchal D J (2017). Mentally Challenged Children's Performance Comparison to Evaluate their Motor Function of the Brain - By Applying Finger Tapping Sub-test Test of Neuropsychological Battery. *International Journal of Indian Psychology*, Vol. 4, (4), DIP:18.01.149/20170404, DOI:10.25215/0404.149