CO-OCCURRENCE OF DIABETES MELLITUS AND HYPERTENSION IN SOME RURAL COMMUNITIES OF SOUTHEAST NIGERIA

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ABSTRACT

Diabetes mellitus and hypertension are common diseases that coexist at a greater frequency than chance alone would predict. This study was conducted on subjects living in rural communities in Southeast Nigeria namely Nkwebi, Elu, Okagwe Ohafia in Abia State and Ezeala Owerre, Umueze, Umunakanu, Umunumo, Umualumaku in Imo State. The objective of the study was to assess the co-occurrence of diabetes mellitus and hypertension. A total of 446 subjects were examined, 186 (41.7%) males and 260 (58.3%) females. All the subjects were above 20 years with a mean age of 58.7 years. Out of 446 subjects studied, 93 subjects had diabetes mellitus, 53 (57%) males and 40 (43%) females. The record also revealed that 254 subjects comprising of 111 males and 143 females had arterial hypertension with a mean blood pressure of 184/113mmHg and 172/102mmHg respectively. Among these subjects, 43 had both diabetes mellitus and hypertension, 26 (60.5%) males and 17 (39.5%) females. From the results obtained, out of the 93 subjects with diabetes mellitus, 43 of them making 46.2% had hypertension. We concluded that there was a close co-occurrence of diabetes mellitus and hypertension.

KEYWORDS: *Hypertension, Diabetes mellitus, insulin, glucose, blood pressure*

INTRODUCTION

Hypertension is a common health problem with sometimes, devastating consequences, and often remains asymptomatic until late in its course. Hypertension is one of the most important risk factors for both coronary artery disease and cerebrovascular accidents. Hypertension can lead to cardiac hypertrophy and, potentially, heart failure (hypertensive heart disease), aortic dissection, and renal failure[1]. It is widely acknowledged that hypertension is a complex, multifactorial disease that has both genetic and environmental determinants[2]. Blood pressure (like height and weight) is considered to be a continuously distributed variable, and essential hypertension is one extreme of

this distribution rather than a distinct disease. The detrimental effects of blood pressure increase continuously as the pressure rises, and no rigidly defined threshold level of blood pressure distinguishes risk from safety. Regardless, a sustained diastolic pressure greater than 90mmHg or a sustained systolic pressure in excess of 140mmHg is considered to constitute hypertension. By these criteria, screening programs reveal that 25% of persons in the general population are hypertensive[3].

Diabetes mellitus is a syndrome of impaired carbohydrate, fat and protein metabolism caused by either lack of insulin secretion or decreased sensitivity of the tissues to insulin. There are two general types of diabetes mellitus: Type I diabetes, also called insulin-dependent diabetes mellitus, is caused by lack of insulin secretion. Type II diabetes, also called non-insulin-dependent diabetes mellitus, is caused by decreased sensitivity of the target tissues to the metabolic effect of insulin[4]. This reduced sensitivity to insulin is often called insulin resistance. Previously a disease of the middle aged and elderly, type 2 diabetes has recently escalated in all age groups and is now being seen in younger age groups, including adolescents, especially in high risk populations[5]. Blood glucose values are normally maintained in a very narrow range, usually 70 to 120mg/dl. The diagnosis of diabetes is established by noting elevation of blood glucose by any of the three criteria[1]:

- A random glucose > 200mg/dl, with classical signs and symptoms.
- A fasting glucose > 126mg/dl on more than one occasion
- An abnormal oral glucose tolerance test (OGTT), in which the glucose is > 200mg/dl 2 hours after a standard carbohydrate load.

Hypertension in the diabetic individual markedly increases the risk and accelerates the course of cardiac disease, peripheral vascular disease, stroke, retinopathy, and nephropathy[6]. Diabetic

nephropathy is an important factor involved in the development of hypertension in diabetics, particularly type I patients. The hallmark of hypertension in type I and type II diabetics appears to be increased peripheral vascular resistance. Increased exchangeable sodium may also play a role in the pathogenesis of blood pressure in diabetics[2,3]. Population studies suggest that elevated insulin levels, which often occurs in type II diabetes mellitus, is an independent risk factor for cardiovascular disease. Other cardiovascular risk factors in diabetic individuals include abnormalities of lipid metabolism, platelet function, and clotting factors. It is estimated that 30% of the adult population may have arterial hypertension and that 30-60% of the diabetic patients have associated hypertension[7].

