PREVALENCE OF DIABETES MELLITUS AMONG HIV POSITIVE PATIENTS ATTENDING GENERAL HOSPITAL MUBI, ADAMAWA STATE.

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ABSTRACT: A study was conducted in June 2010, among HIV positive patients attending General Hospital Mubi with the purpose of assessing the prevalence of diabetes mellitus among the patients. Two hundred (200) samples of HIV positive patients aged 1-65 years were enrolled for the study. Glycemae C strips were used and the manufacturer's procedures were strictly adhered to. Out of the 200 samples tested for diabetes, 28(14%) were found to diabetic, 32(16%) were found to be pre-diabetic and 140(70%) were found to be non diabetic. Out of 28 found diabetic, 9(12.8%) were males and 19(14.6%) were females. The result according to age shows that 1-9 years, 3 samples only were collected and none was found to be diabetic, 10-19 years, 6 samples were examined and none was found to be diabetic, 20-29, 40 samples were tested, 6(15%) were diabetic, 30-39 years, 98 samples were tested 8 (8.2%) were diabetic. 40 years and above 43 samples were tested 14(26.4) were diabetic. The female proportion was significantly higher than that of male (4.5%) at P<0.05.

Keywords: Diabetes mellitus, HIV positive, Insulin, Glucose, obesity.

INTRODUCTION

Diabetes mellitus, often referred to as diabetes is a condition in which a person has a high blood sugar (glucose) level as a result of the body either not producing enough insulin, or because body cells do not properly respond to the insulin that is produced. Insulin is a hormone that is produced in the pancreas which enables body cells to absorb glucose, to turn into energy. Diabetes mellitus is a chronic disease characterized by excess sugar in the body, resulting when the pancreas produces too little insulin or no insulin (Meeks, 2003). Diabetes mellitus is common metabolic disorder resulting from defects in insulin action, insulin production, or both. Insulin a hormone secreted by the pancreas help the body used and store glucose produced during the digestion of food (American Diabetes Association, 2003a). Insulin is a hormone produced in the pancreas that regulates the glucose (sugar) in the body which is the body's main source of energy and it also enables body cell to turn into energy, this hormone acts as a key that opens a door into the cells so that glucose can enter and become fuel (Miller and James, 1998).

Diabetes was known to ancients physicians, but ideas about it's causes have evolved over the centuries and still remain uncertain (Watkins, 1998). Since polyuria and wasting are dominant clinical features, it was long thought to be due to kidney disease continues to be a mystery, although both genetics and environmental factors such as obesity and lack of exercise appear to play a role (Meeks, 2003). The World Health Organization estimates that 150 million people had diabetes worldwide in 2002. This number is projected to double by the year 2025. Much of this increase will occur in developing countries and will be due to population growth, aging, unhealthful diets, obesity and sedentary life styles. In the United States, diabetes is sixth leading cause of death (American diabetes association, 2003b), while 6.2 % of the population have diabetes, an estimated 5.9 million were unaware they have the disease. In addition, about 19% of all deaths in the United States for age twenty five and older are due to diabetes related complications. There are many types of diabetes the most common of which are:

- Type 1 diabetes,
- Type 2 diabetes,
- Gestational diabetes.

Diabetes constitutes a major problem in the world (WHO, 1998).

HISTORY OF DIABETES

The term diabetes was coined by Aretaeus of Cappadocia. It drives from the Greek verb Diabainein, itself formed from the prefix dia-, "Across, apart" and the verb bainein "to walk, stand." The verb diabeinnein meant "to stride, walk, or stand with legs asunder"; hence, its derivative diabetes meant "one that straddles," or specifically "a compass, siphon." The sense "siphon" gave rise to the use of diabetes as the name diabetes involving the discharge of excessive amounts of urine. Diabetes is first recorded in English, in the form diabetes, in a medical text written around 1425. In 1675, Thomas Willis added the word mellitus, from the Latin meaning "honey" a reference to the sweet taste of the urine. This sweet taste had been noticed in urine by the ancient Greeks, Chinese, Egyptians, Indians, and Persians. In 1776, Mathew Dobson confirmed that the sweet taste was because of an excess of a kind of sugar in the urine and blood of people with diabetes (Dobson, 1976).

