



Effect of Juvenile Diabetes on Memory of School going Children

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Abstract

The present study entitled “Effect of Juvenile Diabetes on Memory of School going Children” belongs to the area of Interdisciplinary research. The present study is descriptive in nature in which two groups were selected namely Juvenile Diabetic group and Normal group. A total of 302 school going children, 151 with diabetes mellitus type-1 (DM) and 151 (normal school going children i.e children without any chronic illness) controls matched for sex, age, social background, were compared by means of their scores on Standardized Tests for Memory. The effect of Juvenile Diabetes on different types of memory (Long Term Memory, Short Term Memory and Immediate Memory) was studied in terms of comparison of scores of Juvenile diabetic and Normal school going children on Standardized Tests. Results show that the memory of school going children with DM was low as to those of their healthy peers. In the scores attained on Standardized tests there were statistically significant differences between the groups. In case of students with various kinds of chronic diseases, it is important to understand their health related complications, its effect on their overall performance and support their motivation for learning and planning the future.

Key terms: Juvenile Diabetes, School going Children, Memory

Introduction

Chronic illness disturbs the lives of children limiting their roles in schools, recreation, and vocational pursuit. Parents and siblings often experience social, economic and personal disadvantage. 'Mothering' can be highly stressful. Lot of diseases interrupts the normal cognitive and physical abilities of students. The prevalence of diabetes is increasing most rapidly (150 per cent over next 15 year) of all these diseases. Juvenile Diabetes is Type 1 category of diabetes, developing in individuals of young age and there are about 1 million (10 lakh) Juvenile Diabetic in India which covers around one to four percent of total population of the children in India. Juvenile Diabetes is a major curse in the normal performance of individual.

Diabetes:

Diabetes is a disorder which triggers a series of complications and is one of the major health issues. It is a disease in which the body cannot produce insulin or cannot use insulin to its

full potential. It is characterized by high blood glucose levels. The terms insulin and glucose are defined below:

Insulin :- “A hormone produced by the pancreas that helps control the blood glucose level.”

Glucose :- “Glucose is the main type of sugar in the blood and is the major source of energy for the body's cells. Glucose comes from the foods we eat or the body can make it from other substances. Glucose is carried to the cells through the bloodstream. Several hormones, including insulin, control glucose levels in the blood.”

Classification of Diabetes:

Type 1 and Type 2 diabetes are the commonest forms of primary diabetes mellitus. This division is important both clinically in assessing the need for treatment and also in understanding the causes of diabetes which are entirely different in the two groups. There are some other forms of diabetes also like Mitochondrial Diabetes, Insulin Resistant Diabetes, Mixed Types of Diabetes etc The main forms of diabetes are as follows:

Type 2 Diabetes

The Type-2 diabetes is a disease of adult or occasionally adolescent onset which may originate from Insulin resistance and relative insulin deficiency. The underlying mechanism is due either to diminished insulin secretion—that is, an islet defect, associated with increased peripheral resistance to the action of insulin resulting in decreased peripheral glucose uptake, or increased hepatic glucose output.

Type 1 Diabetes (Juvenile Diabetes)

This is the most common form of diabetes among children. It may occur from birth or develop in later childhood stages. Type 1 diabetes is due to destruction of Beta-cells in the pancreatic Islets of Langerhans with resulting loss of insulin production. A combination of environmental and genetic factors that trigger an autoimmune attack on the Beta cells, in genetically susceptible individuals, is responsible for the disease. Thus, among monozygotic identical twins only about one-third of the pairs are concordant for diabetes in contrast to the situation in Type 2 diabetes where almost all pairs are concordant. The process of islet destruction probably begins very early in life and is known to start several years before the clinical onset of diabetes.

The presence in a non-diabetic individual of three or more antibodies (islet cell antibodies, anti-GAD (glutamic acid decarboxylase) antibodies, anti-IA (insulin autoantibodies) indicates an 88% chance of developing diabetes within 10 years. The presence of insulinitis at the onset of Type 1 diabetes represents the role of inflammatory cells in B-cell destruction. Attempts have been made to prevent the onset of Type 1 diabetes. Immune suppression can to some extent preserve islet function, but permanent remissions are not normally achieved and the treatment is in any case too dangerous for routine use.

Inheriting Type 1 Diabetes:

A child of a mother with Type 1 diabetes has an increased risk of developing the same type of diabetes, amounting to 1-2% by 25 years; the risk is about three times greater if the father has this disease. If both parents have the disease the risk is further increased and genetic counseling

should be sought by these rare couples. There is a small male preponderance among children under the age of 15 years with newly diagnosed Type 1 diabetes, but in those diagnosed after puberty there is a clear male excess with a ratio of 2–3:1. The reasons for such an abrupt switch in the sex ratio after puberty have remained unsettled. Interestingly, Williams et al. reported recently that there is also an apparent male majority among first degree relatives (older than 10 years of age) of the juvenile diabetic child. Whether this change in sex ratio is related in any way to environmental disease determinants remains open.

