



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3830591>Available online at: <http://www.iajps.com>

Research Article

**IMPACT OF TYPE 1 DIABETES MELLITUS ON THE
GROWTH OF CHILDREN**Dr. Hiba Shakeel¹, Dr. Faryal Shuja², Dr. Rukhsar Javaid³¹Shaikh Zayed Hospital, Lahore²Fatima Memorial Hospital, Lahore³Nishtar Hospital, Multan

Article Received: March 2020

Accepted: April 2020

Published: May 2020

Abstract:

Introduction: Type 1 Diabetes Mellitus (T1DM) is one of the most common chronic endocrine disorders of childhood and adolescence. **Aims and objectives:** The main objective of the study is to analyse the impact of type 1 diabetes mellitus on the growth of children. **Material and methods:** This cross sectional study was conducted in Shaikh Zayed Hospital, Lahore during March 2019 to January 2020. The data was collected from the OPD of the hospital. The data was collected from 125 patients of both genders. In general, diabetic children are followed at 3 month intervals in our hospital. **Results:** The data was collected from 125 patients of T1DM. The mean age was 9.83 ± 4.50 years. The mean height SDS of the patients did not change significantly in any of the follow-up durations. All comparisons between BMI SDS values at the start and at the end of separate follow-up periods showed significant differences. **Conclusion:** It is concluded that type 1 diabetics, particularly those diagnosed at a younger age, growth is likely to be affected. Intensive insulin therapy may improve growth of these children over a period of time.

Corresponding author:

Dr. Hiba Shakeel,

Shaikh Zayed Hospital, Lahore

QR code



Please cite this article in press Hiba Shakeel et al, *Impact Of Type 1 Diabetes Mellitus On The Growth Of Children.*, Indo Am. J. P. Sci, 2020; 07(05).

INTRODUCTION:

Type 1 Diabetes Mellitus (T1DM) is one of the most common chronic endocrine disorders of childhood and adolescence. Impaired growth is a well-documented complication of diabetes; studies suggest that good metabolic control is crucial for normal growth. There is evidence to suggest that there are abnormalities in the hypothalamic-pituitary-growth hormone axis in patients with diabetes and these are more common in subjects with poor glucose control and longer duration of the disorder [1]. Hence, evaluating growth in children and adolescents with diabetes together with metabolic control is important.

Studies also suggest that growth velocity is affected in accordance with the age of the patient, as well as the age at diagnosis. Growth of children in pre-pubertal years has been reported to be affected by diabetes [2]. It has been noted that poor relative growth is associated with younger age at onset. Thus, assessing growth of diabetic children with respect to age at diagnosis and duration of disease is crucial.

Type 1 diabetes mellitus (T1DM) is a chronic disorder with well-known short- and long-term consequences. One of the long-term consequences is severe impairment of growth and development, the so-called Mauriac syndrome. As a result of the major advances in diabetes care, this entity has now become a rarity [3]. Indeed, during the last decade, there are some studies reporting positive growth characteristics in diabetic children. However, growth deceleration during the course of the disease has been reported in various countries around the world, such as Austria, Brazil, Czech Republic, Germany, and Sudan. The extent of the impact of

Table 01: Comparison of height, weight and body mass index Z scores according to age at diagnosis

	<3 (n=20)		3-9 (n=55)		9-14 (n=39)		>14 (n=11)	
	DM	Control	DM	Control	DM	Control	DM	Control
HAZ	-1.6 \pm 1.1	-0.06 \pm 1.0	-1.0 \pm 1.2	-0.3 \pm 0.8	-1.1 \pm 1.4	-0.4 \pm 0.8	-0.5 \pm 0.8	-0.04 \pm 0.4
WAZ	-1.2 \pm 1.3	-0.4 \pm 1.8	-1.1 \pm 1.5	-0.7 \pm 1.1	-0.4 \pm 1.1	-0.3 \pm 0.7	NA	NA
BAZ	-0.6 \pm 1.8	-0.6 \pm 2.0	-0.7 \pm 1.4	-0.8 \pm 1.4	-0.7 \pm 1.5	-0.7 \pm 1.1	-0.7 \pm 1.5	-0.7 \pm 1.1

*The mean difference is significant at the 0.05 level, HAZ: Height for age Z scores, WAZ: Weight for age Z scores, BAZ: BMI for age Z scores, BMI: Body mass index, DM: Diabetes mellitus

clinical and laboratory variables on the growth of children with T1DM is also a controversial issue [4,5].

Aims and objectives

The main objective of the study is to analyse the impact of type 1 diabetes mellitus on the growth of children.

MATERIAL AND METHODS:

This cross sectional study was conducted in Shaikh Zayed Hospital, Lahore during March 2019 to January 2020. The data was collected from the OPD of the hospital. The data was collected from 125 patients of both genders. In general, diabetic children are followed at 3-month intervals in our hospital. At each visit, the following assessments are performed: complete physical examination, evaluation of capillary blood glucose measurements done at home, blood and urine sampling, and improvement in diabetes knowledge by a team consisting of a pediatric endocrinologist, a diabetes nurse, and a diabetes dietitian. In our clinic, the tests for HbA1c and urine analyses are obtained every three months. The data was collected and analysed using SPSS version 17.0. All the values were expressed in mean and standard deviation.

RESULTS:

The data was collected from 125 patients of T1DM. The mean age was 9.83 \pm 4.50 years. The mean height SDS of the patients did not change significantly in any of the follow-up durations. All comparisons between BMI SDS values at the start and at the end of separate follow-up periods showed significant differences. In fact, these differences resulted solely from regaining the weight, which was lost during the onset of disease, especially during the first year.

DISCUSSION:

Our results indicate that our study children with T1DM were shorter than age matched controls. Studies evaluating the course of auxological variables following the diagnosis of T1DM generally report deterioration in height SDS [6]. These early studies were conducted on children who were receiving conventional insulin treatment. However, Poyrazoglu *et al* reported that final heights of the diabetic children followed between 1970 and 1987 were consistent with their target heights and no significant overall height loss was observed. Since early 1990's, our understanding and the quality of management of T1DM have enormously improved [7,8].

Several longitudinal studies have demonstrated weight gain was more prominent amongst girls during the pubertal years. Ours being a cross-sectional study we could not study the weight gain amongst our study population. However, there were no differences noted amongst diabetic children and controls for weight and BMI [9]. Although reasons for reduced stature in diabetics are still debatable, some studies on growth in diabetic children report that stature is most affected when diabetes is diagnosed pre-pubertally. The opposite has been concluded in another study where pre-pubertal boys were taller than normal children at the time of diagnosis but such differences were not seen in pubertal children. In our study population, children diagnosed after 14 years were comparable with normal healthy children while children diagnosed before 3 years were the most affected [10].

CONCLUSION:

It is concluded that type 1 diabetics, particularly those diagnosed at a younger age, growth is likely to be affected. Intensive insulin therapy may improve growth of these children over a period of time.

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