

ORIGINAL ARTICLE

ASSESSMENT OF THE DISTRIBUTION OF RISK FACTORS FOR CHRONIC COMPLICATIONS OF DIABETES AMONG PATIENTS ATTENDING JIMMA HOSPITAL DIABETIC CLINIC

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ABSTRACT

BACKGROUND: *Diabetes mellitus is the commonest of all metabolic diseases all over the world including developing countries. In Ethiopia it is being recognized as one of important health problems. Hospital-based studies from Addis Ababa, Gondar and Dire Dawa have reported prevalence rates up to 4.3 % which is the same as reports from other African countries. The study conducted at Gondar College of Medical Sciences indicated 32% deaths of Type 1 diabetic patients under follow up due to different causes one of which was renal complication. Studies show that diabetes is associated with chronic complications like neuropathy, nephropathy, retinopathy and cardiovascular diseases. The association of diabetes with other risk factors like cigarette smoking, hypertension, hypercholesterolemia and obesity increases the chance of developing diabetic complications and consequent mortality.*

The aim of the study was to assess the prevalence of the risk factors for chronic complications of diabetes among diabetic patients attending Jimma Hospital diabetic clinic.

METHODS: *At cross-sectional study of 328 diabetic patients attending at Jimma Hospital Diabetic Clinical was conducted from October 2002-September 2003.*

Demographic data and clinical data was collected by direct patient interview. Fasting blood serum glucose and total cholesterol levels were determined by enzymatic methods. The data was analyzed using SPSS 11.0 for windows.

RESULTS: *Among the 500 registered diabetic patient, 328 participated in the study. The mean age was 45 ± 16 . Farmers accounting for 27.4% were the single most affected category but 44.5% were distributed over a variety of miscellaneous occupations. The 50.5% of patients were from Jimma town while 37.5% were from the rural areas around Jimma and the remaining coming from other zones and regions of the country. The proportion of Type 1 and Type 2 patients was 48.8% and 49.1% respectively. The mean systolic blood pressure, diastolic blood pressure, body mass index, fasting blood glucose, and cholesterol were 132 ± 23.6 , 83 ± 15.9 , 22.5 ± 4.8 , 228.2 ± 114.8 , 176.4 ± 56.6 respectively. The cholesterol level was elevated in 27.7%. Among all patients, 54.9% had poorly controlled blood glucose of ≥ 200 mg/dl, 30.2% are hypertensive, 27.1% are either obese*

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or overweight. The rate of smoking among all diabetics is 2.4%. The rate of hypertension, obesity and elevated total cholesterol in Type1 was 32.5, 11.3, 20.6% respectively as compared to 41.6, 44.1, 35.4 % respectively in Type2 patients.

CONCLUSION –Hyperglycemia, hypertension, obesity and hypercholesterolemia are common risk factors for chronic complications in our patients while smoking does not appear to be as common as in other reports. The prevalence of hypertension, obesity and hypercholesterolemia was higher in Type2 compared to Type1.

KEY WORDS: Hyperglycemia, hypercholesterolemia, hypertension, obesity, diabetes.

INTRODUCTION

Diabetes mellitus is the commonest of all metabolic diseases all over the world (1) including developing countries (2). At present it is estimated that about 150 million people are affected by diabetes worldwide. It has been reported that in some African countries the prevalence ranges vary from 1-10%. In Ethiopia diabetes is being recognized as one of important health problems. In a community based study overall prevalence 0.34% has been reported. Hospital-based studies from Addis Ababa, Gondar and Dire Dawa reported prevalence rates 1.9-4.3 % which is the same as reports from other African countries (3). According to the report of the study conducted at Gondar College of Medical Sciences diabetic clinic, diabetes contributed to 32% deaths among Type 1 diabetics with Known causes of death under follow up during the five years of observation. Of all chronic complications of diabetes renal failure has been identified as a cause of death in 6.8% of the total deaths in Type 1 (4). The report from Menelik II Hospital diabetic follow up clinic indicated 23.3% of diabetics developing renal complications, 28.5% of Type 2 and 35.7% of Type 1 having retinopathy (5).

