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Research Paper

Motor and Perceptual Abilities among Adults with Intellectual Disability

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ABSTRACT

The present study experimentally investigated the motor and perceptual abilities among adults with intellectual disability (ID). This research is focused on the motor and perceptual abilities, visuomotor integration and short-term memory, and dexterity of the right and left hands of adults with mild and moderate ID). The researcher has randomly chosen the participants of 30 adults with Mild ID and 30 adults with Moderate ID belonging to the age level of 18 to 23. And also, the researcher has randomly chosen the control students who were 28 students of classes 2 and 3 for the adults with Mild ID and 30 students of UKG and class 1 for the adults with Moderate ID from different schools. The tools used for this study are the Bender Gestalt II and Finger Dexterity Test. This study employs a Descriptive Research Design, integrating key statistical measures such as Mean and Standard Deviation to gain insights into sample characteristics. Additionally, an inferential statistical method including the t-test is specifically employed to assess significant differences in motor and perceptual abilities, visuomotor integration, and short-term memory and dexterity among adults with mild and moderate intellectual disability. The Pearson Correlation is used to describe the strength and direction of the linear relationship between two quantitative variables. Bar Graphs which are the pictorial representation of data and Scatter Plots are the graphs that present the relationship between two variables in a data-set. This design allows for a comprehensive understanding of the studied psychological variables within the context of intellectual disability. The use of both descriptive and inferential statistics ensures a comprehensive analysis of these variables within the study population. Based on the contribution of a previous study by Patidar, Sharma, and Singh, 2002, the researcher drew out the findings of this study. The motor and perceptual abilities, visuomotor integration, and short-term memory of adults with mild ID is similar to the students of classes 2 and 3 and moderate ID is similar to the students of UKG and class 1. There is also significant difference in motor ability, perceptual ability, visuomotor integration and short term memory between adults with mild ID and moderate ID. On the other hand, right-hand finger dexterity in seconds and errors with mild ID are similar to the students of classes 2 and 3. Instead, there is a significant difference in left-hand finger dexterity in seconds between adults with mild ID and students of classes 2 and 3. Also, the right and left-hand finger dexterity errors of adults with moderate ID is similar to the students of UKG and class 1. There is also significant

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difference in the right and left hand finger dexterity in seconds and errors between adults with mild and moderate ID. There is no significant relationship in the motor ability and perceptual ability among adults with mild ID. But there is significant relationship in the visuomotor integration and short term memory among adults with mild ID is accepted. And there is no significant relationship in the motor ability and perceptual ability among adults with moderate ID. But there is no significant relationship in the visuomotor integration and short term memory among adults with moderate ID. This study revealed the mental age (MA) of adults with mild ID is 7.5 who have average chronological age (CA) of 21.07 and the MA of adults with moderate ID is 5.5 who have the average CA of 20.8.

Keywords: *Motor and Perceptual abilities, Visuomotor Integration, Short-Term Memory, Dexterity*

Intellectual Disability (ID) is once called Mental Retardation (MR) is a genetic disorder manifested in significantly below average overall intellectual functioning and deficits in adaptive behaviour. ID is a particular state of functioning that begins in childhood and is characterized by decreased intelligence and adaptive skills and also is the most common developmental disorder (Bregman, 1991). The Mental ability of a person is determined by the Intellectual Quotient (IQ) and the average IQ level of a mentally normal person is considered as 100. Based on IQ, if a person has an IQ less than 70 then he or she is considered as MR. If MR people have IQ levels in between the ranges of 49 to 70 then they will be categorized in mild MR and moderate MR the person has IQ in ranges from 35 to 50. The severe MR cases the affected ones have IQ of 20 to 34 and in profound MR, those people who have IQ levels below 20. The MR person has impairments in adaptive skills and the onset of the disease is before the age of 18 years. The term MR was changed to ID after many discussions among AAMR board members in 2001 (Schalock, et al, 2002). ID or MR is considered a significant limitation both in intellectual functioning and in adaptive behaviour that covers many everyday social and practical skills that originate before the age of 18 (AAIDD, 2002).

Motor abilities are defined as personal characteristic or trait, such as manual dexterity and reaction time which contributes to proficiency in several motor skills. Motor abilities cannot be easily modified by practice or experience. There are two types of motor skills which are gross motor skills and fine motor skills. The gross motor skills which are the major muscle movements are discovered and developed. These allow large muscles to create proper balance in the body. Instead, fine movements and controls are developed to perform high-degree action or precision in tasks. These are more precise movements that majorly start developing from the very beginning of birth. On the other hand, the term perceptual ability defines the faculty of interpreting or processing sensory information, such as that gathered from sight. Sometimes it is discussed cognitive which is thought and motor which is physical abilities (Milne, 2019).

The visuomotor integration varies in its details depending on the behavioural context and the effect used, the examples are eye or hand. It is relatively slow and the vision is useful for planning movements but sluggish for online control, and the time from visual input to motor output is surprisingly long and variable. It is spatially organized and the retina is a finely-grained two-dimensional map, and central brain regions recapitulate this map. It is adaptive which means the relationship between visual input and motor output is continuously monitored and adjusted as necessary and it is bidirectional. Short-term memory is the mechanism that allows us to retain a certain amount of information over a short period. It temporarily retains processed information that either fades quickly or turns into long-term

memory. It has two main properties such as a limited capacity and a finite duration. The ability of short-term memory is that if you are asked to remember a sequence of 10 digits, you will likely be able to remember between 5 and 9 numbers. It is because the amount of information short-term can retain is **7** elements, with a variation of 2, either more or less (Atkinson & Shiffrin, 1968). The dexterity refers to the ability of a person to use the fingers, hands and arms to perform a task. The quality of performance in daily living skills, work-related functioning, and recreational activities is determined to a large degree by hand function and manual dexterity (Carmeli, Patish, Parish & Coleman, 2003).

To my knowledge, there are no published similar studies done on motor and perceptual abilities among adults with mild and moderate intellectual disability in Kerala or India.

REVIEW OF LITERATURE

The research topic was selected after going through different psychological journals. Approximately 3% of the whole population of the world has an IQ level less than 70 (Flint, et al. 1995). Other studies presented that many genes that are involved in MR have been mapped yet the causes of MR in almost 50 % of MR cases are unknown (Chiurazzi & Oostra, 2000). However, 5.1% of the MR patients are affected with fragile X syndrome (Moeschler & Shevell, 2006). The factors that are responsible for MR are environmental factors, genetic factors malnutrition, maternal use of alcohol during pregnancy, drugs and poverty and these factors are categorized under the heading of behavioural or social factors (Cooper, 2001). The congenital dysfunction of the brain, and injury of the brain during the critical period of prenatal or postnatal development may also be responsible for MR and MR may also be the result of near drowning, traumatic brain injury and central nervous system malignancy. But in industrial nations, 1 to 7 in 1000 MR births is because of Foetal Alcohol Syndrome and it is the most common cause of MR in these nations (Niccols, 2007). The second leading reason for MR is Down's syndrome which is also termed a trisomy of chromosome number 21. The incident rate of Down's syndrome is 1 in 700 births (Galdzicki & Siarey, 2003). Another study presented that one of the important factors responsible for genetic disorders is consanguineous marriages. The researchers demonstrated that the study of genetic disorders like MR becomes very easy in the regions where the rate of cousin marriages is very high (al-Ansari, 1993).

The average chronological age (CA) of persons with mild ID were 22.90 years whereas the average CA of persons with moderate ID was 16.83 years. This study shows the proof of average mental age (MA) and social age (SA) of persons with mild ID which was 8.3 years and 8.17 years respectively whereas average MA and SA of persons with moderate ID was 5.7 years and 6.60 years respectively. The Average IQ and SQ of persons with mild ID was 59.82 and 59.09 respectively whereas the average IQ and SQ of persons with moderate ID were 43.27 and 50.58 respectively (Patidar, Sharma, & Singh, 2002). The motor and sensory dysfunctions in children with MR and epilepsy (Ep) were an interesting topic of researchers in Sweden. Sensorimotor impairments, resulting in disabilities and handicaps, were found to be very common in children with Ep and MR. The severity of the Ep and the MR correlated with the severity of the sensorimotor dysfunctions. To ensure the children proper care and training and to be able to evaluate the effect of training, we have to describe and evaluate their motor capacity and functional abilities in an appropriate way (Beckung, Steffenburg & Uvebrant, 1997).

The physical education programs proved to offer more opportunities for the pupils to develop their perceptual-motor abilities (Shahbazi & Boroujeni, 2011). If children manage to develop

and amend their physical education programmes, the pupils will probably find the chance to develop their creativity through developing perceptual-motor abilities by participating in sports and physical activities while attending school. Perceptual-motor function and cognitive function are bound to each other like the links of a chain and children's perceptual-motor skills development leads to the development and growth of mental functioning (Cratty, 1979 & Green, 1990).It reveals that there is a positive relationship between exercising and achievement of perceptual-motor abilities (Miletiæ, Srhoj & Bonacin, 1999). Individuals with intellectual disabilities who are provided appropriate personalized support over a sustained period generally have improved life outcomes (AAIDD, 2011). In reality, many adults with intellectual disabilities can live independent, productive lives in the community with support from family, friends and agencies (The Arc, 2011). On the other hand, fine motor skills represent the main part of various activities of daily living. Children with fine motor skill impairments have difficulty with everyday activities, social interaction with peers and academic achievement (Mabil & Chaturvedi, 2017).

