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Research Article

EFFECTIVENESS OF SENSORY STIMULATION ON COGNITIVE ABILITY AMONG CHILDREN WITH MODERATE INTELLECTUAL DISABILITY

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ABSTRACT

3% of the World's population is estimated to have intellectual disability. In India, more than 20 million children are suffering with intellectual disability. So a study was conducted to assess the effectiveness of sensory stimulation on cognitive ability among children with moderate intellectual disability.

A quasi-experimental design was used. The samples were selected using non-probability purposive sampling method. The data was collected from 40 samplesage group 05 to 15 years, using the tool consisted of: demographic data, observation checklist for cognitive ability.Researcher applied paired t-test for comparison of cognitive ability score before and after sensory stimulation in experimental group. Average cognitive ability score before sensory stimulation was 8.5 which increased to 19.4 after sensory stimulation. Sensory stimulation was found to be significantly effective in improving the cognitive ability score of the children with moderate intellectual disability (t_{19} = 21.1, $p< 0.05$). Researcher also applied two sample t-tests for comparison of change in cognitive ability score in experimental and control group. Here also Sensory stimulation was found to be significantly effective in improving the cognitive ability score of the children with moderate intellectual disability (t_{38} = 19.3, $p< 0.05$).

INTRODUCTION

The World report on disability, 2011 reveals that more than one billion people in the world who are disabled, 110-190 million encounter significant difficulties in their daily lives. It is a shocking and alarming fact that approximately 2.5 to 3% of the total population are mentally challenged, which, in most cases is a lifelong condition.[1]In surveys of the general population in India among people of all ages, it has been found that around 2% are mentally challenged. In other words, in a village of 1000 people, 20 people are mentally challenged. Only in children, (under 18 years of age) there will be about 3% of cases with mental retardation. Mild mentally challenged are much more common than severe mentally challenged, accounting for 65 to 75% of all cases, who are considered the educable and trainable.[1]Children with intellectual disability may also exhibit some or all of the following characteristics:

- Delays in oral language development
- Deficits in memory skills
- Difficulty learning social rules
- Difficulty with problem solving skills
- Delays in the development of adaptive behaviors such as self-help or self-care skill [(2)]

Due to these above reviews the researcher would like to conduct a research on intellectually disabled children, especially on children having moderate intellectual disability

- To improve their cognitive ability
- To make them understand the things
- To improve their social and communication skills
- To improve their judgment and decision making skills
- To improve their interest, emotion, creativity in day to day activity

Also Sensory stimulation refers to a variety of techniques that arouse the senses of the child. Sensory stimulation and perceptual knowledge are of importance in these children as it will help the child to be more independent. To an extent, it can reduce the risk of injuries in these children. Specific stimulation of the primary senses in an environment that excludes all extraneous stimulation makes perception and interpretation of sensations easier for children. [3] The reported benefits of sensory stimulation therapy includes positive changes in behaviour, improved task concentration, an increase in a variety of skills such as awareness of self, social interaction behaviours, communication, exploration and manipulation of stimuli, relaxation, a reduction in stereotypic self-stimulatory behaviours and an increase in adaptive

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behaviours such as exploratory behaviour or initiating contact with others.[5] It provides an opportunity for carers to focus on the preferences of patients and legitimizes spending time with them. Thus sensory interventions can play a role in nursing care and treatment.[4]

Since, In India most of the children are mentally retarded around 20 million with peak in 10 to 12 years of age and as children are the backbone of the nation, researcher felt with his small dissertation can contribute to a minor extend to help them cope up with mental retardation. So, researcher felt the need to conduct this study.

Objectives of the study

1. To assess the cognitive ability before intervention among children with moderate intellectual disability in selected special children's schools.
2. To assess the cognitive ability after interventionamong children with moderate intellectual disability in selected special children's schools.
3. To compare cognitive ability before and after interventionamong children with moderate intellectual disability in selected special children's schools.
4. To associate the findings with selected demographic variablesamong children with moderate intellectual disability in selected special children's schools.

Hypothesis

Hypothesis for present study was

H0: There will be no significant effect of sensory stimulation on cognitive ability of moderate intellectually disabled children.

H1: There will be a significant effect of sensory stimulation on cognitive ability of moderate intellectually disabled children.

MATERIAL AND METHOD

Research approach

In this study, the researcher has used quantitative approach.

