

## ORIGINAL ARTICLE

# Factors Affecting Glycemic Control in Type-1 Diabetes Mellitus in Patients Visiting Newly Established Diabetic OPD at Tertiary Care Hospital Hyderabad Sindh

NOOR U DDIN KHATTI<sup>1</sup>, ABDUL HAMEED RADHAN<sup>2</sup>, GHULAM SHABIR LAGHARI<sup>3</sup>, MUHAMMAD SOHAIL QAIMKHANI<sup>4</sup>, SHAMAEEL<sup>5</sup>, SAEED AHMED SHAIKH<sup>6</sup>

<sup>1</sup>Consultant Paediatrician, Liaquat University Hospital Hyderabad

<sup>2</sup>Assistant Professor Department of Paediatrics, Liaquat University of Medical and health sciences Jamshoro

<sup>3</sup>Associate Professor Department of Paediatrics, Liaquat University of Medical and Health Sciences Jamshoro

<sup>4</sup>Consultant Paediatrician Liaquat University Hospital Hyderabad

<sup>5</sup>FCPS training completed in Paediatrics Liaquat University Hospital Hyderabad

<sup>6</sup>Consultant Paediatrician, Liaquat University Hospital Hyderabad

Correspondence to: Abdul Hameed Radhan, Email: [abdul\\_hameed82@hotmail.com](mailto:abdul_hameed82@hotmail.com), Cell: 0336-6895241

## ABSTRACT

**Background:** Patients worldwide are affected by diabetes mellitus (DM), one of the most frequent diseases in the world. Various organs and systems in the body are affected by diabetic complications, which can be either microvascular or macrovascular in nature. Finding out and preventing these variables is critical to improving the quality of life for diabetics.

**Objective:** To assess the poor glycemic control and its association with affected factors in our diabetes population.

**Material and Methods:** This Observational study was conducted on 80 patients in the Department of Pediatric (Unit II), Liaquat University Hospital, Jamshoro/Hyderabad for six months from 1<sup>st</sup> January to 30<sup>th</sup> June 2021. Diabetic children between the ages of 1 and 15 who had Type-1DM and were on insulin therapy at LUMHS Hospital Jamshoro/Hyderabad were eligible for inclusion. Using a pre-tested structured questionnaire, we asked particular questions of each child after they had been inspected and their family history was gathered. Data was analyzed using SPSS version 26.0

**Results:** A total of 80 patients were enrolled in this study. Table: 1 shows the age and gender profile of the children. The most of the children were in the age group 5 to 12 years, with a p-value of 0.0001. As demonstrated in Table 2, the Subject had Polyuria, Polydipsia, Polyphagia, Fatigability and weight loss due to Diabetic ketoacidosis, the prevalence of consanguinity in the family, average monthly earnings, and the cost of insulin and glucose control. Table 3 shows weight and height. Graph I (p=0.0001) reveal that 14 (17.5%), 17 (21.2%), and 49 (61.2%) participants had good, fair, or poor glycemic control, respectively.

**Conclusion:** Uncontrolled diabetes and complications are linked to poor insulin adherence, which is the mainstay of treatment. It is suggested that this topic be explored further.

**Keywords:** Factors affecting, Glycemic Control, Type-1 Diabetes Mellitus, Complications, Insulin

## INTRODUCTION

Type 1 diabetes, often known as juvenile diabetes, is most commonly diagnosed in children and young people. Only 5% of diabetics suffer from this complication. Insulin is not generated by a person who has type 1 diabetes. Sugar, starches, and other carbohydrates are converted to energy in the body by insulin, a hormone that is produced by the pancreas. Even very young children can learn to control their diabetes and lead long, healthy lives with the support of insulin therapy and other treatments. Those with type 1 diabetes necessitate insulin treatment for the rest of their lives. Self-monitoring blood glucose levels are used to regulate insulin dosages for most people with diabetes. In order to provide long-term care, a multidisciplinary team of doctors, nurses, nutritionists, and other specialists is required.<sup>1</sup> Insulin therapy can be started as an outpatient procedure for patients with newly diagnosed type 1 diabetes mellitus who have moderate symptoms and are thought to be compliant. In order to be successful, this strategy demands close monitoring and the capacity to provide immediate and extensive teaching regarding insulin use; hypoglycemia; and the importance of self-monitoring blood glucose levels. Beta cells in the pancreas create

