

# Assessing the Effectiveness of Visual Stimulation on Visual Perceptual Ability Among Intellectually Disabled Children

S. Seethalakshmi\*

## Abstract

*Every child, including those with mild mental retardation, has the right to receive an education. As like normal children, mild mentally intellectually disabled children need education that can help their growth and development and to perform their daily life activities. However, learning sources for intellectually disabled children have several obstacles, including recognition of objects. The purpose of this study is to orient the use of basic articles for mild intellectually disabled children that are used for day-to-day activities. The methodology used in this study employed a quantitative approach with a quasi-experimental design. Data collection techniques included observations and interviews conducted with mildly intellectually retarded children at Women's Voluntary Special School in Koundampalayam, Coimbatore. The data obtained from the study were analyzed using descriptive and inferential statistics. Based on the findings, it can be concluded that visual stimulation was successful in enhancing the visual perceptual ability of children with intellectual disabilities.*

**Keywords:** Visual stimulation, visual perceptual ability, intellectually retarded children.

## INTRODUCTION

Observing the growth and development of a young child is an extraordinary and unparalleled journey. Witnessing their progress in sitting up, speaking, and walking are significant milestones in their journey of development. Normal children learn the daily living skills such as feeding, toilet training, dressing, and social skills such as playing, interacting with others daily is the result of “transactions” between the child and his or her environment. It facilitates new learning which results in the development of traits and skills [1–4].

Intellectual disability or mental retardation means a condition of sub average or sub-normality of intelligence manifesting before age of 18 years. Intellectual disability means significantly decreased ability to understand new information and to learn coping skills. This results the child in a reduced ability to cope independently and it begins before adulthood, with a lasting effect on development. Disability depends not only on a child's health conditions but also influence on the extent to which environmental factors support the child's full participation and inclusion in society.

### \*Author for Correspondence

S. Seethalakshmi

E-mail: selvarajseethalekshmi@gmail.com

Associate Professor, PSG College of Nursing, Coimbatore, Tamilnadu, India

Received Date: March 10, 2023

Accepted Date: May 18, 2023

Published Date: May 25, 2023

**Citation:** S. Seethalakshmi. Assessing the Effectiveness of Visual stimulation on Visual Perceptual Ability Among Intellectually Disabled Children. International Journal of Evidence Based Nursing and Practices. 2023; 1(1): 12–22p.

Visual stimulation refers to an action or thing that makes a child to become more active or enthusiastic to develop daily life skills as we receive information through our sensory organs and our brains interpret this input. Visual stimulation changes the neural networks of the brain and changes the quality of output from the left brain as it develops. Visual stimulation involves one person providing the stimulation to another person such as when someone is passively receiving a visual input [5–7].

### **Need for the Study**

Childs population is considered to be greatest potential of any nation more so with developing countries. When children enjoy a state of well-being in every true sense then harmony, stability, peace and happiness prevails in the family, community leading to a building of a strong nation. At times this equilibrium is disturbed due to many factors affecting child population from independent function. Intellectual disability is one of the set back from which 3% of children are affected. Concerns for intellectually disabled children tremendously have increased in past two decades [8–11].

The term “Intellectual Disability” refers to the same group of individuals who were previously diagnosed with mental retardation, encompassing factors such as the extent, severity, type, and duration of the disability. It highlights the unique requirements of individuals with this disability for personalized services and assistance (American Association of Disability) [12].

Sensory stimulation is a form of treatment that may increase the patient’s responsiveness and activeness. A family member or a health care professional systematically applies stimulation to the patient’s five sensory modalities. This sensory stimulation program should be intensive enough to reach the heightened threshold of damaged reticular neurons enhances to activate cortical activity [13–14].

Hence in the process of maturation, an intellectually disabled child needs much more visual stimulation and help than a normal child. So, these children can be helped through early intervention and proper training in developing self-help skills. Improving motor co-ordination, stimulation of comprehension, use of language, and improving social behavior [15, 16].

### **Statement of the Problem**

“A study to assess the effectiveness of visual stimulation on visual perceptual ability among intellectually disabled children in selected special school at Coimbatore.”

### **Objectives**

1. To assess the visual perceptual ability among intellectually disabled children in experimental and control group
2. To evaluate the effectiveness of visual stimulation in experimental group of intellectually disabled Children
3. To compare the visual perceptual ability of intellectually disabled children in experimental and control group after visual stimulation.
4. To associate the findings with selected demographic and clinical variables.

