

EXERCISE AND OTHER LIFESTYLE HABITS OF PATIENTS WITH TYPE II DIABETES MELLITUS IN JOS, NIGERIA

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ABSTRACT

Background

Diabetes mellitus is a chronic disorder with complications affecting millions of people worldwide. It has been projected that in the near future, it will affect people in the developing countries like Nigeria more than the developed world. Lifestyle modification including exercise is important in the management of this condition. The other lifestyle of patients with diabetes including cigarette smoking and alcohol ingestion also affects the glycaemic control and the development or worsening of complications in these patients

Methods

This was a descriptive cross-sectional study carried out at the diabetes clinic of Jos University Teaching Hospital (JUTH) and a diabetes specialist clinic in Jos, North central Nigeria. Ninety patients with diabetes aged 18 years and above were recruited consecutively. Wheel chair bound patients, patients who had amputation in the past and patients who did not consent to the study were excluded from the study. Data was obtained using an interviewer administered questionnaire

Results

Fifty-four (60%) persons were males. The mean age was 56.8 ± 11.5 years. 52.2 % participated in one form of exercise with 43 (91.5%) persons exercising for <150 minutes per week. The mean duration of exercise per week was 75.6 ± 55.5 minutes. Those who exercised were younger, males and with lower HbA1c. The common form of exercise was walking. Barriers to exercise found include lack of time, pain/swelling in the legs, ill health and not knowing what exercise to do. Three (33.3%) out of the nine persons who took alcohol ingested it in significant amount and 1 (1.1%) person smoked cigarette.

Conclusion

The exercise habit of patients with diabetes in this environment is poor with some persons taking alcohol in significant quantity and smoking cigarette. Education and counseling of these patients therefore are important and should be done at every given opportunity.

Key words: Diabetes mellitus, exercise, lifestyle habits.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder due to relative or absolute deficiency of insulin and is associated with acute and chronic complications¹. It has emerged out as a worldwide health problem affecting millions of people in both developing and developed countries². It now affects higher proportion of persons in many developing countries than it does in western countries². Lifestyle modification including diet and exercise are important in the management of these patients³. Exercise is perhaps the single most important lifestyle intervention in diabetes because it is associated with improved glycaemic control,

insulin sensitivity, cardiovascular fitness, and remodeling⁴. Improvements in glycaemic control are usually apparent immediately and become maximal after a few weeks of consistent exercise⁴. The long-term benefits of exercise also include a reduced risk of coronary artery disease and stroke⁵. Thus, routine physical exercise is integral in helping to prevent chronic diseases including diabetes and its complications. There are not only physical but also emotional benefits to routine physical exercise⁶.

Regular, moderate, intensity physical activity for 30 minutes at least 3 times per week is recommended for these

patients⁷. It has been found that majority of individuals with type 2 diabetes are overweight and do not engage in recommended levels of physical activity^{3,8}. Previous studies suggest that individual with diabetes have poor compliance to recommended guidelines for exercise³.

A diabetic patient who smokes has a greatly increased risk of developing ischaemic heart disease compared with a non-smoking non-diabetic person^{9,10}. Smoking also increases the risk of cerebral and peripheral vascular disease and appears to aid the development and progression of microvascular disease^{9,10}. Increased insulin resistance occurs in smokers with and without diabetes¹¹. Smoking is also a risk factor for development of type 2 diabetes. High alcohol intake has been found to be a risk factor for type 2 diabetes¹². It also causes hyperglycaemia mostly in the fed state¹³ and hypoglycaemia¹⁴. Exercise and other lifestyle habits of patients with diabetes in this environment is not known.

