

Childhood Diabetes Mellitus in Kano, North West, Nigeria

Adeleke S I *FWACPaed*, Asani M O *FWACPaed*, Belonwu R O *FWACPaed*, Gwarzo G D *FWACPaed*, Farouk Z L *FWACPaed*

Bayero Univeristy, Faculty of Medicine, Department of Paediatrics, P. M. B. 3011, Kano, Nigeria

Abstract

Background: There is paucity of literature on childhood diabetes mellitus from developing countries and especially North west Nigeria and this has made it pertinent for documentation of the features of the disease in a major regional referral centre.

The study was designed to describe the clinical presentation and outcome of childhood diabetes mellitus.

Methodology: Retrospective review of hospital records of paediatric patients managed for diabetes at Aminu Kano Teaching Hospital, Kano, Nigeria between January 1999 and December 2006. The age, sex, presenting features, complications, laboratory features and outcome of the patients were retrieved from the hospital records.

Results: During the years under review eleven out of 3,585 admissions were managed for Type 1 diabetes mellitus giving a prevalence rate of 3.1/1000. Male to female ratio was 1:0.6. The mean age at presentation was 10±4.5years most of the patients (72.7%) belonged to the lower socio-economic classes IV and V. The duration of symptoms ranged from 6-58days with a mean of 24±22.8days. The patients presented with urinary tract infections (36.4%), malaria (27.3%) and recurrent boils (18.2%). Three (27.3%) of the patients had polyuria and polydypsia while only one (91%) patient had polyphagia and weight loss. The mean random blood glucose on admission was 28.5±7.9mmo/L (16.9-39.2mmo/L) Four patient presented with diabetic Ketoacidosis. Two patients (18.2%) were discharged against medical advice while 1(9.1%) patient died.

Conclusion: Childhood Diabetes Mellitus, remains relatively uncommon in Nigeria.

Keywords: Childhood, Diabetes Mellitus, Northwest Nigeria.

Date Accepted for Publication: 11 March 2010

NigerJMed 2010: 145 - 147

Copyright©2010 Nigerian Journal of Medicine

Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder of multiple aetiologies.^{1,2} Diabetes mellitus is a complex disorder with profound consequences, both acute and

long term for the health of the affected individual and for the lost of health care in society at large.^{3,4} The classical type 1 diabetes mellitus (T1DM), also known as insulin dependent diabetes mellitus (IDDM) is an autoimmune disease that is increasing in frequency worldwide, most rapidly in children.¹ Both genetic and environmental factors play a role in the development of the disease.^{4,5}

It was estimated that about 100,000 children less than 15years developed T1DM with wide global variations in incidence rates. Incidence rates of 1.9 to 7.0 and 0.13 to 10 per 100,000 per year were reported in Africa and Asia respectively, the incidence rates in Europe, North America and South America respectively were 3.4-36, 7.61-25.7 and 1.27-18 per 100,000 per year respectively.⁶ There are scanty data in the incidence, aetiology and outcome of childhood DM from developing countries like Nigeria.^{7,8}

The aim of this study is to review hospital admissions to determine the clinical presentations and outcome of childhood diabetes mellitus in a tertiary hospital in Northwestern Nigeria.

Materials and Methods

The study was conducted at Aminu Kano Teaching Hospital, Kano. This hospital is a major referral centre located in North West Nigeria, providing health care for children in the region. A retrospective review of all children diagnosed with diabetes mellitus between January 1998 and December, 2006 was carried out. Childhood Diabetes mellitus was diagnosed according to the recommendations of the experts committee on the Diagnosis and Classification of Diabetes mellitus.⁹ Diabetic Ketoacidosis (DKA) was diagnosed using a combination of the following criteria hyperglycaemia > 16.7mmo/L, serum bicarbonate < 15mmo/L, glycosuria and Ketonuria. Acute renal failure was also diagnosed from rising levels of serum urea diagnosed from rising levels of serum urea (> 35mg/dl) and Creatinine (> 1.5mg/dL). Data retrieved from the case notes of children included age, sex, presenting symptoms, duration of symptoms prior to presentation, presence of complications and out-come of hospitalization. The

nutritional status of the children was assessed using the welcome classification.¹⁰ The socio-economic background of the subjects was ascribed based on parental education and occupation using the method recommended by Oyedeji.¹¹ The results of random blood glucose, serum electrolytes, urinalysis, and ultrasonographic investigations were also recorded. The data were expressed with SPSS version 6.0 software using descriptive statistics.

