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FACTORS AFFECTING GLYCEMIC CONTROL IN TYPE-1 DIABETIC CHILDREN AT PAEDIATRIC DIABETIC OPD, CIVIL HOSPITAL HYDERABAD

[1]Dr. Noordin Khatti, [1]Dr. Farzana Shaikh, [1]Dr. Abdul Rehman Syal,
[2]Dr. Taj Muhammad Laghari and Dr Mohammad Akber Nizamani
[1] Department of Pediatrics, Liaquat University of Medical and Health Sciences (LUMHS)Jamshoro
[2]National Institute of Child Health (NICH) Karachi Pakistan

Abstract:
Objective: *To assess the factors affecting Glycemic Control in Type-1 Diabetic children at Paediatric Diabetic OPD, Civil Hospital Hyderabad*
Methodology: *ThisObservational study was done at Pediatrics Diabetic OPD, Civil Hospital Hyderabad, total 6 Monthduration from 1st April 2015 to 30 September 2015 in 80 Diabetes children of age 1 year to 15 years of both genders.*
Results: *A total of 80 children were selected in this study. Majority of subjects belonged to 5 to 12 years age group (p=0.0001). Great, reasonable and terrible glycemic control was noted in 14 (17.5%), 17 (21.2%) and 49 (61.2%) separately (p=0.0001). In this examination, the majority of the patients, for example, 66.25% were found in the age aggregate 5 to12 years with male and female and they were similarly influenced. 37.5% were known diabetic. Polyuria, Polydipsia, Polyphagia was prevalent component. The majority of the patients for example half glucose control was not ideal (Blood Sugar Level Greater than 360mg). Dominant part of patients were underweight/malnourished Females were increasingly influenced. It was seen that greater part of patients were short in stature and females were progressively influenced.*
Conclusion:
In our investigation insulin treatment is the backbone of treatment and poor consistence of insulin were the significant hazard factor for uncontrolled diabetes and complexities. It was noted in this examination that lion's share of patients were not ready to perceive/separate sort of insulin infusions and were uninformed about hypoglycemia and its treatment at home. Dominant part were taking illegal nourishments (sweet).
Keywords:*Glycemic Control, Type 1 Diabetes Mellitus, Blood glucose.*

Corresponding author:
*** Dr. Farzana Shaikh,**
Email: zulfikar29@yahoo.com

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INTRODUCTION:

Type 1 diabetes is usually diagnosed in children and young adults, and was previously known as juvenile diabetes. Only 5% of people with diabetes have this form of the disease. In type 1 diabetes, the body does not produce insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. With the help of insulin therapy and other treatments, even young children can learn to manage their condition and live long, healthy lives. Patients with type 1 diabetes mellitus (DM) require lifelong insulin therapy. Most require 2 or more injections of insulin daily, with doses adjusted on the basis of self-monitoring of blood glucose levels. Long-term management requires a multidisciplinary approach that includes physicians, nurses, dietitians, and selected specialists. (1)

Often, the patient with new-onset type 1 DM who presents with mild manifestations and who is judged to be compliant can begin insulin therapy as an outpatient. However, this approach requires close follow-up and the ability to provide immediate and thorough education about the use of insulin; the signs, symptoms, and treatment of hypoglycemia; and the need to self-monitor blood glucose levels.Insulin is a very old protein that may have originated more than one billion years ago.[2]The molecular origins of insulin go at least as far back as the simplest unicellular eukaryotes.[3] When control of insulin levels fails, diabetes mellitus can result. As a consequence, insulin is used medically to treat some forms of diabetes mellitus. Patients with type 1 diabetes depend on external insulin (most commonly injected subcutaneously) for their survival because the hormone is no longer produced internally.[4]

Among individuals with insulin-dependent diabetes mellitus (IDDM), non-adherence has been a problem, in part because the treatment of IDDM is painful, difficult, and time-consuming [5, 6].Given the challenging nature of this daily self-care regimen and the high level of non-adherence that commonly occurs [7, 8] it is important to understand the factors that predict better self-care and physiological outcomes related to diabetes management.While insulin omission has been found to be a common behavior in those with type I diabetes, the factors associated with such omission have shown variations among different populations [9]. As uncontrolled diabetes in children can lead to acute lethal complications like Diabetic Ketoacidosis, so it is mandatory to maintain blood sugar level.

This study is planned to determine the frequency of different factors that are associated with poor blood sugar control in children. The study will help the parents and physicians to keep these factors in mind, while managing diabetic children to prevent the short term and long term complications.