Diabetes mellitus appears to have been a death sentence in the ancient era. Hippocrates makes no mention of it, which may indicate that he felt the disease was incurable. Aretaeus did attempt to treat it but could not give a good prognosis; he commented that "life (with diabetes) is short, disgusting and painful" (Medvei, 1993).

DIABETES AND HIV

Disorders of glucose metabolism have been reported in individuals infected with HIV. Cross sectional studies have reported a prevalence of diabetes among HIV infected patients' receiving protease inhibitors (PIs) and an additional sixteen percent having impaired glucose tolerant (Dube , 1997). The incidence of diabetes mellitus (DM) in HIV infected patients has been estimated to range from one percent to ten percent (1-10%) in various studies. An analysis of California medical database found that the age-specific relative risk for diabetes in person with HIV compared with those without was indeed higher in all age group, peaking at 7.74 among those that 18 – 24 years of age.

Clinical and vitro data support a direct causative role of certain PIs in the pathogenesis of insulin resistance and diabetes to the lipodystrophy syndrome that is prevalent in HIV infected patient and pathogenesis remains poorly understood. The relation of risk factors for diabetes that are well established in general population such as family history, obesity race/ethnicity, age and dyslipidemia is poorly understood in HIV infection patients however.

Furthermore, few data exist on the potential relationship between liver diseases in HIV infected patients' which may be of importance given emerging data associating DM with Hepatitis C virus (HCV) infection in the general population. Drugs such as Megestrol acetate and corticosteroids seem to be responsible for severe hyperglycemia in HIV infected persons (Dube, 2000). The most recent report from the joint United Nations programs on HIV/AIDS reported that HIV infection affected an estimated 39.5 million people worldwide. This epidemic threatens to intersect with another that of obesity related type 2 diabetes mellitus. Estimate from the international diabetes federation show 246 million adults worldwide have diabetes mellitus, mostly contributable to current obesity epidermis. The treatment of HIV-1 infection with combined antiretroviral therapy (cART) has significantly altered the natural history of this life–threatening condition. Immunocompetence has come at significant metabolic cost, however because cART is associated with a range of metabolic complications including insulin resistance, glucose intolerance, type 2 diabetes mellitus, dyslipidemia, and changes in body in fat compartmentalization.

STATEMENT OF PROBLEM

Diabetes mellitus (DM) is one of the health problems that are gradually assuming an epidemic proportion (WHO, 1998). The prevalence of diabetes among HIV positive patients have reported to be 2% to 7% in patients receiving protease inhibitors, while 16% having impaired glucose tolerance. Therefore there is need to know its causes and management.

AIMS AND OBJECTIVES

1. To determine the prevalence of diabetes mellitus among HIV infected patients that are attending general hospital Mubi.
2. To understand factors associated with HIV and predispose to diabetes mellitus.
3. To identify potential risk factors for diabetes in HIV positive patients.
4. To assess characteristics associated with the development of diabetes mellitus in HIV infected patients.

To determine the effects of medication therapy giving to HIV patients that predispose to diabetes mellitus.

MATERIALS AND METHODS

Study Area

Mubi metropolis lies between latitude $9^0 30'$ and 11^0 North of the equator and longitude 13^0 and $13^0 45'$ east of the Greenwich Meridian. Mubi is bounded in the North by Michika Local Government, in the West by Hong Local Government Areas, and in the South and East by the Republic of Cameroon. It has a land area of $4728.77 km^2$ and a population of 759,045 in 2003 (1991 census projection) (Adebayo, 2004).

Collection of specimen and Test Procedures

200 samples of HIV positive patients were collected on clinical days of HIV patients. During the collection of the samples, the following were considered and recorded properly: Age, Sex, Occupation, and Medication therapy.

