Health Behaviour and Quality of Life of Patients with Type 2 Diabetes Attending Selected Hospitals in South Western Nigeria

OO Oguntibeju[1], N Odunaiya[2], B Oladipo[2], EJ Truter[1]

ABSTRACT

Background: *Type 2 diabetes is a chronic disease that affects patients' general health and well-being in various ways. Modification of lifestyle is essential in preventing Type 2 diabetes including its secondary complications.*

Objective: *This study assessed the profile, health behaviour and quality of life of patients presenting with Type 2 diabetes and attending the diabetic clinics of Lagos State University Teaching Hospital, Lagos State and the Ring Road State Hospital, Ibadan.*

Subjects and Method: *A total of 100 diabetic patients aged between 40 and 85 years participated in this study. Their physical activity levels were determined by using the International Physical Activity Questionnaire (IPAQ); quality of life (QOL) was assessed using the Diabetes Quality of Life (DQOL) Inventory questionnaire and alcohol and smoking status as well as nutrition patterns were assessed using the Alcohol, Smoking and Nutrition Questionnaire (ASNQ). Age, gender, body mass index, waist circumference, waist-hip-ratio and blood pressure were also reported. Data were presented using descriptive statistics of mean, standard deviation, percentages and are presented in figures and tables.*

Results: *Results showed that most of the participants were overweight and/or obese with 62% having a body mass index greater than 25 kg/m^2. About 78% of females showed a waist circumference of > 88 cm while 48% of the male participants had a > 92 cm waist circumference. Ninety-seven per cent of the female participants had a waist-hip ratio above 0.85 while 32% of the males had above 1.0 waist-hip ratio. Using the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) classification for hypertension, 49% of the participants were found to be at stages 1 and 2 hypertension by systolic blood pressure while 43% of the participants were at stages 1 and 2 hypertension by diastolic blood pressure. Sixty-two per cent of the participants revealed a low physical activity level, 34% had a moderate physical activity level while 4% had a high physical activity level. All the participants indicated that they neither consumed alcohol nor smoked at the time of the study. Thirty-four per cent of the participants had adequate quantities of fruit, 31% of them also consumed an adequate quantity of legumes and 73% of them ate an adequate quantity of fish per week. Fifty-eight per cent of the participants took less quantities of salt with their food as compared to their peers while 95% of the participants did not add sugar to their food; 79% of them preferred their food boiled. The mean score of the participants' QOL was 31.85 ± 7.98 out of a total score of 75. The QOL as reported by the participants thus indicated a fairly good quality of life.*

Conclusion: *Patients with Type 2 diabetes were generally found to be overweight, obese, sedentary and were frequently found to be hypertensive. It is, therefore, suggested that patients need to pay attention to their weight by participating in weight reduction programmes and also improve their physical activity levels in order to reduce their risk of developing the complications associated with Type 2 diabetes.*

Keywords: Hypertension, Nigeria, physical activity, quality of life, Type 2 diabetes

Comportamiento Hacia la Salud y Calidad de Vida de los Pacientes con Diabetes Tipo 2 que Asisten a Hospitales Seleccionados en Nigeria Sudoccidental

OO Oguntibeju[1], N Odunaiya[2], B Oladipo[2], EJ Truter[1]

From: [1]Oxidative Stress Research Centre, Department of Biomedical Sciences, Faculty of Health and Wellness Sciences, Cape Peninsula University of Technology, Bellville South Africa and [2]Department of Physiotherapy, Faculty of Clinical Sciences, University of Ibadan, Nigeria.

