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Lifestyle Correlates of Erectile Dysfunction in Type 2 Diabetic Subjects Attending the Diabetes Out Patient Clinic of a Nigerian Teaching Hospital

Chidiebele M. Ezeude[1*], Afoma M. Ezeude[2], Marcellinus O. Nkpozi[3], Ogonna C. Oguejiofor[1], Henry M. Nwankwo[1] and Chidiebere V. Ugwueze[4]

[1]Department of Internal Medicine, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria.
[2]Department of Nursing Science, College of Health Sciences / School of Postgraduate Studies, Nnamdi Azikiwe University Awka, Nnewi Campus, Anambra State, Nigeria.
[3]Department of Medicine, Abia State University Teaching Hospital, Aba, Abia State, Nigeria.
[4]Department of Medicine, Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. Author CME conceptualized the study and contributed to the methodology, author AME contributed in study protocol designing, data acquisition and curation, author MON contributed in formal statistical analysis and interpretation, author CVU contributed in literature review and the initial manuscript drafting, author HMN contributed in result interpretation and manuscript writing while author OCO contributed in the critical review and editing of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Erectile dysfunction (ED) is a chronic complication of diabetes mellitus (DM) that is associated with a negative impact on emotional wellbeing and poor quality of life. There is dearth of current data on the lifestyle correlates of ED in subjects with type 2 diabetes both locally and globally.
Objective: To determine the association between ED, tobacco use (snuff use and cigarette

**Corresponding author: E-mail: cm.ezeude@unizik.edu.ng, docchidi@yahoo.co.uk;*

smoking) and alcohol consumption in type 2 DM patients attending the diabetes outpatient clinic of Nnamdi Azikiwe University Teaching Hospital, Nnewi in South-Eastern Nigeria.

Materials and Methods: This was a cross sectional hospital-based study comprising 124 male type 2 diabetic subjects. Data collection was done with a researcher designed study proforma. The Hospital Anxiety and Depression Scale (HADS), International Index of Erectile Function (IIEF) and the abbreviated version of Alcohol Use Disorder Identification Test (AUDIT-C) questionnaires were used for the diagnosis of anxiety/depression, erectile dysfunction and obtaining the alcohol history respectively. History of tobacco use was obtained and cigarette smoking estimated in pack years. Subjects who had anxiety, depression or hypogonadism were excluded from the study. Statistical analysis was done using the Statistical Package for Social Sciences (SPSS) version 20. *P* value of < 0.05 is considered significant.

Results: A total of 124 patients were studied. The prevalence rate of ED among the subjects was 48.4%. No significant associations were found between erectile dysfunction and tobacco use (Cigarette smoking and Snuff use) (*P* = 0.814, OR = 0.904, 95% C.I = 0.389 – 2.101) (*P* = 0.762, OR = 0.867, 95% C.I = 0.344 – 2.15) and alcohol consumption (*P* = 0.389, OR = 0.670, 95% C.I = 0.269 – 1.667) respectively.

Conclusions: There was no significant association between ED and tobacco use and alcohol consumption in subjects with type 2 diabetes mellitus. Similarly, no significant association was found between ED, pack years of cigarette smoking and the grades of alcohol consumption in the subjects. The subjects' diet, medications and the social/religious stigma attached to the use of these substances in our setting could have influenced our findings.

Keywords: Erectile dysfunction; testosterone; Nigerian; type 2 diabetes; hypogonadism; lifestyle; alcohol; tobacco.

