

Occasional report *

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The presentation of newly-diagnosed diabetic patients in Uganda

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Summary

We assessed the clinical characteristics of newly-diagnosed diabetic patients presenting to the Mulago Hospital Diabetic Clinic for the first time between 1 January 1993 and 10 August 1994. There were 252 patients: 117 men and 135 women. Mean age at onset of diabetes was 45 years (range 2–87 years) and peak incidence was at 40–49 years. Body mass index (BMI) was available in only 71 patients, of whom 53.5% (33.8% female, 19.7% male) were overweight (BMI > 25 in women, in > 27 men) and 11.3% (8.5% men, 2.8% women) were underweight (BMI < 20). Obesity was more marked in young women. Almost all patients presented with the classical symptoms of diabetes, and the majority were

severely hyperglycaemic. A family history of diabetes was identified in 16%. Concurrent illnesses at diagnosis of diabetes were unusual. Sepsis was commonest (11.9%), followed by malaria (7.8%), tuberculosis (1.2%), AIDS (1.2%) and pancreatitis (0.8%). Peripheral neuropathy was present in 46.4% of patients, hypertension (BP > 150/100) in 27.3%, impotence in 22.2% of the men, proteinuria in 17.1%, ischaemic heart disease in 4.8%, foot ulcers in 4.0% and cataracts in 3.2%. Insulin was the most commonly prescribed treatment (52.8%); 31% of patients received oral hypoglycaemic agents, only 15.1% were managed on diet only, and 1.2% opted for herbal medicine.

Introduction

There has been very little written about diabetes mellitus in African people before 1960, when it was thought to be rare.^{1–3} More frequent reports of the disease in Africans have appeared since then, but most of the epidemiological studies were hospital-based and lacked uniformity in criteria of diagnosis, methodology and populations studied, making comparisons difficult.^{4–24}

The recent epidemiological study of diabetes in Tanzania²⁵ based on the 1985 WHO criteria²⁶

showed a prevalence of 0.9% (range 0.5–1.3%) of diabetes in these rural Africans. Urbanized Africans in South Africa showed a prevalence of 4.2%²⁷ which compares to similar rates in European countries.²⁸ This suggests that urbanized Africans adopt European lifestyles and hence are exposed to the same environmental risk factors for developing diabetes.

Most studies indicate that the majority of diabetic patients in Africa have non-insulin-dependent

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diabetes,^{29–35} but insulin dependency, previously thought uncommon,^{36–38} is seen with increasing frequency.^{29,39–44} The occurrence of malnutrition-related diabetes mellitus and its association with cassava consumption is debatable.^{31,44–52} We describe the clinical characteristics of newly-diagnosed diabetics presenting to the Mulago Hospital diabetic clinic in Uganda between 1 January 1993 and 10 August 1994.

Uganda

Uganda is an East African country with a recent population estimate of 17 million. The inhabitants are mainly indigenous Africans who are divided into diverse ethnic and tribal groups with differing languages, cultures and traditional backgrounds. Ninety percent of the people living and derive their incomes from rural areas, mainly through mixed farming. With the added advantage of a high-altitude tropical climate, the country is self-sufficient in food, so that malnutrition is usually a result of ignorance rather than lack of food.

Each ethnic group has its own staple starch containing food, although other foods like cassava, sweet potatoes and beans are grown and consumed countrywide. Alcoholic beverages including local brews are liberally consumed by the majority of Ugandans. Illicit spirits like 'Nguli' (a crude form of Ugandan Waragi) are widely consumed, especially among low-income groups.

The country is divided into 39 districts, with a district hospital in almost all of them, but because of poor services in the rural hospitals most patients travel long distances to attend Mulago Hospital which is the national referral and teaching hospital located in the capital city, Kampala.

Methods

Mulago Hospital diabetic clinic (MHDC) has been in existence since the early sixties. It is currently staffed by three physicians, two nurses and three members of the support staff. Most patients who attend the clinic are referred from Mulago Hospital wards after discharge, or from other out-patient clinics. Many patients are also referred from private clinics, mainly from Kampala, or from peripheral hospitals. Other patients are self-referrals from various parts of the country.

The clinic is held once a week, when between 200 and 400 patients turn up. Of these, 5–15 would be new to the clinic. All new patients are registered and seen by physicians, but only a selected number of the old patients get a chance to see physicians, because of the numbers. The rest are seen by support

staff who supply them with their free drugs. Since there is no paediatric diabetic clinic in Mulago Hospital or elsewhere in the country, all children with diabetes are also referred and seen at this clinic.

Urine glucose is tested routinely with dipsticks in all patients to determine the presence of diabetes in new cases and to assess the level of control in established cases. From 1 January 1993, glucose oxidase self-monitoring strips and reflectance meters were available to the clinic through a gift from the Metabolic Unit, Royal Victoria Hospital, Belfast, so that it was possible to determine random blood glucose, especially in new patients to confirm the diagnosis of diabetes.