Diabetes mellitus is associated with chronic complications like neuropathy, nephropathy, retinopathy and cardiovascular diseases. The cardiovascular complications are a major

cause of morbidity and mortality in patients with diabetes (6). Atherosclerosis manifesting in the form of macrovascular complications such as ischemic heart disease, myocardial infarction, stroke, and peripheral arterial disease is an important cause of morbidity and mortality in diabetic patients (7). Though hyperglycemia is the most important risk factor for developing such diabetic complications(8), high levels of cholesterol is a major risk factor for developing atherosclerosis and myocardial infarction(9). The association of diabetes with other risk factors like cigarette smoking, hypertension, obesity and hypercholesterolemia multiplies the chance of developing diabetic complications and consequent mortality(10). This association of risk factors with diabetes makes the need for an intensive therapeutic intervention in primary and secondary prevention(11). The early detection and management of the risk factors was proven to delay future occurrence of diabetic complications. Therefore, screening of diabetic people for risk factors of diabetic complications is recommended in order to plan management to prevent or delay the complications as soon as diagnosis of diabetes is made (9). Besides providing baseline prevalence of risk factors for chronic complications hitherto unavailable for our patients in Jimma, the result of the study will help resolve issues surrounding the introduction of lipid-lowering agents as an important component of the clinical management of patients.

PATIENTS AND METHODS

This cross sectional study was conducted at Jimma Teaching and Referral Hospital which is situated about 346 kilometers South West of Addis Ababa. There were about 500 registered diabetic patients at this diabetic clinic. All diabetic patients regularly attending at Jimma Hospital Diabetic Clinic were considered in the study. Of these 328 patients participated. Patients were told to fast overnight before coming to the hospital for the next appointment. Diabetic patients with psychiatric problem, severe infection and on salicylate therapy were excluded.

Data Collection Demographic data including address, age, sex, ethnic group, religion, literacy status, occupation, history of cigarette smoking was collected by nurses by direct patients interview, systolic blood pressure(systolic BP) and diastolic blood pressure(diastolic BP) was measured by physician and nurses using mercury sphygmomanometer (sphygmomanometer, Tokyo) at the left arm in a seating position every Wednesday before noon. Height was measured using height scale, weight was measured using zero calibrated weight scale(Health O meter, U.S.A.), body mass index(BMI) was calculated using the standard formula. Patient record reviewed was done by the nurse working in diabetic clinic to identify the type of diabetes. Interview, review and measurement results were recorded onto structured format prepared for this study. Fasting blood was collected by nurse and the serum separated and used for a nalysis of glucose and total cholesterol. The serum glucose and serum total cholesterol levels were determined by trained laboratory technician using enzymatic methods (Fluitest GLU and Fluitest CHOL, Germany) and LP 800 spectrophotometer. Standard absorbance was taken for each batch of samples simultaneously analyzed. The data was

entered into SPSS 11.0 for windows. The data was cleared for possible errors.

Data Analysis:- SPSS 11.0 for windows was used to analyze the data. Mean age, BMI, systolic and diastolic BP, serum cholesterol and serum glucose values were calculated. The frequency distribution of risk factors was calculated in all diabetics and Type 1 and Type 2 category when ever necessary. The prevalence of multiple risk factors was also calculated.

Ethical Considerations:- Before conducting the study ethical clearance was obtained from Jimma University. An informed written consent of each study subject was obtained after explaining the purpose of the study. The volunteer subjects were included in the study. The results of glucose analysis was communicated to the diabetic clinic for possible follow up of the blood glucose control.

RESULTS

In this study 328 diabetic patients participated out of which 222(67.7%) were males and 105(32.0%) were females (M:F ratio of 2:1), the data for one patient was missing. The mean age was 45 ±16, ranging between 11 and 84 years. The majority of patients were from Oromo and Amhara ethnicity proportions being 48 % and 25% respectively. Farmers accounting for 27.4% were the single most affected category followed by civil servants, house wives, traders retired groups, small private business and students constituting 16.8%, 13.1%, 7.9, 4.5%, 4.0%, 3.7%, respectively, whereas the other 22.5% were distributed over a variety of miscellaneous occupations. Of all patients 36.9% were illiterates while only 9% were educated up to tertiary level. The majority of patients 50.5% were from the same town while 37.5% are from the rural areas around

Jimma and the remaining coming from other zones and regions of the country.

Type 1 patient proportion was 160(48.8%) while that of Type 2 was 161(49.1%), the classification based on WHO criteria (7) with missing value of 2.1%. The mean age, systolic blood pressure(systolic BP), diastolic blood pressure(diastolic BP), Body mass index ,fasting blood glucose(FBS), and total cholesterol was 44.79 ± 16.40 , 132.1 ± 22.8 , 83 ± 15.9 , 22.5 ± 4.8 , 228.2 ± 114.8 , 176.4 ± 56.6 respectively

Among all patients 251(76.5%) had FBS>126 mg/dl, 180 (54.9%) have FBS \geq 200mg/dl, 119(36.3%) were hypertensive(>140/90mmHg) out of which 32.5%(52/160) were Type1 and 41.6%(67/161) were Type2, 89 (27.1%) were either obese or overweight out of which 11.3%(18/160) were Type1, 44.1%(71/161) were Type2. Fifty four percent (48/89) and 86.5%(77/89) of either overweight or obese patients were found to have FBS>200mg/dl and FBS>126mg/dl

respectively and 60.75% (54/89) of them were hypertensive. The rate of smoking among all diabetics was 2.4%.