Correspondence: Prof OO Oguntibeju, Oxidative Stress Research Centre, Department of Biomedical Sciences, Faculty of Health and Wellness Sciences, Cape Peninsula University of Technology, Bellville, South Africa. E-mail: oguntibejuo@cput.ac.za, bejufemi@yahoo.co.uk

RESUMEN

Antecedentes: *La diabetes tipo 2 es una enfermedad crónica que afecta la salud general y el bienestar de los pacientes de diversas maneras. La modificación del estilo de vida es fundamental para prevenir la diabetes de tipo 2, incluyendo sus complicaciones secundarias.*

Objetivo: *Este estudio evaluó el perfil, el comportamiento en torno a la salud, así como la calidad de vida de pacientes que padecen la diabetes tipo 2, y que asisten a las clínicas para diabéticos en el Hospital Docente de la Universidad de Lagos, Lagos State, y el Hospital Estatal de Ring Road, en Ibadan.*

Sujetos y Método: *Un total de 100 pacientes diabéticos con edades entre 40 y 85 años participaron en este estudio. Sus niveles de actividad física fueron determinados usando el Cuestionario Internacional de Actividad Física (IPAQ). La calidad de vida (QOL) se evaluó usando el Inventario de la calidad de vida en la diabetes (DQOL), en tanto que el consumo de alcohol y el hábito de fumar así como los patrones de nutrición se evaluaron usando el Cuestionario sobre nutrición, alcohol y hábito de fumar (ASNQ). También se reportó la edad, el sexo, el índice de masa corporal, la circunferencia de la cintura, el índice cintura-cadera, y la presión sanguínea. Los datos se presentaron usando estadísticas descriptivas sobre la media, la desviación estándar, y los porcentajes, acompañados con cifras y tablas.*

Resultados: *Los resultados mostraron que la mayoría de los participantes o bien tenían sobrepeso, o bien eran obesos, teniendo el 62% un índice de masa corporal mayor de 25 kg/m^2. Aproximadamente 78% de las hembras mostraron una circunferencia de la cintura de > 88 centímetros, mientras que el 48% de los participantes masculinos tenían una circunferencia de cintura de > 92 centímetros. El noventa y siete por ciento de los participantes hembras tenían un índice cintura-cadera por encima de 0.85, mientras que el 32% de los varones tenían un índice cintura-cadera por encima de 1.0 Partiendo de la clasificación de la hipertensión establecida por el Comité Nacional Conjunto para la Prevención, Detección, Evaluación y Tratamiento de la Hipertensión Arterial (JNC 7), se halló que 49% de los participantes se encontraban en las fases 1 y 2 de hipertensión por tensión arterial sistólica, mientras que 43% de los participantes estaban en las fases 1 y 2 de hipertensión por tensión arterial diastólica. Sesenta y dos por ciento de los participantes reveló un nivel bajo de actividad física, 34% tenían un nivel de actividad física moderado mientras 4% tenían un nivel de actividad física alto. Todos los participantes indicaron que ni consumían alcohol ni fumaban en el momento del estudio. Treinta y cuatro por ciento de los participantes comían cantidades adecuadas de fruta, 31% de ellos también consumieron una cantidad adecuada de legumbres y 73% de ellos comían cantidades adecuada de pescado a la semana. Cincuenta y ocho por ciento de los participantes consumían menos cantidades de sal en sus comidas, en comparación con sus iguales, en tanto que 95% de los participantes no agregaban azúcar a su comida; 79% de ellos preferían sus alimentos hervidos. La puntuación promedio de la calidad de vida de los participantes fue 31.85 ± 7.98 de una puntuación total de 75. Por consiguiente, de acuerdo con lo reportado por los participantes, la calidad de vida era satisfactoriamente buena.*

Conclusión: *Se halló que los pacientes con diabetes tipo 2, se caracterizaban generalmente por sobrepeso, obesidad, y sedentarismo, y eran frecuentemente hipertensos. Por tanto, se sugiere que los pacientes presten atención a su peso participando en programas de reducción de peso, y mejorando sus niveles de actividad a fin de reducir el riesgo de desarrollar complicaciones asociadas con la diabetes de tipo 2.*

Palabras claves: Hipertensión, Nigeria, actividad física, calidad de vida, diabetes de tipo 2