insulin, a peptide hormone that regulates the metabolism of carbohydrates and fats in the body. Sugar is absorbed by cells in the skeletal muscles and fat tissue as a result of this. Over a billion years old, insulin may be the oldest protein known to man.<sup>2</sup> Insulin's molecular origins can be traced back to the earliest Unicellular eukaryotes.<sup>3</sup> The development of diabetes mellitus can occur if insulin control is lost. As a result, insulin is being treated various types of diabetes mellitus. Patients with type 1 diabetes, whose bodies no longer generate insulin, must rely on exogenous insulin injections (most usually administered subcutaneously).<sup>4</sup> Diabetes patients with insulin-dependent mellitus (IDDM) have a difficult time adhering to their treatment regimens, in part because it is time consuming, difficult, and painful.<sup>5,6</sup> Diabetes management is an important consideration because of the difficulty of this self-care regimen and the high rate of non-adherence that occurs.<sup>7,8</sup> In Type I diabetics, insulin omission is prevalent, but the reasons associated with such omission vary between populations.<sup>9</sup> According to Crow et al. (1998), omission occurs when inadequate insulin injection for the calories taken results in an increase in blood glucose levels. There could be a variety of causes for this, ranging from an accident to a calculated attempt<sup>10</sup>.

### MATERIAL AND METHODS

This Observational study was conducted on 80 patients in the Department of Pediatric (Unit II), Liqueate University Hospital, Jamshoro/Hyderabad for six months from 1<sup>st</sup> January to 30<sup>th</sup> June 2021. Children with Type-1DM and Diabetic who came to LUMHS Hospital Jamshoro/Hyderabad and were put on Insulin Therapy, as well as diabetic children aged 1 year to 15 years who were female and survived until the end of the study, were all included in the research. Patients (parents of children) who refused to participate in the study, such as those with mental retardation or congenital defects, were not included in this research. All children who were according to inclusion criteria were screened and their family histories were compiled before they were finally subjected to a series of in-depth interviews. According to a pre-tested, organized survey.

**Dataanalysis:** SPSS version 26.0 was used to collect the data and proper statistical tests such as ANOVA and Chi square were applied.

### RESULTS

A total of 80 children were enrolled in this research. Table: 1 shows the age and gender profile of the children. The most of the children were seen in the age group 5 to 12 years, with a p-value of 0.0001. As demonstrated in Table 2, the Subject had Polyuria, Polydipsia, Polyphagia, Fatigability and weight loss due to Diabetic ketoacidosis, the prevalence of consanguinity in the family, average monthly earnings, and the cost of insulin and glucose control. Table 3 shows weight and height. Graph 1 (p=0.0001) reveal that 14 (17.5%), 17 (21.2%), and 49 (61.2%) participants had good, fair, or poor glycemic control, respectively.

Table 1: Distribution of children with regards to Age & gender (n = 80)

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

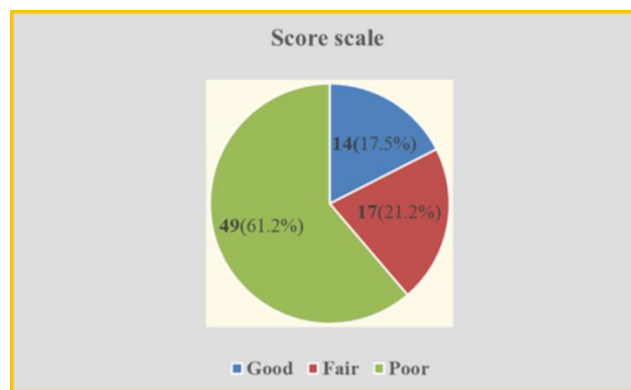
Table 2: Distribution of children according to clinical Symptoms (n = 80)

Presentation	No	%
Known diabetic	30	37.5%
Polyuria	43	53.75%
Polydipsia	38	47.5%
Polyphagia	38	31.75%
Fatigability	33	41.25%
Weightless	36	45%
Diabetic ketoacidosis	13	16.25%
Family History		
Consanguinity	16	20%
H/OIDDM Diabetes in Siblings	03	3.75%
H/OIDD Min Family	05	12.5%
H/ONIDD Min Family	07	8.75%
Glucose Control		
60-90mg	10	12.5%
90-180mg	10	12.5%
180-270m	10	12.5%
270-360mg	10	12.5%
≥360mg	40	50%