ABBREVIATIONS

ED : Erectile dysfunction
DM : Diabetes mellitus
PDGF : Platelet-derived growth factor
VSMC : Vascular smooth muscle cell
PAI-1 : Plasminogen activator inhibitor-1
HADS : Hospital Anxiety and Depression Scale
IIEF : International Index of Erectile Function
AUDIT-C : Alcohol Use Disorder Identification Test
SPSS : Statistical Package for the Social Sciences
ROS : Reactive oxygen species; NO: Nitric oxide
T2DM : Type 2 diabetes mellitus
FPG : Fasting plasma glucose
HbA1c : Glycated haemoglobin
EDTA : Ethylenediaminetetraacetic acid
ELISA : Enzyme-linked immunosorbent assay
BMI : Body mass index
SBP : Systolic blood pressure
DBP : Diastolic blood pressure
USA : United States of America
NAUTH : Nnamdi Azikiwe University Teaching Hospital
ACE-Is : Angiotensin converting enzyme inhibitors
ARBs :Angiotensin receptor blockers

1. INTRODUCTION

Erectile dysfunction (ED) is one of the chronic complications of diabetes mellitus (DM) and is defined as a persistent inability to achieve or maintain penile erection for satisfactory sexual intercourse [1]. The causes of ED fall into two main categories: organic and psychogenic [2]. Idiopathic and familial causes of ED are also encountered in clinical practice [3]. The organic causes can be further divided into: vascular, neurological, post traumatic/post-surgical, age-induced, endocrine-induced and drug-induced while the psychogenic causes result mainly from anxiety and depression [2,4].

Chronic hyperglycaemia that occurs in the setting of DM inhibits arterial endothelial NO production, potentiates platelet-derived growth factor (PDGF)-induced vascular smooth muscle cell (VSMC) proliferation and stimulates endothelial cell plasminogen activator inhibitor-1 (PAI-1) production [5]. Nitric oxide mediates the relaxation of the cavernous smooth muscle, causing erection and inhibition of its production will cause erectile dysfunction [4]. Erectile dysfunction in the setting of type 2 DM is associated with a negative impact on emotional wellbeing and poor quality of life [6].

The social lifestyle correlates of ED evaluated by this study included tobacco use (cigarette

smoking and snuff use) and alcohol consumption. Cigarette smoke contains super oxide and other reactive oxygen species (ROS) [7]. These decrease the bioavailability of nitric oxide (NO) by oxidizing them to peroxynitrite, leading to oxidative damage of the endothelial cells [7]. This causes impairment of endothelium-dependent smooth muscle relaxation in the penile arteries causing vasospasm and impaired blood flow [7]. Also smoking alters the elastin of the extracellular matrix and induces calcification of medial elastic fibers producing arterial stiffness, including stiffness of the penile arteries [8].

Mutagawa et al in Tanzania found that cigarette smoking and drinking of alcohol were significantly associated with ED in diabetic subjects [9]. Studies done in Jos, Ilorin and Ile-Ife (all in Nigeria), did not find significant positive correlation between cigarette smoking and ED in men that had type 2 diabetes mellitus [10-12]. Similarly, studies done in Italy and Iran did not find significant correlation between cigarette smoking and ED in patients with type 2 diabetes [13,14]. Yovwin et al. did not find a significant association between tobacco smoking and ED in the non-diabetic population [15]. Equally, Oyalade et al did not find a statistically significant association between cigarette smoking and ED in the general population in Ogbomoso, but Olugbenga-Bello et al found an association between cigarette smoking and ED in a non-diabetic population in Benin, all in Nigeria [16,17]. Al-Hunayam et al found significant association between current smoking, duration of smoking and ED in type 2 diabetic subjects in Kuwait while Bortolotti et al found that the duration and intensity of smoking habit was associated with an increased risk of ED for diabetic subjects [18,19].

Excessive alcohol intake has been shown to have additive deleterious effects on diabetes mellitus and by extrapolation may be associated with increased prevalence of ED in patients with diabetes. Adegite et al found no significant evidence of higher prevalence of ED in T2DM patients who were alcohol consumers in Nigeria [10]. Seid et al had a similar finding in diabetic patients who consumed alcohol in Ethiopia [20]. Mutagaywa et al on the other hand found a significant association between drinking of alcohol and ED in diabetic subjects [9]. Nisanhan et al found that consuming unsafe level of alcohol was significantly associated with ED in diabetic subjects in Sri Lanka [21].