Objective:

To assess the Factors Affecting Glycemic Control in Type-1 Diabetes children visiting to Paediatric Diabetic OPD.

METHODOLOGY:

Operational Definitions:

Glycemic Control should include keeping random blood sugar < 200 mg/dl by monitoring HbA1c level 7-8% (Wayne Harris) by monitoring HbA1c level every 3 months, giving insulin regular and NPH two divided doses subcutaneous in both sex of age 1 year to 15 years.

ThisObservationalcross sectional study was done at Department of Pediatrics Diabetic OPD, Civil Hospital Hyderabad, total 6 Month duration from 1st April 2015 to 30th September 2015 in 80 diabetic children with non-probability consecutive sampling technique. Sample size was calculated on the basis of total population which depends on all children coming to LUMHS Hospital Jamshoro/ Hyderabad, suffering from Type-1 DM, on insulin therapy. The following formula was used to calculate sample size

Sample size = $\frac{N}{1-N(e)^2}$

N=total population

e=error rate

Inclusion Criteria was children,age 1 year to 15 years of both genders coming to LUMHS Hospital Jamshoro/ Hyderabad, suffering from Type-1 DM and placed on Insulin Therapy

Children having Type-2 Diabetes or having Mental retardation or congenital anomalies were excluded from the study. All the children coming under the "inclusion criteria" were examined and their general history collected through their parents, were finally asked specific questions according to a pre-tested structured questionnaire.The data collected was analyzed using SPSS version 21. Frequencies and percentages were calculated for categorical variables and chi square and ANOVA test was applied for data analysis.

RESULT:

A total of 80 children were selected in this study. Age

distribution of study subjects is shown in table I. Majority of subjects belonged to 5 to 12 years age group (p=0.0001). Clinical presentation revealed polyuria, polydipsia, polyphagia, fatigability, weight loss and diabetic ketoacidosis as shown in table II. Family history of Consanguinity, monthly income and insulin purchasing affordability are shown in table II. Glucose control, weight and height are shown in table III-IV. Good, fair and bad glycemic control was noted in 14 (17.5%), 17 (21.2%) and 49 (61.2%) respectively as shown in TableIII (p=0.0001). Frequency of responses to questions asked from patients / parents during routine checkup at paediatric diabetes OPD are shown in barTable V.

Table I. Age &sex profile of diabetic children

Age Group		Male	Female	%
≤ 1yrs	02	01	01	2.5%
1-5 yrs	14	07	07	17.5%
5-12 yrs	53	25	28	66.25%
≥ 12yrs	11	08	03	13.75%

Table II. Clinical Presentation (Symptoms)/Family Socio-economic History

Presentation	No	%
Known diabetic	30	37.5%
Polyuria	43	53.75%
Polydipsia	38	47.5%
Polyphagia	38	31.75%
Fatigability	33	41.25%
Weight loss	36	45%
Diabetic ketoacidosis	13	16.25%
Family History		
Consanguinity	16	20%
H /O IDDM Diabetes in Siblings	03	3.75%
H/O IDDM in Family	05	12.5 %
H/O NIDDM in Family	07	8.75%
Low income	64	80.0%
Insulin Purchasing affordability Yes No	 0 100	 0 100%

Table III. Glucose Control/Glucose scoring scale

S No:	Blood Sugar Random	No	%
1	60-90 mg	10	12.5%
2	90-180 mg	10	12.5%
3	180-270 mg	10	12.5%
4	270-360 mg	10	12.55
5	≥ 360 mg	40	50%
	Good	**Fair**	**Bad**
Score scale	14 (17.5%)	17 (21.2%)	49 (61.2%)

Table IV. Weight/Height Centile

S No:	**Weight**	No	%
1	≤ 5th	48	60%
2	≥ 5th	19	23.75%
3	≥50th	07	8.75%
4	5th	03	3.75%
5	50th	03	3.75%
	Height		
1	≤ 5th	46	57.5%
2	≥ 5th	17	21.25%
3	5th	07	8.75%
4	≥50th	10	12.5%

TableV. Frequency of responses to questions asked from patients / parents at routine checkup in OPD.