Research design

The research design adopted for the study was quasi-experimental design in this no equivalent one group pre-test post-test control group design was used.

Population

The population for the study is the intellectual disabled children of Pune City.

Sample

The study samples consist of moderate intellectually disabled children of special schools of Pune.

Sample size

The sample size selected for the study was40.

Sampling technique

In the present study, purposive sampling technique was used.

Sampling criteria

The following criteria are set to select samples.

Inclusion Criteria

1. Children with moderate intellectual disability fromspecial children's schools.
2. Children in age group of 05-15 years.
3. Children, who can understand English Hindi and Marathi.

Exclusion criteria

1. Children, who have mental retardation with any other psychiatric disease condition like M.R. with psychosis, M.R. with schizophrenia etc.
2. Children, who have physical problems like handicapped, blindness, deafness etc.

Data Collection Technique and tool

For the present study data was collected from JeevandharaVidyalaya (mentally challenged school), Rasta Peth, Pune and SevaSadanDilasha Kendra (mentally challenged school), Laxmi Road, Pune from 40 samples.

Technique and Procedure for Data Collection

1. Prior permission was obtained from the respective school authority.
2. The purpose of the study was explained to the parents/guardians member of the participants and principal of school and confidentiality of their response assured and formal consent taken.
3. Pre-test was conducted after orientation and introduction of study by using observational check list.
4. For pre-test, researcher has assigned the experimental group containing 20 children and control group containing 20 children. Then again researcher has assigned 4 groups by taking 5 children from experimental group and 5 children from control group.
5. Researcher has taken pre-test on 4 groups of 10 children each.
6. After pre-test researcher has given intervention to experimental group for 30 days.
7. Approximately 1 hour was spent with children for sensory stimulation intervention every day.
8. Post-test was conducted on 3rd day after intervention by using observational check list related to demographic data.

Description of the tool in brief

Section A: - Demographic data

It consists of demographic variables such as code number, age, gender, Family type.

Section B: - Observation check list

It consists of 4 sub- scale of 30 observational questions related to cognitive ability during intervention of game.

Scoring

It is according to activity of children which he/she show during intervention of game.

- If activity shown/present in children score '1'
- If wrong activity shown/present in children score'0'

- Unshown activity also score '0'
- Non attendant activity also score '0'

Grade

Grade I 0-9 poor improvement on cognitive ability
Grade II 10-21 average improvement on cognitive ability
Grade III 22- 30 good improvement on cognitive ability

Validity

The tool is valided from 25 experts of different mental health professions.

Reliability

In this study the reliability of the tool was determined by inter rater method which is 0.909 and tool found reliable for study.

Pilot study

The pilot study was conducted by researcher on 10 children with moderate intellectual disability and found feasible. From the pilot study results, the duration of intervention was extended from 20 days to 30 days after expert's discussion being done. As Pilot study did not reveal any major feasibility problems, the study was carried on a large sample.

RESULT

Results of the study are according to section.

Section I

Table 1 Description of samples (children with moderate intellectual disability) according to demographic variables **N=20+20**

Demographic variable	Experimental Group		Control Group	
	Freq	%	Freq	%
Age				
5 to 8 years	3	15.0%	2	10.0%
9 to 12 years	9	45.0%	12	60.0%
13 to 15 years	8	40.0%	6	30.0%
Gender				
Male	16	80.0%	10	50.0%
Female	4	20.0%	10	50.0%
Family Type				
Nuclear	14	70.0%	11	55.0%
Joint	6	30.0%	8	40.0%
Extended	0	0.0%	1	5.0%

Table no 1 show that, in experimental group, 45% of them had age 9 to 12 years and 40% of them had age 13 to 15 years, 15% of the children with moderate intellectual disability had age 5 to 8 years. In control group, 60% of them had age 9 to 12 years and 30% of them had age 13 to 15 years, 10% of them special school children had age 5 to 8 years.

Section II

Analysis of data related to assessment of the cognitive ability before intervention

Figure show that, in pre-test, 65% of the children with moderate intellectual disability in experimental group had poor cognitive ability (score 0-9) and 35% of them had average cognitive ability (score 10-21). 55% of the children with moderate intellectual disability in control group had poor cognitive ability (score 0-9) and 45% of them had average cognitive ability (score 10-21).