Clinical data for each patient is filed and stored in a special records room at the clinic. A proforma record sheet (designed with the co-operation of the staff of the Metabolic Unit, Royal Victoria Hospital, Belfast) was introduced in January 1993 with the aim of recording systematically all clinical data from new patients who attended the clinic. The proforma record sheet was to record information on the patient's name, tribe, age at onset of diabetes, sex, family history of diabetes, complications related to diabetes at presentation, the presenting symptoms of diabetes, and residential address.

After one year and eight months, all files and proforma record sheets of patients who attended the clinic for the first time between 1 January 1993 and 10 August 1994 were retrieved from the records. A manual search for the data from proforma record sheets, supplemented by the patient's hospital records, if available, was made, and the Lotus 123 spreadsheet was used to contain the data (DM and RK undertook this work during a student elective period in Kampala).

Results

Records of 252 patients with diabetes mellitus who attended the clinic for the first time between these dates were reviewed: 117 (46.4%) were male and 135 (53.6%) were female, male:female ratio 1:1.2. The youngest was a female child aged 2 years, the oldest an 87-year-old man. Mean age of onset was 45 years, range 30–69 years. There was no difference in age distribution between males and females. Ninety-eight patients (60 female, 30 male) were aged 40 years or less, compared to 154 (75 female, 79 male) who were more than 40 years old. Only 10 patients (2 female, 8 male) were aged 70 years and over.

Only 71 patients had records of both weight and height at onset of diabetes. Obesity (BMI >25 kg/m² for females or >27 kg/m² for males) was present in 38 of these (24 (33.8%) female, 14 (19.7%) male).

Female patients were generally fatter than men, (BMI > 30 kg/m² in 12 (16.9%) women compared to eight (11.3%) men), but males were more often underweight (BMI < 20 kg/m²) in six men (8.5%) and two women (2.8%).

The majority (143, 56.7%) of patients were residents of Kampala city and its suburbs; 109 (43.1%) came from rural areas in various parts of the country, although some were from smaller towns around the country. The urban:rural ratio was 1.3:1, but some of the patients work in the city and live in the countryside.

A family history of diabetes was present in 41 (16.3%) patients, but not all knew about the health problems of their relatives. Five women reported having given birth to large babies (birth weight > 3.5 kg), two (1.5%) had had spontaneous abortions and one (0.4%) had experienced polyhydramnios during her previous pregnancy. One patient had a history of transient diabetes during a past pregnancy.

Presenting symptoms

Symptoms at onset of diabetes are shown in Table 1 in descending order of frequency. The majority of patients presented with classical symptoms of diabetes, polyuria (94.0%), polydipsia (93.3%), weight loss (56.3%) and polyphagia (42.5%). Other fairly common symptoms included perineal itching (in both men and women) (27.8%), poor vision (27.8%) and weakness (23.0%). Other symptoms were less frequent, and in particular, ketosis/coma occurred in only three (1.2%) patients.

Table 1 Presenting symptoms at onset of diabetes, Mulago Hospital, Kampala

Symptom	<i>n</i>	Frequency
Polyuria	237	94.0%
Polydipsia	235	93.3%
Weight loss	142	56.3%
Polyphagia	107	42.5%
Perineal itching	70	27.8%
Poor vision	70	27.8%
Weakness	58	23.0%
Obesity	49	19.4%
Headache	36	14.3%
Abdominal pains	32	12.7%
Leg pains	29	11.5%
Anorexia	28	11.1%
Body aches	26	10.3%
Dizziness	21	8.3%
Fever	20	7.9%
Sweating	19	7.5%
Ketosis/coma	3	1.2%

Concurrent illness at onset

Table 2 shows the frequency of concurrent illnesses diagnosed in diabetic patients at presentation of diabetes. Sepsis was by far the commonest complicating illness, occurring in 30 (11.9%) patients: 14 of these had pneumonia, 11 urinary tract infection, two pyogenic dermatitis, and there were single cases of salpingitis, otitis media and dental sepsis. Malaria was diagnosed in 20 patients (7.9%) at presentation, chronic cough (duration > 1 month) was present in seven (2.8%) and three (1.2%) were already on treatment for tuberculosis. Three (1.2%) patients had symptoms and signs suggestive of acquired immune deficiency syndrome (AIDS), but viral serology was not done to confirm the diagnosis. Two patients (0.8%) had a previous history of pancreatitis and one (0.4%) was asthmatic.

Complications of diabetes mellitus at presentation

Peripheral neuropathy was the commonest complication observed at presentation (Table 3). This was present in 117 patients (46.4%) (50 men, 66 women). With the exception of those below 10 years of age, neuropathy, particularly peripheral paraesthesia and numbness, was present in all age groups, although with a higher frequency in those > 30 years of age. Twenty-six men presented with impotence, 23 (88.5%) of whom had neuropathy as well.