West Indian Med J 2012; 61 (6): 620

INTRODUCTION

Diabetes mellitus is a chronic disease that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces (1, 2). The major types of diabetes are Type 1 diabetes (insulin dependent diabetes mellitus), Type 2 diabetes (non-insulin dependent diabetes mellitus) and gestational diabetes. Type 2 diabetes is the most common type of diabetes, contributing to more than 90% of diabetes mellitus cases worldwide (3). It has been reported that about 171 million people globally suffer from diabetes. Diabetes has been found to be more prevalent in developed countries and it is expected that the number of adults with diabetes in the world will rise from 135 million in 1995 to 300 million in 2025; the major com-

ponent of this numerical increase will occur in developing countries due to epidemiological transition (4). Diabetes is known to have a profound impact on life expectancy and a person diagnosed with Type 2 diabetes during middle age (40−60 years) stands to lose as much as 10 years of life expectancy (2). It is also known to affect a patient's general health and well-being in various ways (5) such as a severe dietary restriction and daily self-administration of oral medications or insulin which may adversely affect an individual's health-related quality of life. In addition, the long-term complications of diabetes, such as nephropathy, neuropathy, heart disease and stroke with their considerable impact on health, may as a result also have a negative impact on quality of life.

Various lifestyle factors may play a role in the development of Type 2 diabetes such as obesity which has been shown to increase the risk of developing Type 2 diabetes (6, 7) and physical inactivity which is known to further elevate the risk of developing diabetes independent of obesity (8, 9). Cigarette smoking is associated with a small increased risk (10) while light to moderate alcohol consumption is associated with a decrease in the risk of cardiovascular disease among men and women with diabetes mellitus (11). In addition, a low-fibre diet with a high glycaemic index has been associated with an increased risk of diabetes (12) and the intake of specific dietary fatty acids may also affect insulin resistance and increase the risk of developing diabetes (13, 14). Other risk factors include age, gender, race, family history and genetics (15).

Studies have shown that adoption of a number of core protective/health promoting lifestyle behaviours at an individual level has a potentially large positive influence on population health (16). Health promoting lifestyle behaviours involve participating in physical activity, eating a healthy diet, smoking cessation, body mass index (BMI) < 25 kg/m^2 and waist circumference < 88 cm in women or < 92 cm in men (16). In two randomized trials, it was reported that lifestyle interventions including 150 minutes/week of physical activity and diet-induced weight loss of 5%–7% may reduce the risk of progression from impaired glucose tolerance (IGT) to Type 2 diabetes by 58% (17, 18). A study by Frank *et al* (16) among a large cohort of middle-aged women reported that an approximately 90% decrease in the incidence of Type 2 diabetes was observed among individuals who engaged in a combination of several lifestyle modifications compared to those individuals who do not engage in a lifestyle modification.

A report on health behaviour among patients with Type 2 diabetes in Poland showed that the majority of patients with diabetes have a fairly healthy lifestyle and are physically active. They also followed a suitable diabetic diet, did not smoke, regularly controlled their weight as well as their plasma glucose concentration and blood pressure and they further took special care of their feet (19).

Many studies have been carried out on profiles and health behaviour of patients with Type 2 diabetes in developed countries (16−19), however, similar studies are lacking in developing countries such as Nigeria. The present study was therefore intended to determine the profile, health behaviour and quality of life of Type 2 diabetic patients in diabetes clinics in Lagos State University Teaching Hospital, Lagos and the Ring Road State Hospital, Ibadan. It is hoped that the findings from this study could be useful to health professionals in developing health behaviour modification programmes for the secondary prevention of Type 2 diabetes, particularly, in developing countries.

SUBJECTS AND METHODS

One hundred Type 2 diabetic outpatients attending the Diabetic Clinic of Ring Road State Hospital, Ibadan, Oyo State and the Diabetic Clinic of Lagos State University Teaching Hospital, Lagos State, participated in the study.

Inclusion criteria were willingness to participate in the study, ability to comprehend relevant information and patients who have been diagnosed with Type 2 diabetes and receiving treatment at the Diabetic Clinic of the Ring Road State Hospital, Ibadan, and the Diabetic clinic of Lagos State University Teaching Hospital, Lagos State.