We therefore, looked at these habits and barriers to exercise among these patients

Materials and methods

This descriptive cross-sectional study was carried out at the diabetes clinic of Jos University Teaching Hospital and Diabetes Screening Centre in Jos, North central Nigeria. The study was conducted between September and December, 2014. Ninety patients with diabetes, aged 18 years and above who consented to the study were recruited consecutively. Patients who are wheel chair bound, who had amputation and who did not consent to the study were excluded. Data was collected using an interviewer questionnaire with information on demographics, type of diabetes, duration of diabetes, exercise habits in the last one month, alcohol and smoking habits. Weight and height were measured with patients wearing light clothes and no head gear in kilogram and meter respectively. Waist circumference (measured at the midpoint between the iliac crest and the lower costal margin) and hip circumference (measured at the horizontal level using the greater trochanter as the landmark) was also measured with a non stretch tape to the nearest centimeters. Waist circumference was classified in females as normal (<80cm) and abnormal (≥ 80 cm) and in males normal (<94cm) and abnormal (≥ 94 cm). Waist hip ratio (WHR) was classified in females as normal (<0.85) and abnormal (≥ 0.85) and in males normal

(<0.90) and abnormal (≥ 0.90). Body mass index was calculated using weight/ square of the height and classified into underweight (<18.5), normal weight (18.5-24.9), overweight (25-29.9), obese (30 and above) while waist hip ratio was calculated using waist circumference/ hip circumference. Glycated haemoglobin (HbA1c) and fasting blood glucose were retrieved from their records

Statistical analysis

Statistical analysis was done using Epi info 3.5.3. Continuous variables were expressed as means \pm SD, while categorical variables were expressed as proportions. Chi square test was used to compare categorical variables. Where the expected frequency of a cell was <5, Fisher's exact test was used. Univariate and multivariate analyses were done to determine barriers of exercise. In all cases, p- value of <0.05 was considered statistically significant.

Ethical consideration

This study was approved by the human research ethics committee of the Jos University Teaching Hospital. Information concerning all participants was treated with confidentiality. Patients were educated appropriately.

Results

A total of ninety patients with diabetes participated in this study (all had type 2 diabetes). The age range was 29-84 years with the mean of 56.8 ± 11.5 years. Most of the participants (62.2%) were within the age range 45-64 years.

The mean duration of diabetes was 9.4 ± 6.8 years with 50 (55.6%) having diabetes for less than 10 years. Fifty four (60%) of the patients were males. The mean BMI was $28.0 \pm 6.0 \text{ kg/m}^2$ with 59 (65.6%) having a BMI of $\geq 25 \text{ kg/m}^2$; 36.7% classified as overweight and 28.9% as obese. Thirty one (86.1%) females had abnormal waist circumference with thirty three (61.1%) of males having abnormal WC. 88.9% of females and males had abnormal WHR each.

The mean glycated haemoglobin was $10.7 \pm 8.4\%$ with 69 (77.5%) having HbA1c of $\geq 7\%$. Table 1

Table 1: socio-demographic and clinical characteristics of the study population

Characteristics	Frequency (%)
Age (mean)	56.8±11.5
29-44	12 (13.3)
45-64	56 (62.2)
65-84	22 (24.4)
Duration of diabetes (years)	
≤ 9	50 (55.6)
≥ 10	40 (44.4)
Sex	
Females	36 (40)
Males	54 (60)
BMI (mean)	28.0±6.0
Underweight	0
Normal weight	31 (34.4)
Overweight	33 (36.7)
Obese	26 (28.9)
Waist circumference (WC)	
Females	
<80cm	5 (13.9)
≥ 80cm	31 (86.1)
Males	
<94cm	21 (38.9)
≥ 94cm	33 (61.1)
Waist hip ratio (WHR)	
Females	
<0.85	4 (11.1)
≥ 0.85	32 (88.9)
Males	
<0.90	6 (11.1)
≥ 0.90	48 (88.9)
Glycated hemoglobin (HbA _{1c})	
Mean	10.7±8.4%
< 7%	20 (22.5)
≥7%	69 (77.5)