Different studies demonstrated that intellectual disability does not have any automatic impact on visual perceptual functioning (Bortner & Birch, 1960; O'Connor & Hermelin, 1962; Miranda & Fantz, 1973; Stratfort, 1980a &1980b). But the levels of intellectual disability which are mild and moderate have a clear impact on visuomotor functioning. Instead, the other study Blassi et al, (2007) found a significant difference in eye-hand coordination and visual-motor speed with regard to the presence or absence organic damage in persons with intellectual disability (Patidar, Sharma, & Singh, 2002). Another study demonstrated the application of MODEREN model improved the gross motor skills of students with mental retardation. This model increased the student's initiative in learning, hence attempting more of the moves being taught. In addition, through MODEREN tools organization model, students are involved to learn in groups and inciting interactions and cooperation among students throughout the learning process. Motor skills will also increase if students continue to practice and improve motor movements (Pradana, Juniarisca & Olahraga, 2019).

METHODOLOGY

Aim:

To assess the motor and perceptual abilities, visuomotor integration and short-term memory and dexterity among adults with mild and moderate intellectual disability.

Objectives:

- To study the motor and perceptual abilities of adults with mild and moderate ID.
- To study the visuomotor integration and short-term memory of adults with mild and moderate ID.
- To study the balance of the right and left hands of adults with mild and moderate ID.

Rationale of Study

This study investigates the motor and perceptual abilities among adults with mild and moderate intellectual disabilities belonging to the age level of 18 to 23 and to find out their mental age. This study will help understanding more deeply that how are the situations of the adults with intellectual disability in different parts of Kerala and their family backgrounds. Therefore, the government, management and charitable institutions can understand the ongoing process of adults with mild and moderate intellectual disability and where to start dealing with it. This research helps to analyse where to start the process of making progress for the development of intellectually disabled children. By increasing the motor and

perceptual abilities of adults with intellectual disability they may be able to cope with daily activities at home, in institutions and the societies.

Research Design

This study employs a Descriptive Research Design, integrating key statistical measures such as Mean and Standard Deviation to gain insights into sample characteristics. Additionally, inferential statistical methods, including the *t*-test, will be utilized to rigorously examine the hypotheses concerning differences in variables. The *t*-test is specifically employed to assess significant differences in motor and perceptual abilities, visuomotor integration and short-term memory, and dexterity among adults with mild and moderate intellectual disability. The Pearson Correlation is used to summarize the characteristics of a dataset and to describe the strength and direction of the linear relationship between two quantitative variables. Bar Graphs and Scatter Plots are used to explain the results in a more concretely. This design allows for a comprehensive understanding of the studied psychological variables within the context of intellectual disability. The research concentrates on four primary variables: 1) Motor and Perceptual Abilities, 2) Visuomotor Integration and Short-Term Memory, and 3) Dexterity. The use of both descriptive and inferential statistics ensures a comprehensive analysis of these variables within the study population.

Sample

The study comprised a sample of 30 adults with Mild ID and 30 adults with Moderate ID belonging to the age level of 18 to 23. The control students were 28 students of classes 2 and 3 for the adults with Mild ID and 30 students of UKG and Class 1 for the adults with Moderate ID from different schools. The sample was selected by a simple random sampling method which is a randomly selected subset of a population. The researcher has focused on a previous study by Patidar, Sharma, & Singh, 2002 to select the sample for this study to find out the equivalent age of adults with Mild and Moderate ID belonging to the age level of 18 to 23. The average chronological age (CA) of persons with mild ID was 22.90 years whereas the average CA of persons with moderate ID was 16.83 years. This study shows the proof of average mental age (MA) and social age (SA) of persons with mild ID which was 8.3 years and 8.17 years respectively whereas the average MA and SA of persons with moderate ID was 5.7 years and 6.60 years respectively. The Average IQ and SQ of persons with mild ID were 59.82 and 59.09 respectively and the average IQ and SQ of persons with moderate ID were 43.27 and 50.58 respectively. Then the researcher did a pilot study by using the standardized psychological tool the Finger Dexterity Test by the collection of data from class 8 followed by class 7, then class 6, class 5, class 4, class 3, class 2, class 1 and UKG. Then the researcher confirmed that adults with mild ID are similar to class 2 and class 3 and moderate ID is similar to class 1 and UKG. Then the researcher did a pilot study with another standardized test which is Bender Gestalt II with Moderate ID and class 3 and confirmed the tools and ID population and control students then preceded with the main study.

Tool Used

The Tools used in this study are the Finger Dexterity Test (FDT); Bender Visual-Motor Gestalt Test, Second Edition (Bender-Gestalt II Test) which contains Perceptual Test; Motor Test; Visuomotor Integration; Short-Term Memory; and General Data Sheet. The Finger Dexterity Test is used to measure the speed, clarity, and accuracy of fingers. Dexterity influencing factors are habit, attention or concentration of mind, sense organs, training and monotony. It is made of plastic in regular form, containing a hundred wholes in ten rows, ten wholes in each row, which is made on a plastic fixed to it. Other materials used for conducting this test are pins, paper, a stopwatch and a pen. The precautions and control are

before use, all the holes may be cleared. The pin may be held in the right direction or position to minimize time and error frequency (Jagdish & Bhargava, V., 1971). Bender-Gestalt II measures visual-motor integration skills in children and adults from age level of 4 to 85+ years of age. The Bender-Gestalt II utilizes the original nine designs from the Bender-Gestalt Test. To enhance its utility in educational, psychological, and neuropsychological assessment, seven new designs have been added to increase the ability range assessed by the Bender-Gestalt II. Four of the designs are used exclusively with the lower age range which is 4 years to 7 years and 11 months. And three others are used exclusively in the upper age range (8 to 85+ years). To amplify the test's clinical value, a recall phase and two supplementary tests which are the Motor Test and the Perception Test were also added (Brannigan & Decker, 2003). A general data sheet was designed to collect the background data of the participants. The researcher herself collects the major information of the sample. It contains of students' name, age, gender, name of the school or institutions and education.

Procedure

The current study employs an experimental design which is the process of carrying out research in an objective and controlled fashion so that precision is maximized and specific conclusions can be drawn regarding a hypothesis statement. This design relies on large sample sizes, focusing on the quantity of responses rather than nuanced emotional understanding. The researcher established a good rapport with the clients and administered two standardized tools which are the Finger Dexterity Test and Bender-Gestalt II Test with General Data Sheets. The researcher clarified the participants' doubts. Confidentiality of the data was ensured during the data collection process to ensure the dependability of the data. The collected information is scored according to the scoring system of the respective tools and presented numerically, facilitating statistical analysis. The mean, calculated by summing the provided numbers and dividing by the total count, is used for statistical evaluation. Here the researcher used the*t*-test which is an inferential statistic to determine if there is a statistically significant difference between the means of two variables. And also, used the Pearson correlation coefficient which is a descriptive statistic, meaning that it summarizes the characteristics of a dataset. The researcher used the Bar graphs which display the number of cases in particular categories, or the score on a continuous variable for different categories and the scatter plots used to examine the relationship between two continuous variables.

RESULTS

PILOT STUDY

Table 3: 1: 1 shows the Right and Left-hand finger dexterity scores of participants

	N	**Finger Dexterity Test**			
Class		Right Hand Dexterity in Sec.	Right Hand Dexterity Errors	Left Hand Dexterity in Sec.	Left Hand Dexterity Errors
Mild ID	4	379	6.5	396	5.75
Class-8	2	150	1	160	2
Class-7	2	200	2	210	3
Class-6	2	250	3	260	4
Class-5	2	300	5	310	6
Class-4	2	350	6	360	7
Class-3	4	379.5	6.5	396.85	5.75

Table 3:1.1 shows the Right and Left Hand Finger Dexterity scores of participants, classes, numbers, Right-Hand Finger Dexterity in Seconds, Right-Hand Finger Dexterity Errors, Left-Hand Finger Dexterity in Seconds, Left-Hand Finger Dexterity Errors. The mean scores of

Mild ID are 379 for the Right Hand Finger Dexterity in Seconds, 6.5 is for the Right Hand Finger Dexterity Errors, 396 for the Left-Hand Finger Dexterity in Seconds and 5.75 for the Left Hand Finger Dexterity Errors. The total number of Adults with Mild Intellectual Disability (ID) is 4.