### **Hypothesis**

The intellectually disabled children who received visual stimulation show a significant difference in visual perceptual ability than the children who did not receive visual stimulation.

### **Research Methodology**

Research methodology is a systematic approach used to address problems and inquiries in a structured manner. It outlines the overall framework for organizing procedures and collecting credible and dependable data to conduct investigations effectively.

### **Research Approach**

Quantitative approach.

### **Research Design**

True experimental research design. The researcher recruited the study participants into two groups: Experimental and Control groups (see Figure 1).

---

Research design for this study is depicted as follows:

R E O1 X O2  
R C O3–O4

*R*: Random assignment

*E*: Experimental group

*C*: Control group

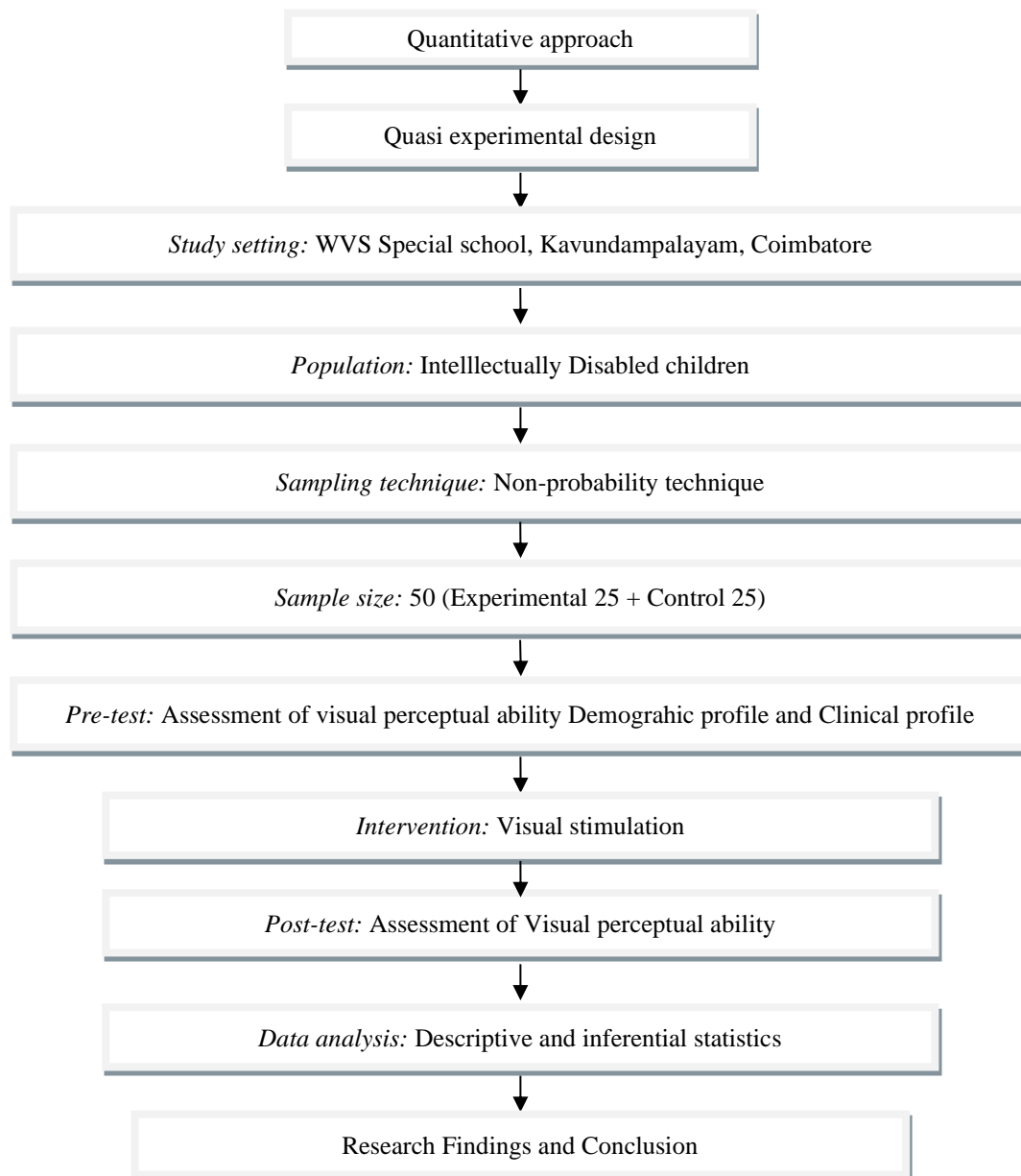
*O1*: Pre-test assessment of visual perceptual ability in experimental group