Some studies done on ED found an association between a moderate alcohol consumption and better erection in both men with diabetes and in the general population [6,22]. Oyalade et al. did not find significant association between alcohol consumption and ED in the general population, while two other studies found significant association between alcohol consumption and ED in the general population in Nigeria [16,15,17].

There is paucity of current data on the lifestyle correlates of ED in subjects with type 2 diabetes especially tobacco use and alcohol consumption, both locally and globally. Majority of the studies done on the correlation between erectile dysfunction, cigarette smoking and alcohol consumption in male subjects with type 2 DM that were cited in this study had contrasting findings. This underscores the need for more studies to bridge these gaps on this very important topic.

This study sought to determine the correlation between ED, tobacco use (snuff use and cigarette smoking) and alcohol consumption in type 2 DM patients and to add to the existing literature.

2. SUBJECTS, MATERIALS AND METHODS

This study was a cross sectional one carried out at the diabetes clinic of the Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria.

The study population consisted of male T2DM subjects aged 30 years and above respectively from Anambra State and the other neighbouring South-eastern states, including Abia, Imo, Enugu and Delta, that also patronize the hospital.

A convenient sampling method was used whereby the study subjects were met individually by the researcher as they attended consecutively the diabetes clinic. The patients who met the study inclusion criteria and had none of the exclusion criteria were recruited and they completed the study.

Males with T2DM aged 30 years and above who agreed to participate were eligible for the study. Any patient was excluded from the study if he had type 1 DM, a history of pelvic/penile trauma or surgery, hypogonadism, a history of psychiatric illness, including anxiety and

depression or anti-psychotic medication use, unfavourable penile anatomy for sexual act, urinary tract infection or was severely ill [23].

The researcher had two contacts with each of the study subjects. At the first meeting, the eligible subjects were guided to fill the Hospital Anxiety and Depression Scale (HADS) questionnaires for the diagnosis of depression or anxiety [24]. The participants without anxiety or depression were given another appointment on an agreed date, between 8 and 10 o'clock a.m after an overnight fast of about 10 – 12 hours for biochemical investigations including fasting plasma glucose (FPG), glycated haemoglobin (HbA1c) and serum total testosterone. This was immediately followed by a detailed physical examination and each of the participants filled a pre-tested investigator-structured study proforma, an International Index of Erectile Function questionnaire (IIEF) and the abbreviated version of Alcohol Use Disorder Identification Test (AUDIT-C) [25,26]. The contents of the questionnaires were translated into vernacular for participants who could not understand English language and their responses were filled in appropriately by the researcher. The study proforma was used to obtain the medical, drug and tobacco use history, while the IIEF questionnaire was for the diagnosis of erectile dysfunction. Cigarette smoking was estimated in pack years. A total of 48 subjects had hypogonadism and were dropped from the study while 124 participants completed the study.

Blood samples (7 mL) for the laboratory assays were obtained via venipuncture of the antecubital veins with the observance of all the necessary aseptic procedures. 2 mL of blood for FBG were collected in fluoride oxalate bottles, centrifuged within 30 minutes of collection, stored at 2-8°C and were analyzed within twenty-four hours of collection by the Trinder glucose oxidase method [27]. 1 mL of blood for HbA1c were collected in EDTA bottles stored in the refrigerator at 2-8°C and analyzed within 3 (three) days of collection using the boronate affinity chromatography method using the automated CLOVER A1c Analyzer (Infopia, Korea) and CLOVER A1c Self-Test Cartridge [28]. 4 mL of blood for total testosterone assay were collected in plain bottles, immediately centrifuged at room temperature, the serum separated and stored in the hospital refrigerator at 2-8°C and constant power supply was ensured until they were measured by radioimmunoassay (RIA) using Testosterone ELISA Immunoassay kits (BioCheck) – BC – 1115 [29].