The samples were carefully taken from the veins after thorough scrubbing of the skin with alcohol swab. A drop of the blood was then dropped on the allotted portion of the testing strip for period of 2 minutes and cotton wool was used to clear the excess blood on the strip, the reading of the sugar level was done in 30 seconds, the color chart on the strip container was used to compare with the color change on the strip. The sugar level was recorded in mmol/L/mg/dl. The remaining blood was then transferred into the EDTA containers to avoid clotting of the blood for the CD_4 count.

RESULTS AND DISCUSSION

RESULTS
The results obtained are on tables below:

Table 1. Prevalence of Diabetes Mellitus among HIV Positive Patients attending General Hospital Mubi

Health Institution	No. of Diabetic	*Pre-diabetic	Non-diabetic	Total
General Hospital Mubi	28	32	140	200
Percentage	(14%)	(16%)	(70%)	(100%)

*The pre-diabetic patients may or may not develop diabetes in the future

The result obtained showed that, of the 200 samples collected and tested, 140 (70%) were non-diabetic (Random Blood Sugar 60-120 mg/dl), 32 (16%) were pre-diabetic (Random Blood Sugar Level 100-125mg/dl, WHO, 1999) and 28 (14%) were found to be diabetic.

Table 2. Prevalence of Diabetes Mellitus among HIV Positive Patients attending General Hospital Mubi According to Sex

Sex	Diabetic	Non-diabetic	Total No. of Samples
Male	9(12.8%)	61(87.2%)	70
Females	19(14.6%)	111(85.4%)	130

Out of the 200 samples examined, 70 (35%) were males and 130 (65%) were females. 19 (14.6%) of the females samples tested were found to be diabetic while 111(65.4%) were not diabetic, and 9 (12.8%) of the males samples tested were found to be diabetic while 61(87.2%) were not diabetic.

The above result reveals that the percentages of the diabetic HIV positive patients are the female patients with 14.6% of the tested samples irrespective of the males with 12.8% of the tested samples.

Table 3. Prevalence of diabetic HIV Positive Patients attending General Hospital Mubi according to Age

Age Range	Diabetic	Non-diabetic	Total No. of Samples
1-9	0(0%)	3(100%)	3
10-19	0(0%)	6(100%)	6
20-29	6(15%)	34(85%)	40
30-39	8(8.2%)	90(91.8%)	98
40 and above	14(26.4%)	39(73.5%)	53

The impact of age was also noted in the group investigated. Out of the 28 cases found to be diabetic, 6 (21.4%) of the diabetic were found to be between the age range of 20-29 years, 8 (28.5%) of the diabetic were found between the age range of 30-39, while the remaining 14 (50%) of the diabetic cases were found at the age range of 40 years and above. The result reveals that the highest percentage of diabetic patients falls within 40 years and above.

MEDICATION

Of the 200 samples tested, 150(75%) are on drugs while 50(25%) were not on drugs. The 150 on drugs tested, 25 were found to be diabetic and of the 50 not on drugs, 3 were found to be diabetic.

The HIV positive patients are given the following drugs:

-Zidovudine (AZT)   -Lamivudine (3CT)   - Nevirapine (NEV)
-Effervirenz (EFF)   -Tenofovir(TDF) -Tenofavir/Emtriatabine (TDF/FTC)
-Stavudine (D4T)

The drugs are taking in the following combination:

-    AZT/3TC/NEV   -AZT/3TC/EFF   -D4T/3TC/NEV
-    D4T/3TC/EFF   -TDF/FTC/NEV

Table 4. Prevalence of Diabetes Mellitus among HIV Positive Patients attending General Hospital Mubi on Drugs and not on Drugs

Description	Diabetic	Non-diabetic	Total Samples
On Drugs	25(16.7%)	125(83.3%)	150
Not on Drugs	3(6%)	47(94%)	50

DISCUSSION

Disorders of glucose metabolism have been reported in individuals infected with HIV. Other studies have reported a prevalence of diabetes mellitus of 2% to 7% among HIV infected patients receiving Protease Inhibitors (PIs) and 16% having impaired glucose tolerance. Generally, the prevalence of diabetes mellitus   (DM) in HIV infected patients has been estimated to range from 1% to 10% in various studies.

