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Association of Erectile Dysfunction with Systemic Hypertension and Diabetes Mellitus in Rivers State, Nigeria

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ABSTRACT

Most men experience erectile dysfunction and this condition can be associated with various health problems. This study was carried out to investigate the association of erectile dysfunction with systemic hypertension and diabetes mellitus. The study was a cross-sectional descriptive study carried out among men above 20 years in Rivers State, Nigeria. The multi stage sampling technique was used to select 330 men across the city. Blood pressure of the subjects was measured with a digital sphygmomanometer and a glucometer was used to measure the blood glucose level. Results showed that were 115 subjects with hypertension, out of which 94 (81.7%) had ED. Among subjects of 21-30 years, no subject had ED; for 31-40 years, 3 (37.5%) out of 8 had ED; for 41-50 years, 12 (70.6%) out 17 had ED; for 51-60 years, 22 (84.6%) out of 26 had ED; for 61-70 years, 28 (87.5%) out of 32 had ED; for above 70 years, 29 (90.6%) out of 32 had ED. Data analysis with the Statistical Package of Social Sciences (SPSS) version 23 using the chi-square test at 0.05 level of significance showed a significant association of ED with systemic hypertension ($P<0.05$). Results also showed that there were 91 subjects with diabetes mellitus, out of which 77 (44.6%) had ED. Among subjects of 21-30 years, 1 (50.0%) out of 2 had ED; for 31-40 years, 6 (75.0%) out of 8 had ED; for 41-50 years, 14 (87.5%) out 16 had ED; for 51-60 years, 22 (95.7%) out of 23 had ED; for 61-70 years, 15 (78.9%) out of 19 had ED; for above 70 years, 19 (82.6%) out of 23 had ED. There was a correlation of erectile dysfunction with both systemic hypertension and diabetes mellitus. Data analysis with the Statistical Package of Social Sciences (SPSS) version 23 using the chi-square test at 0.05 level of significance showed that the association of ED with systemic hypertension was significant with increasing age ($P<0.05$) but not with increasing age of people with diabetes mellitus ($P>0.05$). It was recommended that physicians counsel their patients with systemic hypertension and diabetes mellitus on the possible association with erectile dysfunction.

Keywords: Erectile dysfunction, Hypertension, Diabetes mellitus, Age

INTRODUCTION

Erectile dysfunction (ED) is when a man has trouble getting or keeping an erection. ED can be a sign of health problems. It could be an early manifestation of coronary artery and peripheral vascular disease. [1] Most men experience erectile dysfunction during their sexual lives. Professional help is needed when erectile dysfunction becomes a persistent problem. [2] Erectile dysfunction is probably the most poorly understood and mismanaged of all medical disorders. Although considerable advances have been made in the diagnosis and treatment of erectile dysfunction in the past decades, more than 80% of men with erectile dysfunction are not treated. [3] This is due to embarrassment, ignorance, myths, superstition, guilt, stigma and taboo attached to anything sexual in the minds of people. Culture and financial barrier may

also hamper health seeking habits of erectile dysfunction patients. [4] Largely, people including health care professionals, believe that erectile dysfunction is psychological in origin. This is why erectile dysfunction does not come to light, the few that do are grossly mismanaged. Lee et al. [5] reported most patients live on self-denial and usually do not seek treatment while others believe it is a normal part of aging. In a study conducted by Omer et al. [6] on help seeking attitude of 279 Turkish men aged 20-80, results showed that 33% of the participants could not seek help earlier due to embarrassment, while 26.7% assumed ED was a natural process of aging. The economic impact of ED is multifactorial with direct costs that include physician evaluation, pharmacotherapy and diagnostics testing, and indirect costs that include lost time at work, lost productivity and effects on the man's partner, family and coworkers. [7] Yet most health insurance plans available minimally provide for erectile dysfunction in their care plan.