In a large prospective cohort study that included 12,550 adults, the development of type 2 diabetes was almost 2.5 times more likely in persons with hypertension than in their normotensive counterparts[7]. Similarly, evidence points to increased prevalence of hypertension in diabetic persons. Moreover, each pathophysiological disease entity serves to exacerbate the other. Both hypertension and diabetes predisposes to the development of cardiovascular disease (CVD) and renal disease. The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy. Indeed, when hypertension coexists with diabetes, the risk of CVD is increased by 75%, which further contributes to the overall morbidity and mortality of an already high-risk population[8]. Generally, hypertension in type 2 diabetic persons clusters with other CVD risk factors such as microalbuminuria, central obesity, insulin resistance, dyslipidaemia, hypercoagulation, increased inflammation and left ventricular hypertrophy. This clustering risk factor in diabetic patients ultimately results in the development of CVD, which is the major cause of premature mortality in patients with type 2 diabetes [2,7,8].

MATERIALS AND METHODS

Subjects were assembled from neighboring rural communities in two states of the southeast geographical region on Nigeria. Two different venues were used and a total of 446 subjects were examined. A complete case history was taken on each subject. Those who had a history of hypertension and diabetes mellitus were noted. The blood pressure was taken with the use of KODEA electronic sphygmomanometer. The subjects were then given urine tubes to bring samples of urine for urinalysis using the Combi 9 test strips. This was aimed at identifying those with high glucose levels. The blood glucose levels were also taken using the Accu-chek blood glucose monitoring system. Result of subjects who had eaten on that day was recorded as *random blood glucose* level while those who had not taken any meal for that day was recorded as *fasting blood glucose* level. The subjects who had both diabetes and hypertension were then noted.

RESULTS

A total of 446 subjects were examined, 186 males (41.7%) and 260 females (58.3%). Out of this number, 93 subjects had diabetes mellitus, 53 males (57%) and 40 females (43%). This is shown in figure 1, Also a total of 254 subjects had hypertension of which 111 (43.7%) were males and 143 (56.3%) were females as shown in figure 2. From all the subjects examined, 43 had both diabetes mellitus and hypertension of which 26 (60.5%) of them were males and 17 (39.5%) were females. This is shown in figure 3. Figure 4 shows a frequency distribution of the subjects of which 254 subjects had hypertension, 93 subjects had diabetes mellitus and between this two, 43 subjects had both diabetes and hypertension.