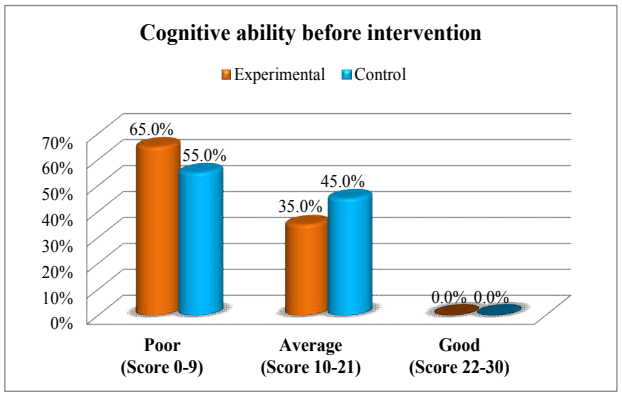

Figure 1 Assessment of the cognitive ability before intervention

Section III

Analysis of data related to assess the cognitive ability after intervention

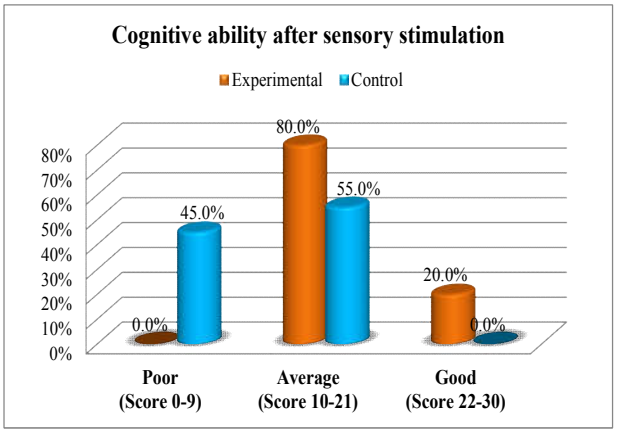

Figure 2 Assessment of the cognitive ability after intervention

Figure show that, in post-test, 80% of the children with moderate intellectual disability in experimental group had average cognitive ability (score 10-21) and 20% of them had good cognitive ability (score 22-30). 45% of the children with moderate intellectual disability in control group had poor cognitive ability (score 0-9) and 55% of them had average cognitive ability (score 10-21).

Section IV

Analysis of data related to compare cognitive ability before and after sensory stimulation

Table 4 Comparison of cognitive ability before and after sensory stimulation N=20+ 20

Cognitive ability	Experimental group				Control group			
	Pretest		Posttest		Pretest		Posttest	
	Freq	%	Freq	%	Freq	%	Freq	%
Poor (Score 0-9)	13	65.0%	0	0.0%	11	55.0%	9	45.0%
Average (Score 10-21)	7	35.0%	16	80.0%	9	45.0%	11	55.0%
Good (Score 22-30)	0	0.0%	4	20.0%	0	0.0%	0	0.0%

Table no 4 show that, in pre-test, 65% of the children with moderate intellectual disability in experimental group had poor cognitive ability (score 0-9) and 35% of them had average cognitive ability (score 10-21). 55% of the children with

moderate intellectual disability in control group had poor cognitive ability (score 0-9) and 45% of them had average cognitive ability (score 10-21). In post-test, 80% of the children with moderate intellectual disability in experimental group had average cognitive ability (score 10-21) and 20% of them had good cognitive ability (score 22-30). 45% of the children with moderate intellectual disability in control group had poor cognitive ability (score 0-9) and 55% of them had average cognitive ability (score 10-21). This indicates that the cognitive ability of the children with moderate intellectual disability improved remarkably after sensory stimulation.

Table 5 Comparison of cognitive ability score before and after sensory stimulation in experimental group N=20+ 20

	Mean	SD	T	df	p-value
Pretest	8.5	2.8	21.1	19	0.000
Posttest	19.4	1.3			

Table no 5 show that, the researcher applied paired t-test for comparison of cognitive ability score before and after sensory stimulation in experimental group. Average cognitive ability score before sensory stimulation was 8.5 which increased to 19.4 after sensory stimulation. T-value for this comparison with 19 degrees of freedom was 21.1. Corresponding p-value was 0.000, which is small (less than 0.05), the null hypothesis is rejected. Sensory stimulation was found to be significantly effective in improving the cognitive ability score of the children with moderate intellectual disability.

