Clinical profile of childhood type 1 diabetes in Jos, Nigeria

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Abstract

We describe the clinical prevalence and profile of diabetic children seen in our centre over a 1-year period. All subjects admitted for type 1 diabetes within the review period were recruited. Data retrieved include age, sex, family history, clinical features, and anthropometry.

Eight subjects were admitted with a hospital prevalence of 10.1/1000 per year. Mean and modal age were 12 years and 15 years respectively. Five were newly diagnosed (prevalence of new diagnosis 6.3/1000 per year). Five (67%) had a family history of diabetes. Major complaints were polyuria, polyphagia, and polydipsia. Two had altered sensorium on admission. Five (67%) had a body mass index (BMI) >-2 standard deviation Z scores. Six (75%) were in diabetic ketoacidosis (DKA) on admission. All DKA subjects had sepsis. Complications noted during admission were cerebral oedema (1) and acute kidney injury (1). Seven were discharged, while one subject died.

This paper highlights an emerging problem in our environment. Efforts need to be intensified in education of health workers and the populace at large for quick presentation and prompt diagnosis.

Introduction

Diabetic mellitus is the most common endocrine disorder in children. It is estimated that approximately 343 million people worldwide have diabetes, and this number is increasing globally with 80% of the people estimated to have diabetes living in middle- to low-income countries of the world. It is estimated that these figures will double by the year 2030.[1] Prevalence is on the rise world-wide, associated with genetic and environmental risk factors.[2]

The overall age-adjusted incidence of type 1 diabetes varies from 0.1/100 000 per year in China, 36.8/100 000 per year in Venezuela, and 36.5/100 000 per year in Finland.[1] In Africa the incidence rate in children ranges from 1.5/100 000 in Tanzania to 10.1/100 000 in Sudan.[3]

Due to inadequacy of documentation, the incidence and pattern of presentation in Nigeria is not well defined. Regional variations, however, exists in terms of prevalence and features. A hospital prevalence of 1.6/1000 in Port Harcourt, south Nigeria[4] and 3.1/1000 in Kano, northwest Nigeria,[5] has been reported. In southeast Nigeria, a hospital prevalence rate of 0.1/1000 was reported by Ibekwe et al[6] and a community prevalence of 0.25–0.46/1000.[7]

Childhood diabetes may present in classical forms with polyuria, polydipsia and polyphagia; or the initial presentation may be in diabetic ketoacidosis (DKA).[8] This study aims to examine the prevalence and patterns of clinical presentation of type 1 diabetes in children at the Jos University Teaching Hospital over a 1-year period.

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Patients and methods

A review of all children diagnosed with diabetes in the Paediatric Department of Jos University Teaching Hospital between January 2011 and March 2012 was carried out. Childhood diabetes was diagnosed by typical symptoms, with a random plasma glucose (RBG) >11.1 mmol/l or fasting plasma glucose (FPG) >7.0 mmol. DKA was diagnosed by significant hypoglycaemia (>14 mmol/l), ketonuria, or ketonaemia, serum bicarbonate <15mmol/l, and DKA-associated chemical signs (e.g. dehydration, Kussmaul respiration, etc.).

Data retrieved from the case notes included age, sex, presenting symptoms, duration of symptoms prior to presentation, presence of complications, and outcome of hospitalisation. The socio-economic background of the subjects was described based on parental education and occupation using the method recommended by Olusanya.[9] The results of random plasma glucose, serum electrolytes, and urinalysis, were also recorded.

The data were entered into Epi info version 3.6.5 software and a descriptive analysis was done. Using the World Health Organization (WHO) Anthro-Plus software version 1.04, the Z score for weight for age, height for age, and body mass index (BMI) for age was calculated.

Results

Eight cases of childhood diabetes were seen out of 857 admissions during the 15-month period, indicating a hospital prevalence of 10.1/1000 per year.

The study subjects were between the ages of 5 and 17 years, with a modal and mean (± SD) age of 15 years and 12.4±4.3 years respectively. There were equal proportions of males and females with the majority of subjects

7/8 residing in urban centres. Two of the subjects were from high social economic class, two of middle class and four from lower socioeconomic class. A family history of diabetes was shown in five out of eight of the children.

Five of the eight children were diagnosed within the study period (6.3/1000 per year). All presented with polydipsia and polyuria. Other presenting features are shown in Table 1.