The mean scores of class 8 are 150 seconds for the Right Hand Finger Dexterity and committed an average of 1 error. 160 seconds for the Left Hand Finger Dexterity and 2 errors committed for the Left Hand Finger Dexterity. The mean scores of class 7 are 200 seconds for the Right Hand Finger Dexterity and committed an average of 2 errors. 210 seconds for the Left Hand Finger Dexterity and 3 errors committed for the Left Hand Finger Dexterity. The mean scores of class 6 are 250 seconds for the Right Hand Finger Dexterity and committed an average of 3 errors. 260 seconds for the Left-Hand Finger Dexterity and 4 errors committed for the Left-Hand Finger Dexterity. The mean scores of class 5 are 300 seconds for the Right-Hand Finger Dexterity and committed an average of 5 errors. 310 seconds for the Left-Hand Finger Dexterity and 6 errors committed for the Left-Hand Finger Dexterity. The mean scores of class 4 are 350 seconds for the Right-Hand Finger Dexterity and committed an average of 6 errors. 360 seconds for the Left-Hand Finger Dexterity and 7 errors committed for the Left Hand Finger Dexterity. The mean scores of class 3 are 379.5 seconds for the Right Hand Finger Dexterity and committed an average of 6.5 errors. 396.85 seconds for the Left Hand Finger Dexterity and 5.75 errors committed for the Left Hand Finger Dexterity. Then the researcher confirmed the mental age of Adults with Mild Intellectual Disability (ID) which is the students of class 3. This study will be help to look into forward that how can we help the Adults with Mild and Moderate Intellectual Disability (ID) increase their Motor Ability and how can they contribute more supporting activities to their family, and society. And also, to stimulate them to participate in more activities of the society so that they will not feel that they are not capable of doing anything like others.

Then the researcher used another tool the Bender Gestalt Test II (BGII) to collect the other data to deepen the objectives of the research. The researcher selected the same participants to collect the data to use another tool entitled the Bender Gestalt Test II (BGII).

Table 3: 1.2 shows Motor and Perceptual Abilities, Visuomotor Integration and Short Term Memory Scores of participants

BENDER GESTALT II (BGII)		
	Class 3	**Mild ID**
Motor Ability Test	11.5	11.5
Perceptual Ability Test	8.75	8.75
Visuomotor Integration	29.25	29.25
Short Term Memory	6.75	6.75

Table 3: 1. 2 shows the Motor and Perceptual Abilities, Visuomotor Integration and Short Term Memory scores of participants using Bender Gestalt II (BGII). The Motor Ability Test scores are for class 3 is 11.5 and Mild ID is 11.5, Perceptual Ability Test scores for class 3 are 8.75 and for Mild ID is 8.75. Visuomotor Integration scores for class-3 are 29.25 and mild ID is 29.25. Short Term Memory of class 3 are 6.75 and for Mild ID is 6.75. Motor Ability is defined as the personal characteristic or trait, such as manual dexterity and reaction time which contributes to proficiency in several motor skills. Here in the pilot study, the result shows that Adults with Mild Intellectual Disability is similar to the class 3. The highest score of Motor Ability Test score of BGII is 12 and the mean score of Adults with Mild Intellectual Disability (ID) is 11.5 which is similar to class 3. Instead, the highest Perceptual Ability Test

score of BGII is 10 and the Adults with Intellectual Disability can acquire the scores of 8.75 and the class-3 students have acquired 8.75. It shows their mental age is similar to Class-3 students.

Since the mental age of Adults with Intellectual Disability is the highest score for Visuomotor Integration of BGII is 52 the mean score obtained by Adults with Mild Intellectual Disability (ID) is 29.25 and the mean score obtained by class 3 is 8. The highest score for the Visuomotor Integration score is 52 the obtained mean score of Adults with Mild Intellectual Disability (ID) is 29.25 and the class 3 is 29.5. It reveals that the mean score is almost 50 percentage which means Visual Motor Integration (VMI) involves effective, efficient communication between the eyes and the hands, so that you can copy, draw or write what you see. The highest score for Short Term Memory is 52 the obtained mean score for Adults with Mild Intellectual Disability (ID) is 6.75 and the obtained mean score for class 3 is 6.75. The scores are similar but it seems that they are very poor in short-term memory which is the memory mechanism that allows us to retain a certain amount of information over a short period. It retains processed information that either fades quickly or turns into long-term memory.

MAIN STUDY

The Motor Ability, Perceptual Ability, Visuomotor Integration, Short-Term Memory, Right-Hand Finger Dexterity in Seconds, Left-Hand Finger Dexterity in Seconds, Right-Hand Finger Dexterity Errors, Left-Hand Finger Dexterity Errors of adults with mild and moderate intellectual disability (ID).

The following null hypothesis is tested. Table 4.1:1 gives the details.

- Ho. Motor ability of adults with mild intellectual disability is similar to the students of classes 2 and 3.
- Ho. Motor ability of adults with moderate intellectual disability is similar to the students of UKG and class 1
- Ho. There will not be any significant difference in the motor ability between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 1. 1 shows the Motor Ability of adults with mild and moderate intellectual disability.

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	9.37	0.93	*t*=1.586
	Students of classes 2 and 3	28	8.96	0.99	p=0.118
	Moderate ID	30	7.30	1.73	*t*=-0.622
Motor Ability	UKG and class 1	30	7.57	1.59	p=0.536
	Mild ID	28	9.37	0.93	*t*=5.779
	Moderate ID	30	7.30	1.73	p=0.000

As it is shown in table 4.1:1 The motor ability of 30 adults with mild intellectual disability was compared with 28 students from classes 2 and 3. The mean motor ability score of adults with mild ID is 9.37 (SD= 0.93), and the mean motor ability score of students of classes 2 and 3 is 8.96 (SD= 0.99). Comparing the means statistically the obtained *t*-value is, *t*=1.586, p=0.118. Thus, it is clear that there is no significant difference in the motor ability of adults with mild ID and the control students which means the motor ability of adults with mild ID is similar to the students of classes 2 and 3. The null hypothesis is motor ability of adults with mild intellectual disability is similar to the students of classes 2 and 3. So the null hypothesis

is accepted means that the 't' value of motor ability is 1.586 showing that there is no significant difference in motor ability between adults with mild intellectual disability and students of classes 2 and 3. The motor ability of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean motor ability score of adults with moderate ID is 7.30 (SD= 1.73), and the mean motor ability score of students of UKG and class 1 is 7.57 (SD= 1.59). Comparing the means statistically the obtained *t*-value is, *t*=-0.622, p=0.536. Thus, it is clear that there is no significance in the motor ability scores of adults with moderate ID and the control students which means the motor ability of adults with moderate ID is similar to the students of UKG and class 1. The null hypothesis is motor ability of adults with moderate intellectual disability is similar to the students of UKG and class 1. The motor ability of 30 adults with mild intellectual disability was compared with 30 adults with moderate intellectual disability. The mean motor ability score of adults with mild ID is 9.37 (SD= 0.93), and the mean of motor ability score of students with Moderate ID is 7.30 (SD= 1.73). Comparing the means statistically the obtained *t*-value is, *t*=5.779 which is significant at 0.01 level. Thus, it is clear that there is significance in the motor ability scores of adults with mild ID and moderate ID which means the motor ability of adults with mild ID is different with the adults with moderate ID.

The following null hypothesis is tested. Table 4.1:2 gives the details.

- Ho. Perceptual ability of adults with mild intellectual disability is similar to the students of classes 2 and 3.
- Ho. Perceptual ability of adults with moderate intellectual disability is similar to the students of UKG and class 1.
- Ho. There will not be any significant difference in the Perceptual ability between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 1. 2 shows the Perceptual Ability of adults with mild and moderate intellectual disability.

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	9.17	2.67	t=0.494
	students of classes 2 and 3	28	8.86	2.09	p=0.623
	Moderate ID	30	5.90	1.16	*t*=-0.239
Perceptual Ability	UKG and class 1	30	5.97	0.99	p=0.812
	Mild ID	30	9.17	2.67	*t*=5.663
	Moderate ID	30	5.90	1.156	p=0.000

As shown in table 4: 1. 2, the mean perceptual ability score of adults with mild ID is 9.17 (SD= 2.67), and the mean perceptual ability scores of students of class 2 and 3 is 8.86 (SD= 2.09). Comparing the means statistically the obtained *t*-value is, t=0.494, p=0.623. Thus, it is clear that there is no significance in the perceptual ability scores of adults with mild ID and the control students which means the perceptual ability of adults with mild ID is similar to the students of classes 2 and 3. The perceptual ability of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean perceptual ability scores of adults with moderate ID is 5.90 (SD= 1.16), and the mean motor ability score of students of UKG and class 1 is 5.97 (SD= 0.99). Comparing the means statistically the obtained *t*-value is, *t*=-0.239, p=0.812. Thus, it is clear that there is no significance in the perceptual ability scores of adults with moderate ID and the control students which means the perceptual ability of adults with moderate ID is similar to the students of UKG and class 1. The null hypothesis is perceptual ability of adults with moderate intellectual disability is similar to the students of UKG and class 1. So the null hypothesis is accepted means that the

'*t*' value of motor ability is -0.239 showing that there is no significant difference in the perceptual ability of adults with moderate intellectual disability and UKG and class 1. The mean perceptual ability score of adults with mild ID is 9.17 (SD= 2.67), and the mean motor ability score of students with moderate ID is 5.90 (SD= 1.156). Comparing the means statistically the obtained *t*-value is, t=5.663, p=0.000. Thus, it is clear that there is significance in the perceptual ability scores of adults with mild ID and moderate ID which means the perceptual ability of adults with mild ID is different from the adults with moderate ID. The null hypothesis is there will not be any significant difference in the perceptual ability between adults with mild intellectual disability and moderate intellectual disability. So the null hypothesis is rejected means that the 't' value score of perceptual ability is 5.663 which is significant at 0.01 level. This means that the perceptual ability of adults with mild intellectual disability and adults with moderate intellectual disability is significantly different from each other.