Results

Table I summarizes the clinical presentation and complication of all the children that were studied. There were eleven children treated for diabetes mellitus out of a total of 3,585 Paediatric admissions during the period under review, giving a prevalence rate of 3.1 per 1,000. There were seven (63.6%) males and four (36.4%) females giving a male to female ratio of 1:0.6. The mean (\pm SD) age at presentation was 10 ± 4.51 years eight (73.7%) of the patients belonged to the lower socio-economic classes IV and V while 2(18.2%) belonged to the middle class (Class III) while the remaining one was from the upper socio-economic background.

Duration of symptoms ranged from 6-58 days with a mean \pm SD of 24 ± 22.8 days. All the patients presented with infections, urinary tract infections (36.4%), malaria (27.3%) and recurrent boils (18.2%). Only 3(27.3%) of the patients had polyphagia and weight loss. Thirty six percent of the patients had malnutrition, all belong the social class IV and V. There was family history of diabetes in only one patient in social class I, both parents have diabetes. The blood glucose on admission ranged from 16.9-392 mmol/L with a mean of 28.5 ± 7.9 mmol/L all the patient had significant glycosuria with urinary glucose ranging 2⁺ - 3⁺ while four also had Ketonuria.

Table II describes the serum urea and electrolytes profile of the patients at the point of admission.

All the patients had type 1 diabetes mellitus. They were all managed with insulin according to the standard guidelines. The duration of hospitalization ranged between 2 and 21 days with the mean of 14.0 ± 8.5 days. Eight (72.7%) patients were discharged, 2 (18.2%) were discharged against medical advice due to financial constraint and 1(9.1%) died, he had both Diabetes Ketoacidosis and acute renal failure.

Table I: Pattern of clinical presentation of Eleven patients with Type 1 Diabetes mellitus

Subjects	Age	Sex	Sec	Complication
I	10	Female	IV	Diabetes Ketoacidosis (DKA)
II	6	Male	V	UTI and Hypoglycaemia
III	4	Male	IV	Recurrent boils and hypoglycaemia
IV	4	Female	V	Recurrent boils
V	7	Male	V	Malaria, DKA and hypoglycaemia
VI	5	Female	IV	UTI
VII	9	Female	IV	UTI, DKA and hypoglycaemia
VIII	5	Male	III	Malaria & Hypoglycaemia
IX	8	Male	III	UTI and Hypoglycaemia
X	5	Male	IV	DKA + ARF
XI	6	Male	I	Malaria & Hypoglycaemia

Keys:

SEC	=	Socio-economic Class
DKA	=	Diabetic ketoacidosis
UTI	=	Urinary Tract Infection
ARF	=	Acute Renal Failure.

Discussion

The present study appears to be the first of childhood diabetes in our region. Our hospital is a major referral centre established over a decade ago. The prevalence rate of 3.1/1000 obtained over period of nine years in the present study suggests that the disease may be uncommon in the population studied. This rate is higher than the 1.2/1000 reported from Port-Harcourt⁷ in Southern Nigeria and also 1.6/1000 in Sagamu⁸ south west Nigeria. The low prevalence in the present study may be due to the hospital based study. There are many forms of treatment in our region, most of the time, the patients visit the local traditional healers before coming to the hospital. It is not likely the cases are sequestered in peripheral facilities since such facilities lacked where withal to manage such cases and therefore should be referred to tertiary hospitals. However, it is not impossible that some of the affected children succumbed to the illness at home out of parental ignorance and high cost of orthodox medical care.

All the patients in our review had type 1 diabetes mellitus. The occurrence of hypoglycaemia, DKA, and infections was also similar to previous reports.¹² There were superficial or invasive infectious in all the children studied, may be explained by the metabolic and hormonal changes that characterize diabetes mellitus with result in immunosuppression.²

One of the patients had an unusual presentation presented as a case of severe malaria with cerebral involvement. The basic urine analysis for glucose should be incorporated into the care of acutely ill patient to avoid missed cases of childhood diabetes mellitus.^{13,14}

Most of the patients belong to the lower socio-economic group where the risk of long term malnutrition and endemic infections predisposing to pancreatic diseases and DM later in life may be significantly high.^{15,16} There

Table II: Pattern of serum urea and electrolytes in 11 patients with Type 1 Diabetes Mellitus

Serum Electrolytes	Mean \pm (SD)mmo/L
Potassium	3.6 \pm 0.6
Sodium	123.0 \pm 2.6
Bi carbonate	11 \pm 5.6
Urea	43 \pm 5.9

were only six patients with malnutrition and there were no pancreatic calcifications. Only one of the patients with family history diabetes was seen. However, several factors have been incriminated in development of T1DM.^{17,18}

Diabetes Ketoacidosis was the commonest complication recorded in this present study, this is similar to reports in Tunis,¹⁷ Sudan¹⁹ and Sagamu⁸ (southwest Nigeria). This is the cause of death in the only child who died following short course of illness. This highlights the need to pay

attention to symptoms and signs which may be suggestive of DKA in acutely ill children.