*X*: Intervention

*O2*: Post-test assessment of visual perceptual ability in experimental group

*O3*: Pre-test assessment of visual perceptual ability in control group

*O4*: Post-test assessment of visual perceptual ability in control group



**Figure 1.** Schematic representation of research design.

**Research Setting**

WVS Special School, Kavundampalayam, Coimbatore

**Independent Variable**

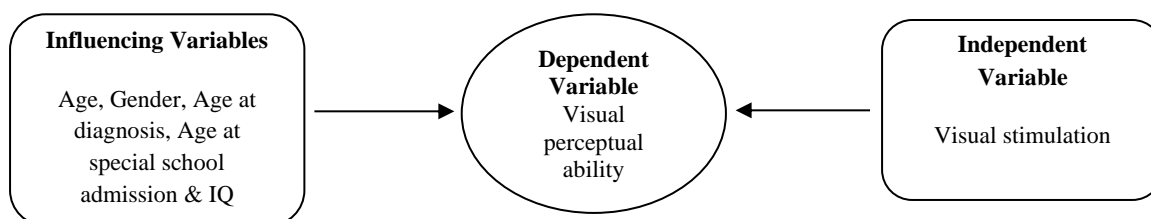
In this study, visual stimulation is the independent variable.

**Dependent Variable**

In this study, visual perceptual ability is the dependent variable.

**Influencing Variable**

Age, sex, and age of special school admission, and age at diagnosis are in the influencing variables (Figure 2).



**Figure 2.** Three different variables.

**RELATIONSHIP OF VARIABLES****Population**

In this present study, the total population is 150. The target population is 100.

**Sample Size**

Sample size,  $n = 4pq/L^2$

4 = Constant number, p = percentage population

$Q = 100 - p$

L = allowable error (13)

p = target population/total population  $\times 100$

$p = 100/150 \times 100 = 67$

$q = 100 - p = 100 - 67 = 33$

$n = 4 \times 67 \times 33/13 \times 13 = 52.3$

$n = 52$

- The total sample size was determined as 50 subjects
- The experimental group consists of 25 subjects
- The control group consists of 25 subjects

**Sample Size**

Sample size was 50 mild and moderate intellectually disabled children.

**Sampling Technique**

Simple random sampling technique

**Criteria for Sample Selection****Inclusion Criteria**

- Intellectually disabled children aged less than 11 years
- Mild and moderate level intellectually disabled children without physical disability
- Care givers of the children who care the children at least for 6 months

### **Exclusion Criteria**

Children with other sensory co-morbidities such as deafness, blindness, epilepsy, ADHD (attention-deficit/hyperactivity disorder), and autism.

### **Development of the Tool**

The following tools are used for the study:

**Section A:** includes demographic profile consisting of variables such as age, sex, age on admission to special school, birth order of child, and relationship with the child.

**Section B:** includes clinical profile consisting of intellectually disabled children IQ level, age at diagnosis, duration between diagnosis and admission, presence of enuresis, self-care ability, able to communicate with others, and duration of child's attendance in special schools.

**Section C:** includes modified sensory profile. Sensory profile is a standardized tool designed by Dunns in the year of 2002. It consisted of 125 items which includes multi-sensory processing (taste, vision, touch, auditory, vestibular, and multi-sensory processing). From the investigator takes only visual sensory processing, which consists of 18 items. Items are classified according to visual processing domains. Items are separately scored for each domain.

### **Scoring and Interpretation**

Each item is scored on a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*) with a total score range of 90. The possible minimum score is 18 and the maximum score is 90. The score will be interpreted as follows:

- 90–64: Typical performance in visual perceptual ability.
- 55–63: Probable difference in visual perceptual ability
- 54–18: Definite difference in visual perceptual ability

### **Content Validity and Reliability**

Content validity was obtained from the experts of psychiatric department. The tool was modified based on the suggestions and guidance from the experts. The reliability of the tool was checked by split half method was computed from the scores and the obtained "r" value was 0.9 and hence the tool was found to be reliable.