Almost all (96.3%) patients were aware of the importance of exercise in the management of diabetes but only 47 (52.2%) of them participated in any form of exercise. Twenty three (48.9%) persons walked while 22 (46.8%) engaged in jogging with the remaining 2 (4.3%) participating in cycling. Eighteen (38.3%) persons exercised less than 30 minutes per episode and 91.5% exercised for less than 150 minutes per week with the mean duration and frequency of exercise per week being 75.6±55.5 minutes and 2.7 times respectively. Twenty (42.6%) persons exercised more than three times per week. Nine (10.0%) persons took alcohol (all males) with 3 (33.3%)

taking in significant quantity (> 21 units per week). Most 8 (88.9%) took beer. Only one (1.1%) person smoked cigarette. Table 2

Table 2: Exercise and other lifestyle habits of the study population

Characteristics	Frequency (%)
Awareness of the importance of exercise	
Yes	87 (96.7)
No	3 (3.3)
Exercise	
Yes	47 (52.2)
No	43 (47.8)
Type of exercise	
Cycling	2 (4.3)
Jogging/running	22 (46.8)
Walking	23 (48.9)
Duration of exercise per episode	
< 30 minutes	18 (38.3)
≥ 30 minutes	29 (61.7)
Duration of exercise per week	
< 150 minutes	43 (91.5%)
≥ 150 minutes	4 (8.5%)
Alcohol	
Yes	9 (10.0)
No	81 (90.0)
Cigarette smoking	
Yes	1 (1.1)
No	89 (98.9)

Persons who engaged in exercise were slightly younger than those who did not participate in any form of exercise (56.0±9.4 and 57.7±13.4 years respectively) but this was not statistically significant. (P value=0.47). The mean HbA_{1c} of those who exercised was lower 9.8 (3.1) % than for those who did not exercise 11.7 (11.7)% (P=0.3).

Only waist circumference in females was associated with exercise. Table 3.

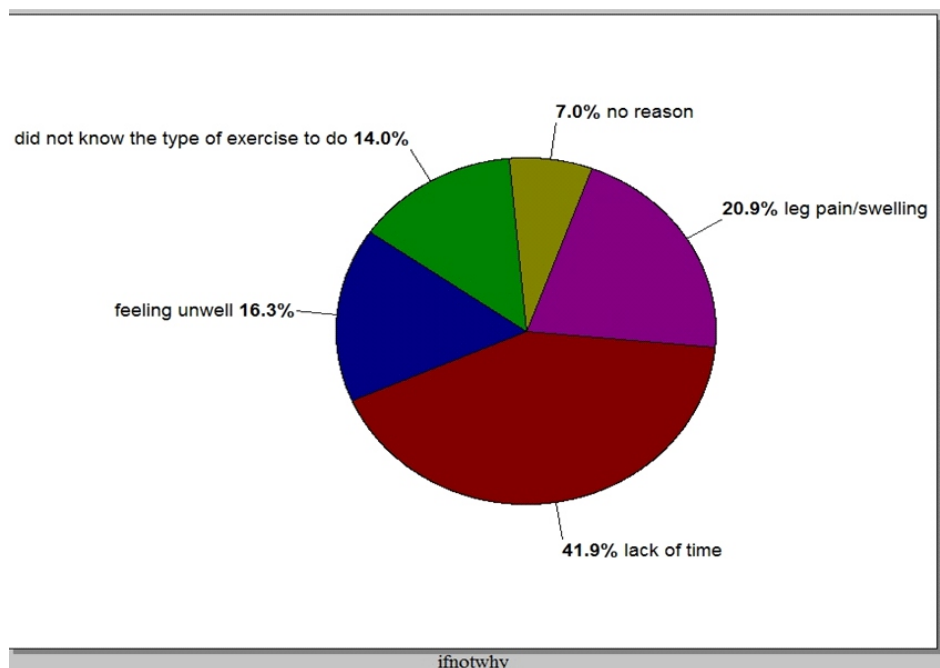
Table 3: Relationship between socio- demographic and clinical characteristics and exercise