Three patients signed discharge against medical advice. The parents belonged to the lower socio-economic groups and their management was largely hindered by lack of funds for investigations and drug procurement. Control was difficult culminating in a high rate of premature discharges from hospital care because of uncontrolled diets, irregular supplies and poor storage of insulin due to power outages.

There is a need for frequent laboratory investigations, and regular purchase of expensive drugs, the care of diabetic children may be economically burdensome for families with low incomes. This often leads to poor compliance with management and increase risk of poor out-come.^{18,20} A recent review of the management of T1DM, revealed about 65% of families expenditure is on health.¹⁹ It is important to provide affordable hospital care for diabetic children in currently advocated by the International Diabetes Foundation.²¹ This will ensure adequate care for affected children and may thus improve the outcome of childhood DM in this part of the world.

References

- Eisenbarth GS Type 1 diabetes mellitus: a chronic autoimmune disease. *N Engl J Med* 1986; 314: 1360-8.
- Alemzadeh R, Wyatt DT. Diabetes mellitus in children. In: Behrman RE, Kleigman RM, Jenson HB (eds). *Nelson Textbook of Paediatrics*. 17th ed. Philadelphia: Saunders, 2003; 1947-2.
- Nishikawa T, Edelstein D, Brownlee M. The mission link; a single unifying mechanism for diabetes complications. *Kidney Int*. 2000; 77: S26-30.
- Soltész G. Diabetes in the young: a Paediatric and epidemiological perspective. *Diabetologica* 2003; 46(4): 447-7.
- Kishiyama CM, Chase HP, Barker JM. Prevention strategies for Type 1 diabetes. *Rev. Endocr Metab Disord* 2006; 7(3): 215-4.
- Adeghate E, Schattner P, Dunn E. An update on the etiology and epidemiology of Diabetes Mellitus. *Ann NY Acad Sci* 2006; 1084: 1-20.
- Anochie I, Nkangimeme KEO. Childhood diabetes in Port-Harcourt, Southern Nigeria. *Diabetes International* 2002; 12(1): 20-21.
- Fetuga MB, Ogunlesi TA, Adekanbi AF, Olanrewaju DM. Clinical presentation of childhood mellitus in Olabisi Onabanjo University Hospital, Sagamu. *Nig Hosp Pract* 2007; 1(3): 70-3.
- Report of the Expert Committee on Diagnosis and classification of Diabetes Mellitus. *Diabetes care*. 1999; 20(suppl): S5.
- Wellcome Trust Working Party. *Lancet* 1970; ii: 302.
- Oyedeji GA. Socio-economic and cultural background of hospitalized children in Ilesha. *Nig J Paediatr* 1985; 12: 111-7.
- Akanji A. O. Clinical experience with adolescent diabetes in a Nigerian Teaching Hospital. *J Natl Med Ass* 1996; 88: 101-5.
- Tubiana Rufi N. Diagnosis of diabetes mellitus in children. *Rev Prat* 1996; 46(5): 552-5.
- Valerio D. Acute diabetic abdomen in Childhood. *Lancet* 1976; 1: 66-68.
- Afoke AO, Ejeh NM, Nwone EN. Prevalence and clinical picture of IDDM in Nigerian Igbo school children. *Diabetes care*. 1992; 15: 1310-2.
- Assan R, Assan D, Thebaut MF. Diabetogenic tropical pancreatitis. *Diabetologia* 1998; 14(3): 299-12.
- Mongalgi MA, el Bez M, Chakroun D. Analytic study of cases of childhood diabetes in paediatric department in Tunis. *Ann Pediatric (Paris)* 1991; 38: 623-6.
- Yoon JW, Jun HS. Cellular and molecular pathogenic mechanism of insulin dependent diabetes mellitus. *Ann Sci* 2001; 928: 200-1.
- Elrayah H, Eltom M, Bedri A. Economic burden on families of childhood type 1 diabetes in urban Sudan. *Diabetes Res Clin Pract* 2005; 70(2): 159-5.
- Hanson CL, DeGure MJ, Schiskel AM. Empirical Validation for a family centered model of care. *Diabetes care* 1995; 18: 1347-6.
- International Diabetes Foundation. Available at the website [HYPERLINK http://www.idf.org](http://www.idf.org) assessed on 8th December, 2007.