The prevalence of diabetes mellitus in HIV infected patients can also be expected to vary from one population to another, modified factors such as genetic susceptibility, obesity, prevalence rates, and sedentariness.

In this study, the prevalence of diabetes among HIV infected patients was recorded to be 14%. The overall findings of this research with significant difference $p > 0.05$ appears to be contrary to the work done by Dube, (1997) reporting that prevalence of diabetes mellitus in HIV patients range from 1-10%. The prevalence according sex to sex shows that 19 (14.6%) female were diabetic, while 9 (12.8%) male were diabetic, that could be due to obesity and sedentary lifestyle of females. The result according to sex ($p < 0.05$) married similar work done by Afolabi and Addo (2002) reporting that highest rate of obesity is among women with 15% in respect of men with 5%. The findings according to age ($p > 0.05$), goes in agreement with the report of the World Health Organization (1998) reported that the group at risk for diabetes are older men and women over the age of 50 years. Findings on effects of drugs married the report of Henry(1992) reported that megesterol acetate used as an appetite stimulant in AIDS patients has an intrinsic glucocortic-cold-like activity that predisposed a small number of patients to hyperglycemia. Increased caloric intake and weight gain associated with the use of the drugs also might have played a role in the development of diabetes.

A further consideration is the impact of obesity on diabetes prevalence in HIV infection. A large US study (n = 1669) reported prevalence rates of overweight and obesity similar to that of the general population: 13% and 14% in their in their HIV infected patients. As obesity has a promoting effect on insulin resistance and progression of the beta cells secretory defect to diabetes mellitus. It can be expected that HIV infected patients with coexisting obesity may have a higher prevalence of diabetes than that reported before the obesity epidemics.

CONCLUSION

The prevalence of diabetes mellitus among the HIV positive patients found to be 14%. HIV and diabetes are both chronic diseases that significantly affect lifestyle. When they intersect, the treatment regimens required for both diseases can be overwhelming for patients. Understanding the glucose disturbances that are possible with treatment, performing appropriate screening for glucose intolerance and diabetes and making prudent changes in HIV treatment when necessary, and treating patients for alterations in glucose metabolism are the key components of care for at risk patients.

Although, beyond the scope of this research, other metabolic disturbances associated with HIV medications, such as lipoprotein and fat distribution abnormalities place patients with HIV at risk for cardiac disease. Glucose metabolism alterations inn HIV patients present much like those of type 2 diabetes. Therefore the best clinical care regimen will address all of the cardiac risk factors, insulin resistance diabetes, lipid abnormalities, and body fat abnormalities.

RECOMMENDATIONS

Diabetes mellitus in HIV patients can be properly managed and controlled if individuals appreciate the magnitude of mortality and morbidity that may result from both diseases. In this regard, the importance of early detection of diabetes can't be overemphasized.

Patients who had diabetes before the diagnosis of HIV may be taking a combination of medications and/or insulin to control glucose levels. Insulin resistance associated with PI therapy may affect glucose control and necessitate adjustment in therapy. Self-monitoring of blood glucose can help determine when medication changes are needed. Subsequent glucose readings will assist in evaluating the therapeutic adjustments.

For the health and the safety of others, all patients who self-test their blood glucose should handle and dispose blood contaminated supplies appropriately.

There is an urgent need for aggressive awareness campaign that will enable individuals with HIV to know their sugar level.

Furthermore, the importance of physical exercise, weight reduction, diets that are rich in fibers and carbohydrates rather than fat and calories should be emphasized. This help to prevent obesity that leads to insulin resistance.

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