2.1 Statistical Analysis

All the data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20 (Chicago, IL, USA). Descriptive statistics which included frequency, percentages, means and standard deviations were used to summarize categorical and continuous variables. Associations between categorical variables were done using Chi-square test and logistic regression. Level of significance was set at $P < 0.05$. Results were presented in tables.

2.2 Definition of Terms and Criteria

1. Erectile dysfunction (ED) was diagnosed with a score of ≤ 25 in the IIEF Questionnaire [25].
2. Mild ED was diagnosed with a score of 17-25 on the IIEF Questionnaire [25].
3. Moderate ED was diagnosed with a score of 11-16 on the IIEF Questionnaire [25].
4. Severe ED was diagnosed with a score of 6-10 on the IIEF Questionnaire [25].
5. Diabetes mellitus was defined by fasting plasma glucose of ≥ 7.0 mmol/l (126 mg/dl) measured on at least 2 separate occasions or the patient was already on glucose lowering agents [30].
6. Type 1 DM was defined as subjects with DM who were dependent on insulin for survival and were at risk for ketoacidosis [30].
7. Type 2 DM was defined as patients with DM on diet therapy either alone or in combination with oral glucose lowering agent(s) for glycaemic control [30].
8. Impaired fasting glucose (IFG) was defined as fasting plasma glucose of 6.1-6.9mmol/l (110-125mg/dl) [30].
9. Hypogonadism was taken as morning serum total testosterone level < 280ng/dl (9.70nmol/l) [29].
10. Anxiety was defined by a score on the HADS Anxiety Scale of ≥ 8 [31].
11. Depression was defined by a score on the HADS Depression Scale of ≥8 [31].
12. Non-harmful drinking was diagnosed with a score of < 4 in the AUDIT-C questionnaire [26].
13. Hazardous drinking was diagnosed with a score of ≥ 4 < 5 in the AUDIT-C questionnaire [26].
14. Alcohol use disorder was diagnosed with a score of ≥ 5 in the AUDIT-C questionnaire [26].

3. RESULTS

A total of 124 type 2 DM subjects were studied. The prevalence rate of ED among the subjects was 48.4%.

3.1 Characteristics of the Study Subjects

The mean age of the subjects was 58.29 (10.02) years, mean FBG was 9.01 (3.19) mmol/L and their mean IIEF score was 26.77 (19.40). Also, the mean BMI was 26.89 (4.22) kg/m2 and the mean blood pressure was 128.60 (18.22) mmHg for SBP and 84.16 (12.64) mmHg for DBP [23]. These and the other clinical characteristics are shown in Table 1.

3.2 Association between Erectile Dysfunction and its Social Life Style Correlates among the Subjects

No significant associations were found between erectile dysfunction and tobacco use (cigarette smoking and snuff use) (*P* = 0.814, OR = 0.904, 95% C.I = 0.389 – 2.101) (*P* = 0.762, OR = 0.867, 95% C.I = 0.344 – 2.15) and alcohol consumption (*P* = 0.389, OR = 0.670, 95% C.I = 0.269 – 1.667) respectively. These are shown in Table 2.

3.3 Association between Cigarette Smoking and Grades of Erectile Dysfunction among the Subjects

Table 3 shows that there was a higher proportion of cigarette smokers without erectile dysfunction (57.69%) than those with erectile dysfunction, although the association was not statistically significant. Moderate and severe erectile dysfunction was commoner among subjects who smoked 5 pack years or less compared to those who smoked more than 5 pack years. This was equally not statistically significant (*P*= 0.766).