Table 3: Distribution of children according to Weight and Height (n=80)

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%
Male	---	38	47.5%
Female	---	42	52.5%
Centile (Height)		Height	
1	≤5th	46	57.5%
2	≥5th	17	21.25%
3	5th	07	8.75%
4	≥50th	10	12.5%
Male	----	37	46.25%
Female	----	43	53.75%

p=0.0001



Graph: 1 Outcome of glycemic control

### DISCUSSION

Our Hyderabad tertiary care hospital is the first to publish a study of this kind. Glycemic scale scores were frequently used to assess insulin compliance in this study. Table VI and Graph demonstrate that glycemic control was rated as good, fair, or poor in 14 (17.5%), 17 (21.2%), and 49 (61.2%) of the patients. I. Ross et al.<sup>11</sup> found that parental intelligence seems to have a greater impact on a child's Glycemic management than the child's test results. Continued investigation of the relationship between main caregiver literacy and glycemic treatment in children with type1 diabetes is being conducted in this new study. Glycemic control in children with diabetes is greatly affected by the literacy level of their caregivers, according to our research. Diabetes self-management requires a great deal more reading than most other health topics, so this is no surprise. Furthermore, this research implies that improved glycemic management is linked to higher levels of literacy. Caregivers who have a better understanding of diabetes are more likely to keep their patients' blood sugar levels in check<sup>12</sup>. Diabetes educators and healthcare providers may be able to use grade-appropriate information and language to improve glycemic control by first assessing caregiver literacy at the outset of the disease<sup>13</sup>. Diabetes control necessitates a working knowledge of algebra and trigonometry. Counting carbohydrates and determining optimal insulin dosages are difficult tasks for caretakers because of their inability to effectively subtract

and add and grasp percentages. Low math skills were found to have a major impact on a person's ability to control their blood sugar levels. Because the NVS math questions are wordy and have not yet been confirmed separately for math skills, we were unable to differentiate language inadequacies from pure arithmetic skill shortcomings in this evaluation. Therefore, math questions were investigated independently because the test can be used as a fast screening tool to identify weaknesses.

Recent research found that low numeracy abilities were prevalent among adults with diabetes. That study also concluded that low levels of diabetes-related democracy were linked to lower levels of perceived self-efficacy, fewer self-management practices, and probably lower levels of glycemic control<sup>15</sup>. The caregivers' performance in our study may reflect prior results that even highly educated persons have trouble with relatively simple numeracy questions<sup>16</sup>. For this reason, it is important to examine the ability of caregivers to read and write, as well as to use grade-appropriate diabetes teaching materials<sup>17</sup>. As a single-site investigation and as an Ethnic distribution that wasn't equal or representative, this study has certain drawbacks. Other inequalities were found in the distributions of educational attainment and financial well-being. The disparity in racial representation reflects the demographics of the people who use our center, where there are far fewer people of Spanish descent than of English descent. Outpatient care is less accessible to persons with a low level of education or finances. Those with a lower level of literacy, who are typically ashamed of their reading deficiencies, may have been discouraged from participating in this study because it was entirely voluntary. It is well recognized that children in two-parent households have much better glycemic control than those in a single-parent home<sup>19</sup>, but we did not investigate the impact of family structure on glycemic management. Literacy, income, and education all interacted in different ways to influence blood glucose levels. After accounting for these interactions, we discovered a significant and independent link between literacy and glycemic control, but we can't ignore the fact that low literacy is linked to poverty, a lack of formal education, and ethnic or racial minorities<sup>20</sup>. Responsibility falls on the shoulders of those who supply and educate. Ideal glycemic control can be attained by ensuring that primary caregivers of children with type 1 diabetes have the literacy and numeracy abilities necessary so that culturally relevant steps can be adopted to optimize the advantages of diabetes education. It is suggested that additional research be done in order to improve the care of diabetic patients.

## CONCLUSION

According to the result of this research, our children have a higher than previously reported prevalence of poor glycemic control. Uncontrolled diabetes and complications are linked to poor insulin adherence, which is the mainstay of treatment. It is suggested that this topic be explored further.

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