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Assessment of level of physical activity in patients with type 2 Diabetes Mellitus

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Abstract. Type 2 Diabetes mellitus (DM) is increasing globally due to population growth, ageing, urbanization, obesity and physical inactivity. Studies assessing level of physical activity among patient with the disease is scarce. The study was aimed at assessing the level of physical activity in patient with type 2 Diabetes mellitus. *Method*: Purposive sampling technique was used to recruit 150 participants for the study, but only 100 copies of questionnaire were amenable to data analysis. Ethical clearance was obtained from Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) Ile Ife Ethical and Research Committee and all the respondent gave their consent. International Physical Activity Questionnaires (IPAQ) was administered to each patient after adequate explanation of the procedure. Data obtained were analyzed using descriptive. Significance was set at 0.05 alpha level. *Result*: Results obtained showed that 26% have low physical activity level, 41% of the respondents have moderate level of physical activity and 33% have high physical activity level while 68% were female and 32 % were male 35% of the respondent were age group of 50 – 59yr. Fifty percent (50%) of the respondents were traders, 21% were civil servants, 9% were farmer and 12 % were retiree. *Conclusion:* It was concluded that higher percentage of patients with type 2 Diabetes Mellitus in this environment have low and moderate level of physical activity, female were more affected by DM than male, traders were more affected with type 2 DM than any other occupation and age group of 50 -59 years were more affected than any other age group.
Key words: *physical activity, questionnaire, trader, diabetes mellitus,*

Introduction

Diabetes is a global problem with devastating human, social and economic impact. Around 250 million people worldwide are living with diabetes mellitus and by 2030 this total is expected to increase to over 366 million (1). So much attention is being given even recently to communicable diseases like HIV, tuberculosis and malaria at the detriment of the emerging epidemic of non-communicable disease like DM, hypertension and heart disease. Over 30% of our elite populations including decision-makers are diabetic (2). The prevalence of DM has been increasing steadily over the past 30 years (2) and research suggested that diabetes is emerging as a major health problem in Africa, including Nigeria (3). Ebenezer et al. (3) found out that the prevalence of DM in Nigeria is 4.6% in the lower class and 2.5% in the highest class and that 40% of the subjects with diabetes are undiagnosed and over 80% of these are asymptomatic. The progressive increase in the prevalence rates of diabetes is associated with lifestyle changes.

Overweight and obesity, physical inactivity, alcohol consumption, dietary changes and cigarette smoking are factors that are potentially modifiable (2).

The direct and indirect effects on the human vascular tree are the major source of morbidity and mortality in both type 1 and type 2 Diabetes. Generally, the injurious effects of hyperglycemia are separated into macrovascular complications (coronary artery disease, peripheral arterial disease, and stroke) and microvascular complications (diabetic nephropathy, neuropathy, and retinopathy) (4). According to Mayo Clinic (5), diabetes affects many major organs, including your heart, blood vessels, nerves, eyes and kidneys, although long-term complications of diabetes develop gradually, they can eventually be disabling or even life-threatening. Some of the potential complications of diabetes includes retinopathy, neuropathy, nephropathy and arteriosclerosis. Nerve disease caused by type 2 diabetes is the leading cause of amputation of feet,

toes, legs, hands and arms among diabetes sufferers. Collectively, the disorders which cause these amputations are called diabetic neuropathies. Foot infections are the most common problems in persons with diabetes (6). A physically inactive population is at increased risk for many chronic diseases, including heart disease, stroke, colon cancer, diabetes, and osteoporosis. Regular physical activity can reduce the risk of developing type 2 Diabetes and metabolic syndrome. Research showed that lower rates of these conditions are seen with 120 to 150 minutes (2 hours to 2 hours and 30 minutes) a week of at least moderate-intensity aerobic activity. And the more physical activity someone does, the lower the risk will be (7).