3.4 Association between Grades of Alcohol Consumption and Severity of Erectile Dysfunction in the Subjects

Table 4 shows that type 2 DM subjects with mild alcohol consumption had the highest proportion of severe erectile dysfunction, although this was not statistically significant. Also the highest number of subjects without erectile dysfunction (54.83%) was found among those that consumed alcohol mildly. This association was equally not statistically significant (*P* = 0.308)

Table 1. Baseline characteristics of study subjects

Variables	Mean (SD)
	Type 2 DM Subjects (n=124)
Age (years)	58.29 (10.02)
IIEF score	26.77 (19.40)
Weight (kg)	78.89 (9.86)
Height (m)	1.70 (0.08)
BMI (kg/m^2)	26.89 (4.22)
WC (cm)	91.15 (9.86)
WHR	0.95 (0.05)
SBP (mmHg)	128.60 (18.22)
DBP (mmHg)	84.16 (12.64)
FPG (mmol/L)	9.01 (3.19)

BMI=Body Mass Index; DPB=Diastolic Blood; Pressure; FPG=Fasting Plasma Glucose; IIEF=International Index of Erectile Function; SBP=Systolic Blood Pressure; WC=Waist Circumference; WHR=Waist to Hip Ratio

Table 2. Association between erectile dysfunction and its social life style correlates among the subjects

	OR	95% C.I for OR	P value
Cigarette smoking	0.904	0.389 – 2.101	0.814
Snuff use	0.867	0.344 – 2.185	0.762
Cigarette/snuff use	0.690	0.185 – 2.578	0.582
Alcohol use	0.670	0.269 – 1.667	0.389

Table 3. Association between cigarette smoking and grades of erectile dysfunction

N (%)						
Cigarette Smoking (Pack Years)	**Type 2 DM Subjects who smoke cigarettes (N=26)**				**χ^2**	**p-value**
	Mild ED (n=1)	**Moderate ED (n=2)**	**Severe ED (n=8)**	**ED Absent (n=15)**		
0-5	0 (0.0)	2 (100.0)	3 (37.5)	9 (60.0)	10.813	0.766
6-10	1 (100.0)	0 (0.0)	1 (12.5)	4 (26.6)		
11-15	0 (0.0)	0 (0.0)	1 (12.5)	1 (6.7)		
16-20	0 (0.0)	0 (0.0)	1 (12.5)	1 (6.7)		
21-25	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		
26-30	0 (0.0)	0 (0.0)	1 (12.5)	0 (0.0)		
31-35	0 (0.0)	0 (0.0)	1 (12.5)	0 (0.0)		

Table 4. Association between grades of alcohol consumption and severity of erectile dysfunction in the subjects

N (%)						
Grade of Alcohol Consumption	**Type 2 DM Subjects (N=124)**				**χ^2**	**p-value**
	Mild ED (n=16)	**Moderate ED (n=7)**	**Severe ED (n=37)**	**ED Absent (n=64)**		
No alcohol use	6 (37.50)	1 (14.28)	7 (18.92)	13 (20.97)	10.588	0.308
Mild alcohol consumption	5 (31.25)	3 (42.86)	17 (45.95)	34 (54.83)		
Moderate alcohol consumption	2 (12.50)	0 (0.00)	7 (18.92)	5 (8.06)		
Severe alcohol consumption	3 (18.75)	3 (42.86)	6 (16.21)	12 (19.34)		

4. DISCUSSION

This study was a cross sectional hospital-based one that assessed the association between ED and social life style habits like tobacco use and alcohol consumption in subjects with type 2 diabetes mellitus.