Type 2 diabetic patients living with HIV/AIDS were excluded as well as persons with impaired mental function who were unable to comprehend relevant information.

The following questionnaires were used in this study: The International Physical Activity Questionnaire (IPAQ), The Quality of Life Brief Clinical Inventory Questionnaire and the Questionnaire to assess Diet adherence, Smoking and Alcohol consumption. The questionnaires were interviewer-administered and each participant completed the questionnaires at the Clinics where they were receiving treatment.

The IPAQ (modified version), a seven-day recall 10-item questionnaire comprising four parts (Part 1−4) was used. It assessed the physical activity levels of patients with Type 2 diabetes mellitus. Part 1: Consists of three questions that assessed the amount of rigorous physical activities performed over a seven-day period. Part 2: Consists of three questions that assessed the amount of moderate physical activities performed over a seven-day period. Part 3: Consists of three questions that assessed the amount of walking that was done over a seven-day period. Part 4: Consists of one question that assessed the amount of sitting that was done over a seven-day period. The IPAQ has been tested for reliability and validity by the IPAQ committee in 12 countries from 1998−1999 (20). Test-retest reliability was determined to be 0.8 for Spearmann's Rho when the retest was performed after three to seven days. Criterion validity was determined to be 0.3 (Rho) when tested against accelerometer (computer science application) data for seven consecutive days (20). The test-retest reliability was also examined in the European Physical Activity Surveillance System (EUPASS) project (20). Measurements of Spearmann's Rho indicated test-retest reliability for the last seven days version of IPAQ was 0.4. The IPAQ has been used among different subpopula-

tions in Nigeria (21) and we were comfortable to use it for the current study. The categorical scores were used which included high, moderate and low activity.

***High*:** Vigorous-intensity activity for at least three days for at least more than 30 minutes at a time and for seven or more days in any combination of walking and moderate-intensity activity.

***Moderate*:** Three or more days of vigorous-intensity activity for at least 20 minutes at a time per day for five or more days of moderate-intensity activity and/or walking at least 30 minutes per day for five or more days in any combination of walking and moderate-intensity activity.

***Low*:** Individuals who do not meet criteria for categories moderate or high.

Questionnaire for Diabetes Quality of Life Inventory

This is a 15-item questionnaire which provides a total health-related quality of life score that predicts self-reported diabetes care behaviour and satisfaction with diabetes control. In addition, it provides a vehicle for quickly screening patients for readiness and specific treatment-related concerns. It takes about 10 minutes to complete the questionnaire and can be used to identify quality of life issues that might not arise during the typical patient-provider encounter (22). The validity, internal consistency and test-retest reliability were tested among 1080 adults with Type 1 or Type 2 diabetes and test-retest reliability was found to be 0.513 and Cronbach's alpha score was 0.85. The validity was considered to be satisfactory (22). Items were scored on a five-point Likert scale and were of two general formats. One format asks about the frequency of negative impact of diabetes itself or of the diabetes treatment (*ie* "How often do you worry about whether you will pass out?") and provides response options from 1 (never) to 5 (all the time). The second format asks about satisfaction with treatment and quality of life (*ie* "How satisfied are you with the time you spend on exercising?") and is scored from 1 (very satisfied) to 5 (very dissatisfied). Higher scores on DQOL items and subscales are therefore negatively valenced, indicating problem frequency or dissatisfaction.

Questionnaire to assess Diet, Smoking and Alcohol Consumption

This instrument was developed by the investigators and validated using an expert panel.

Study Design

This was a cross-sectional survey of diabetic patients receiving medical treatment at the Diabetic Clinic of the Lagos State University Teaching Hospital, Lagos State, and at the Ring Road State Hospital, Ibadan, Nigeria. A consecutive sampling technique was used to recruit subjects.

Ethical Approval

Ethical approval of the Joint University of Ibadan/University College Hospital Institutional Review Committee and permission from the physicians in charge of the participants were obtained before commencing the study. An informed consent form stating the purpose of the study and confidentiality of results was distributed to participants who met the inclusion criteria. Measurements and assessments were done for each participant at the two hospitals.