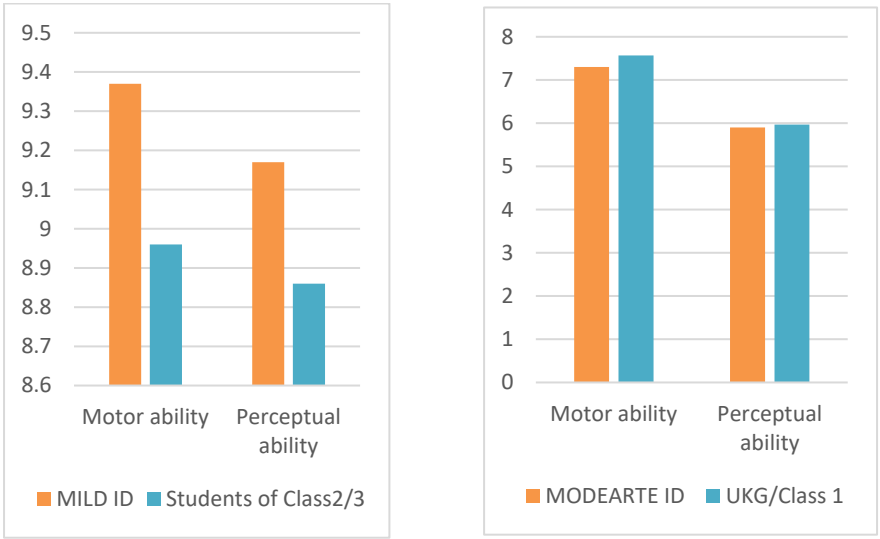


Figure 4. 1 Bar graph comparing the motor and perceptual abilities of adults with mild ID and students of class 2 and 3 and Bar graph comparing the motor and perceptual abilities of adults with moderate ID and students of UKG and class 1.

Figure 4.1 indicates the 1st bar graph comparing the motor and perceptual abilities of adults with mild intellectual disabilities and students of class 2 and 3. In this bar graph, the first bar demonstrates the adults with mild intellectual disabilities and the second bar indicates the students with classes 2 and 3. The result reveals that the motor abilities of adults with mild intellectual disabilities and the students of classes 2 and 3 are similar which means there is no significant difference. The result shows also the perceptual disabilities of adults with mild intellectual disabilities and the students of class 2 and class 3 are similar which means there is no significant difference. The 2nd graph presents clearly that the adults with moderate intellectual disabilities have their motor and perceptual abilities are very low compared to their peer group. In this bar graph, the 1st bar demonstrates the adults with mild intellectual disabilities and the blue bar indicates the students with UKG and classes 1. The result reveals that the motor abilities of adults with moderate intellectual disabilities and the students of UKG and class 1 are similar which means there is no significant difference. The result shows also the perceptual abilities of adults with moderate intellectual disabilities and the students of UKG and class 1 are similar which means there is no significant difference. The graph presents clearly that the adults with moderate intellectual disabilities have their motor and perceptual abilities are very low compared to their peer group.

The following null hypothesis is tested. Table 4:2.1 gives the details.

1. Ho. Visuomotor integration of adults with mild intellectual disability is similar to the students of classes 2 and 3.
2. Ho. Visuomotor integration of adults with moderate intellectual disability is similar to the students of UKG and class 1.
3. Ho. There will not be any significant difference in the Visuomotor integration between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 2. 1 shows the Visuomotor Integration of adults with mild and moderate intellectual disability.

Variables.	**Severity/ Population**	**No.**	**Mean**	**SD**	***t***
	Mild ID	30	19.47	7.43	*t*=-0.634
	Students of classes 2 and 3	28	20.79	8.36	p=0.529
	Moderate ID	30	9.13	5.53	*t*=-0.445
	UKG and class 1	30	9.70	4.27	p=0.658
	Mild ID	30	19.47	7.43	*t*=6.114
Visuomotor Integration	Moderate ID	30	9.13	5.53	p=0.000

The visuomotor integration of 30 adults with mild intellectual disability was compared with 28 children from classes 2 and 3. As shown in table 4: 2. 1, the mean visuomotor integration score of adults with mild ID is 19.47 (SD= 7.43), and the mean visuomotor integration score of students of classes 2 and 3 is 20.79 (SD= 8.36). Comparing the means statistically the obtained *t*-value is, *t*=-0.634, p=0.529. Thus, it is clear that there is no significance in the visuomotor integration scores of adults with mild ID and the control students which means the visuomotor integration of adults with mild ID is similar to the students of classes 2 and 3. The null hypothesis is visuomotor integration of adults with mild intellectual disability is similar to the students of classes 2 and 3. So the null hypothesis is accepted means that the '*t*' value of visuomotor integration is -0.634 showing that there is no significantly different visuomotor integration of adults with mild intellectual disability and students of classes 2 and 3.The Visuomotor integration of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean visuomotor integration score of adults with moderate ID is 9.13 (SD= 5.53), the mean of visuomotor integration scores of students of UKG and class 1 is 9.70 (SD= 4.27). Comparing the means statistically the obtained *t*-value is, *t*=-0.445, p=0.658. Thus, it is clear that there is no significance in the visuomotor integration scores of adults with moderate ID and the control students which means the visuomotor integration of adults with moderate ID is similar to the students of UKG and class 1. The null hypothesis is visuomotor integration of adults with moderate intellectual disability is similar to the students of UKG and class 1. So, the null hypothesis is accepted means that the 't' value of visuomotor integration is -0.445 showing that there is no significantly different in visuomotor integration of adults with mild intellectual disability and students of UKG and class 1. The Visuomotor Integration of 30 adults with mild intellectual disability was compared with 30 adults with moderate intellectual disability. The mean visuomotor integration scores of adults with mild ID is 19.47 (SD= 7.43), and the mean of the visuomotor integration score of students with moderate ID is 9.13 (SD= 5.53). Comparing the means statistically the obtained *t*-value is, *t*=6.114, p=0.000. Thus, it is clear that there is significance in the visuomotor integration scores of adults with mild ID and the moderate ID which means the visuomotor integration of adults with mild ID is different from that of adults with moderate ID. The null hypothesis is there will not be any significant difference between adults with mild intellectual disability and moderate intellectual disability. So the null

hypothesis is rejected means that the 't' value score of visuomotor integration is 6.114 which is significant at 0.01 level. This means that the visuomotor integration of adults with mild intellectual disability and adults with moderate intellectual disability is significantly different from each other.

The following null hypothesis is tested. Table 4.1:4 gives the details.

1. Ho. Short-term memory of adults with mild intellectual disability is similar to the students of classes 2 and 3.
2. Ho. Short-term memory of adults with moderate intellectual disability is similar to the students of UKG and class 1.
3. Ho. There will not be any significant difference in short-term memory between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 2. 2 shows the Short Term Memory of adults with mild and moderate intellectual disability.

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	5.00	4.89	*t*=0.151
	students of classes 2 and 3	28	4.82	4.11	p=0.881
	Moderate ID	30	0.37	1.07	*t*= -0.129
	UKG and class 1	30	0.40	0.93	p=0.898
Short-Term Memory	Mild ID	30	5.00	4.89	*t*=5.062
	Moderate ID	30	0.37	1.07	p=0.000

The short-term memory of 30 adults with mild intellectual disability was compared with 28 children from classes 2 and 3. The following null hypothesis is tested. As shown in table 4: 2. 2, the mean of the short-term memory score of adults with mild ID is 5.00 (SD= 4.89), and the mean of short term memory score of students of classes 2 and 3 is 4.82 (SD= 4.11). Comparing the means statistically the obtained *t*-value is, *t*=0.151, p=0.881. Thus, it is clear that there is no significance in short-term memory scores of adults with mild ID and the control students which means the recall phase of adults with mild ID is similar to the students of classes 2 and 3. The null hypothesis is short-term memory of adults with mild intellectual disability is similar to the students of classes 2 and 3. So the null hypothesis is accepted means that the '*t*' value of short -term memory is 0.151 showing that there is no significant difference in short-term memory of adults with mild intellectual disability and students of classes 2 and 3. The short-term memory of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean short-term memory score of adults with moderate ID is 0.37 (SD= 1.07), and the mean short-term memory score of students of UKG and class 1 is 0.40 (SD= 0.93). Comparing the means statistically the obtained *t*-value is, *t*=-0.129, p=0.898. Thus, it is clear that there is no significance in the short-term memory scores of adults with moderate ID and the control students which means the short-term memory of adults with moderate ID is similar to the students of UKG and class 1. The null hypothesis is short-term memory of adults with moderate intellectual disability is similar to the students of UKG and class 1. So, the null hypothesis is accepted means that the 't' value of short-term memory is -0.129 showing that there is no significant difference in short-term memory of adults with mild intellectual disability and students of UKG and class 1. There will not be any significant difference in the short-term memory between adults with mild intellectual disability and moderate intellectual disability. The mean short-term memory score of adults with mild ID is 5.00 (SD= 4.89), and the mean of short -term memory score of students with moderate ID is 0.37 (SD= 1.07). Comparing the means statistically the obtained *t*-value is, *t*=5.062, p=0.000. Thus, it is clear that there is significance in the short-term

memory scores of adults with mild ID and the moderate ID which means the short-term memory of adults with mild ID is different from the adults with moderate ID. The null hypothesis is there will not be any significant difference in short-term memory between adults with mild intellectual disability and moderate intellectual disability. So the null hypothesis is rejected means that the 't' value score of short-term memory is 5.062 which is significant at 0.01 level. This means that the short-term memory of adults with mild intellectual disability and adults with moderate intellectual disability is significantly different from each other.

