

**Effectiveness Of A Health Teaching Program On Knowledge Regarding Prevention And Management On Juvenile Diabetes Mellitus Among High School Students In Selected Schools In Vadodara**

**Nirmal Raj .E .V<sup>1</sup>, Rajesh .P Joseph<sup>1</sup>, Dayanand Belagavi<sup>2</sup>, Jaimina Chauhan<sup>3</sup>, Dhruvi Patel<sup>3</sup>  
Snehal Dabhi<sup>3</sup>, Divyang Chaudhari<sup>3</sup>**

<sup>1</sup>Associate Professor, Department of Paediatric Nursing, Sumandeep Nursing College, Sumandeep Vidyapeeth deemed to be University, Vadodara, Gujarat

<sup>2</sup>Assistant Professor, Department of Paediatric Nursing, Sumandeep Nursing College, Sumandeep Vidyapeeth deemed to be University, Vadodara, Gujarat

<sup>3</sup>Undergraduate Nursing student, Sumandeep Nursing College, Sumandeep Vidyapeeth deemed to be University, Vadodara, Gujarat

**ABSTRACT**

**BACKGROUND:** Diabetes, one of the most challenging heterogeneous diseases, can be simply classified into type 1 diabetes mellitus and type 2 diabetes mellitus. Type 1 Diabetes is one of the most common chronic diseases of childhood with peak ages of onset at 5–7 years of age and again peri-pubertally. Historically, the distinction between type 1 diabetes mellitus and type 2 diabetes mellitus has mostly depended on the clinical presentation, such as age at disease onset, the presence of ketosis and the dependence of insulin.

**METHODS & MATERIALS:** Quantitative approach with pre experimental one group pre testpost test design including 100 high school students were selected as samples using non probability convenience sampling technique and a Questionnaire on demographic profile and structured knowledge questionnaire was administered to collect data.

**RESULTS:** The collected data were tabulated and analysed by using descriptive and inferential statistics. The obtained paired ‘t’ calculated value 12.08 is more than tabulated “t” value 1.66 at 0.05 level of significance with  $df = 99$ . It shows a significant difference between the pre-test and post-test knowledge score regarding prevention and management of juvenile diabetes mellitus among high school students. So the H1 was accepted. The obtained  $\chi^2$  value of demographic variables such as class, gender, food habit, type of family, parental education, monthly income, and family history were found less than the table value of  $\chi^2$  at 0.05 level of significance. Hence there is no significant association.

**CONCLUSION:** In pre-test, the score reveals that the knowledge level regarding juvenile diabetes mellitus were inadequate. After the post test it was observed that the knowledge and practice has improved considerably.

**KEYWORDS:** High school students, Juvenile Diabetes Mellitus,

**1. INTRODUCTION**

Diabetes, one of the most challenging heterogeneous diseases, can be simply classified into type 1 diabetes mellitus and type 2 diabetes mellitus. Historically, the distinction between type 1 diabetes mellitus and type 2 diabetes mellitus has mostly depended on the clinical presentation, such as age at disease onset, the presence of ketosis and the dependence of insulin. Type 1 diabetes mellitus,

appearing mainly in childhood or young adulthood, is characterized by T cells- mediated autoimmune destruction of  $\beta$ - cells, absolute insulin dependence and the need for insulin treatment. Type 2 diabetes mellitus, mainly appearing in adulthood, is the result of insulin resistance and relative insulin deficiency<sup>1</sup>.

Type 1 diabetes mellitus (T1D) is an autoimmune disease in which the insulin-producing pancreatic  $\beta$ -cells are targeted and destroyed by infiltrating immunocytes, resulting in lifelong dependence on exogenous insulin. T1D is one of the most common chronic diseases of childhood with peak ages of onset at 5–7 years of age and again peri-pubertally. While residual  $\beta$ -cells have been detected in patients with even long-standing T1D, evidence supports that individuals present clinically after a significant loss of  $\beta$ -cell mass and function at which point glucose homeostasis can no longer be maintained. As such, hyperglycemia develops with classic symptoms of polyuria, polydipsia, and weight loss. Globally, the incidence of T1D has been increasing over the past several decades, with the number of new cases rising by approximately 3% per year in children and teens<sup>2</sup>. It is estimated that more than 382 million people suffer from diabetes across the globe, most of which are between the age of 40 and 59 years. ICT can play a key role in better management of diabetes and in patient empowerment. Patient empowerment involves patients to a greater extent in their own health care process and disease management becomes an integrated part of their daily life. Self-management opens the possibility for patients to contribute to their own healthcare as well as to be more in control of their disease<sup>3</sup>.