Physical inactivity has been identified as the fourth leading risk factors for global mortality causing an estimated 3.2 million deaths globally (8). According to the Department of Health and Human Services' "2008 Physical Activity Guidelines for Americans", physical activity generally refers to bodily movement that enhances health. Physical activity is any body movement that works your muscles and uses more energy than you use when you're resting. Walking, running, dancing, swimming, yoga, and gardening are examples of physical activity (9). Physical activity improves health and well-being. It reduces stress, strengthens the heart and lungs, increases energy levels, helps you maintain and achieve a healthy body weight and it improves your outlook on life. Being physically active, along with following a healthy diet and not smoking, is one of the most important things that can be done to keep the heart and lungs health, the good news, though, is that even modest amounts of physical activity are good for the health. The more active you are, the more you will benefit (9). Regular moderate intensity physical activity – such as walking, cycling, or participating in sports – has significant benefits for health. For instance, it can reduce the risk of cardiovascular diseases, diabetes, colon and breast cancer, and depression. Moreover adequate levels of physical activity will decrease the risk of a hip or vertebral fracture and help control weight (9). Exercise has positive benefit for those who have diabetes. Regular physical activity has been described to have special advantages on type 2 diabetes mellitus in that it improves body's sensitivity to insulin and helps manage blood glucose levels (10). It lowers blood sugar level, improve insulin sensitivity, and strengthen the heart . Aerobic exercise has significant and particular benefits for people with type 1 diabetes. It increases sensitivity to insulin, lowers blood pressure, improves cholesterol levels, and decreases body fat. The best thing that can be done for diabetes and general health is to be physically active. Physical activity provides wonderful benefit to the body by making insulin work more efficiently and therefore reducing blood glucose levels. It reduces blood pressure, lipid levels (such as cholesterol and triglyceride) and the risk of heart problem. There is dearth of studies on the assessment of level of physical activity in patient with diabetes mellitus in this environment. Therefore the objective of this study was to assess the level of physical activity in patient with diabetes mellitus in Osun State of Nigeria.

Material and Method

A cross sectional survey research design was used in this study. The population consisted of patients living with type 2 DM attending out-patient clinics at major Hospitals in Osun State in Nigeria. These hospitals were: Obafemi Awolowo University Teaching Hospital Complex Ile-Ife, Wesley Guild Hospital (WGH), Ilesha, Ladoke Akintola University of Technology (LAUTECH) Teaching Hospital, General Hospitals, Asubi-Aro Osogbo and General Hospital Oke-Ogbo, Ile-Ife. Purposeful sampling technique was used to select 150 patients with type 2 diabetes mellitus and 100 responded.

Ethical approval was obtained from the Ethics and Research Committee of OAUTHC, Ile-Ife. International Physical Activity Questionnaire (IPAQ) which is an instrument that is designed primarily for population surveillance of physical activity among adult (11) was used to assess the physical activity level of the patients. IPAQ assessed physical activity undertaken across a comprehensive set of domains including: leisure time physical activity, domestic and gardening (yard) activities, work-related physical activity and transport - related physical activity.

Procedure. Each patient with type 2 diabetes mellitus was approached individually, the aim and purpose of the study was explained. Every patient that volunteered to participate was given a copy of the questionnaire and informed consent form to fill. About 150 patients with type 2 diabetes mellitus were recruited for the study, but only 100 volunteered to participate.

Data analysis. Descriptive statistics of mean and standard deviation was used to analyze the data. Chi-square test of association was used to test the relationship between the correlates and physical activity level. Alpha level was set at p=0.05

Results

Socio-demographic data of respondent. Presented in table I is socio-demographic data of the participant. It was observed that 87% of the respondents were married out of which 32% was male and 55% was female. The remaining 13% were widow.

Considering occupation of the respondents, 21% were civil servants, 50% were trader, 9% were farmer, retiree were 12% and 6% for other forms of occupation such as being a Clergyman.

Level of Physical activity of respondents. Shown in table II is level of physical activity of respondents. The table revealed that 33% of the respondents have high level of physical activity out of which 12% of them are male while the remaining 21% are females. 41% of the respondents rank moderate in their level of physical activity; 11% male and 30% female. 26% of the respondents have low level of physical activity; 9% male and 17% females.

Table I. Demographic data of respondent (N = 100)

VARIABLES	MALE		FEMALE		TOTAL	
	N	%	N	%	N	%
MARITAL STATUS						
Married	32	32	55	55	87	87
Single	0	0	0	0	0	0
Divorced	0	0	0	0	0	0
Widowed	0	0	13	13	13	13
OCCUPATION						
Civil servant	9	9	12	12	21	21
Vocation	0	0	2	2	2	2
Trader	9	9	41	41	50	50
Farmer	3	3	6	6	9	9
Retiree	8	8	4	4	12	12
Others	3	3	3	3	6	6
TOTAL	32	32	68	68	100	100

Key: N=frequency, %=percentage

Table II. Frequency distribution of physical activity level of respondent (N=100)

P/A LEVEL	MALE		FEMALE		TOTAL	
	N	%	N	%	N	%
High	12	37.5	21	30.9	33	33
Moderate	11	34.4	30	44.1	41	41
Low	9	28.1	17	25.0	26	26
Total	32	100	68	100	100	100

Key: N=frequency . %=percentage

Frequency distribution showing age range of respondents. Shown in Table III is the frequency distribution of age range of respondents. It could be observed that respondents within the age range of 50 – 59years are 35%, those within the age of 60 – 69years are 27% and 19% for age range within 70 -79years are 19%.