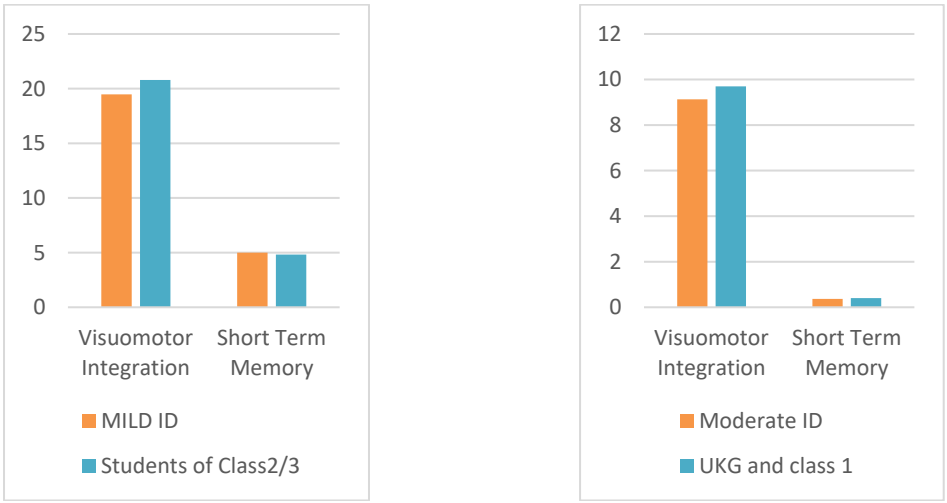


Figure 4: 2 Bar graph comparing the visuomotor integration and short term memory of adults with mild ID and students of classes 2 and 3 and Bar graph comparing the visuomotor integration and short-term memory of adults with moderate ID and students of UKG and class 1.

The result indicates that the visuomotor integration of adults with mild intellectual disability is similar to the students of classes 2 and 3 which means there is no significant difference. The result also demonstrates that the short-term memory of adults with moderate intellectual disability is similar to the students of UKG and class 1which means there is no significant difference. But visuomotor integration of mild ID is good means the capability for observing and following the activities is good. But short-term memory is very poor means that their memory power for retrieving things is very poor compared to their peer group. The result also indicates that the short-term memory of adults with moderate intellectual disability is similar to the students of UKG and class 1 which means there is no significant difference. The result also demonstrates that the short-term memory of adults with moderate intellectual disability is similar to the students of UKG and class 1 which means there is no significant difference. But in short-term memory is almost zero to one means that their memory power for retrieving things is zero to one compared to their peer group. The result shows that they are unable to acquire the academic skills like their peer group. But by giving continuous encouragement and therapies, they can learn at least some skills to maintain their daily life routines like washing their clothes, taking a bath, eating food, cleaning and helping some activities at home. They can help also do some activities at home like sweeping the floor, to clean the house.

The following null hypothesis is tested. Table 4: 3.1 gives the details.

1. Ho. Right-hand finger Dexterity in Seconds with mild intellectual disability is similar to the students of classes 2 and 3.

2. Ho. Right-Hand Finger Dexterity in Seconds of adults with moderate intellectual disability is similar to the students of UKG and class 1.
3. Ho. There will not be any significant difference in the Right-Hand Finger Dexterity in Seconds between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 3. 1 shows The Right-Hand Finger Dexterity in Seconds of adults with mild and moderate intellectual disability.

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	429.30	108.69	*t*=2.998
	students of classes 2 and 3	28	360.32	61.62	p=0.004
	Moderate ID	30	503.40	56.14	t=0.014
	UKG and class 1	30	503.20	54.93	p=.989
Right-Hand Finger Dexterity in Seconds	Mild ID	30	429.30	108.69	t=-3.317
	Moderate ID	30	503.40	56.14	p=0.002.

The Right-Hand Finger Dexterity in Seconds of 30 adults with mild intellectual disability was compared with 28 children from classes 2 and 3. As shown in table 4: 3 .1, the mean of right-hand finger dexterity in seconds score of adults with mild ID is 429.30 (SD= 108.69), the mean of right-hand finger dexterity in seconds score of students of classes 2 and 3 is 360.32 (SD= 61.62). Comparing the means statistically the obtained *t*-value is, *t*=2.998, p=0.004. Thus, it is clear that there is significance in the p=0.004 scores of adults with mild ID and the control students which means the p=0.004 of adults with mild ID is different to the students of classes 2 and 3. The null hypothesis is right-hand finger dexterity in seconds with adults with mild intellectual disability is similar to the students of classes 2 and 3, so the null hypothesis is accepted. The Right-Hand Finger Dexterity in Seconds of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean Right-Hand Finger Dexterity in Seconds score of adults with moderate ID is 503.40 (SD= 56.14), and the mean short-term memory score of students of UKG and class 1 is 503.20 (SD= 54.93). Comparing the means statistically the obtained *t*-value is, t=0.014, p=.989. Thus, it is clear that there is no significance in the perceptual ability scores of adults with moderate ID and the control students which means the Right-Hand Finger Dexterity in Seconds of adults with moderate ID is similar to the students of UKG and class 1. The null hypothesis is Right-Hand Finger Dexterity in Seconds of adults with moderate intellectual disability is similar to the students of UKG and class 1, so the null hypothesis is accepted. The Right-Hand Finger Dexterity in Seconds of 30 adults with mild intellectual disability was compared with 30 adults with moderate intellectual disability. The mean of Right-Hand Finger Dexterity in Seconds score of adults with mild ID is 429.30 (SD= 108.69), the mean of right-hand finger dexterity in seconds score of students of moderate ID is 503.40 (SD= 56.14). Comparing the means statistically the obtained *t*-value is, t= -3.317, p= 0.002. Thus, it is clear that there is a significance in the Right-Hand Finger Dexterity in Seconds scores of adults with mild ID and the moderate ID which means the Right-Hand Finger Dexterity in Seconds of adults with mild ID is different from the adults with moderate ID. The null hypothesis is There will not be any significant difference in the Right-Hand Finger Dexterity in Seconds between adults with mild intellectual disability and moderate intellectual disability, so the null hypothesis is rejected means that the 't' value score of Right-Hand Finger Dexterity in Seconds is -3.317 which is significant at 0.01 level.

The following null hypothesis is tested. Table 4: 3. 2 gives the details.

1. Ho. Left-hand finger Dexterity in Seconds with mild intellectual disability is similar to the students of classes 2 and 3.
2. Ho. Left-Hand Finger Dexterity in Seconds of adults with Moderate Intellectual Disability is similar to the students of UKG and class 1.
3. Ho. There will not be any significant difference in the Left -hand finger dexterity in Seconds between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 3. 2 shows The Left-Hand Finger Dexterity in Seconds of adults with mild and moderate intellectual disability.