Type 1 diabetes mellitus is a serious autoimmune disease for which no cure is available. The treatment includes insulin therapy, carbohydrate counting, eating healthy foods, exercising regularly, and maintaining a healthy weight. The goal is to keep blood glucose levels close to normal most of the time to delay or prevent complications. Despite the increase in the use of insulin pumps and continuous glucose monitors in recent years, the management of type 1 diabetes remains suboptimal in terms of glycaemic control and normal glycatedhaemoglobin (HbA1c) level. This article discusses the case of a child with type 1 diabetes who was successfully treated with a very low-carbohydrate diet, resulting in normal levels of HbA1c and normal blood glucose 95% of the time in a range of 70-180 mg/dL (4.0 mmol/L-10 mmol/L). Therefore, further studies are needed to verify how a very low carbohydrate diet impacts child development.<sup>4</sup>

This study investigated the effect of chronic consumption of a high-fat diet rich in corn oil (CO-HFD) on atrial cells ultra structure, antioxidant levels and markers of intrinsic cell death of both control and type 1 diabetes mellitus (T1DM)-induced rats. Adult male rats (10 rats/each) were divided into 4 groups: control fed standard diet (STD) (3.82 Kcal/g, 9.4% fat), CO-HFD (5.4 Kcal/g, 40% fat), T1DM fed STD, and T1DM + CO-HFD. CO-HFD and T1DM alone or in combination impaired systolic and diastolic functions of rats and significantly reduced levels of GSH and the activity of SOD, enhanced lipid peroxidation, increased protein levels of P53, Bax, cleaved caspase-3, and ANF and decreased levels of Bcl-2 in their atria. Concomitantly, atrial cells exhibited fragmentation of the myofibrils, disorganized mitochondria, decreased number of atrionatriuretic factor (ANF) granules, and loss of gap junctions accompanied by changes in capillaries walls. Among all treatments, the severity of all these findings was more severe in T1DM and most profound in the atria of T1DM + CO-HFD. In conclusion, chronic consumption of CO-HFD by T1DM-induced rats elicits significant biochemical and ultra structural damage to rat atrial cells accompanied by elevated oxidative stress and mitochondria-mediated cell death. This article is protected by copyright. All rights reserved.<sup>5</sup>

Environmental influences are another important factor in the development of type 1 diabetes. Perhaps the best evidence for this influence is the demonstration in multiple populations of a rapid increase in the incidence of type 1A diabetes. The etiology of the increase is unknown.<sup>6</sup>

Maturity onset diabetes of the young (MODY) represents a diabetes type which has an enormous clinical impact. It significantly alters treatment, refines a patient's prognosis and enables early detection of diabetes in relatives. Nevertheless, when diabetes is manifested the vast majority of MODY patients are not correctly diagnosed, but mostly falsely included among patients with type 1 or type 2 diabetes, permanently. The aim of this article is to offer a simple and comprehensible guide for recognizing individuals with MODY hidden among adult patients with another type of long-term diabetes and in women with gestational diabetes.<sup>7</sup>

Self-monitoring of blood glucose alone is not a good predictor of HbA<sub>1c</sub> goal attainment. Health plans might benefit from formulary restrictions to provide more cost-effective care, without negatively impacting glycemic control. Self-monitoring of blood glucose (SMBG) can be an important tool in diabetes treatment, both for patient self-management and for guiding clinicians regarding medication adjustments.<sup>8</sup>

Diabetes is a complex disease characterized by hyperglycemia, together with polyuria, polydipsia, and polyphagia. While Type 1 diabetes mellitus (T1DM) results from genetic, environmental, or immune dysfunction factors leading to pancreatic  $\beta$ -cell destruction depriving the organism from endogenous insulin.<sup>9</sup>

Type 1 diabetes mellitus (T1DM) is one of the most frequent chronic endocrine diseases in the paediatric population. As a result, this disease has a strong impact on psychological well-being. In line with this, emotional factors play an important role in adaptation. The aim of the present study protocol is to design an emotional abilities programme to improve metabolic control assessed by haemoglobin A1C (HbA1c) samples. Specifically, this intervention will be focused on adaptive coping strategies to deal with unpleasant emotions associated with T1DM. The primary aim of this project is to assess whether the employment of this new psychological intervention improves the emotional abilities of adolescents with T1DM.<sup>10</sup>