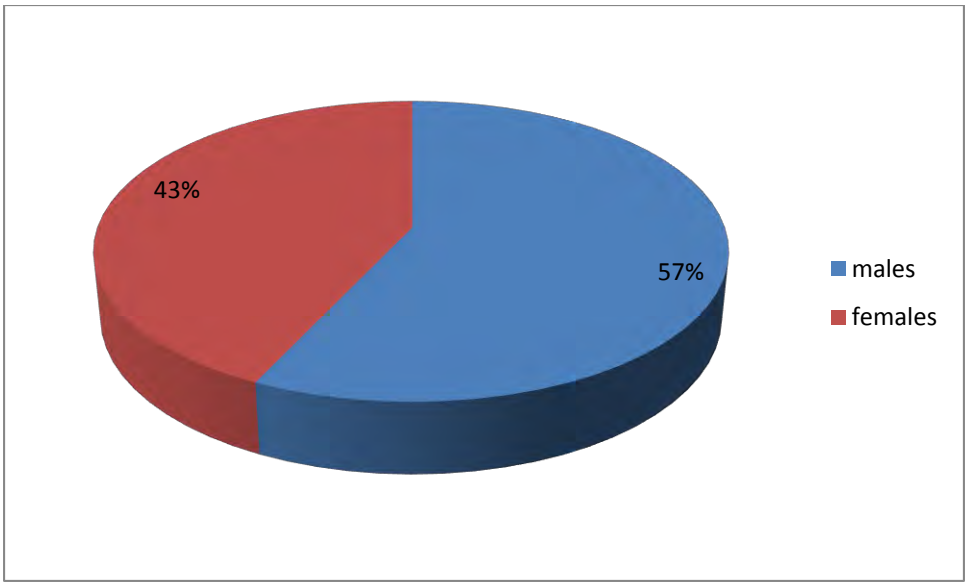

Fig 1: Frequency of male and female subjects with diabetes mellitus

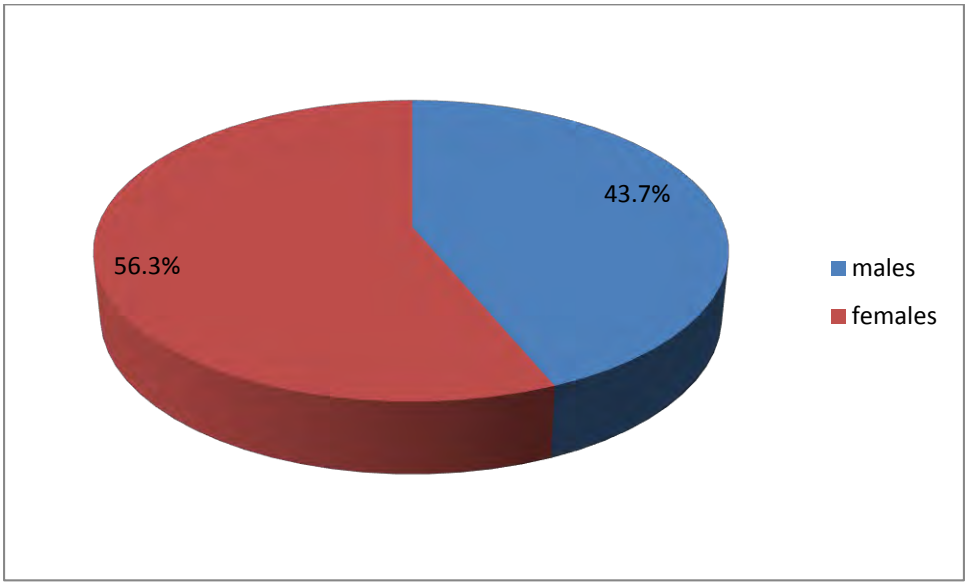

Fig 2: Distribution of male and female subjects with hypertension

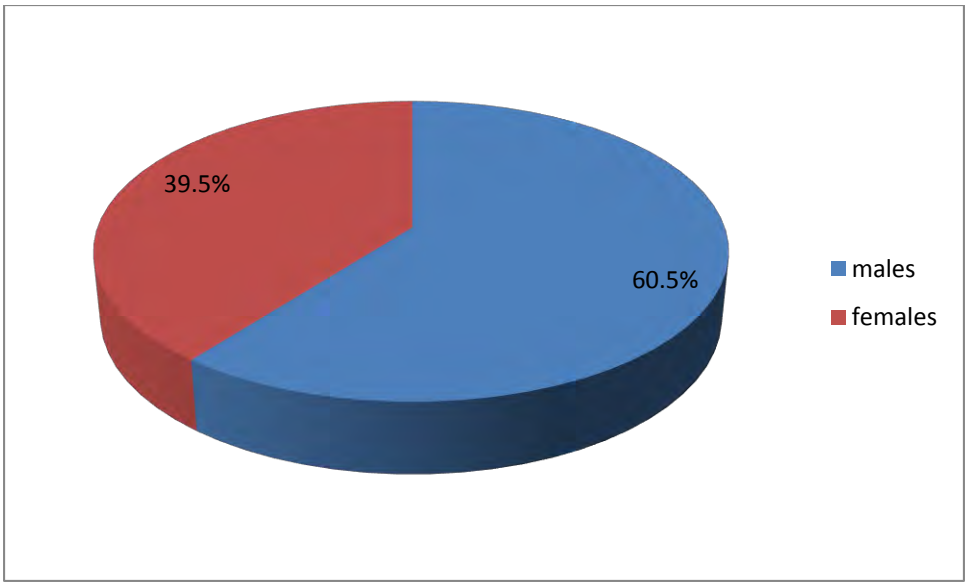

Fig 3: Prevalence of male and female subjects with both diabetes and hypertension