Sixty-nine (27.3%) patients were found to have hypertension (BP > 150/100 mmHg) at presentation.

Table 2 Concurrent illnesses at onset of diabetes

Illness	<i>n</i>	Frequency
Sepsis/infection	30	11.9%
Malaria	20	7.9%
Chronic cough	7	2.8%
Tuberculosis	3	1.2%
AIDS	3	1.2%
Pancreatitis	2	0.8%
Bronchial asthma	1	0.4%

Table 3 Complications of diabetes at presentation

Complications	<i>n</i>	Frequency (%)
Neuropathy	117	46.4
Hypertension	69	27.3
Impotence (men only)	26	22.2% (of men)
Proteinuria	12	4.8
Ischaemic heart disease	12	4.8
Foot pathology	10	4.0
Cataract	8	3.2

Of these, 43 (62.3%) were women and 26 (37.7%) men. The average age for hypertensive women was 50.5 years (range 40–49 years) and for men 56 years (range 50–59 years). Hypertension was present in six (60%) of those aged >70 years, and none was recorded in those <30 years.

Proteinuria was detected in 12 (17.1%) of the 70 patients in whom it was tested. Hypertension was concomitantly present in only four (33.3%) of them. There was no correlation between the presence of proteinuria and degree of hyperglycaemia. A history suggestive of ischaemic heart disease was present in 12 (4.8%) patients, and six of these had both hypertension and ischaemic heart disease.

Foot lesions, mainly ulcers, were present in 10 patients (4.0%) (6 men, 4 women). Peripheral neuropathy was concomitantly present in six of these. Cataracts were observed in eight (3.2%) patients. Retinopathy was not looked for, due to technical problems with both supply and function of the ophthalmoscope, and the absence of a suitable dark room at the clinic.

Initial treatment

Following initial assessment of 252 diabetic patients, 133 (52.8%) were started on insulin, 79 (31%) received oral hypoglycaemic agents, 38 (15.1%) were maintained on diet only and 3 (1.2%) opted for herbal medicines. Table 4 shows the correlation between type of treatment and age of onset of diabetes. Of the 98 patients with onset below 40 years of age, 58 (59.2%) received insulin and of the 154 patients with onset over 40 years of age, 75 (48.7%) received insulin. Age of onset alone did not determine the type of initial treatment for diabetes.

Discussion

The occurrence of diabetes mellitus in Uganda was first mentioned in 1901 when it was reported to be 'rather uncommon and very fatal'.¹ With no proper epidemiological studies on diabetes in Uganda, the

prevalence of diabetes is still not known, but hospital-based data over the years seem to suggest an increasing occurrence of the disease. Shaper in 1957 observed that 155 diabetic patients were admitted to Mulago Hospital over a period of 6 years, a rate of two patients per month.³⁵ In 1964, Tulloch noted a 5% average incidence of glycosuria in four hospitals¹⁰ while Patel and Lwanga observed an increase in the percentage of medical admissions due to diabetes at Mulago Hospital from 2.5% in 1958 to 5.0% in 1966–68.⁵³ In a recent study in rural hospitals, an average of 11 new patients were seen each month at each of the 17 hospitals surveyed.⁵⁴ A similar rate has been demonstrated in the present study, where 252 newly diagnosed patients were registered over a period of 20 months, an average of 13 patients per month. There are many factors which may account for the increasing occurrence of diabetes in Uganda, but in general the trend is in keeping with the worldwide epidemic of diabetes.²⁸

Most studies in Africans have indicated a male preponderance,^{29,31,35} but in the present study women outnumbered men. The sex ratio of patients studied may depend on the sex ratio in the general population, and also on which sex more easily can attend the clinic.^{56,69} Studies in the USA, however, have shown a higher frequency of diabetes in black women.⁶¹ In the UK Prospective Diabetes Study there was a male preponderance of non-insulin-dependent patients aged 25–65 years.⁶⁶

The majority of patients developed diabetes at a younger age than that observed in developed countries, where most patients present in the sixth decade or after.^{59,62} Other African countries have also recorded a young age of onset of diabetes,^{56–60} in contrast to the higher prevalence in older age groups in populations with a higher life expectancy.⁶³

Among the risk factors for diabetes, obesity ranked highest, with 53.5% of patients above ideal body weight. Women were generally more obese than men, as has been observed in other African countries^{23,40,60,64} and Europe.⁶² In Uganda, obesity is regarded as a sign of beauty for women and a sign of wealth and well-being in the general population. These beliefs together with the abundance of food in both rural and urban areas as a result of favourable agricultural conditions, may account for the higher rate of obesity observed in Ugandan patients compared to those seen in Dar es Salaam.³¹ Some 11.3% of patients were underweight. Most of these were young men (8.5% men, 2.2% women) with a history of recent weight loss, suggesting metabolic derangement as a cause rather than a consequence of underweight. AIDS as a cause of wasting was suspected in only three (1.2%) of these patients.