The rate of hypercholesterolemia (total cholesterol >200mg/dl) in our patients was 27.7%(91/328) of which 10.7%(35/328) and 5.5%(18/328) had values>240mg/dl and >260mg/dl respectively. Out of these 16.1%(53/328) were males while 11.6%(38/328) were females, 20.6%(33/160) Type 1, 35.4%(57/161) Type 2. Out of those with hypercholesterolemia 81.3%(74/91) and 59.3%(54/91) were found to have blood glucose levels of >126mg/dl and >200mg/dl respectively, 38.5%(35/91) hypertensive, 50.5%(46/91) either overweight or obese, 3.3%(3/91) were underweight, 2.2%(2/91) were smokers.

In our series 27.1%(89), 18%(59), and 4.9%(16) were found to have two, three and four risk factors for atherosclerosis (macro vascular complications) respectively.

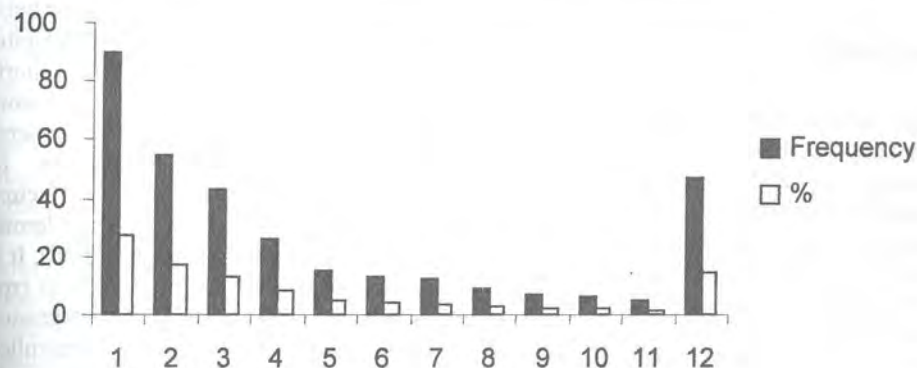


Figure 1. Frequency distribution of occupation in diabetic patients attending Jimma Hospital Diabetic Clinic October 2002-September 2003

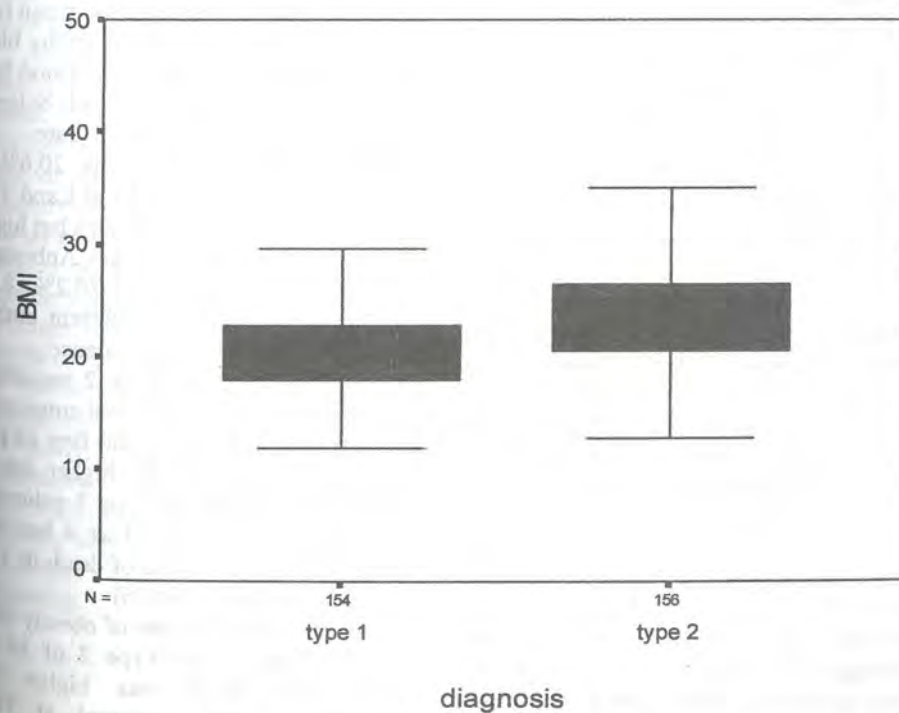


Figure 2. Distribution of Body Mass Index with the type of diagnosis in diabetic patients attending Jimma Hospital Diabetic Clinic October 2002-September 2003

