Glycaemic Control amongst Persons with Diabetes Mellitus in Benin City

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SUMMARY

Objective: This study set out to find the level of glycaemic control amongst persons with diabetes mellitus in Benin City.

Methods: Forty two persons with diabetes had their glycaemic control assessed by measuring the level of their glycated haemoglobin. Other data collected included age, sex, duration of diabetes, type of diabetes, weight, height, body mass index and waist hip ratio.

Results: There were twenty four males and eighteen females in the study population. Thirty one subjects had type 2 diabetes, while eleven had type 1 diabetes. Nineteen subjects(46%), had poor glycaemic control (HbAic > 7%) while twenty three (54%) had good control (HbAic £ 7%). Thirteen males (54%) had good control while ten females (53%) had good control and this was not statistically significant (p>0.05). Eighteen of the thirty-one type 2 DM subjects (58%) had good glycaemic control, while five persons out of eleven with type 1 DM (45%) had good glycaemic control and this was not statistically significant (p>0.05).

Conclusion: This study has shown that poor glycaemic control is common amongst persons with diabetes mellitus in Benin City. Studies have shown that good glycaemic control prevents and delays the complications of diabetes mellitus. We therefore recommend that health education on the benefits of good glycaemic control should be given in diabetes clinics, and efforts intensified to achieve target glycated haemoglobin levels to prevent diabetes complications.

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INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disorder primarily characterized by elevated blood glucose level, macrovascular and microvascular complications that substantially increase the morbidity and mortality associated with the disease and reduce the quality of life of the affected individual[1]. Poor glycaemic control causes the accumulation of sorbitol and advanced glycaemic end products which are responsible for causing the chronic complications of DM[2]. Studies done in Type 1 and 2 DM subjects have shown unequivocally that tight control of the blood glucose prevents or delays the progression of diabetic complications[3,4], Tight glycaemic control is now the cornerstone of management of persons with DM.

This study set out to find the degree of glycaemic control amongst persons attending the Diabetes Clinic of the University of Benin Teaching Hospital in Benin City, Nigeria.

METHODS

This was a cross sectional, descriptive study. Forty-two DM subjects (diagnosed using the 1999 WHO criteria)[5] who consented were recruited from the Diabetes clinic of the University of Benin Teaching Hospital, Benin City, a tertiary health facility that caters for patients from Edo, Delta, Ondo and neighbouring states in Nigeria. This study was carried out between June and December 2004. Data obtained from the subjects included age, sex, type and duration of DM, body mass index and waist hip ratio.

Weight measured in kilogrammes and height in metres was obtained using the weighing scale and stadiometer. The body mass index was calculated using the formula below[6].

$$\text{Body Mass Index} = \frac{\text{Weight (in kg)}}{\text{Height}^2 \text{ (in m)}}$$

The waist circumference was measured at the mid point between the ribcage and iliac crest, while hip circumference was taken as the maximal circumference around the buttocks[7]. Glycaemic control was assessed using glycated haemoglobin which was assayed using the chromatography method[8]. Poor glycaemic control was defined as a HbA^{-}_{Ic} level of ³ 7%, and good glycaemic control defined as HbA_{Ic} level < 7%.

Data analysis was done using SPSS version 10 (2000). Comparison of means was done using the student t-test. The level of statistical significance was taken as p £ 0.05. These are shown in table 2 and 3.

RESULTS

The clinical characteristics of the study subjects are shown in Table 1. There were twenty four males, and eighteen females. Thirty one subjects had type 2 DM, while eleven were type 1

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DM persons. The mean age (±SD) of the study subjects was 48.7 ± 9.4 years, while the mean Body Mass Index was 26.2 ± 3.7 kg/m^2 with mean glycated haemoglobin of 7.4±1.3%.

Twenty three (54%) of the subjects had good glycaemic control, while nineteen (46%) had poor control. Thirteen males (54%) had good glycaemic control, while eleven (45%) had poor glycaemic control. Ten females (55%) had good glycaemic control, while 8 (44%) had poor glycaemic control. Eighteen of the thirty one DM subjects (58%) who had type 2 DM, had good glycaemic control, while five (45.4%) type 1 DM had good glycaemic control and this was not statistically significant (p>0.05).