### **Pilot Study**

Pilot study was conducted at Coimbatore.

### **Method of Data Collection**

Before the actual collection of the data the investigator obtained the written permission to conduct the study in the WVS (Womens voluntary services) special school Kavundampalayam, Coimbatore. The data collection was done for a period of four weeks. Before the pretest, the investigator introduced her, to the caregivers and get oral consent from the parents. Demographic profile and clinical profile of the intellectually disabled children was collected from the observation and Interview with teachers. The group was divided into experimental and control group. Then, the investigator provided the intervention for the experimental group along with the special school training. After 2 weeks post-test was conducted by the modified sensory profile.

### **Plan for Data Analysis**

Descriptive statistics was used to analyze the frequency, percentage, mean, and standard deviation of the following variables: demographic variable, clinical profile, and visual perceptual ability score.

### **Inferential Statistics was used to Make Comparison, Relationship and Association**

- Paired t-test was used to find out the effectiveness of visual stimulation by comparison between pre-test and post-test score of experimental group patients.

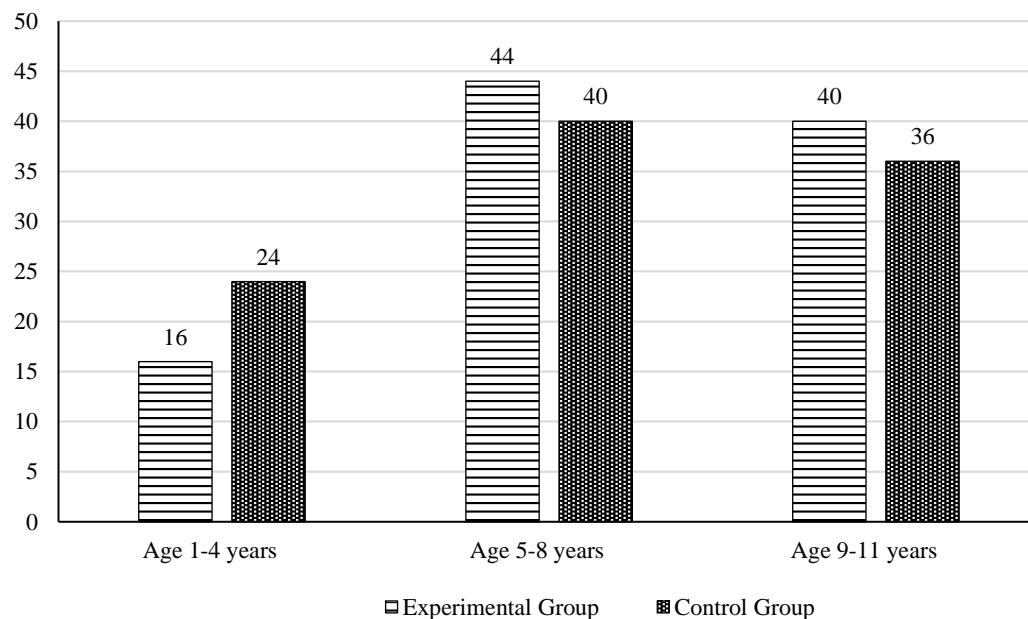
- Z test was used to compare the differences between the groups.
- Chi-square test was used to find the association between demographic and clinical variables.

**Data Analysis and Interpretation**

Data analysis is the systematic organization and synthesis of research data and testing the research hypothesis using those data. Interpretation is the process of making sense of the results of a study and examining the implications (Table 1 and Figure 3).

**Table 1.** Distribution of study participants with regard to demographic variables (n = 50).

Sociodemographic variables	Experimental group		Control group	
	Frequency(f)	Percentage (%)	Frequency(f)	Percentage (%)
<i>Age</i>				
• 1-4 Years	4	16	6	24
• 5-8 Years	11	44	10	40
• 9-11 Years	10	40	9	36
<i>Gender</i>				
• Male	17	68	15	60
• Female	8	32	10	40
<i>Age on admission to special school</i>				
• 2-4 Years	23	92	22	88
• 5-6 Years	2	8	3	12
<i>Relationship with the child</i>				
• Teacher	9	36	12	48
• Care giver	16	64	13	52
<i>Birth order of the child</i>				
• First child	17	68	21	84
• Second child	8	32	4	16



**Figure 3.** Graph showing study participants with regard to demographic variables.

Regarding the IQ level in the experimental group 16 (64%) were mild intellectually disabled children and 9 (36%) children were moderate intellectually disabled. In the control group 19 (76%) were mild intellectually disabled and 6 (24%) were moderate intellectually disabled (Table 2).