Systemic hypertension is high blood pressure in the systemic arteries. [8] These are the vessels that carry blood from the heart to the body's tissues other than the lungs. High systemic blood pressure is usually caused by the constriction of the arterioles. This increases the peripheral resistance to blood flow, which increases the heart's workload and raises arterial pressure. [9] Blood Pressure is measured at its highest (systolic) and lowest (diastolic) levels. Normal systolic pressure depends on a person's age, but a maximum normal adult reading is around 140 mmHg and the upper limit for normal diastolic blood pressure is around 90 mmHg. [9] The term Pulse Pressure refers to the difference between the systolic and diastolic pressures. Systemic hypertension that is caused by another condition or disease is referred to as secondary. For example, high blood pressure may be caused by a narrowing of the aorta, by kidney disease that involves a narrowing of the renal artery, or by certain endocrine disorders. [10] Systemic hypertension has no obvious symptoms of its own and may not be recognized until complications arise. Both high diastolic and systolic blood pressure are associated with increased risk of strokes, heart attacks, atherosclerosis, kidney failure, and cerebral hemorrhage. [11] Risk factors for systemic hypertension include age, sex, genetic factors, ethnicity, obesity, alcohol intake and stress. [11]

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. [8] The first WHO global report [12] on diabetes demonstrates that the number of adults living with diabetes has quadrupled to 422 million adults. WHO reports that 1.5 million deaths are attributed to diabetes each year. Diabetes mellitus can be classified as follows:

(i) Type 1 diabetes, also called insulin-dependent diabetes mellitus, is caused by lack of insulin secretion due to destruction of the pancreatic β-cells. It accounts for approximately 10% of all case. [13]

(ii) Type 2 diabetes, also called non-insulin-dependent diabetes mellitus, is caused by failure of pancreatic β-cells to secrete sufficient amounts of insulin to meet metabolic needs and the decreased sensitivity of the target tissues to the metabolic effect of insulin. It accounts for approximately 90% of all cases. This reduced sensitivity to insulin is often called insulin resistance. [8]

(iii) Type 1.5: Latent Autoimmune Diabetes in adults (LADA). This is a slow progressing form of autoimmune diabetes. Like type 1 diabetes, LADA occurs because the pancreas stops producing adequate insulin, most likely from some "insult" that slowly damages the insulin-producing cells in the pancreas. [14] But unlike type 1 diabetes, with LADA, the patient often won't need insulin for several months up to years after being diagnosed.

(iv) Gestational diabetes mellitus; a condition in which women without previously diagnosed diabetes exhibit high blood glucose levels during pregnancy.

Normal fasting blood glucose values are maintained in a range of 70-120mg/dl or 7.0mmol/L to 11mmol/L. Diagnosis can be established by either a fasting plasma glucose of ≥126 mg/dl on more than one occasion; a random plasma glucose of ≥ 200 mg/dl with classical signs and symptoms; and an abnormal oral glucose tolerance test (OGTT), in which the glucose is ≥ 200mg/dl, two hours after a standard carbohydrate load. [8] This study was carried out to investigate the association of erectile dysfunction with systemic hypertension and diabetes mellitus.

MATERIALS AND METHODS

This study was a cross-sectional descriptive study carried out among men above 20 years in Rivers State, Nigeria. The multi stage sampling technique was used to select 330 men across the city. An informed consent was obtained from all participants who were given questionnaires to fill out. A digital sphygmomanometer was used to measure the blood pressure of the participants. A glucometer was also used to measure the blood glucose level. Data was uploaded into the Statistical Package for Social Sciences (SPSS) version 23, and descriptive statistics was used for presentation of data while the Chi square test was used to test the association of erectile dysfunction with systemic hypertension and diabetes mellitus at 0.05 level of significance.

RESULTS

There were a total of 330 males with a mean age of 48±2.3 years participated in the study out of which 115 had hypertension. Table 1 showed the distribution of hypertensive subjects with and without erectile dysfunction. There were 115 subjects with hypertension, out of which 94 (81.7%) had ED. Among subjects of 21-30 years, no subject had ED; for 31-40 years, 3 (37.5%) out of 8 had ED; for 41-50 years, 12 (70.6%) out 17 had ED; for 51-60 years, 22 (84.6%) out of 26 had ED; for 61-70 years, 28 (87.5%) out of 32 had ED; for above 70 years, 29 (90.6%) out of 32 had ED. Data analysis with the Statistical Package of Social Sciences (SPSS) version 23 using the chi-square test at 0.05 level of significance showed a significant association of ED with systemic hypertension [P(0.006)<0.05]. Table 2 showed the distribution of non-hypertensive subjects with and without erectile dysfunction. There were 215 subjects without hypertension, out of which 116 (54%) had ED. Among subjects of 21-30 years, 13 (29.5%) out of 44 had ED; for 31-40 years, 16 (37.2%) out of 43 had ED; for 41-50 years, 25 (55.6%) out 45 had ED; for 51-60 years, 24 (77.4%) out of 31 had ED; for 61-70 years, 18 (66.7%) out of 27 had ED; for above 70 years, 20 (80%) out of 25 had ED. Data analysis with the Statistical Package of Social Sciences (SPSS) version 23 using the chi-square test at 0.05 level of significance showed a significant association of ED with age among subjects without hypertension [P(0.0001)<0.05].