1	**80%** **20%**	Unable to differentiate type of insulin i.e. regular / NPH Able to recognize insulin injection
2	**60%** **40%**	Keeping insulin in fridge. Not using fridge or having no facility b/o poverty
3	**50%** **50%**	Know dose of regular insulin. Unable to understand dose
4	**46%** **50%**	Know dose of NPH. Unable to take dose properly.
5	**60%** **40%**	Can unable to fill regular insulin properly. Cannot properly.
6	**40%** **60%**	Can fill NPH insulin properly. Cannot properly NPH.
7	**70%**	Can first fill from regular insulin in syringe.
8	**80%**	Change insulin syringe when marks disappear.
9	**50%** **50%**	Able to fill by themselves. Need training and counseling.
10	**24%** **75%**	Able to recognize sign / symptoms of hypoglycemia. Unable to appreciate sign / symptoms of hypoglycemia
11	**30%** **70%**	Avoiding forbidden food (sweets), Using forbidden food even were told and counseled about sweet prohibition.
12	**60%**	Know type of food which is forbidden.
13	**30%**	Always avoid forbidden food.
14	**50%**	Receive doses of insulin by trained persons.
15	**70%**	Know proper injection sites.

DISCUSSION:

Non adherence to prescribed treatment regimen in patient with TIDM is quite high. There is need to design strategies to help patients and their family members understand their treatment regimen including dietary and physical activity advices in order to improve their adherence. Multidisciplinary approach consisting of physicians, dietician and diabetes educator can be of great help in achieving this goal.10

The present study is the first study being reported from our tertiary care hospital at Hyderabad. In present study poor insulin compliance was frequently found as evaluated by glycemic scale score. The good, fair and bad glycemic control was noted in 14 (17.5%), 17 (21.2%) and 49 (61.2%) respectively. In anunsimilar international study there was poor glycemic control was present in 72% children11the underlying cause for this high number was due to association between limited insulin supply and near total lack of self-monitoring of blood glucose due to the limited availability of economic resources. In another similar study showed Poor HbA1c control was seen in 63 (73.2%), average control in 10 (11.6%) and good control in 13 (15.1%) children, poor glycemic control was associated with low socioeconomic background and depression 12.

In this study as perquetionaryprofarma was asked in weekly OPD in which we observed 80 % were not able to differentiate type of insulin i.e regular / NPH, only 20% were able to recognize insulin injection. In an unsimilar study 88% of the mothers had a very good knowledge about the general use of insulin, whereas, an 11% mothers were not able to answer the questions on insulin correctly 13. In another study despite regular clinic attendance, diabetes education, and provision of insulin, hemoglobin A1C (HbA1c) levels did not improve. Four children (5%) had HbA1c 7.5%, 22 (28%) HbA1c 7.5-10%, 9 (24%) HbA1c 11-12.5%, and 36 (44%) HbA1c >12.5%.

60% parents were keeping insulin in fridge and 40% were not using fridge or having no facility b/o poverty.In a similar international study about 66.3% of children had fridges to store their insulin but the glycemic control was not significantly better than in those who kept their insulin (33.6%) at room temperature 11.

50% parents were able to know advised dose of regular insulin, 50% were not able to do so. 46% were able to know advised dose of NPH, still more than 50% were not able to take advised dose properly. 60% were able to fill regular insulin properly, while 40% were not filling properly.Only 40% were able to fill NPH insulin properly, while 60% were not doing properly with NPH. 70% were first filling regular insulin in syringe, 80% were changing insulin syringe when marks disappear. In a unsimilar international study 97.2% children were on intensive insulin therapy but still 71% children had poor glycemic control15. While in our study children were on 2 injections regimen per day and the glycemic control was similar to intensive injections regimen, this may be due to longer duration of diabetes in their study.

Only 50% parents were able to fill herself / himself insulin still 50% needs training and counseling further.Only 24% were able to recognize sign / symptoms of hypoglycemia, more than 75% were not able to appreciate sign / symptoms of hypoglycemia, it was major drawback for patients and parents. Either was under estimated or over estimated.In a similar study around half of the mothers of diabetic children were unaware of the common complications of the diabetes and the glycemic control was in 66.26% children 13.

Only 30% children were avoiding forbidden food (sweets), 70% were using forbidden food even were told and counseled about sweet prohibition. 50% were receiving doses of insulin by trained persons. 70% knew proper method for injection sites.

In our study 80% children belonged to low income group families and there was bad glycemic control in 61.2% children. In a similar study there was highly significant correlation was found between poorer socioeconomic backgrounds and worse glycemic control. These results are supported by a similar study identified a highly significant correlation between living in a higher socioeconomic area and having better glycemic control16.