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	441.17	49.194	*t*=3.313
	Students of classes 2 and 3	28	395.32	55.71	p=0.002
	Moderate ID	30	536.50	42.27	*t*=-0.407
Left- Hand	UKG and class 1	30	541.00	43.38	p=0.686
Finger Dexterity	Mild ID	30	441.17	49.19	*t*=-8.051
in Seconds	Moderate ID	30	536.50	42.27	p=0.000

The Left-Hand Finger Dexterity in Seconds of 30 adults with mild intellectual disability was compared with 28 children from classes 2 and 3. As shown in table 4: 3. 2, the mean right-hand finger dexterity in seconds score of adults with mild ID is 441.17 (SD= 49.194), the mean right-hand finger dexterity in seconds score of students of classes 2 and 3 is 395.32 (SD= 55.71). Comparing the means statistically the obtained *t*-value is, *t*=3.313, p=0.002. Thus, it is clear that there is significance in the p=0.002 scores of adults with mild ID and the control students which means the p=0.002 of adults with mild ID is different to the students of classes 2 and 3 in right-hand finger dexterity in seconds. The null hypothesis is Left-Hand Finger Dexterity in Seconds with mild intellectual disability is similar to the students of classes 2 and 3 so the null hypothesis is rejected. The Left-Hand Finger Dexterity in Seconds of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean Left-Hand Finger Dexterity in Seconds score of adults with moderate ID is 536.50 (SD= 42.27), and the mean of Left -Hand Finger Dexterity in Seconds score of students of UKG and class 1 is 541.00 (SD= 43.38). Comparing the means statistically the obtained *t*-value is, *t*=-0.407, p=0.686. Thus, it is clear that there is no significance in the Left-Hand Finger Dexterity in Seconds scores of adults with moderate ID and the control students which means the Left-Hand Finger Dexterity in Seconds of adults with moderate ID is similar to the students of UKG and class 1. The null hypothesis is Left-Hand Finger Dexterity in Seconds of adults with Moderate Intellectual Disability is similar to the students of UKG and class 1 so the null hypothesis is accepted The Left-Hand Finger Dexterity in Seconds of 30 adults with mild intellectual disability was compared with 30 adults with moderate intellectual disability. The mean of Left-Hand Finger Dexterity in Seconds score of adults with mild ID is 441.17 (SD= 49.19), the mean Left -Hand Finger Dexterity in Seconds score of students of moderate ID is 536.50 (SD= 42.27). Comparing the means statistically the obtained *t*-value is, *t*=-8.051, p=0.000. Thus, it is clear that there is significance in the Left-Hand Finger Dexterity in Seconds scores of adults with mild ID and the moderate ID which means the Left-Hand Finger Dexterity in Seconds of adults with mild ID is different from that of adults with moderate ID. The null hypothesis is There will not be any significant difference in the Left-hand finger Dexterity in Seconds between adults with mild intellectual disability and moderate intellectual disability. So the null hypothesis is rejected means that

the ‘t’ value score of Right-Hand Finger Dexterity in Seconds is -8.051which is significant at 0.01 level.

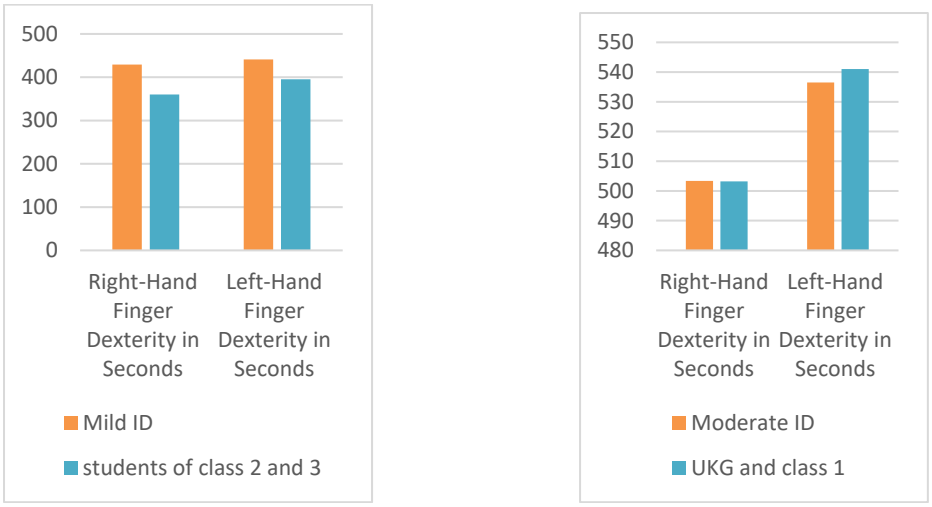


Figure 4. 3 Bar graph comparing the Right-Hand and Left-Hand Finger Dexterity in Seconds of adults with mild ID and students of class 2 and 3 and Bar graph comparing the Right-Hand and Left-Hand Finger Dexterity in Seconds of adults with moderate ID and students of UKG and class 1.

The result also indicates that the right-hand finger dexterity in seconds of adults with mild intellectual disability is different to the students of classes 2 and 3 which means there is no significant difference. The result also demonstrates that the Left-Hand Finger Dexterity in Seconds of adults with Mild ID and students of classes 2 and 3 is different which means there is a significant difference. But right-hand finger dexterity in seconds of adults with mild intellectual disability is similar to the Left- Hand Finger Dexterity in Seconds of adults with Mild ID. It reveals that they have balance in both hands but a little more in left hand. The result indicates that the right hand finger dexterity in seconds of adults with Moderate intellectual disability is similar to the students of UKG and class 1 which means there is no significant difference. The result also demonstrates that the Left Hand Finger Dexterity in Seconds of adults with Moderate ID and students of UKG and class 1 is different which means there is a significant difference. The results also showed clearly that the balance of hands of adults with Moderate intellectual disability has more balance in doing activities.

The following null hypothesis is tested. Table 4: 4. 1 gives the details.

1. Ho. Right-Hand Finger Dexterity Errors of adults with mild intellectual disability is similar to the students of classes 2 and 3.
2. Ho. Right-Hand Finger Dexterity Errors of adults with moderate intellectual disability is similar to the students of UKG and class 1.
3. Ho. There will not be any significant difference in the Right-Hand Finger Dexterity Errors between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 4. 1 shows The Right-Hand Finger Dexterity Errors of adults with mild and moderate intellectual disability.

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	5.67	1.89	*t*=-0.547
	Students of classes 2 and 3	28	5.96	2.22	p=0.587
	Moderate ID	30	6.40	2.33	*t*=-1.368
Right-Hand Finger	UKG and class 1	30	7.17	2.00	p=0.177
Dexterity Errors	Mild ID	30	5.67	1.89	*t*=-1.337
	Moderate ID	30	6.40	2.33	p=0.187

The Right-Hand Finger Dexterity Errors of 30 adults with mild intellectual disability was compared with 28 children from classes 2 and 3. As shown in table 4: 4. 1, the mean right-hand finger dexterity Error score of adults with mild ID is 5.67 (SD= 1.89), the mean right-hand finger dexterity in seconds score of students of class 2 and 3 is 5.96 (SD= 2.22). Comparing the means statistically the obtained *t*-value is, *t*=-0.547, p=0.587. Thus, it is clear that there is no significance in the p=0.587 scores of adults with mild ID and the control students which means the p=0.587 of adults with mild ID is different to the students of classes 2 and 3. The null hypothesis is right-hand finger dexterity errors in adults with mild intellectual disability is similar to the students of classes 2 and 3. So the null hypothesis is accepted means that the 't' value of right-hand finger dexterity in seconds is -0.547 showing that there is no significant differences in right-hand finger dexterity errors with adults with mild intellectual disability and students of classes 2 and 3. The Right-Hand Finger Dexterity Errors of 30 adults with moderate intellectual disability was compared with 30 children from UKG and class 1. The mean of Right-Hand Finger Dexterity Error score of adults with moderate ID is 6.40 (SD= 2.33), and the mean of right-hand finger dexterity error score of students of UKG and class 1 is 7.17 (SD= 2.00). Comparing the means statistically the obtained *t*-value is, t=-1.368, p=0.177. Thus, it is clear that there is no significance in the right-hand finger dexterity error scores of adults with moderate ID and the control students which means the right-hand finger dexterity errors between moderate ID is different to the students of UKG and class 1. The null hypothesis is Right-Hand Finger Dexterity Errors of adults with moderate intellectual disability is similar to the students of UKG and class 1. So the null hypothesis is accepted means that the 't' value of right-hand finger dexterity errors is -1.368 showing that there is a significant difference in right-hand finger dexterity errors with adults with moderate intellectual disability and students of UKG and class 1. The Right-Hand Finger Dexterity Errors of 30 adults with mild intellectual disability was compared with 30 adults with moderate intellectual disability. The mean of the Right-Hand Finger Dexterity errors of adults with mild ID is 5.67 (SD= 1.89), and the mean Right-Hand Finger Dexterity error score of students with moderate ID is 6.40 (SD=2.33). Comparing the means statistically the obtained *t*-value is, *t*= -1.337, p= 0.187. Thus, it is clear that there is a significance in the Right-Hand Finger Dexterity Errors scores of adults with mild ID and the moderate ID which means the Right-Hand Finger Dexterity Errors of adults with mild ID is different from the adults with moderate ID. The null hypothesis is There will not be any significant difference in the Right-Hand Finger Dexterity Errors between adults with mild intellectual disability and moderate intellectual disability.So, the null hypothesis is rejected means that the 't' value score of Right-Hand Finger Dexterity errors is -1.337 which is significant at 0.01 level. This means that the Right-Hand Finger Dexterity errors of adults with mild intellectual disability and adults with moderate intellectual disability is significantly different in adults with mild intellectual disability and moderate intellectual disability.

The following null hypothesis is tested. Table 4: 4. 2 gives the details.

1. Ho. Left-Hand Finger Dexterity Errors of adults with mild intellectual disability is similar to the students of classes 2 and 3.
2. Ho. Left-Hand Finger Dexterity Errors of adults with moderate intellectual disability is similar to the students of UKG and class 1.
3. Ho. There will not be any significant difference in the Left-Hand Finger Dexterity Errors between adults with mild intellectual disability and moderate intellectual disability.