4.1 Association between Tobacco Use and Erectile Dysfunction in Subjects with Type 2 Diabetes Mellitus

This study showed no significant association between tobacco use (cigarette smoking and snuff use) and erectile dysfunction in the subjects with type 2 diabetes mellitus (P = 0.814, OR = 0.904, 95% C.I = 0.389 – 2.101) (P = 0.762, OR = 0.867, 95% C.I = 0.344 – 2.15) respectively. There was also no significant association between the pack years of cigarette smoking and the severity of erectile dysfunction in these subjects (P = 0.766). In this study, the subjects that used tobacco comprised those that smoked cigarette alone, those who took snuff alone and those who took both. This finding agrees with some studies done in T2DM subjects in Nigeria [10-12]. The finding is also similar to those obtained in some studies done in non-diabetic population in Nigeria [15,16]. Some studies done outside Nigeria equally did not find significant association between tobacco smoking and ED in subjects with type 2 diabetes [13,14,32]. Al-Hunayan et al found significant association between current smoking and duration of smoking with ED in T2DM subjects in Kuwait [18]. Bortolotti et al found that duration and intensity of smoking was associated with increased risk of ED for DM subjects in Italy [19]. Malavige et al found that erectile dysfunction was significantly more likely to occur in diabetic patients who smoked compared to those who never smoked [33]. In the general population Chew et al found a non-significant association between daily cigarette smoking and ED and Natali et al found that heavy smokers (> 20 cigarettes per a day) had likelihood of severe ED compared to those who smoked less [34,35].

The non-significant correlation between tobacco use and ED in the T2DM subjects found in this study could be explained by many facts. Firstly, only a few of the diabetic subjects studied (26)

smoked cigarette and few were currently smoking. As at the time of the study, most of the subjects had quitted smoking due to medical advice. Moreover, the socio-cultural and religious stigma attached to smoking in Nigeria, especially the southern part of Nigeria is another key reason. This may have caused reluctance in volunteering the history of tobacco use by the subjects in this study. A recent meta-analysis put the pooled prevalence of current smokers in Nigeria at 10.4% and 17.7% for ever smokers [36]. These figures were comparatively lower than those of some other climes that had better tolerance for smoking.

Furthermore, though current literature has yet to reach a consensus as to the magnitude of the benefit for smoking cessation specifically with regards to ED, there is currently emerging evidence that the effect of smoking on ED could be reversible with smoking cessation prior to middle age and not restarted [37,38].

Also, the fact that so many of our study subjects who smoked tobacco, had stopped at the time of this study could have influenced this result. This is based on the fact that a large population-based study in the United States had demonstrated that former smokers were not at increased risk of ED compared to non-smokers, suggesting that the impact of smoking on erectile function wears off with time following cessation of smoking [39]. A short smoking cessation period of 24-36 hours in heavy smokers could allow for significant improvement in tumescence and vascular erectile parameters [40]. Equally, Chan et al in China demonstrated that in a cohort of 143 men with ED who quitted smoking, > 50% reported improvement in erectile function at 6 months, double the rate of those who were unable to quit [38].

Another factor that could account for our finding is the peculiarity of the population we studied. Most of our T2DM subjects who were hypertensive were on either angiotensin converting enzyme inhibitors (ACE-Is) or angiotensin receptor blockers (ARBs). A lot of the non-hypertensive subjects among them, had proteinuria and were equally on either ACE-Is or ARBs. Angiotensin receptor blockers had been reported in a study to exhibit a beneficial effect on erectile function while ACE-Is had neutral effect [41].

Lastly our African diet, especially the Nigerian diet which consists of mainly vegetables and herbs could also account for the type of result from this study. Alhassan et al reported that a lot of Nigerian plants have anti diabetic and anti-oxidants properties [42]. Anti-diabetic and anti-oxidant medications have beneficial effects on the blood vessels physiologically and can prevent ED developing in type 2 diabetic patients. Salim et al equally reported anti diabetic and antioxidant properties of rosemary (Salvia rosmarinus) [43].

4.2 Association between Alcohol Use and Erectile Dysfunction in Subjects with Type 2 Diabetes Mellitus

This study showed no significant association between alcohol use and erectile dysfunction in subjects with type 2 diabetes mellitus (P = 0.389, OR = 0.670, 95% C.I = 0.269 – 1.667). There was also no significant association found between the different severity grades of alcohol consumption (mild, moderate and severe) and the severity grades of erectile dysfunction (P = 0.308).