Former study17 demonstrated that parental intelligence seemed to influence glycemic control significantly in a child with type 1 diabetes as opposed to child's test scores.This is probably because of poor understanding / low level literacy. A previous study demonstrated that greater diabetes knowledge of care givers is associated with better glycemic control 18. Hence, assessing literacy of care givers at onset may allow for targeted improvement in glycemic control by use of grade-appropriate material and language by diabetes educators and health care providers. Diabetes management requires basic mathematic skills. Inability of caregivers to

subtract and add accurately and understand percentages limits their ability to count carbohydrates and calculate optimal insulin doses accurately. Furthermore, those who are less educated and of lower income are less likely to access outpatient health care

In this study 60% of children were underweight, while in a unsimilar international study 7.9% children were underweight and the poor glycemic control was present in 76% children.

CONCLUSION:

In our study insulin therapy is the main stay of treatment and poor compliance with insulin are major risk factor for uncontrolled diabetes and complications.It was noted in this study that majority of patients were not able to recognize/differentiate type of insulin injections and were unaware about hypoglycemia and its treatment at home. Majority were taking forbidden foods (sweet). This can be improved by focusing on dietary education and demonstration by trained persons and effective counseling and follow up.Further studies are recommended to overcome these deficiencies.

REFERENCES:

1. Aljabri KS, Glycemic changes after vitamin D supplementation in children. Ann Saudi Med 2010; 30 (6):12-9.
2. Anderson EA, Usher JA. Understanding and enhancing adherence with diabetes. Current Diabetes Reports, 2011, 3:141–148.
3. Agrawal RP, Jain S, Shah S, Chopra A, Agarwal V. “Effect of camel milk on glycemic control and insulin requirement in patients with type 1 diabetes: 2-years randomized controlled trial”, Eur J Clin Nutr 2001;65(9):1048-1052
4. Chimen M, Kennedy A, Nirantharkumar K, et al. “What are the health benefits of physical activity in type-1 diabetes mellitus? A literature review”, Diabetologia, 2012; 55:542-551
5. Ibrahim AE, “Investigate the level of IL-8 in patients with diabetes mellitus and its relation with lipid profile and the incidence of atherosclerosis”, Eur J Chem, 2014; 5(3):529-531
6. Leclair E, de Kerdanet M, Riddell M, Heyman E. Type 1 Diabetes and Physical Activity in Children and Adolescents. J Diabetes Metab 2013; S10: 004.
7. Piłaciński S, Dorota A et al, Influence of lifestyle on the course of type 1 diabetes mellitus, Arch Med Sci 2014; 1 (1): 124–134.
8. Shapo L, Saker L, A case of immediate and delayed reactions with a venomous mauvestinger jellyfish in a diabetic patient, IJCRI 2013 ;4(7):388–391 .
9. Menzin J, Langley-Hawthorne C, Friedman M, Boulanger L, Cavanaugh R: Potential short-term economic benefits of improved glycemic control: a managed care perspective. Diabetes Care, 2011, 24:51–55.
10. De Souza AMF, Lopez JA, Insulin or insulin-like studies on unicellular organisms: a review. Braz. arch. biol. Technol 2004: 47 (6):S1516-891.
11. Ventura C S. The History of Diabetes Mellitus A Maltese perspective.2002; 18:1-41
12. American Diabetes Association Diabetes, Diagnosis and Classification of Diabetes Mellitus Diabetes care.diabetesjournals.org 2012; 35:64-71.
13. David G, Gardner G, Dolores. Greenspan's basic & clinical endocrinology (9th ed). New York: McGraw-Hill Medical. Chapter 2011; 17:162243-8.
14. Way KJ, Katai N, King GL. Protein kinase C and the development of diabetic vascular complications, Diabetic Medicine. 2001; 18(12):945-59.
15. Chahil TH, Ginsberg HN. Diabetic dyslipidemia, Endocrinology and metabolism clinics of North America, 2006; 35(3): 491-510.
16. Georges CA, Bolton LB, Bennett C. Functionalhealth literacy: an issue in African-American and other ethnic and racial communities.J Natl Black Nurses Assoc. 2004;15(1):1– 4.
17. Sullivan-Bolyai S, Deatrick J, Gruppuso P, Tamborlane W, Grey M: Mothers' experiences raising young children with type 1 diabetes. J Spec PediatrNurs. 2002, 7: 93-103
18. Svensson J, Johannesen J, Mortensen HB, Nordly S, on behalf of the Danish Childhood Diabetes Registry: Improved metabolic outcome in a Danish diabetic paediatric population aged 0-18 yr: results from a nationwide continuous registration. Pediatr Diabetes. 2008, 10: 461-467.