Table 4: 4.2 Shows Comparing the Left-Hand Finger Dexterity Errors of adults with mild and moderate intellectually disability (ID)

Variables	Severity/ Population	No.	Mean	SD	*t*
	Mild ID	30	7.07	2.07	*t*=-2.319
	students of classes 2 and 3	28	8.46	2.49	p=0.024
	Moderate ID	30	7.27	2.53	*t*= -0.442
Left-Hand Finger	UKG and class 1	30	7.57	2.73	p= 0.660
Dexterity Errors	Mild ID	30	7.07	2.07	t= -0.335
	Moderate ID	30	7.27	2.53	p= 0.739

The Left-Hand Finger Dexterity Errors of 30 adults with mild intellectual disability was compared with 28 children from class 2 and 3. As shown in table 4: 4.2 the mean of the Left-Hand Finger Dexterity Error score of adults with mild ID is 7.07 (SD= 2.07), the mean of Left-Hand Finger Dexterity Error score of students of classes 2 and 3 is 8.46 (SD=2.49). Comparing the means statistically the obtained *t*-value is, *t*= -2.319, p= 0.024.Thus, it is clear that there is significance in the Left-Hand Finger Dexterity Errors scores of adults with mild ID and the students of classes 2 and 3 which means the Left-Hand Finger Dexterity Errors of adults with mild ID is different from the students of classes 2 and 3.The null hypothesis is Left-Hand Finger Dexterity Errors of adults with mild intellectual disability is similar to the students of classes 2 and 3. So the null hypothesis is accepted means that the 't' value of right-hand finger dexterity errors is -2.319 showing that there is a significant difference in right-hand finger dexterity errors between adults with mild intellectual disability and students of classes 2 and 3. The Left-Hand Finger Dexterity Errors of 30 adults with moderate intellectual disability were compared with 30 children from UKG and class 1. The mean Left-Hand Finger Dexterity Error score of adults with moderate ID is 7.27 (SD= 2.53), and the mean Left-Hand Finger Dexterity Error score of students of UKG and class 1 is 7.57 (SD= 2.73). Comparing the means statistically the obtained *t*-value is, *t*=-0.442, p=0.660. Thus, it is clear that there is no significance in the Right-Hand Finger Dexterity Errors scores of adults with moderate ID and the control students which means the Right-Hand Finger Dexterity Errors with moderate ID is different to the students of UKG and class 1. The null hypothesis is Left-Hand Finger Dexterity Errors of adults with Moderate Intellectual Disability is similar to the students of UKG and class 1. So, the null hypothesis is accepted means that the 't' value of right-hand finger dexterity errors is -0.442 showing that there is difference in right-hand finger dexterity errors between adults with mild intellectual disability and students of UKG and class 1. The Left-Hand Finger Dexterity Errors of 30 adults with mild intellectual disability were compared with 30 adults with moderate intellectual disability. The following null hypothesis is tested. The mean of Left-Hand Finger Dexterity Errors of adults with mild ID is 7.07 (SD= 2.07), and the mean Left-Hand Finger Dexterity in Seconds score of students of moderate ID is 7.27 (SD=2.53). Comparing the means statistically the obtained *t*-value is, t= -0.335, p= 0.739. Thus, it is clear that there is a significance in the Right-Hand Finger Dexterity Error scores of adults with mild ID and the moderate ID which means the Right-

Hand Finger Dexterity Errors of adults with mild ID is different with the adults from moderate ID. The null hypothesis is There will not be any significant difference in the Left-Hand Finger Dexterity Errors between adults with mild intellectual disability and moderate intellectual disability. So the null hypothesis is rejected means that the 't' value score of Right-Hand Finger Dexterity errors is -0.335 which is significant at 0.01 level. This means that the Left-Hand Finger Dexterity errors of adults with mild intellectual disability and adults with moderate intellectual disability are significantly different in adults with mild intellectual disability and moderate intellectual disability.

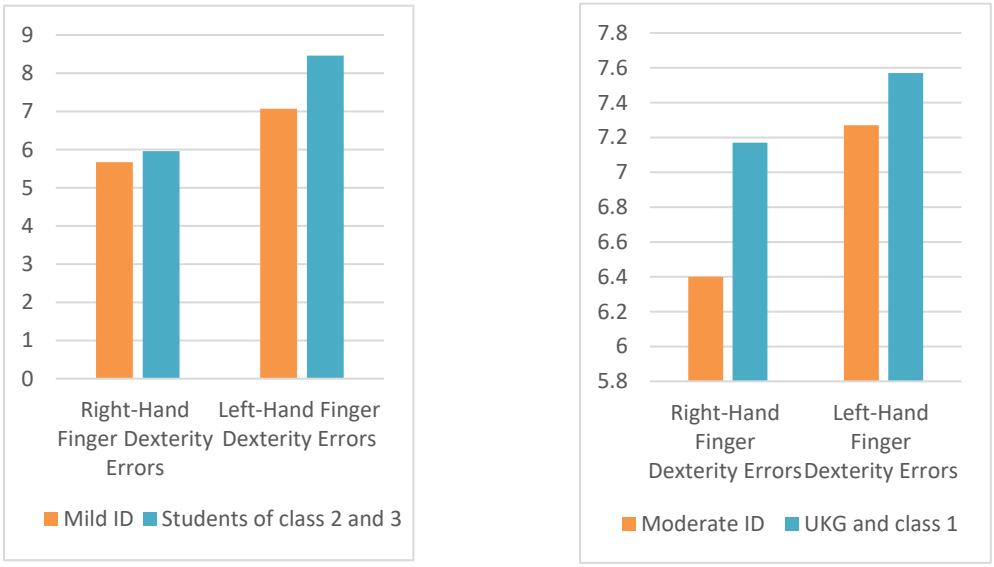


Figure 4. 4 Bar graph comparing the Right-Hand and Left-Hand Finger Dexterity Errors of adults with mild ID and students of class 2 and 3 and Bar graph comparing the Right-Hand and Left-Hand Finger Dexterity Errors of adults with moderate ID and students of UKG and class 1.

The result demonstrates that there is no significance in the Left-Hand Finger Dexterity Error scores of adults with mild ID and the students of classes 2 and 3 which means the Left-Hand Finger Dexterity Errors of adults with mild ID is different from the students of classes 2 and 3. But the result shows that there is a significance in the Left-Hand Finger Dexterity Error scores of adults with mild ID and the students of classes 2 and 3 which mean the Left-Hand Finger Dexterity Errors of adults with mild ID is different from the students of classes 2 and 3. The result demonstrates that there is no significance in the right-hand finger dexterity error scores of adults with moderate ID and the control students which means the right-hand finger dexterity errors with moderate ID are different to the students of UKG and class 1. However, there is no significance in the Right-Hand Finger Dexterity Errors scores of adults with moderate ID and the control students which means the Right-Hand Finger Dexterity Errors with moderate ID is different to the students of UKG and class 1.

The following null hypothesis is tested. Table 4: 5. 1 gives the details.

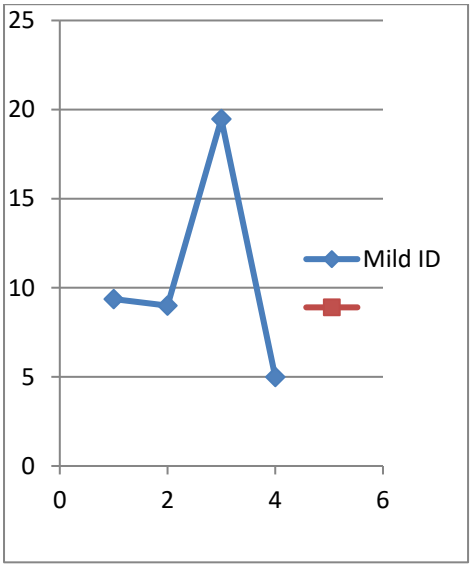
1. Ho. There is no significant relationship in the motor ability and perceptual ability among adults with mild intellectual disability
2. Ho. There is no significant relationship in the Visuomotor integration and short-term memory among adults with mild intellectual disability.
3. Ho. There is no significant relationship in the motor ability and perceptual ability among adults with Moderate intellectual disability

4. Ho. There is no significant relationship in the Visuomotor integration and short-term memory among adults with moderate intellectual disability.