Considering the age at diagnosis in the experimental group 4 (16%) were diagnosed at the age of one year, 16 (64%) were diagnosed at the age of 2 years and 5 (12%) were diagnosed at the age of 3 years. In the control group 6 (24%) were diagnosed at the age of 1 year, 16 (64%) were diagnosed at the age of 2 years, and 3 (12%) were diagnosed at the age of 3 years.

**Table 2.** Distribution of study participants with regard to clinical variables (n = 50).

Clinical variables	Experimental group		Control group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
<i>IQ Level</i>				
Mild	16	64	19	76
Moderate	9	36	6	24
<i>Age at diagnosis</i>				
1. Year	4	16	6	24
2. Year	16	64	16	64
3. Year	5	12	3	12
<i>Duration between diagnosis and admission</i>				
1-2 Years	18	72	21	84
3-4 Years	7	28	4	16
<i>Presence of seizures</i>				
Yes	11	44	17	68
No	14	56	8	64
<i>Presence of enuresis</i>				
Yes	12	48	18	72
No	13	52	7	49
<i>Self-care ability</i>				
Needs assistance	25	100	25	100
<i>Able to communicate with others</i>				
Yes	20	80	16	64
No	5	20	9	36
<i>Duration of child's attendance in special school</i>				
< 6 Months	5	20	8	32
>6 Months	20	80	17	68

Regarding duration between diagnosis and admission in the experimental group 18 (72%) were started treatment at 1 to 2 years, 7(28%) were started treatment at 3 to 4 years. In the control group, 21 (84%) were started intervention at the age of 1 to 2 years and 4 (16%) were started intervention at the age of 3 to 4 years.

While considering the presence of seizures, 11 (44%) had seizures in the experimental group and 14 (56%) had no seizures. In the control group, 17 (68%) had seizures and 8 (32%) had no seizures.

Regarding the presence of enuresis in the experimental 12 (48%) of the intellectually disabled children had enuresis and 13 (52%) of the children had no enuresis.

While considering the self-care ability in the experimental group, 25 (100%) of the intellectually disabled children needs assistance. In the control group, 25 (100%) of the children needs assistance.

Considering the communication with others in the experimental group, 20 (80%) of the intellectually disabled children are able to communicate with others and 5(20%) of the children are not able to communicate with others. In the control group, 16 (64%) of the children are able to communicate with others and 9 (36%) of the children are not able to communicate with others.

Regarding the child's attendance in the special school admission in the experimental group, 5 (20%) of the intellectually disabled children are attending less than 6 months and 20 (80%) of the children are attending special school more than 6 months. In the control group, 8 (32%) of the children attending special school less than 6 months and 17 (68%) of the children attending special school more than 6 months.

Table 3 and Table 4 show the pre-test and post-test values of visual perceptual ability in experimental and control group.

Table 5 shows the calculated value of t is (4.9) is greater than the tabulated value of t (2.064) at 5% level of significance. Hence the null hypothesis is rejected. In this study, there is a significant difference in the visual perceptual ability in the experimental group. So visual stimulation is effective.

From the above Table 6, the calculated value of Z is greater than tabulated value of Z at 5% level of significance. So, the null hypothesis is rejected. Hence there is a significant difference in the visual perceptual ability between the experimental and control group. This shows the visual stimulation is effective in increasing the visual perceptual ability among the intellectually disabled children.