Characteristics	Exercise			P value
	Yes	No	Total	
Age (mean)	56.0 (9.4)	57.7(13.4)		0.47
29-44	5 (10.6)	7 (16.3)	12 (13.3)	0.48
45-64	32 (68.1)	24 (55.8)	56 (62.2)	
65-84	10 (21.3)	12 (27.9)	22 (24.4)	
Duration of diabetes (mean)	9.5 (7.1)	9.4 (6.5)		1.00
<10 years	24 (51.1)	26 (60.5)	50 (55.6)	0.19
≥ 10 years	23 (48.9)	17 (39.5)	40 (44.4)	
Sex				
Female	15 (31.9)	21 (48.8)	36 (40.0)	0.08
Males	32 (68.1)	22 (51.2)	54 (60.0)	
HbA _{1c} (mean)	9.8 (3.1)	11.7 (11.7)		0.3
<7%	11 (23.4)	9 (21.4)	20 (22.5)	0.42
≥7%	36 (76.6)	33 (78.6)	69 (77.5)	
BMI (mean)	28.6 (5.2)	27.4 (6.7)		0.3
<18.5	0	0	0	
18.5-24.9	12 (25.5)	19 (44.2)	31 (34.4)	0.17
25-29.9	19 (40.4)	14 (32.6)	33 (36.7)	
≥ 30	16 (34.0)	10 (23.3)	26 (28.9)	
Waist circumference (WC)				
Females (mean)	98.2 (7.0)	92.7 (13.3)		0.15
<80cm	0	5 (23.8)	5 (13.9)	0.05*
≥ 80cm	15 (100)	16 (76.2)	31 (86.1)	
Males (mean)	99.1 (11.6)	93.4 (12.6)		0.09
<94cm	10 (31.3)	11 (50.0)	21 (38.9)	0.13*
≥ 94cm	22 (68.8)	11 (50.0)	33 (61.1)	
Waist hip ratio (WHR)				
Females (mean)	0.93 (0.07)	0.91 (0.45)		0.18
<0.85	2 (13.3)	2 (9.5)	4 (11.1)	0.56*
≥ 0.85	13 (86.7)	19 (90.5)	32 (88.9)	
Males (mean)	0.98 (0.06)	0.95 (0.6)		0.04
<0.90	3 (20.0)	7 (33.3)	10 (27.8)	0.3*
≥ 0.90	12 (80,0)	14 (66.7)	26 (72.2)	

• Fisher exact

Various reasons were given for not exercising. Eighteen (41.9%) persons had no time for exercise, while 7 (16.3%) felt unwell. Figure 1

Figure 1: Barriers to exercise



Discussion

This study found that not many patients with diabetes exercise with only 52.2% of the study population participating in any form of exercise. This is consistent with other findings where 57.1%¹⁵ and 53%¹⁶ of patients with diabetes were found to participate in one form of exercise or the other. It is however higher than what was found by Thomas et al¹⁷ in Scotland (34%). Oyewole et al¹⁸, in South West, Nigeria found that 31% of patients with diabetes are inactive. This means that 69% of the patients were active. In another study in Nigeria, 62% of patients with diabetes were found to be moderately active¹⁹. This finding is higher than what was found in this study probably because in the two studies the international physical activity questionnaire was used while in this study questions about the exercise habits of the patients were asked. We also found that those who exercised did not follow recommendations for exercise among patients with diabetes in terms of frequency and duration. This is also corroborated by other studies in Africa, Asia United kingdom and the United States of America^{3,8,15-17}. There was no significant difference in age, sex, duration of diabetes, BMI, and glycaemic control between those who exercised and those who did not exercise even though those who exercised were males, younger and had a better glycaemic control. Boule et al²⁰ found that exercise reduced HbA1c with no significant greater change in body mass between the exercise and control group. Thomas et al¹⁷, in another study found that younger people participated in exercise more than the elderly.