Anthropometric Measurements

***Height*:** The Seca height scale (Vogel and Halk Gmbh and Co, Germany) calibrated in centimetres was used to measure the heights of participants (23).

***Weight*:** A bathroom weighing scale (Hanson, Ireland) calibrated in kilograms from zero to 220 kg was used to determine the weights of participants (23).

BMI: The BMI was derived by dividing the weight by the square of the height (23).

***Waist to Hip Ratio*:** This was done by using a tape measure. The participant stood erect with the upper limbs in abduction. The waist circumference was measured around the umbilicus or just above it while the hip circumference was measured at its widest part usually around buttocks. The waist-to-hip ratio was then calculated by dividing the waist measurement by the hip measurement.

***Waist circumference*:** A tape measure was used. The participant stood with upper limbs in abduction. The tape was held parallel to the ground with one of its ends placed against the participant's stomach just above the umbilicus. The tape measure was wrapped around the participant's waist without compressing the skin until it met the end over the umbilicus. The circumference was then read off to the nearest centimetre.

Blood Pressure Measurement

The Littmann brand sphygmomanometer (3M Healthcare, USA) was used to measure blood pressure. This was taken about 10 minutes after the measurement of weight and height to ensure that the participant had rested enough. A sphygmomanometer and stethoscope were used to take the blood pressure.

Data Analysis

Descriptive statistics of mean, standard deviation, percentages, tables and figures were used to summarize the data collected.

RESULTS

The participants' profile (number, percentage and cumulative percentage) in terms of age groups, BMI, QOL, waist circumference (WC), waist-hip-ratio (WHR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) are shown in Tables 1a−1c, respectively. A total of 100 participants with a mean age of 64.75 ± 9.64 years participated in this study (Table 2). The mean BMI, mean WC, mean WHR, mean systolic, mean diastolic blood pressure and mean QOL of the participants are presented in Table 2.

According to the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) classification of hypertension, 37% of the participants had a normal systolic blood pressure; 14% of the participants had pre-hypertensive systolic blood pressure; 22% of the participants had stage 1 hypertensive systolic blood pressure and 27% of the participants stage 2 hypertensive systolic blood pressure (Table 1c).

Health Behaviour of the Participants

All the participants reported that they did not currently drink alcohol (Table 3). Twenty-seven per cent reported that they had stopped drinking alcohol before being diagnosed with Type 2 diabetes while 10% of them reported that they stopped drinking alcohol after being diagnosed (Table 3). All the participants reported that they did not currently smoke and 9% reported that they stopped smoking before they were diagnosed (Table 3). The physical activity of the participants is presented in the Figure. The nutrition pattern of the participants is shown in Tables 4a and 4b.

Quality of Life of the Participants

The quality of life was scored on the Diabetes Quality of Life Inventory Scale. The total score on the scale is 75 and the higher the score, the poorer the quality of life of the participants. Forty per cent (40%) of the participants scored between 18−28, 41% of the them scored between 29−38, 15% of them scored between 39−48 and 4% of them scored between 49−58 (Table 1a).

Table 1a: Profile of the participants

Variable	Number (n)	Percentage (%)	Cumulative %
Age (years)			
40−49	2	2	2
50−59	35	35	37
60−69	27	27	64
70−79	28	28	92
80−89	8	8	100
BMI			
≤ 18 (underweight)	2	2	2
18−24.9 (normal)	36	36	38
25−29.9 (overweight)	36	36	74
≥ 30 (obese)	26	26	100
QOL			
19−28	40	40	40
29−38	41	41	81
39−48	15	15	96
49−58	4	4	100

BMI: body mass index; QOL: quality of life

Table 1b: Profile of the participants

Variable	Number (n)	Percentage (%)	Cumulative %
WC (cm)			
Below 88 (female)	15	**21.7**	**21.7**
89 and above (female)	54	78.3	100
Below 92 (male)	16	51.6	51.6
93 and above (male)	15	48.4	100
WHR			
0.80 and less (female)	–	–	–
0.81 − 0.85 (female)	2.0	2.9	2.9
Above 0.85 (female)	67	97.1	100
0.95 and less (male)	17	54.8	54.8
0.96 − 1.00 (male)	4	12.9	67.7
1.00 and above (male)	10	32.3	100