Adegite et al had a similar finding in T2DM subjects while Oyalade et al had a similar finding in the general population in Nigeria [10,16]. Equally both Seid et al and Yang et al did not find significant correlation between alcohol consumption and ED in diabetic subject [20,44]. Shiri et al did not find significant difference in the incidence of ED and amount of alcohol consumption in the Finnish general population [45]. The finding from this work however is different from that of Mutagaywa et al who found significant association between drinking alcohol and ED in diabetic subjects [9]. Likewise, Nisahan et al found that consuming unsafe level of alcohol is significantly associated with ED in diabetic patients [21].

The majority of the subjects that consumed alcohol in our study were categorized under the mild consumption group (59), compared to those in the moderate (24) and severe (14) consumption groups respectively. Majority of our study subjects had quitted alcohol consumption as at the time of this study and this was mainly in response to medical advice. Equally, consumption of excessive quantity of alcohol and alcohol use disorders are viewed with a lot contempt in our clime. A recent study in an urban slum in South-eastern Nigeria found that only 8.1% of the people drank alcohol above the general recommended unit per week. Alcohol consumption was supposed to be higher in urban slums compared to rural settings and organized

urban dwellings [46]. This prevalence of alcohol consumption in Nigeria is far lower than what is obtainable in most cold climes.

Yovwin et al and Olugbenga-Bello et al found significant association between alcohol consumption and ED in the general population in Nigeria [15,17].

The fact that majority of our study subjects consumed alcohol mildly and also that most had quitted alcohol as at the time of this study could have accounted for the non-significant finding.

Furukawa et al found that the frequency of alcohol consumption and weekly alcohol consumption were independently inversely associated with ED in Japanese men with type 2 diabetes. Alcohol consumption of less than 60g, but not 60g or more per day was independently related to a lower prevalence of ED [47]. Finally, the consumption of plant rich diet that is common in our population and the fact that majority of our study subjects were on ARBs or ACE-Is could have accounted for the non-significant correlation between alcohol consumption and ED found from our study.

5. CONCLUSIONS

There was no significant association between ED and tobacco use and alcohol consumption in subjects with type 2 diabetes mellitus. There was equally no significant association found between ED and the pack years of cigarette smoking and the different grades of alcohol consumption in subjects with type 2 diabetes mellitus.

These findings could be partly explained by the fewer number of our study subjects that used tobacco and consumed alcohol and the fact that they consumed low quantities of these substances. This was in addition to the fact that many of the subjects had quitted tobacco use and alcohol consumption prior to the time of this study.

Moreso, the local diet of the population we studied was richly plant based and some of the plants have proven medicinal values, including anti diabetic and anti-oxidant properties. This could also have accounted for our findings. Additionally, majority of the study subjects were on ARBs either as anti-hypertensive or anti proteinuric medications. ARBs could improve ED in some of these subjects.

6. LIMITATIONS

1. The Hospital Anxiety and Depression Scale (HADS) questionnaires, International Index of Erectile Function questionnaire (IIEF) and the abbreviated version of Alcohol Use Disorder Identification Test (AUDIT-C) questionnaire used in this study are all self-report diagnostic tools. Their interpretation to the patients who did not understand English language may have reduced the accuracy of the responses given.
2. Also, the prevailing socio-cultural and religious implications of some the questions in we asked our study participants could make some of the responses very subjective. This pertains mainly to questions on alcohol consumption, tobacco smoking and erectile dysfunction.
3. This study being a cross sectional one, did not allow the researcher make inference about cause and effect of the social life style risk factors of ED in the population studied.

CONSENT

All the study participants provided a written informed consent before their enrollment into the study.

ETHICAL APPROVAL

Ethical clearance for the study was gotten from the ethics committee of Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria. Ethical clearance reference: NAUTH/CS/66/VOL.6/112.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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