Table 4: 5. 1 shows The Correlation of Motor Ability and Perceptual Ability, Visuomotor Integration and Short Term Memory of Adults with Mild Intellectual Disability (ID)

Severity/ Population	Variables	No.	Mean	SD	*t*
Mild Intellectual Disability (ID)	Motor ability	30	9.37	0.93	r=-.134
	Perceptual ability	30	9.00	2.77	p=.479
	Visuomotor Integration	30	19.47	7.43	r=.641**
	Short-Term Memory	30	5.00	4.89	p=.000
Moderate Intellectual Disability (ID)	Motor ability	30	7.30	1.73	r=.137
	Perceptual ability	30	5.90	1.16	p=.471
	Visuomotor Integration	30	9.13	5.53	r=.600**
	Short-Term Memory	30	0.37	1.07	p=.000

The Motor ability of 30 adults with mild intellectual disability was correlated with their Perceptual ability. As shown in table 4: 5. 1, and the mean motor ability score of adults with mild ID is 9.37 (SD=0.93), the mean of perceptual ability scores of students with mild ID is 9.00 (SD= 2.77). Correlating the means statistically the obtained *r*-value is, r= -.134, p = .479. Thus, there is no significant relationship in the motor ability and perceptual ability among adults with mild intellectual disability. The null hypothesis is There is no significant relationship in the motor ability and perceptual ability among adults with mild intellectual disability. So, the null hypothesis is accepted. The Visuomotor integration of 30 adults with mild intellectual disability was correlated with their short-term memory. The mean of visuomotor integration score of adults with mild ID is 19.47 (SD=7.43), and the mean of Short Term Memory score of students with mild ID is 5.00 (SD= 4.89). Correlating the means statistically the obtained *r*-value is, r=.641**, p=.000. Thus, there is a significant relationship between the visuomotor integration and Short-Term Memory among adults with mild intellectual disability. The null hypothesis is There is no significant relationship in the Visuomotor integration and short-term memory among adults with mild intellectual disability. So the null hypothesis is rejected. The Motor ability of 30 adults with moderate intellectual disability was correlated with their Perceptual ability. The mean of motor ability score of adults with Moderate ID is 7.30 (SD=1.73), and the mean of perceptual ability score of students of moderate ID is 5.90 (SD= 1.16). Correlating the means statistically the obtained *r*-value is, r= -.137, p = .471. Thus, there is no significant relationship in the motor ability and perceptual ability among adults with moderate intellectual disability. The null hypothesis is There is no significant relationship in the motor ability and perceptual ability among adults with moderate intellectual disability. So, the null hypothesis is accepted. The Visuomotor integration of 30 adults with moderate intellectual disability was correlated with their short term memory. The mean of the visuomotor integration score of adults with moderate ID is 9.13 (SD=5.53), and the mean of the Short-Term Memory score of students with moderate ID is 0.37 (SD= 1.07). Correlating the means statistically the obtained *r*-value is, r=.600**, p=.000. Thus There is a significant relationship between the visuomotor integration and Short Term Memory among adults with moderate intellectual disability. The null hypothesis is There is no significant relationship between the Visuomotor integration and short term-memory among adults with moderate intellectual disability. So, the null hypothesis is rejected.



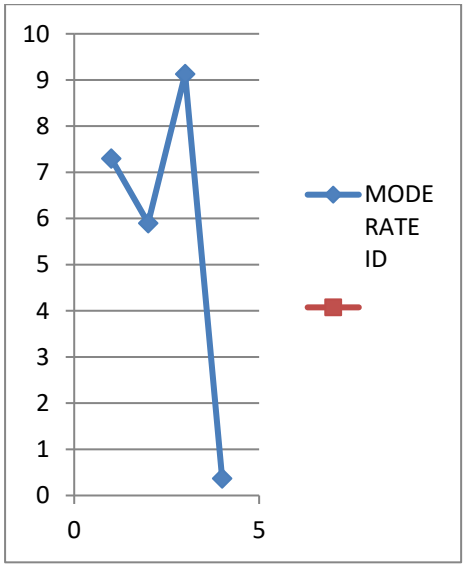


Figure 4: 5 indicates the Scatter chart Correlation of Motor Ability and Perceptual Ability, Visuomotor Integration and Short Term Memory of Adults with Mild ID; Correlation of Motor Ability and Perceptual Ability, Visuomotor Integration and Short Term Memory of Adults with Moderate ID.

The result shows that There is no significant relationship in the motor ability and perceptual ability among adults with mild intellectual disability. The result also revealed that There is a significant relationship in the visuomotor integration and Short Term Memory among adults with mild intellectual disability. Also, the result indicates that There is no significant relationship in the motor ability and perceptual ability among adults with moderate intellectual disability. The result also revealed that There is a significant relationship between the visuomotor integration and Short-Term Memory among adults with moderate intellectual disability.

DISCUSSION

The motor and perceptual abilities, VisuoMotor Integration and short-term memory of adults with mild intellectual disability are similar to the students of classes 2 and 3. The motor and perceptual abilities, Visuomotor Integration and short term memory of adults with moderate intellectual disability are similar to the students of UKG and class 1.There is also a significant difference in the motor ability, perceptual ability, visuomotor Integration Short-term memory between adults with mild intellectual disability and moderate intellectual disability. On the other hand, Right-Hand Finger Dexterity in Seconds with mild intellectual disability is similar to the students of classes 2 and 3. Instead, there is a significant difference in Left-hand finger dexterity in seconds between adults with mild intellectual disability and students of classes 2 and 3. Also, there is a significant difference in the Right and Left Hand Finger Dexterity in Seconds between adults with mild intellectual disability and moderate intellectual disability. The Right and Left- Hand Finger Dexterity Errors of adults with mild intellectual disability is similar to the students of classes 2 and 3. Also, the Right and Left Hand Finger Dexterity Errors of adults with moderate intellectual disability is similar to the students of UKG and class 1. Finally, there is a significant difference in the Right and Left Hand Finger Dexterity Errors between adults with mild intellectual disability and moderate intellectual disability.

There is no significant relationship in the motor ability and perceptual ability among adults with mild intellectual disability. However, there is a significant relationship in the visuomotor

integration and short-term memory among adults with mild intellectual disability is accepted. And there is no significant relationship between the motor ability and perceptual ability among adults with moderate intellectual disability. However, there is no significant relationship in the visuomotor integration and short-term memory among adults with moderate intellectual disability.

Major Findings

- Motor ability of adults with mild intellectual disability is similar to the students of classes 2 and 3.
- Motor ability of adults with moderate intellectual disability is similar to the students of UKG and class 1.
- There is a significant difference in motor ability between adults with mild intellectual disability and moderate intellectual disability.
- Perceptual ability of adults with mild intellectual disability is similar to the students of classes 2 and 3.
- Perceptual ability of adults with moderate intellectual disability is similar to the students of UKG and class 1.
- There is a significant difference in the Perceptual ability between adults with mild intellectual disability and moderate intellectual disability.
- Visuomotor integration of adults with mild intellectual disability is similar to the students of classes 2 and 3.

Recommendations

1. To investigate the same study but including adults with severe and profound intellectual disability.
2. The study can be conducted by taking samples from different parts of the Kerala state or from different parts of south India or North India to obtain significant and stable results.
3. After coming up with the result the suitable interventions depend upon the participants

Limitations of the Study

The present study has certain limitations that not need to be taken into account when considering the study and its contributions.

1. The study failed to focus on adults with severe and profound intellectual disability and to take more data from different age levels of control students.
2. The study failed to collect data from all the districts of Kerala to understand the status of intellectual disability in different parts of Kerala.
3. The corona virus situation prolonged the time of study and it brought the hindrance to enter into the rehabilitation centres and special education schools and many Rehabilitation centres and Special education schools were not functioning successfully because of the corona virus.
4. Travelling to different parts of Kerala was difficult because of Corona virus and because of that the study has taken on a small sample size.
5. The study on a large sample size would have given more significant results.

Interventions

Intervention comes from the Latin intervenire, which means to come between and interrupt. Sometimes an intervention is intended to make things better. It can be classified into two broad categories which are preventive interventions and therapeutic interventions. preventive

interventions are those that prevent the disease from occurring and thus reduce the incidence of new cases of disease. The second one is therapeutic interventions are those that treat, mitigate, or postpone the effects of a disease, once it is underway, and thus reduce the case fatality rate or reduce the disability or morbidity associated with a disease. Often some interventions may have both effects. For the increase of motor and perceptual abilities, visuomotor integration and short-term memory can follow these interventions. Grab a squeeze ball, Put up your dukes and make a fist, Get relief when you exercise, Stretch your wrists, Lift your fingers, Gross motor activities, Fine motor activities, Body awareness activities, Spatial awareness activities, Directional awareness activities, Balance activities, Integration activities and Expressive activities

CONCLUSION

The present study entitled motor and perceptual abilities among adults with intellectual disabilities. This study revealed the mental age of adults with mild and moderate ID. Here the adults with mild intellectual disability have an average chronological age of 21.07 and the adults with moderate have a chronological age of 20.8. This study could able to come up with the findings a mental age of adults with mild ID is 7.5 and adults with moderate ID have the mental age of 5.5. On the other hand, the previous study by Patidar, Sharma and Singh demonstrated through their study on the ID population that the average chronological age of persons with mild intellectual disability was 22.90 with chronological age of 8.3. Instead, the average chronological age of persons with moderate intellectual disability was 16.83 and the mental age of 5.7. The advantage of revealing the mental age of adults with mild and moderate Intellectual Disability can have some interventions to develop their motor and perceptual abilities, visuomotor integration and short-term memory. Though it is true that they cannot come up with the activities same as their peer group at least they can improve their activities at home and in society.

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Conflict of Interest

The author(s) declared no conflict of interest.

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