Other age range and their percentages are; 20 – 29 years is 1%, 30 -39years is 1%, 40 – 49years is 13%, 50-59 years, 34%, 60-69years, 24%, 70-79 years 20% and 80 years and above is 2%.

Table III. Age and level of physical activity of respondent (N= 100)

AGE	HIGH	MODERATE	LOW	TOTAL
20 – 29	1	0	0	1
30 – 39	0	1	0	1
40 – 49	4	6	3	13
50 – 59	11	16	7	34
60 – 69	12	6	9	24
70 – 79	5	10	5	20
80+	0	0	2	2
MssnVal	0	2	0	2
TOTAL	33	41	26	100

Discussion

Our study provides evidence that more women may be affected with type 2 diabetes mellitus than men in this environment. The ratio observed in this study was ratio 1: 2, men : women. This is in contrary to the finding of the work of Doney et al. (12) they reported that male to female ratios at different ages-diagnosed confirms a known phenomenon that men are much more prone to early type 2 diabetes (type 2 DM) than women. More, so the result of Christa et al. (13) from their study titled "Sex differences in risk factors for incident type 2 Diabetes Mellitus", the age-standardized incidence rate was 5.8 per 1000 person-years for men and 4.0 per 1000 person-years for women which indicated that more males were affected than females. Circulating sex hormone levels are associated with type 2 diabetes, but the causal nature of these associations is still a point of debate. In men, lower testosterone, higher estradiol and lower sex hormone binding protein levels are associated with type 2 diabetes. In women, higher testosterone, higher estradiol and lower sex hormone binding protein are associated with type 2 diabetes (14). Information from NDIC, (15) indicated that some women develop gestational diabetes late in pregnancy which may disappears after the birth of the baby, women who have had gestational diabetes (GD) have a 35 to 60 percent chance of developing type 2 diabetes within 10 to 20 years. This may accounted for higher rate of type 2 DM in women in this environment.

Considering the demographic data of the respondents 30.9 % percent of female have high level of physical activity while 37.5 % percent of male have high level of physical activity. Earlier study by Thompson et al. (16) suggested that males are more active than females and that they were significantly more engaged in more time moderate physical activity than females. The number of female with type 2 diabetes mellitus is sixty-eight out of one hundred respondents while the remaining 32% of the respondent are males. This finding was contrary to. Exactly fifty percent (50%) of the respondents are trader showing that type 2 diabetes mellitus is more prevalent among traders. A total of twenty-one percent (21%) of the respondents are civil servant. There seems to be a dearth of data on this; if there is any link between type 2 Diabetes mellitus and occupation as being a trader or a civil servant.

Regarding the level of physical activity in this study, largest number of respondent had moderate level of physical activity. This result was similar to the result got by Nor et al. (17) when they conducted similar study in Malaysia, majority of patients had moderate (47.0%) physical activity level. In the same vein the work of Abdel & Abdullah (18) showed that 64.4% patients with type 2 Diabetes mellitus had moderate level of physical activity and were not participating in regular exercise. A study among rural elderly with diabetes in America also showed that half of the subjects (52.5%) had a moderate physical activity level (19). All these were in support that moderate level of physical activity is rampant among patients with type 2 Diabetes mellitus. Regular exercise has special advantages on type 2 diabetes, it improves body sensitivity to insulin and helps manage blood glucose levels. Canadian Association of Diabetes (10) recommended a 150 minutes of moderate to vigorous exercises five times a week. This is a pointer that good percentageof patients living with type 2 DM in this environment are within acceptable level of physical exercises

With regard to the age range, it was observed that type 2 Diabetes mellitus was common among

people with age ranging from 50 to 79 years; the prevalence of type 2 diabetes mellitus was more between age of 40 – 79 years. This finding is in support with what Guyton and John (20) said about type 2 diabetes mellitus that it develops gradually between the age of 50 and 60 years, hence called "adult onset diabetes mellitus". In addition NDIC (17) reported that type 2 diabetes is more common in older people, especially in people who are overweight, and occurs more often in African Americans. National survey data in 2007 indicated a range in the prevalence of diagnosed and undiagnosed diabetes in various populations ages 20 years and older. The report indicated that 10.7 percent, of all people in above 20years old may have diabetes and in 60 years or older**,** 23.1 percent, of all people in this age group have diabetes.

It was observed from this study that physical activity level decreased with age, and the highest percentage of the respondents were of moderate physical activity. This result is in accordance with the result that Norman et al, (20). Norman et al. also documented that the total daily physical activity was decreasing systematically between age 45 and 79 years which is in line with this study. However the finding of our study was in congruent with the work of Knowler et al. (21) which involved a randomized clinical trial. They showed that an intensive lifestyle modification of healthy diet and moderate physical activity of 30 minutes a day for 5 days a week was found to reduce the incidence of type 2 diabetes by 50% as compared with placebo.