## **2. AIMS AND OBJECTIVES**

- Assess the knowledge of high school students regarding prevention and management of juvenile diabetes mellitus by pre-test.
- Plan and administer health teaching on prevention and management on juvenile diabetes mellitus.
- Evaluate the effectiveness of health teaching program by post-test.
- Find out the association between pre-test knowledge of high school students regarding juvenile diabetes mellitus with their selected demographic variable

## **HYPOTHESIS**

There will be a significant difference between the Pretest and Post test knowledge regarding prevention and management of juvenile diabetes mellitus among high school students in selected schools of Vadodara

## **3. STATEMENT OF THE PROBLEM**

“A STUDY TO EVALUATE THE EFFECTIVENESS OF A HEALTH TEACHING PROGRAM ON KNOWLEDGE REGARDING PREVENTION AND MANAGEMENT ON JUVENILE

**DIABETES MELLITUS AMONG HIGH SCHOOL STUDENTS IN SELECTED SCHOOLS IN VADODARA**

**4. METHODOLOGY**

The research design used in this study was pre experimental one group pre-test post-test design. The sampling technique used for this study was non probability purposive sampling. The samples were 100 high school students of selected schools of Vadodara city. The tool consists of section A: socio demographic tool. Section B: Structured knowledge questionnaires. The data analysis was planned on the basis of objectives of the study using descriptive and inferential statistics in consideration with hypothesis of the research study. The data collection tool includes two sections, the first one consist socio demographic characteristics such as Class, Gender, Food habit, Type of Family, Parental Education, Monthly income, and Family history of the samples and the second one consists questionnaire to assess the knowledge for measuring the knowledge regarding prevention and management on juvenile diabetes mellitus.

**5. FINDINGS**

Total 100 samples were analysed under study. Identified frequency percentage distribution of sample characteristics, grading and mean difference between pre and post knowledge score. Detailed data is summarized in tables below

**TABLE 1 CHARACTERISTICS OF SOCIO DEMOGRAPHIC VARIABLES**

Sr.No	Variables	Frequency	Percentage
<b>CLASS</b>			
1	8 <sup>TH</sup> Standard	30	30%
	9 <sup>TH</sup> Standard	70	70%
<b>GENDER</b>			
2	Male	55	55%
	Female	45	45%
<b>FOOD HABIT</b>			
3	Non-veg	69	69%
	Veg	31	31%
<b>TYPE OF FAMILY</b>			
4	Nuclear	45	45%
	Joint	25	25%
	Extended	30	30%
<b>PARENTAL EDUCATION</b>			
5	No Formal Education	33	33%
	Primary Education	25	25%
	Secondary Education	20	20%
	Graduate and Above	22	22%
<b>MONTHLY INCOME</b>			
6	<10000	33	33%
	10001-20000	25	25%
	20001-30000	20	20%
	>30001	22	22%
7	<b>FAMILY HISTORY</b>		

	Yes	26	26%
	No	74	74%

**Table 1:** Shows that majority 30 students (30 %) were in 8<sup>th</sup> standard and 70 students (70%) were in 9<sup>th</sup> standard, 45 students (45%) were female students, 55 students (55%) were male students, 69 students (69%) were non-vegetarian, 31 students (31%) were vegetarian, 45 students (45%) are from nuclear family, 25 students (25%) are from joint family, 30 students (30%) are from extended family, 33 parents (33%) are not having formal education, 25 parents (25%) are having primary education, 20 parents (20%) are having secondary education and 22 parents (22%) are graduate and above, 33 students (33%) are having <10000 monthly income, 25 students (25%) are having 10000-20000 monthly income, 20 students (20%) are having 20000-30000 monthly income and 22 students (22%) are having >30000 monthly income, 74 students (74%) are not having any member with diabetes in family, 26 students (26%) are having any member with diabetes in family.

**TABLE 2 GRADING OF PRE-TEST KNOWLEDGE SCORE**

Sr. No	Categories	Score (Range)	Frequency	Percentage
1	Inadequate	0-10	36	36%
2	Moderate	11-20	64	64%
3	Adequate	21-30	00	00%

**Table 2:** The result pertaining to knowledge revealed that 36 students (36%) had inadequate knowledge, 64 students (64%) had moderate knowledge and 00 students (00%) had adequate knowledge.

**TABLE 3 GRADING OF POST-TEST KNOWLEDGE SCORE**

Sr. No	Categories	Score (Range)	Frequency	Percentage
1	Inadequate	0-10	00	00%
2	Moderate	11-20	26	26%
3	Adequate	21-30	74	74%

**Table 3:** The result pertaining to knowledge revealed that 26 students (26%) had moderate knowledge, 74 students (74%) had adequate knowledge after conducting planned health teaching program.