Juvenile Diabetes and Effect on Students:

Diabetes mellitus may be controlled but not cured and requires management throughout the day, including the time spent in school. Problems associated with loss of control such as hypoglycemia may arise during school hours, sometimes with little warning, and emotional difficulties of diabetic children may affect attendance and academic performance.

Present Study:

The present study entitled “Effect of Juvenile Diabetes on Memory of School going Children” belongs to the area of interdisciplinary research.

Rationale of the Study:

As we all know that behavioral aspect is gaining importance day by day in educational system. Behavior and cognitive performance of students are very important from the point of view of their educational development. Juvenile Diabetes is one of the most serious of all chronic childhood diseases, but due to lack of work done on its effect on educational achievement, more and more work in this field is required.

This has been proved from medical studies that severe and long lasting glucose level fluctuations effect the functioning of central and peripheral nervous system and hence the problems these children suffering from Juvenile Diabetes may face like memorizing, learning, retention, attention span and absence from school need to be studied. This can help them to know the causes, the possible effects, the precautions, the remedies and cures etc. It will also help the teachers to know about their academic and adjustment problems and to find out and apply some appropriate teaching strategies to help them bring out their inherent potential.

Objectives of the Study:

To study the effect of Juvenile Diabetes on memory of school going children.

Hypothesis:

There will be a significant effect of Juvenile Diabetes on memory of school going children as compared to healthy.

Research methodology:

The present study is in the area of interdisciplinary research based on survey method. The purposive sampling technique a type of non probability sample was used. The sample of juvenile diabetic adolescents was selected from “Dream trust organization Nagpur working for cause of juvenile diabetics. The non diabetic sample comprised of normal school going children of the same age group. A comparison was made between the juvenile diabetic and healthy school going children in terms of memory. The memory Scores for long term, short term and immediate

memory achieved by the students on long term , short term and immediate memory sheet developed by Agra psychological research cell, Agra (1978) were considered. The sample was divided into two groups. One group represented the normal healthy school going children n=151 while the other group was having Juvenile Diabetic school going children n=151. Standardized Memory data sheet developed by Agra psychological research cell, Agra (1978) was used to compare the memory of both the group. Mean and SD were calculated for both the groups and t-test was applied to test the hypothesis.

Analysis and Interpretation of Data:

The objective of the study was to find the effect of juvenile Diabetes on memory of school going children. For this purpose the juvenile diabetic group was compared with normal group for memory i.e long term memory, short term memory and immediate memory. Comparison was carried out using long term, short term and immediate memory data sheet developed by Agra psychological research cell, Agra (1978) the analysis and results are as under

Effect of Juvenile Diabetes on Long Term Memory

To see the effect of juvenile diabetes on Long term memory a comparison was made between the scores of both the groups i.e Normal and Juvenile Diabetic School going children.

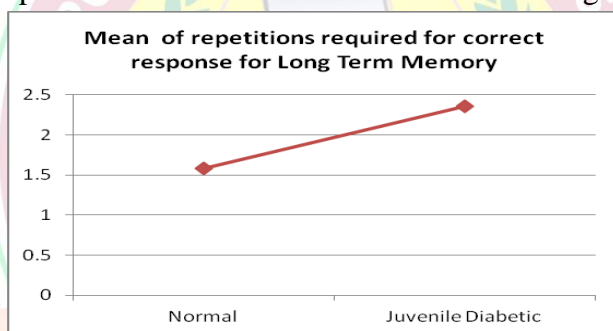


Fig.1 Graph showing comparison of means of Long term memory

The mean value in the above graphs shows that the average number of repetitions required by normal group to memorise the test items in the test for Long Term Memory is 1.58 and the average number of repetitions required by juvenile diabetic group to memorise the test items in the test for Long Term Memory is 2.36 i.e. juvenile diabetic group requires more number of repetitions to memorise the same items for which the normal group requires less repetitions. To compare mean score of both the group i.e. juvenile diabetic and normal school going children’ in terms of Long term memory t test was used .the results are presented below in table 4.5

Table1. For Mean , SD and t Value for Long Term Memory

S.No.	Group	Number of Students	Mean	S.D.	t-Value
1	Normal	151	1.58	0.87	4.87*
2	Juvenile Diabetic	151	2.36	1.77	

* Significant at 0.01 level

The mean values in the above table shows that the average number of repetitions required by normal group to memorise the test items in the test for Long Term Memory is 1.58 and the average number of repetitions required by juvenile diabetic group to memorise the test items in the test for Long Term Memory is 2.36 i.e. juvenile diabetic group requires more number of repetitions to memorise the same items for which the normal group requires less repetitions. The t value for the comparison of two means was calculated to be 4.87 which is highly significant at .01 level of significance indicating that the difference in the two mean scores can not be attributed to chance factors . Thus it can be inferred that Juvenile Diabetes effects the Long Term Memory of the school going children.