WC: waist circumference, WHR: waist-hip ratio

Table 1c: Profile of the participants

Variable	Number (n)	Percentage %	Cumulative (%)
Systolic Blood Pressure			
< 120 (normal)	37	37	37
120−139 (pre-hypertension)	14	14	51
140−159 (stage 1 hypertension)	22	22	73
≥ 160 (stage 2 hypertension)	27	27	100
Diastolic Blood Pressure			
< 80 (normal)	57	57	57
80−89 (pre-hypertensive)	–	–	–
90−99 (stage 1 hypertension)	23	23	80
≥ 100 (stage 2 hypertension)	20	20	100

Table 2: Mean, standard deviation of participants' profile

Variables	Frequency	Minimum	Maximum	Mean	SD
Age (years)	100	40	85	64.75	9.64
BMI (kg/m²)	100	17.70	43.3	26.91	5.08
WC (cm)	100	66.00	130.00	98.04	12.80
WHR	100	0.81	1.24	0.94	0.07
SBP (mmHg)	100	80	210	138.05	23.47
DBP (mmHg)	100	60	130	84.90	12.75
QOL	100	19	57	31.85	7.98

BMI: body mass index; WC: waist circumference; WHR: waist-hip ratio; SBP: systolic blood pressure; DBP: diastolic blood pressure; QOL: quality of life

DISCUSSION

The majority of the participants of this study were within the age range of 50−59 years. This indicates that Type 2 diabetes is more commonly observed among the middle-aged and the elderly than in young adults. This is in agreement with the Public Health Agency of Canada which stated that age greater than 45 years increases the risk of developing Type 2 diabetes (24).

There were more females (69%) than males (31%) among the participants of this study. This is probably due to the fact that the population of diabetic patients in the selected hospitals was predominantly females. The report by the World Health Organization (WHO) in 2008 stated that the lifetime risk of developing diabetes is estimated to be 33% for males and 39% for females (2). This probably explains the higher prevalence of Type 2 diabetes amongst the female participants.

Table 3: Alcohol and smoking status of participants

Variable	Number (n)			Percentage (%)			Cumulative %		
Alcohol Consumption									
	C	BD	AB	C	BD	AD	C	BD	AD
Yes	0	27	10	0	27	10	0	27	10
No	100	73	90	100	73	90	100	73	90
Smoking Status									
Yes	0	9	0	0	9	0	0	9	0
No	100	91	100	100	91	100	100	91	100

C: current; BD: stopped before diagnosis; AD: stopped after diagnosis

Table 4a: Nutritional pattern of the participants

Variable	n	%	cumulative %
Legumes/day			
0 (very bad)			
1–3 (bad)	37	37	37
4–5 (good)	32	32	69
6–7 (very good)	31	31	100
Cereals/day			
0 (good)			
1–3 (bad)	47	47	47
4–5 (worse)	17	17	64
6–7 (worst)	36	36	100
Fruits and vegetables/day			
Not at all	5	5	5
Once	14	14	19
Twice	16	16	35
Thrice	31	31	66
More than thrice	34	34	100
Meat and poultry/day			
0 (good)	40	40	40
1–3 (bad)	45	45	85
4–5 (worse)	8	8	93
6–7 (worst)	7	7	100
Fish/day			
0 (very bad)	1	1	1
1–3 (good)	10	10	11
4–6 (better)	16	16	27
6–7 (best)	73	73	100
Pastries/day			
0 (good)	81	81	81
1–3 (bad)	14	14	95
4–5 (worse)	3	3	98
6–7 (worst)	2	2	98
Dairies/day			
0 (good)	24	24	24
1–3 (bad)	51	51	75
4–5 (worse)	16	16	91
6–7 (worst)	9	9	100