**TABLE 4 MEAN STANDARD DEVIATION, MEAN DIFFERENCE AND ‘T’ VALUE OF PRE- TEST AND POST TEST SCORES.**

Variables		Mean	Mean difference	SD	t-value	Significance
Knowledge score	Pre-test	11.48	13.38	2.24	12.08*	S
	Post-test	24.86				

**t( 0.05, 99) = 1.66**

**Table 4:** The obtained paired ‘t’ calculated value 12.08 is more than tabulated “t” value 1.66 at 0.05 level of significance with df = 99. It shows a significant difference between the pre-test and post-test

knowledge score regarding prevention and management of juvenile diabetes mellitus among high school students. So H1 is accepted.

**TABLE 5 ASSOCIATION BETWEEN PRE-TEST SCORE AND DEMOGRAPHIC VARIABLE**

N=100						
Category	Median And above	Below median	Total	X2	df	Inference
<b>Class</b>						
8 <sup>th</sup> Std	33	23	56	0.907	1	NS
9 <sup>th</sup> Std	30	14	44			
<b>Gender</b>						
Female	33	23	56	0.259	1	NS
Male	30	14	44			
<b>Food habit</b>						
Non-veg	42	25	67	0.266	1	NS
Veg	22	11	33			
<b>Type of family</b>						
Nuclear	28	16	44	0.532	2	NS
Joint	16	9	25			
Extended	20	11	31			
<b>Parental education</b>						
No Formal Education	20	13	33	0.972	3	NS
Primary Education	14	11	25			
Secondary Education	13	7	20			
Graduate and Above	13	9	22			
<b>Monthly income</b>						
<10,000	21	12	33	0.972	3	NS
10000-20000	17	8	25			
20000-30000	10	10	20			
>30000	15	7	22			
<b>Family history</b>						
Yes	16	9	25	0.475	1	NS
No	49	26	75			

**at (0.05 level)**

**Table 5:** The obtained  $\chi^2$  value = 4.383 of length of knowledge in high school students is less than the table value of  $\chi^2 = 12.59$  at 0.05 level of significance with df = 6. Hence, the obtained  $\chi^2$  value of demographic variables such as class, gender, food habit, type of family, parental education, monthly income, and family history were found less than the table value of  $\chi^2$  at 0.05 level of significance. Hence there is no significant association.

**6. DISCUSSION**

The present study was conducted to evaluate the effectiveness of planned teaching program on knowledge regarding prevention and management of Juvenile Diabetes Mellitus among high school students of selected schools of Waghodia, Vadodara. After surfing many articles, we came to know that diabetes cases are increasing day by day because majority of the people are not aware about and management of the diabetes and this can increase risk for Hyperglycemic conditions which can lead to warning signs of diabetes mellitus such as Excessive thirst, Frequent urination, Blurred Vision, Fruity smelling breath, Unusual behaviour, etc. Majority of deaths are increasing day by day because of this conditions and its very important aspect as a healthcare professional that to make aware people about and management of diabetes which can control further complications as obesity is controlled. In this study we have taken reviews of literature regarding knowledge about diabetes, attitude toward this disease condition, risk factors related to autoimmune disorders.

**7. CONCLUSION**

This study shown effective outcome of health education program regarding prevention and management of Diabetes mellitus among high school students. Diabetes mellitus (T1D) is an autoimmune disease in which the insulin-producing pancreatic  $\beta$ -cells are targeted and destroyed by infiltrating immunocytes, resulting in lifelong dependence on exogenous insulin. Hyperglycemia develops with classic symptoms of polyuria, polydypsia, and weight loss. In the Health education program on prevention and management of Juvenile Diabetes Mellitus we have explained why blood sugar can increase, how to monitor it, and ways to keep it within a normal range, what are the foods type etc. In this study effective outcome of health teaching program regarding prevention and management of Diabetes mellitus among high school students is seen and the students gained the knowledge regarding Juvenile Diabetes Mellitus and were made aware about the prevalence and life style modifications to prevent further complications in future.

**CONFLICT OF INTEREST**

There was no conflict of interest.

**SOURCE OF FUNDING**

The study is not funded by any external sources as it is self-funded research project.

**ETHICAL CLEARANCE**

Ethical clearance has been obtained from the Sumandeep Vidyapeeth institutional ethical committee and willingness has been obtained from participants before data collection.

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