Table 1: Clinical Characteristics of study subjects (n = 42)

Parameter	mean ± SD
Age	48.7±9.4 years
BMI	26.2±3.7 kg/m^2
WC	85.4±13.4 cm
Duration of DM	5.7±2.3 years
HbA_{Ic}	7.4±1.3%

BMI = body mass index, WC = waist circumference, DM = Diabetes Mellitus

Table 2: Glyceamic control according to gender

	Good control HbA_{1c} <7%	Poor Control HbA_{1c} ≥7%	Total
Males	13	11	24
Females	10	8	18
Total	23	19	42

Table 3: Glyceamic control according to type of DM

	Good control HbA_{1c} <7%	Poor Control HbA_{1c} ≥7%	Total
Type 1 DM	5	6	11
Types 2 DM	18	13	31
Total	23	19	42

DISCUSSION

Many studies done have shown the importance of tight blood glucose control in preventing or delaying the progression of complications in DM persons[3,4]. In the much celebrated Diabetes Control and Complications Trial (DCCT) and the similarly designed, but smaller Stockholm Diabetes Intervention Study done in type 1 DM persons, it was shown unequivocally that lowering blood glucose delayed the onset and slowed the progression of complications[3,9]. In the DCCT study, the incidence or progression of retinopathy was reduced by 54-76% and the need for photocoagulation was reduced by 56%; the incidence of clinical albuminuria reduced by 54% and clinical neuropathy by 69%. There was also a continuous reduction in complications as glycaemic levels approached the normal range. In the United Kingdom Prospective Diabetes Study (UKPDS) done in type 2 DM persons it was similarly shown that retinopathy, nephropathy and neuropathy were benefited by lowering the blood glucose levels with intensive therapy in which a mean HbA_{Ic} of 7.0% was achieved[4]. It was also shown that for every percentage point decrease in $HbA_{Ic,}$ there was a 25% reduction in diabetes related deaths, a 7%, reduction in all cause mortality and an 18% reduction in combined fatal and non fatal myocardial infarction[10,11,12]. The guidelines for management of DM recommend intensive control of blood glucose reaching target HbA_{IC} as close to physiological level as possible, preferably less than 7%, since this was associated with reduced morbidity and mortality[13]. However, despite all the wealth of evidence available as to the benefit of good glycaemic control in preventing diabetic complication, studies has shown that good glycaemic control is not achieved in many subjects[14,15,16,17]

In this study, poor glycaemic control was seen in as many as 46% of the subjects. Probable reasons for poor control may include poor health seeking behaviour of our people, low level of literacy, poverty, poor compliance and adherence with follow up visits and medications amongst others. Many people in our society also make use of alternative medicines like roots and herbs in treating their ailments. In a similar study by Qari, done in Saudi persons with diabetes, poor glycaemic control was seen in 42% of the subjects[14]. In other studies done in other countries, poor glycaemic control was also seen in most of the subjects[15,16,17]. In a study done in Nairobi, Kenya Otieno et al noted that majority of the persons with diabetes had poor glycaemic control and this was presumed to be due to suboptimal medication and deteriorating diabetes[18].

In a study done in Calabar, Nigeria 63% of the subjects had poor glycaemic control,[19]. Factors identified for the poor glycaemic control in that study included poverty, illiteracy and poor compliance and adherence with medications. Coker and Fasanmade documentedd poor glycaemic control in their study amongst persons with diabetes in Lagos, Nigeria. In their study the mean HbA_{1c} level was 10.5%. They concluded also that both physician and patients dependent factors were responsible for this poor outcome[20]. Adebisi et al in Ilorin, Nigeria also documented this poor glycaemic control in 500 persons with diabetes and the mean HbA_{1c} level was 8.0%[21]. All these studies show that poor glycaemic control is common in Nigerian persons with diabetes.

The low rates of good glycaemic control in this study calls for more urgent attention. With the overwhelming evidence that good glycaemic controls prevents or delays diabetic complications, efforts must be intensified by medical personnel looking after persons with DM to educate them on the benefits of adhering strictly to medical nutrition therapy, and medications to prevent these complications. Good glycaemic control must however be achieved without causing hypoglycaemia as a recent study has shown that the occurrence of severe hypoglycaemia is associated with increased mortality amongst patients with type 2 diabetes and other cardiovascular risk factors.[22] The limitation of this study is the low number of patients used in this study. In a resource poor country like ours, where the average cost of a test for glycated haemoglobin is about ₦5,000 ($50), most patients still use blood glucose for glycaemic control and cannot afford a glycated haemoglobin test hence the low number of patients. We recommend that subsidies for diabetes care

should be provided by the Government and the cost of a glycated haemoglobin test subsidized. Furthermore, the test should also be included in the National Health Insurance Scheme (NHIS).

CONCLUSION

Our study showed that many of the persons with diabetes mellitus in Benin city still have poor glycaemic control similar to previous reports. We recommend that health education should be given to patients about compliance with treatment and that adequate and optimal glycaemic control within the targeted HbA_{Ic} should be the aim of all interventions in persons with DM.

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