Table 3 showed the distribution of diabetes mellitus subjects with and without erectile dysfunction. There were 91 subjects with diabetes mellitus, out of which 77 (44.6%) had ED. Among subjects of 21-30 years, 1 (50.0%) out of 2 had ED; for 31-40 years, 6 (75.0%) out of 8 had ED; for 41-50 years, 14 (87.5%) out 16 had ED; for 51-60 years, 22 (95.7%) out of 23 had ED; for 61-70 years, 15 (78.9%) out of 19 had ED; for above 70 years, 19 (82.6%) out of 23 had ED. Data analysis with the Statistical Package of Social Sciences (SPSS) version 23 using the chi-square test at 0.05 level of significance showed there was no significant association of ED with diabetes mellitus with regard to age [P(0.392)>0.05]. Table 4 showed the distribution of non-diabetes mellitus subjects with and without erectile dysfunction. There were 239 subjects without diabetes mellitus, out of

which 133 (55.6%) had ED. Among subjects of 21-30 years, 12 (28.6%) out of 42 had ED; for 31-40 years, 13 (30.2%) out of 43 had ED; for 41-50 years, 23 (50.0%) out 46 had ED; for 51-60 years, 26 (76.5%) out of 34 had ED; for 61-70 years, 30 (75.0%) out of 40 had ED; for above 70 years, 29 (85.3%) out of 34 had ED. Data analysis with the Statistical Package of Social Sciences (SPSS) version 23 using the chi-square test at 0.05 level of significance showed a significant association of ED with age among subjects without diabetes mellitus [P(0.000)<0.05].

Table 1: Age distribution of hypertensive subjects with and without erectile dysfunction

Age (years)	No. with Hypertension	ED Present (%)	ED Absent (%)
21- 30	0	0	0
31- 40	8	3 (37.5)	5 (62.5)
41- 50	17	12 (70.6)	5 (29.4)
51 – 60	26	22 (84.6)	4 (15.4)
61 – 70	32	28 (87.5)	4 (12.5)
Above 70	32	29 (90.6)	3 (9.4)
Total	115	94 (81.7)	21 (18.3)
P = 0.006			

Table 2: Age distribution of Non-hypertensive subjects with and without erectile dysfunction

Age (years)	No. without hypertension	ED Present (%)	ED Absent (%)
21- 30	44	13 (29.5)	31 (70.5)
31- 40	43	16 (37.2)	27 (62.8)
41- 50	45	25 (55.6)	20 (44.4)
51 – 60	31	24 (77.4)	7 (22.6)
61 – 70	27	18 (66.7)	9 (33.3)
Above 70	25	20 (80.0)	5 (20.0)
Total	215	116 (54.0)	99 (46.0)
P = 0.0001			

Table 3: Age distribution of diabetic mellitus subjects with and without erectile dysfunction

Age (years)	No. with Diabetic Miletus	ED Present (%)	ED Absent (%)
21- 30	2	1 (50.0)	1 (50.0)
31- 40	8	6 (75.0)	2 (25.0)
41- 50	16	14 (87.5)	2 (12.5)
51 – 60	23	22 (95.7)	1 (4.3)
61 – 70	19	15 (78.9)	4 (21.1)
Above 70	23	19 (82.6)	4 (17.4)
Total	91	77 (44.6)	14 (15.4)
P = 0.392			

Table 4: Age distribution of non-diabetic mellitus subjects with and without erectile dysfunction

Age (years)	No. without Diabetic Miletus	ED Present (%)	ED Absent (%)
21- 30	42	12 (28.6)	30 (71.4)
31- 40	43	13 (30.2)	30 (69.8)
41- 50	46	23 (50.0)	23 (50.0)
51 – 60	34	26 (76.5)	8 (23.5)
61 – 70	40	30 (75.0)	10 (25.0)
Above 70	34	29 (85.3)	5 (14.7)
Total	239	133 (55.6)	106 (44.4)
P = 0.000			