Table 2 shows WHO Z scores demonstrating that one patient had severe wasting and was stunted Height for Age Z score (HFA Z <-2) and three patients had mild to moderate stunting and wasting respectively.

Table 3 shows the indications for admissions (six of the eight had DKA), complications, precipitating factors, and outcome (one child died).

Discussion

From this information, it is obvious that we have an emerging challenge on our hands when compared with other zones of Nigeria.[5,6] Other reported hospital incidence figures ranged from 0.1-3.1/1000, but we found a very high incidence of 10.1/1000 per year.

Five out of the eight subjects had a family history of diabetes, i.e. genetic factors were involved. Reports indicate variations in incidence and prevalence by race, age, season, and geographic location.[2] This however is not conclusive, as few studies exist in Africa on geographic spread or variation in incidence. Perhaps this report and subsequent research will help answer the question.

Incidence of diabetes in childhood may also be influenced by malnutrition, especially in the tropics.[10] In the subjects studied 87% of them had HAZ scores >-2, and 62% with a BMI for Age Z score (BAZ) >-2. This implies that under-nutrition is not so much a factor in the aetiology and presentation of diabetes among the subjects seen. In Egypt, Ismail et al[11] reported 79% of subjects to be underweight.

A bi-modal, though skewed, pattern of age at presentation was seen in our subjects. Most (75%) were adolescents (10–19) years of age and the youngest in our study was 5 years of age. Bi-modal patterns have been previously reported in the presentation of diabetes in children. The peak ages of presentation in North America are reported as 6–8 years and also during puberty.[2]

Clinical features at presentation in our subjects were similar to those reported by Ibekwe et al[6] except that all our subjects had polyuria and polydipsia, while polyphagia was seen less frequently. The clinical feature differed from those of Adeleke et al,[5] who reported weight loss and polyphagia in only 27% of their subjects.

Six (75%) had diabetic ketoacidosis (DKA) on initial presentation. This, although lower than the 88% found by Ibekwe et al[6] is consistent with several reports of DKA as initial presentation.[3,5,6]

In most subjects the apparent trigger for DKA was infection. This ranged from septicaemia, urinary tract infection to malaria. One was admitted because of poor insulin administration. Infections have been documented[12,13] as a precipitating factor for DKA. Other documented precipitating factors include newly diagnosed diabetes, poor insulin administration, and cerebrovascular accident.[12]

The outcome of subjects was very good among those admitted with 7/8 discharged to follow-up, while one died from DKA with multiple co morbidities (sepsis,

Clinical feature	Frequency
Polyuria	8 (100%)
Polydipsia	8 (100%)
Polyphagia	6 (75%)
Weight loss	5 (62%)
Abdominal pain	4 (50%)
Vomiting	3 (37%)
Shock	2 (25%)
Acidotic breath	2 (25%)
Altered consciousness	2 (25%)

Table 1 Clinical features at presentation (n=8)

Number	Sex	Age (kg)	Weight (cm)	Height	WAZ	HAZ	BAZ
1.	M	5	19	115	0.26	1.09	-0.65
2.	F	8	20	120	-1.48	-1.13	-1.17
3.	M	13	18	126	–	-4.04	-5.18
4.	M	15	85	170	–	0.13	2.41
5.	F	15	40	163	–	0.19	-2.51
6.	M	16	75	165	–	-1.02	1.94
7.	F	17	39	158	–	-0.73	-2.42

Notes: M = male, F = female
WAZ = Weight for Age
HAZ = Height for Age
BAZ = BMI for Age

Table 2 WHO Z score for Height for Age, Weight for Age, and BMI for age

Indication for admission	Number
Diabetic ketoacidosis (DKA)	6
Uncontrolled hyperglycaemia	1
Elective surgery	1
Complication identified	
Acute renal failure	1
Cerebral oedema	1
Severe malnutrition	1
Outcome	
Died	1
Discharged	7
Precipitating factor for DKA	
Septicemia	3
Malaria	1
Urinary infection	2

Table 3 Indication for admission, complications, and outcome (n=8)

acute renal failure, severed dehydration, shock, and coma) and spent only 2 days in hospital. DKA accounts for a large percentage of deaths in children within the first few days of diagnosis.[14] The low number of deaths we observed may be due to a fewer number of subjects seen over the study period. Nevertheless, efforts need to continue to identify children with type 1 diabetes as soon as possible, and to admit to hospital as soon as possible when infections and/or metabolic decompensation occur.

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