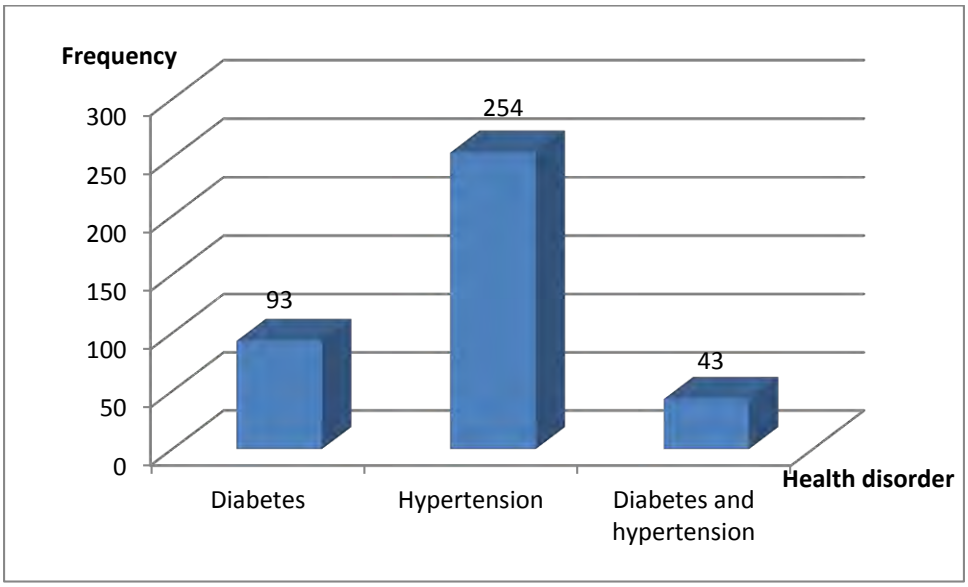

Fig 4: Frequency distribution of the health disorders

Fig 5: Subjects gathering at Ezeala Owerre civic ground for examination

DISCUSSION

Our study revealed that out of 254 and 93 subjects with hypertension and diabetes mellitus respectively, 43 had both hypertension and diabetes mellitus. This is shown in figure 4. We can also say that 46.2% of the subjects with diabetes mellitus had hypertension. In a study of the common ocular manifestations of cerebrovascular accidents in hypertensive and diabetic patients in Lagos state Nigeria, 12.5% of hypertensive patients had diabetes[12]. Ayodeji et al in a study of the control of hypertension in Nigerians with diabetes mellitus found 57% of patients with diabetes mellitus having co-existing hypertension[13]. A study in Taiwan showed a greater percentage of hypertensive subjects (10.2%) with diabetes mellitus against a lower percentage of normotensive subjects (4.9%) with diabetes mellitus[8]. The Global Liaison for Diabetes and Hypertension Help Society (DHS), an NGO, says that Nigeria is witnessing an increase in the number of people affected by diabetes and hypertension owing to certain stress factors[9]. The

prevalence was said to be very high due to the fact that life in Nigeria is very stressful for many reasons. A five-day free diabetes and hypertension screening for Lagos State residents organized by the Lagos State government, in collaboration with the Ministry of Health and the local councils aimed at reducing the number of deaths from the diseases by sensitizing the public about the importance of regular check-up and early detection was carried out in Lagos State Nigeria[10]. The program created awareness on the dangers of hypertension and diabetes and afforded people the opportunity to check their health status.

A lot of factors can be found to be responsible for the high level of hypertension in rural areas of Nigeria. The level of stress and tension is high in the communities. This could be attributed to poverty, as many of the people cannot afford to put three square meals on the table. They cannot afford to live in a descent accommodation and they cannot afford the basic necessities of life. A good number of the elderly are pensioners who cry that they are being owed arrears of their pension. This has brought a lot of misery and frustration to them as they have no other means of sustaining themselves. Many complained that their children were unemployed and thus could not support themselves. They were still living under their parents' roof jobless when they should be gainfully employed at their age. Death of loved ones is also a great source of anxiety which aggravates high blood pressure. Some of the women were widows who carry the burden of the entire family on their head without the support of any family member. They have to work tirelessly to be able to feed their family and train the children in school. Also, a high level of insecurity in the communities where kidnappings have become very rampant have had people living in fear for the life of themselves and their loved ones. The lack of adequate health care including health care facilities and health workers has left a lot of people with serious health problems unattended to. A health center where part of this study was carried out was the only

health center in the community and there were evidently no facilities or manpower to provide the health needs of the community. Figure 5 shows the inside of the health center during the field work of this study. Notice how the hall lacked the presence of any health facility. With all these sources of anxiety, and subsequent high blood pressure, there is increased insulin resistance and this leads to high blood glucose.

In conclusion, there is a close co-occurrence between diabetes mellitus and hypertension. People need to be well educated on these two diseases as the prevalence is on the increase. Proper and adequate health facilities must be made available in rural areas for most people in these rural areas do not have the means or resources to go to the urban centers for adequate treatment. Also those socio-economic and political factors that cause anxiety and aggravate the blood pressure need to be addressed by the government.

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