DISCUSSION

Erection is a complex psycho-neurovascular process and involves several system interactions that converge to an increase in hypogastrian-penian blood flow and subsequent activation of veno-occlusive mechanism of corpus cavernosum. It is well known that the blood increment towards the cavernous necessary for a rigid erection is huge and even small hemodynamic disturbances could produce sexual dysfunction. [15] Therefore ordinary risk factors such as hypertension and diabetes mellitus could contribute to ED development or worsening even in situations where psychological etiology seems more likely. In this study, there was a correlation of ED with both systemic hypertension and diabetes mellitus. The association of ED with systemic hypertension was significant (P<0.05) according to age, but not with diabetes mellitus (P>0.05). After adjusting for age, Traish et al [16] reported that the correlation between ED and modifiable risk factors such as hypertension, diabetes, hyperlipidemia, obesity remained significant. Vignozzi et al [17] reported that most men with hypothetic vasculogenic ED present at least one traditional cardiovascular risk factor.

Erectile dysfunction (ED) is a common complaint in hypertensive men and can be caused by a systemic vascular disease, a side effect of antihypertensive medication or a frequent concern that may impair drug compliance. [18] ED has been considered an early maker of cardiovascular disease because vascular disturbances of the penile endothelium leads to ED, the possibility arises that ED may be an early indicator for systematic endothelial function and subsequent cardiovascular disease. [19] The connection between both conditions seems to be located in the endothelium, which may become unable to generate the necessary dilatation in penile vascular bed in response to sexual excitement, producing persistent impairment in erection. On the other hand, the real influence of

antihypertensive drugs in erectile function still deserves discussion. Therefore, regardless of ED mechanism in hypertension, early diagnosis and correct approach of sexual life represent an important step of cardiovascular evaluation which certainly contributes for a better choice of hypertension treatment, preventing some complications and restoring the quality of life. According to Javaroni and Neves, [20] hypertension is considered one of the most hazardous cardiovascular risk factors and it is a frequent co-morbidity of men with erectile dysfunction. The main reasons for ED among hypertensive individuals were penile circulation disability which is the case in about 89% of those affected. [20] The prevalence of ED in hypertensive male adults is quite high, measuring up to 67%. [21]

Diabetes mellitus is a chronic endocrine-related disorder where chronic hyperglycemia has occurred to the extent that it may have adverse effects on health leading to reduced life expectancy and/or increase medical problems. [22] In a sectarian society like Nigeria, where discussion on human sexuality is considered a taboo, many patients who may experience one form of sexual dysfunction or the other choose to suffer in silence. That notwithstanding, the association between ED and diabetes mellitus is a well-recognized phenomenon and has been established that as much as 75% [23] of men with diabetes mellitus will be confronted with this problem. Chu et al [24] in a publication titled erectile dysfunction and diabetes, published in 2002 reported that the prevalence of ED in diabetes mellitus increased progressively with age. All men with diabetes mellitus, even those aged 20 – 24 years show up to 6 percent prevalence, though those between 55 to 59 years is up to 52 percent. Besides age, the main factors associated with ED are peripheral neuropathy, retinopathy, long duration of diabetes and poor glycemic control. [25] Most of the available studies do not distinguish between type 1 and type 2 diabetes; as such it is difficult to determine if prevalence rates between the two forms of diabetes differ significantly. Prevalence estimates of ED in cross-sectional studies of diabetes populations rangers from 20 – 71%. [26] This wide range of difference may arise from the methods employed in the studies. Pathophysiology of ED in diabetes shows penile tissue impaired neurogenic and endothelium-medicated relaxation of smooth muscles. [27] Adequate cavenosal arterial inflow is necessary for penile erection. Arterial morphology, flow and diameter differ between diabetic and non-diabetic population with ED.

In conclusion, the percentage of people with ED increased with increasing age among people with and without systemic hypertension. There was a correlation of ED with systemic hypertension. The association was found to be significantly significant with age. There was also a correlation of ED with diabetes mellitus, however, the association was not significant among increasing age groups. Physicians should counsel their patients with systemic hypertension and diabetes mellitus on the possible association with erectile dysfunction.

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