In conclusion, women were found to be more affected by DM than male in this environment, higher percentage of patients with type 2 diabetes mellitus engaged in moderate level of physical activity. Type 2 diabetes mellitus was most prevalent among traders (50%) and at age group of 50 -59 years.

References

1. Hossain P, Kawar B, El Nahas M (2007). Obesity and Diabetes in the Developing World — A Growing Challenge. *N Engl J Med*; 356:213-215.
2. Isaac Akogu (2009): The Problem of Diabetes in Nigeria. *http://eziniearticles.com.*
3. Ebenezer A. Nyenwe, Osaretin J. Odia, Anele E. Ihekwaba, Aaron Ojule, Seye Babatunde, (2003): Type 2 diabetes in adult Nigerians: a study of its pre valence and risk factors in Port Harcourt, Nigeria. *Diabetes Research and Clinical Practice;* 62: 177-185.
4. Michael J. Fowler (2008). Microvascular and Macrovascular Complications of Diabetes Mellitus. Clinical Diabetes; (26) 2: 77-82.
5. Mayo Clinic (2011). Complication of type 2 diabetes mellitus. *http://www.mayoclinic.com/health/type-2-diabetes/DS00585/DSECTION=complications*
6. Michael Stuart Bronze (2011). Foot Infection In Diabetes Mellitus. *http://emedicine.medscape.com/article/237378*
7. C.D.C.P (2011). Centers for Disease Control and Prevention, US Department of Health and Human Services. Physical activity for everyone, Atlanta, GA *(http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/ index.html.*
8. WHO (2011). Physical Inactivity: A Global Public Health Problem. *http://www.who.int/dietphysicalactivity/ factsheet_inactivity/en/index.html.*
9. NIH (2008). 2008 Physical Activity Guidelines for Americans. *http://www.health.gov/ PAGuidelines/ guidelines/ default.aspx*
10. Canadian Diabetes Association (2011): Physical Activity and Diabetes Mellitus Management. Clinical Practice guideline. *http://www.diabetes.ca/diabetes-and-you/healthy-guidelines/physical-activity-and-exercise/html.*
11. Craig CL, Marshall AL, Sjostrom M, Bauman AE, Booth ML, Ainsworth BE, et al. International Physical Activity Questionnaire:12-country Realiability and Validity. *Med Sci Sports Exerc.* 2003;35:1381-1395. Doi: 10.1249/01. MSS.0000078924.61453.FB. (Pubmed).
12. Doney, A. S. F., Fischer, B., Cecil, J. E., Cohen, P. T. W., Boyle, D. I., Leese, G., Morris, A. D. & Palmer, C. A. N. (2003) Male preponderance in early diagnosed type 2 diabetes is associated with the ARE insertion/deletion polymorphism in the PPP1R3A locus. *BMC Genet* 4, 11.
13. Meisinger C, Thorand B, Schneider A, Stieber J, Doring A, Lowel H (2002). Sex Differences in Risk Factors for Incident Type 2 Diabetes Mellitus. *Arch Intern Med*. 2002;162:82-89 .
14. Ding EL, Song Y, Malik VS, Liu S (2006). Sex differences of endogenous sex hormones and risk of type 2 diabetes: a systematic review and meta-analysis. *JAMA;* 295:1288–1299.
15. National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (2011). National Diabetes Statistics, 2011. *http://diabetes.niddk.nih.gov/DM/PUBS/statistics/.*

16. Thompson A, Baxter-Jones A, Mirwald R, Bailey D. (2003). Comparison of Physical Activity in Male and Female Children: Does Maturation Matter? *Medicine and Science in Sports and Exercise;* 35:1684-1690.
17. Nor Shazwani MN, Suzana S, Hanis Mastura Y, Lim CJ, Teh SC et al. (2010): Assessment of Physical Activity Level among Individuals with Type 2 Diabetes Mellitus at Cheras Health Clinic, Kuala Lumpur. *Mal J Nutr* 16(1): 101 - 112.
18. Abdel- RM, Abdullah BN (2007). Cultural factors and patients' adherence to lifestyle measures. *British J Gen Prac* 57(537): 291–295.
19. Arcury TA, Snively BM, Bell RA, Smith SL, Stafford JM, Wetmore A et al (2006). Physical activity among rural older adults with diabetes. *J Rural Health* 22(2): 164–168.
20. Norman A, Bellocco R, Valida F, Wolk A (2002). Total physical activity in relation to aged, body mass, health and other factors in a cohort of Swedish men. *Int J Obes*.26(5): 670– 675.
21. Knowler WC, Barrett-Connor E, Fowler SC (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*.;346(6):393–403.

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