Effect of Juvenile Diabetes on Short Term Memory

To see the effect of juvenile diabetes on short term memory a comparison was made between both the groups i.e Normal and Juvenile Diabetic School going children

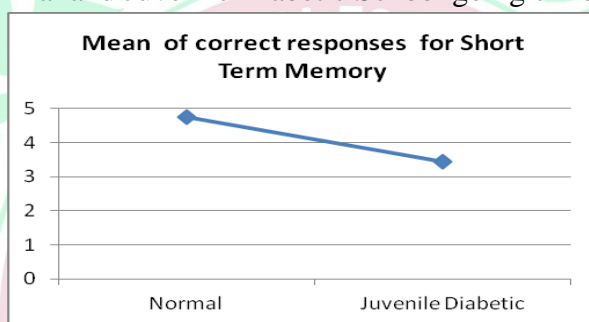


Fig.2 Graph showing comparison of means of Short term memory

The mean values in the above graphs shows that the average number of correct responses given by normal group in memorising the test items in the test for Short Term Memory is 4.76 and the average number of correct responses given by juvenile diabetic group in memorising the test items in the test for Short Term Memory is 3.44 i.e. juvenile diabetic group lacks behind in memorizing the same items for which the normal group is ahead.

To compare mean score of both the group i.e. juvenile diabetic and normal school going children’ in terms of short term memory t test was used .the results are presented below in table 4.6

Table 2 For Mean, SD and t Value for Short Term Memory

S.No.	Group	Number of Students	Mean	S.D.	t-Value
1	Normal	151	4.76	1.16	7.95*
2	Juvenile Diabetic	151	3.44	1.68	

* Significant at 0.01 level

The mean values in the above table shows that the average number of correct responses given by normal group in memorising the test items in the test for Short Term Memory is 4.76 and the average number of correct responses given by juvenile diabetic group in memorising the test items in the test for Short Term Memory is 3.44 i.e. juvenile diabetic group lacks behind in memorizing the same items for which the normal group is ahead. The t value for the comparison of two means was calculated to be 7.95 which is highly significant at .01 level of significance

indicating that chance factors are not responsible for this difference in mean values rather Juvenile Diabetes effects the Short Term Memory of the of the school going children.

Effect of Juvenile Diabetes on Immediate Memory

To see the effect of juvenile diabetes on immediate memory a comparison was made between the scores of both the groups i.e Normal and Juvenile Diabetic School going children

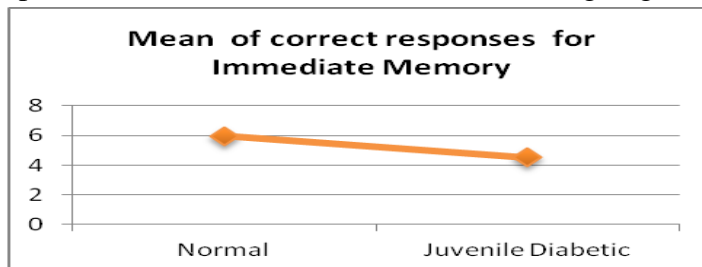


Fig.3 Graph showing comparison of means of immediate memory

The mean values in the above graphs shows that the average number of correct responses given by normal group in memorising the test items in the test for Immediate Memory is 5.97 and the average number of correct responses given by juvenile diabetic group in memorising the test items in the test for Immediate Memory is 4.52 i.e. juvenile diabetic group lacks behind in memorizing the same items for which the normal group is ahead.

To compare mean score of both the group i.e. juvenile diabetic and normal school going children’ in terms of immediate memory t test was used .the results are presented below

Table3. For Mean, SD and t Value for Immediate Memory

S.No.	Group	Number of Students	Mean	S.D.	t-Value
1	Normal	151	5.97	1.06	11.71*
2	Juvenile Diabetic	151	4.52	1.09	

* Significant at 0.01 level

The mean values in the above table shows that the average number of correct responses given by normal group in memorising the test items in the test for Immediate Memory is 5.97 and the average number of correct responses given by juvenile diabetic group in memorising the test items in the test for Immediate Memory is 4.52 i.e. juvenile diabetic group lacks behind in memorizing the same items for which the normal group is ahead. The t value for the comparison of two means was calculated to be 11.71 which is highly significant at .01 level of significance indicating that chance factors are not responsible for this difference in mean values and the difference in means is due to Juvenile Diabetes.

Findings:

There was significant difference between the performance of juvenile diabetic school going children and normal school going children in terms of memory. The normal student’s memory was found to be better than that of juvenile diabetic school going children.

Conclusions:

Results indicated that Juvenile Diabetes has significant effect on memory of school going children as compared to normal school going children. Diabetic school going children scored low on the selected variables as compared to normal school going children.

Discussion :

The objective of the study was to find the effect of Juvenile Diabetes on Memory of school going children . Dentate Gyrus, a part of brain, responsible for memory is specially sensitive to change glucose levels and hence effect on memory of such school going children can be very well explained. The other probable cause for this effect can be the reaction of medicines taken by these school going children regularly, the psychological stress that they undergo due to hardships posed by the disease in terms of health, family problems, finance etc. Absenteeism due to the complications caused by the disease, neuro-cognitive effects of the disease, hypo and hyper glycemia can be the reason for this effect.

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