Table 6 Comparison of change in cognitive ability score in experimental group and control groups N=20, 20

Group	Mean	SD	T	Df	p-value
Experimental	10.9	2.3	19.3	38	0.000
Control	0.3	0.6			

Table no 6 show that, the researcher applied two sample t-test for comparison of change in cognitive ability score in experimental and control group. Average change in cognitive ability score was 10.9 for experimental group which was 0.3 for control group. T-value for this comparison with 38 degrees of freedom was 19.3. Corresponding p-value was 0.000, which is small (less than 0.05), the null hypothesis is rejected. Sensory stimulation was found to be significantly effective in improving the cognitive ability score of the children with moderate intellectual disability.

Section V

Analysis of data related to association of cognitive ability of the children with moderate intellectual disability with their demographic variables

Table 7 Association of cognitive ability of the children with moderate intellectual disability with their demographic variables N=40

Demographic variable		Poor	Average	p-value
Age	5 to 8 years	3	2	1.000
	9 to 12 years	13	8	
	13 to 15 years	8	6	
Gender	Male	18	8	0.176
	Female	6	8	
Family Type	Nuclear	15	10	0.590
	Joint	9	5	
	Extended	0	1	

Association of cognitive ability of the children with moderate intellectual disability with their demographic variables was assessed using Fisher's exact test. Following is the summary of Fisher's exact test.

Table no 7 show that, since p-values corresponding to all the demographic variables are large (greater than 0.05). None of the demographic variable was found to have significant association with cognitive ability of the children with moderate intellectual disability.

DISCUSSION

The findings of the study were discussed with the objectives and hypothesis stated. The present study was undertaken to assess the effectiveness of sensory stimulation on cognitive ability among children with moderate intellectual disability in selected special children's schools of Pune. The cognitive ability among intellectual disabled children with the sample of 40 (20 experimental and 20 control) having moderate intellectual disability (male and female) were included. Age group from 05 to 15 years were included in the study.

The researcher applied paired t-test for comparison of cognitive ability score before and after sensory stimulation in experimental group. Average cognitive ability score before sensory stimulation was 8.5 which increased to 19.4 after sensory stimulation. t-value for this comparison with 19 degrees of freedom was 21.1. Corresponding p-value was 0.000, which is small (less than 0.05), the null hypothesis is rejected. Sensory stimulation was found to be significantly effective in improving the cognitive ability score of the children with moderate intellectual disability.

Researcher applied two sample t-tests for comparison of change in cognitive ability score in experimental and control group. Average change in cognitive ability score was 10.9 for experimental group which was 0.3 for control group. t-value for this comparison with 38 degrees of freedom was 19.3. Corresponding p-value was 0.000, which is small (less than 0.05). Sensory stimulation was found to be significantly effective in improving the cognitive ability score of the children with moderate intellectual disability.

A similar study conducted by Abbas T, Salar F, Ahmad A, Fahime H. with the aim of investigating the effects of rhythmic play on ID (Intellectually Disabled), children's attention and memory functioning at the age range of 9-16 years. A sample size of 20 (10 control and 10 experimental) by using multistage random sampling were selected by keeping homogeneous in sensory and motor skills. The researchers applied rhythmic movements to experimental group twice a week 45 minutes for each session for three months as an intervention program. Eight rhythmic movements (play) were employed in this research. The results revealed that rhythmic movements would affect attention problems (focus of attention, sustained attention, shifting attention, divided attention and attention capacity), general attention, memory (short-term, long-term, working), as well as general learning problems in educable children with intellectual disability according to their performance scales.[5]

According to kamal P, Handi P, Guitar M (2014), in their study titled effectiveness of training sensory stimulation on gross motor skills of 5-7 years old children with Down syndrome.

The study had an experimental design and a pre-test, post-test plan with control group used. For the purpose 24 children (aged 5-7 years old) were choose randomly from the Down Syndrome Association. Subjects were divided in two groups (experimental and control each 12 children) randomly. Results showed that there was a significant relationship between the training of sensory stimulation and gross motor skill development in children with Down syndrome. [6]

From the two research discussion made above and also from the findings of the present study reveals that sensory stimulation is effective in improving the cognitive ability score of the children with moderate intellectual disability and also to help them live a good life.

CONCLUSION

The study revealed that the sensory stimulation is effective in improving the cognitive ability score of the children with moderate intellectual disability and also to help them live a good life.

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