Walking was the most popular activity in this study. This is consistent with the findings of a study done by Thomas and his colleagues in Spain¹⁷. The preference for walking may be due to the fact that it is convenient, less tasking and it is not costly. Aerobic exercise which includes walking is recommended for patients with diabetes²⁰. The duration and frequency of exercise however, was not as recommended. This may explain why there was no significant statistical difference in glycaemic control with higher WC WHR and BMI in those who exercised. Exercise only improves glycaemic control and subsequently reduces weight if it is done consistently^{4,19}..

Additionally, exercise is also associated with weight loss and weight maintenance when used along with an appropriate calorie controlled meal plan²¹.. The diet plan of these patients was not

assessed in this study which may explain why patients that exercised had a higher BMI, WC and WHR. It may also be that patients with abnormal weight were counseled more about the need for exercise and weight reduction than those with normal weight.

Barriers to exercise identified in this study include lack of time, ill health, pain in the legs, and not knowing what exercise to do. Some had no reason for not exercising which may suggest lack of self motivation. Lack of time was also found as a barrier in some studies^{17,22,23}. Ill health^{22,23} and pain in the legs²² have also been found as barriers in other studies. The finding that some persons did not know the type of exercise to engage in may suggest that patients' education in our setting is not adequate. The barriers found in this study may help clinicians and other health workers counsel patients appropriately as counseling is said to be important²⁴. It may also suggest that counseling about lifestyle changes should be individualized addressing physical challenges as well as the attitude of patients regarding physical activity so as to achieve results. Setting modest and realistic goals and helping patients to undertake exercise are likely to be effective at changing behaviour patterns²⁵. Assessing Patients' knowledge regarding physical activity may be helpful. Patients need to be encouraged to take some form of physical activity no matter how they feel.

We also found out that 10% of the study population (all males) took alcohol with 3 (33.3%) taking in significant quantity (> 2 drinks (710ml containing 5% alcohol) per day). A study in Nepal found that 16.6% of patients with diabetes took alcohol but the quantity was not specified¹⁵. Moderate alcohol ingestion (≤ 1 drink in females and ≤ 2 drinks in men per day) is said to be associated with reduced risk for heart disease²⁶ but excess amount of alcohol is associated with complications^{13,14,26}. It also worsens some complications of diabetes especially peripheral neuropathy²⁶. Alcohol use, at least on a social level among patients with diabetes is said to be common²⁷ but moderation is important and must be emphasized²⁶. This is to reduce complications of diabetes in these patients.

One (1.1%) person smoked in this study. This is low and may be attributed to the fact that smokers deny their smoking habits²⁸. However, self-reported cigarette smoking has been validated in some studies²⁹. Studies in Africa, Asia, United kingdom and the USA have found admitted rates of smoking

to range from 16-28%^{15,22,30-32}. This is higher than what was found in this study and may be because of the younger age group studied as the risk for smoking is highest among young adults³³. Even though the rate is low in this study, it is important that clinicians identify patients with diabetes that smoke and counsel on the need to stop smoking since it is associated with complications^{9,10}.

This study had some limitations. The data were self reported and may not reflect the habits of these patients as they may have reported what is acceptable and not what was practiced. In addition, physical activity at work was not assessed and this may have underestimated the total activity levels. Consistency of exercise was also not assessed in this study as patients were asked if they participated in any form of exercise in the last one month. The relatively small sample size and the fact that it was a hospital based study may limit generalizing the findings.

Conclusion

The number of patients with diabetes who participate in any form of exercise is disappointing with many not exercising as recommended in terms of frequency and duration. Counseling patients on exercise should be individualized addressing problems of these patients to achieve results and minimize barriers to exercise. The social habit of these patients should also be sought for and counseling done appropriately to reduce complications of diabetes. This should be done continuously as patients need encouragement to exercise and to do away with habits that are detrimental to their health.

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