DISCUSSION

Many studies have shown the evil association diabetes with hypertension, smoking habit, obesity, and hypercholesterolemia (1, 11-23). Diabetic patients with better glycemic control, lower blood pressure and better lipid profile are at lower risk of both macrovascular and microvascular complications (24). Though the individuals risk of developing diabetic complications vary due to variations in genetic factors (7), patients with diabetes mellitus are at increased risk of developing atherosclerotic disease and death from all vascular causes (25). In our diabetic patients we attempted to assess the distribution of risk factors for macrovascular and microvascular complications such as poorly controlled blood glucose, hypertension, total cholesterol level, Obesity, and smoking.

The mean serum glucose level of 228.2 ± 114.7 in our subjects was relatively higher compared to reports from Tikur Anbessa 195.5 ± 79.9 (31). Such dramatic elevation in patient under treatment and follow-up was unexpected. Dietary noncompliance, poor transportation and storage of insulin by patients, poor injection technique, suboptimal dosing or failure to comply treatment could be some of the reasons behind poor control. The extreme poverty under which many of our patients live may increase the temptation by some to transacting their freely given but precious insulin for money, an evil but reasonable hypothesis supported by personal observation. Such are the challenges of treating patients with chronic illness in our part of the country.

The overall prevalence of hypertension of 36.3% among all diabetics was comparable to other reports that demonstrated that hypertension is a common occurrence in diabetic patients

(25). The rate of hypertension in diabetic patients at Tikur Anbessa teaching hospital was 24% (26). Similar to other reports Hypertension appeared to be more prevalent in type 2 than Type 1 patients (27). The simultaneous presence of hypertension with other risk factors increases the risk of an atherosclerotic event in multiplicative fashion (28-30). It is a well known fact that particularly in type 2 patients, a poorly controlled hypertension is more fatal than even poorly controlled blood glucose and hence a priority area of intervention by the clinicians (25).

The mean cholesterol level of 176.4 ± 56.6 was higher than that of 166.5 ± 45.4 reported from patients attending at the Endocrinology and Metabolism unit at the Tikur Anbessa teaching hospital (31). This value was also higher than the mean total cholesterol level reported for healthy blood donors by a study conducted at blood bank of Gondar College of Medical Sciences Hospital (32). The rate of hypercholesterolemia of 27.7%, 20.6% and 35.4% in all our diabetics, Type 1, and Type 2 respectively was in accordance but higher rate than that reported at Tikur Anbessa in corresponding categories as 20.2%, 8.6% and 30.2% respectively. Different authors reported the prevalence of hypercholesterolemia in Type 2 patients to range from 30-70% which was comparable to our finding (33-35). In the face of poor blood glucose control the higher rate of hypercholesterolemia in Type 2 patients is a problem to be addressed as it has been shown to increase the risk of death in Type 2 diabetics by four folds (36).

In our series the rate of obesity in all diabetics, Type 1 and Type 2 of 36.3%, 11.3%, and 44.1% was higher rate compared to that reported at Tikur Anbessa in corresponding categories as 22.8%, 7.1% and 36.4% respectively (27). In consistent with Scandinavian reports (37-38) but contrary to reports Tikur Anbessa

in corresponding categories (31) the rate of hypercholesterolemia does seem to be correlated with obesity since the rate of obesity in hypercholesterolemics was 50.5%. In consistent with reports from Tikur Anbessa in corresponding categories (31) the rate of obesity was higher in Type 2 than Type 1 diabetics.

The 2.4% rate of smoking in our series was lower than similar reports from Tikur Anbessa Hospital of 6.6%. The rate of smoking was similar in Type 1 and Type 2 patients.

In our series the poor glycemic control, hypertension, obesity and hypercholesterolemia were common problems while smoking does not appear as prevalent as other reports.

An appropriate pharmacologic and non-pharmacologic approaches should be implemented in order to decrease morbidity and mortality due to uncontrolled hypertension in diabetic patients. In addition, the diabetic clinic should consider closer follow up of patients for tight control of the blood glucose levels, and weight reduction for obese patients. The multiple issues of poor glycemic control should be addressed not only through regular health education at every visit in all aspect of promoting self care but also economic empowerment enabling patients to buy their insulin or other drugs, an issue of wholistic economic development.

Finally, we recommend further study on cholesterol fraction before considering lipid lowering agents. It would be interesting also to look into the level of triglycerides to get the better picture of lipid profile.

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