**Table 3.** Pretest values of visual perceptual ability in experimental and control group (n = 50).

Variables	Experimental group		Control group	
	Mean	SD	Mean	SD
Visual perceptual ability	61.6	4.55	62.8	4.21

**Table 4.** Post test values of visual perceptual ability in experimental and control group (n= 50).

Variables	Experimental Group		Control Group	
	Mean	SD	Mean	SD
Visual perceptual ability	73.36	4.05	60.44	4.08

**Table 5.** Comparison of pre-test and post-test scores of visual perceptual ability in experimental group (n = 25).

Visual perceptual ability score	Mean	SD	Calculated value of t	Tabulated value of t at 5% level
Pre-test score	61.6	2.55	4.9	2.064
Post-test score	73.36	4.05		

**Table 6.** Comparison of visual stimulation scores among intellectually disabled children in experimental and control group (n = 50).

Visual stimulation score	Mean	SD	Calculated value of Z	Tabulated value of Z
Experimental Group	73.6	4.06	4.1	1.96
Control Group	60.92	14.7		

Coefficient of variation of visual perceptual ability score is less than the pretest score. This shows posttest is more consistent (Table 7).

The gender is 4.8 which is greater than the tabulated value (3.84) at 5% level of significance. So, there is an association between visual perceptual ability and gender (Table 8).

Table 9 shows that the calculated value of chi-square of visual perceptual ability at 5% level of significance in the above clinical variables.

**Table 7.** Comparison between pre-test and post-test scores on visual perceptual ability in experimental group (n = 25).

S.N.	Visual stimulation score	Visual perceptual ability		
		Mean	SD	CV
1	Pre-test	61.6	2.55	7.38
2	Post-test	73.36	4.05	5.5

**Table 8.** Association of visual perceptual ability with selected demographic variables in experimental group (n = 25).

Demographic variables	<Mean	>Mean	Calculated value of Chi square ( $\chi^2$ )	Tabulated value of Chi square ( $\chi^2$ ) at 5% level
<i>Age</i>				
1-7 Years	7	7	<1	3.84
8-11 Years	6	5	NS	
<i>Gender</i>				
Male	10	4	4.8*	3.84
Female	3	8	S	
<i>Age of school admission</i>				
2-4 Years	7	15	<1	3.84
5-6 Years	1	2	NS	

**Table 9.** Association of visual perceptual ability with selected clinical variables in experimental group (n = 25).

S.N.	Clinical variables	< Mean	>Mean	$\chi^2$ Value	$\chi^2$ Value at 5%
1	<i>IQ Level</i>				
	Mild	9	5	2.99	3.84
	Moderate	8	3	NS	
2	<i>Age at diagnosis</i>				
	0-1 Year	5	2	2.68	3.84
	2-3 Year	11	7	NS	
3	<i>Duration between diagnosis and admission</i>				
	1-2 Years	7	6	<1	3.84
	3-4 Years	6	6	NS	
4	<i>Duration of child's attendance in special school</i>				
	< 6 Months	11	7	2.68	3.84
	>6 Months	5	2	NS	

## RESULTS AND DISCUSSION

The purpose of the study was to evaluate the effectiveness of visual stimulation on visual perceptual ability among intellectually disabled children in selected special school at Coimbatore. The findings of the study have been discussed with the reference to the objectives.

### Objective 1: To assess the visual perception among intellectually disabled children in experimental and control group

The visual perceptual ability was assessed by modified sensory profile. The sample was 50. Table 3 and 4 show that the mean and standard deviation of visual perceptual ability for children in experimental group were 61.6 and 4.55 during the pretest and 73.36 and 4.05 during the post-test, respectively. In the control group pre-test mean and standard deviation of visual perceptual ability were 62.8 and 4.21 and post-test mean and standard deviation were 60.44 and 4.08, respectively.

### Objective 2: To evaluate the effectiveness of visual stimulation in experimental group.

Table 5 describes the effectiveness of visual stimulation program in improving the visual perceptual ability of the intellectually disabled children. In this study, paired test was used to find out the

effectiveness of visual stimulation of the intellectually disabled children. From the table, it was concluded the calculated value of  $t$  was (4.9), which was greater than the tabulated value of  $t$  (2.1). This indicates that the visual stimulation was effective in improving the visual perceptual ability of the intellectually disabled children.

Various studies agreed with the effectiveness of visual stimulation on visual perceptual ability for intellectually disabled children. One study was conducted to assess the effectiveness of visual stimulation with the 7-year-old boy with moderate mentally retarded was taught to draw a flower using incremental visual clues. The process was observed and evaluated. The results of the research showed that the boy with moderate mental retardation acquired the ability to draw a flower independently after 13 sessions. The researcher concludes the visual clues increase the visual perceptual ability of the intellectually disabled children.