There were slightly more patients from the urban area who attended the clinic (56.7% urban, 43.1%

Table 4 Initial treatment of diabetes related to age at onset

Treatment	Age at onset ≤40 years		Age at onset >40 years	
	<i>n</i>	%	<i>n</i>	%
Insulin	58	59.2	75	48.7
Oral agent	33	33.7	45	29.2
Diet	6	6.1	32	20.8
Herbs	1	1.0	2	1.3

rural) but there were no differences observed in sex, age, body weight or mode of presentation in the two groups. This difference may be a result of awareness and easy accessibility for the urban patients rather than increased risk.⁵⁵

A family history of diabetes was present in only 16.3% of patients. Similar low rates were observed in other African studies^{29,65} compared to high rates seen in European patients.⁶⁶ This difference might be due to major underestimation of positive family histories of diabetes in African patients, who are usually not aware of the types of diseases affecting people and causes of their death. Other risk factors were confined to women, and included a history of large babies at birth, spontaneous abortions, polyhydramnios and gestational diabetes, but these were all very infrequent.

Most patients presented with classical symptoms of diabetes as has been the case in other African studies.^{29,31,56,57} Sepsis, especially pneumonia and urinary tract infection, was the most frequent complicating illness, in conformity with the situation in general hospital patients, where sepsis, especially pneumonia, has been found to be the most common illness which makes people in the general population in Africa seek medical attention.⁶⁷⁻⁷³ There was no female predilection in sepsis as was observed in Gambia.⁶⁴

Malaria was less frequent, occurring in 7.9% of patients, while tuberculosis (1.2%) and AIDS (1.2%) were rare despite the epidemic of these two diseases in this country. In Zambia it was also observed that only 0.3% of the 600 patients studied had AIDS and 2.7% had tuberculosis.³³ Tuberculosis was, however, the main complicating illness at presentation of diabetes in Ethiopians.³⁹ These observations are useful in relation to speculation in Uganda that the AIDS epidemic was responsible for the increasing incidence of diabetes. The HIV virus may cause pancreatitis and hence diabetes, but pancreatitis was clinically diagnosed in only two patients, indicating the rarity of this condition in newly-diagnosed diabetic patients. Moreover, these two patients were over 40 years of age which is above the predominant age of AIDS patients in Uganda.⁸³

Patients presented with the usual complications of diabetes. Neuropathy was the commonest, as has also been observed in reports from other African countries^{56,74,75} as well as Europe.⁶² Peripheral neuropathy was present in 88.5% of men with impotence, suggesting an almost direct relationship. This might be useful for suspecting impotence in those who may be unwilling to talk about it.

Hypertension was more common in young women at diagnosis of diabetes as has also been observed in the UK Prospective Diabetes Study.⁷⁶ Since hypertension is also known to be more prevalent in those

with non-insulin-dependent diabetes,⁷⁷⁻⁷⁹ we recommend that all young women with hypertension be screened for diabetes early to reduce the risks of complications. Ischaemic heart disease was rare, as is the case in African diabetics elsewhere.^{56,74} Foot ulceration was also rare, despite the high frequency of neuropathy and sepsis and the fact that some people, especially those from rural areas, do not wear shoes all the time. Foot ulcers are also rare in diabetics from other African countries, and probably related to the low prevalence of peripheral vascular disease.^{32,40,56,74}

A survey of the literature shows that most diabetic patients in Africa are treated with insulin^{56,81} despite the fact that most of them have non-insulin-dependent diabetes.²⁹⁻³⁵ In our study, 52% of patients were started on insulin at presentation, mainly to relieve symptoms and to avoid coma in those who were severely hyperglycaemic. This was regardless of other presenting features, and it is likely that many of them did not require insulin subsequently.

Treatment by diet only was prescribed in 15% of the patients. Such therapy is difficult to administer in the Ugandan environment where all sick people expect to carry away medicines when they visit a health facility and in a community where food restriction is shunned in a bid to stay fat for social reasons. On the other hand, herbal medicines are usually tried in all ailments, especially in the elderly, so that medical advice is only sought if failure is discerned. In Nigeria, herbal medicines were found to relieve symptoms but without improvement in the blood glucose.⁸² Three patients in our study were happy enough to continue with herbs.

Overall the presenting features of diabetes in Uganda are similar to patterns in the western world; there is a higher incidence of neuropathy at presentation, and a lower incidence of ischaemic heart disease. The disease is becoming commoner.

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