**Objective 3: To compares the visual perceptual ability of intellectually disabled children in experimental and control group after visual stimulation**

Table 4 shows the comparison of visual perceptual ability among the intellectually disabled children between the experimental and control group. It reveals that the calculated value of  $z$  (4.1) was greater than the tabulated value of  $z$  (1.96) at 5% level of significance. So, the null hypothesis was rejected. So, it was concluded that there is a significant difference in the visual perceptual ability in the intellectually disabled children between the experimental and control groups.

A quasi-experimental study was conducted in selected special school in Mangalore. The accessible population was 286, of this 201 met inclusion criteria. Observational checklist was used to screen children for the presence of emotional disturbances and sensory perceptual problems. Out of that, 91 children had sensory perceptual problems (vision, hearing, olfactory, tactile, and gustatory) and emotional disturbances. Simple random sampling technique was used to select 40 children, 20 in Group 1, and 20 in Group 2. Pre-test was conducted using sensory perceptual ability assessment scale and emotional well-being scale and the data was collected from teachers and caregivers, sensory stimulation techniques were introduced to group one for 30 days. Individual session for one hour and post-test assessment of sensory perceptual ability and emotional well-being of the children were done by collecting data from caregivers and teachers. Data analysis revealed that the subjects receiving sensory stimulation showed a significant difference in sensory perception than the control subjects receiving special training.

**Objective 4: To associate the findings with selected demographic and clinical variables**

The study factors associated with age, sex, IQ, age of special school admission, age at diagnosis and intervention. The study reveals there was a significant association between gender of the intellectually disabled children and visual perceptual ability.

**CONCLUSION**

The present study had been supported by a series of other studies. Visual stimulation helps the intellectually disabled children to perform the daily activities without much support. From this analysis and result concluded that visual stimulation was effective in increasing the visual perceptual ability of the intellectually disabled children.

**REFERENCES**

1. Aggarwal LP. Modern educational research. New Delhi, India: Dominant Publishers & Distributors; 2005.
2. Frisch NC, Frisch LE. Psychiatric and mental health nursing. Philadelphia, PA, USA: Wolters Kluwer Publications; 2003.
3. Fortinash KM. Psychiatric mental health nursing. 4th ed. Maryland Heights, MO, USA: Mosby Publishers; 1996.

4. Varcolis EM. Foundations of psychiatric and Mental Health Nursing. 3rd ed. Philadelphia, PA, USA: W B Saunders Company; 1998.
5. Gupta SP. Statistical methods. 5th ed. New Delhi, India: Sultan Chand publishers; 2002.
6. Sadock BJ, Sadock VA. Kaplan & Sadock's. synopsis of psychiatry. 10th ed. Philadelphia, PA: Wolters Kluwer publications; 2007.
7. Lalitha A. Psychiatric and mental health nursing. Bangalore, Karnataka, India. V(G)M Publishers; 2010.
8. Neeraja KP. Essentials of psychiatric and mental health nursing. 1st ed. New Delhi, India: Jaypee publishers; 2008.
9. Polit DF. Nursing research principles and methods. 3rd ed. New Delhi, India: Lippincott Publications; 2003.
10. Polit DF, Beck CT. Nursing research: principles and methods. 7th ed. Philadelphia, PA, USA: Lippincott Williams & Wilkins; 2004.
11. Sreevani R. A guide to mental health and psychiatric nursing. 3rd ed. New Delhi, India: Jaypee Publishers; 2010.
12. Gail SW. Principles and practice of psychiatric nursing. 6th ed. Philadelphia, PA, USA: Lippincott Williams & Wilkins; 1995.
13. Mary TC. Psychiatric mental health nursing. Philadelphia, PA, USA: Davis Company; 2006.
14. World Health Organization. (2002). The International Classification of Diseases, 11th Revision. [Online] Available at <https://www.who.int/standards/classifications/classification-of-diseases> [Accessed on June 2023]
15. World Health Organization. (2001). International Classification of Functioning, Disability and Health. [Online] Available at <https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health> [Accessed on June 2023]
16. Strauss A, Letinen L. Psychopathology and education of the brain injured child. J Clin Psychol. 1948; 4 (3): 315.