Table 4b: Nutritional pattern of the participants

Variable	n	%	cumulative %
Refined sugar consumption			
Yes	5	5	5
No	95	95	100
Salt intake			
Low	58	58	58
Same	41	41	99
More	1	1	100
Cooking preference			
Boiled	79	79	79
Boiled and fried	11	11	90
Boiled and roasted	6	6	96
Boiled, fried and roasted	1	1	98
Fried	1	1	99
Roasted	1	1	100

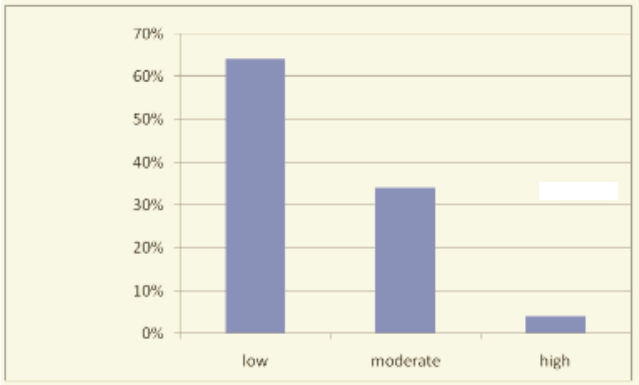

Figure: Physical activity levels of the participants

Most of the participants were overweight and obese. Of the 100 participants, 36 of them were overweight while 26 of them were obese. Obesity has been implicated in Type 2 diabetes. Although participants were receiving treatment, it appears that much has not been achieved as regards weight reduction and such patients were still shown to be overweight and obese. This could predispose them to complications and thus make their condition more difficult to manage. According to Lewis *et al* (25) and Raz *et al* (26), the resultant effect of obesity is insulin resistance which can develop into

glucose intolerance and diabetes. In addition to this, the excess glucose and fat in the blood could lead to additional organ and vascular damage, which underlies much of the morbidity and mortality associated with diabetes (27).

From the results of this study, more females (78% for WC and 97% for WHR) were observed to have a larger waist circumference and waist-hip-ratio than normal. Olatunbosun *et al* (28) in a study which investigated the effect of fat distribution pattern on the co-existence of hypertension and diabetes mellitus showed that abdominal obesity was the most powerful fat pattern distribution responsible for causing an increased hypertension-diabetes co-morbidity (HDC) in women. This supports the fact that females are at a higher risk of having HDC than males and are therefore more likely to be susceptible to cardiovascular diseases. It may possibly also indicate that lifestyle modification in terms of weight reduction has not been achieved especially in the female participants.

Using the JNC 7 classification for hypertension, the results of this study showed that 49% of the participants fell into the stages 1 and 2 hypertension categories of the systolic blood pressure while 43% of the participants fell into the stages 1 and 2 hypertension categories of the diastolic blood pressure. This shows that the patients may have another co-morbidity which may predispose them to cardiovascular diseases and is in accordance with a previous study by the National High Blood Pressure Education Programme Working Group (29) which showed that diabetes is a chronic disease that frequently co-exists with hypertension.

The physical activity level of the participants was predominantly low. Sixty-two per cent of the participants showed low physical activity levels, 34% of them had moderate physical activity levels while only 4% had high physical activity levels. This indicates that most of the patients are sedentary and are thus predisposed to cardiovascular diseases, according to previous reports (30−33). Epidemiological studies have suggested that moderate-to-vigorous leisure-time physical activity (LTPA) protects against the development of Type 2 diabetes (8, 14) as well as metabolic syndrome which commonly precedes diabetes and cardiovascular disease (34). It is therefore necessary for these patients to improve their physical activity levels.

At the time of this study, all the participants reported that they neither consumed alcohol nor smoked. This shows that health behavioural modification was achieved with reference to these habits.

The type of diet recommended by the American Diabetes Association in 2006 for Type 2 diabetic patients is called a low-risk diet. A low risk diet is defined as a diet with low trans-fat and glycaemic load and high in fibre, with a high ratio of polyunsaturated to saturated fat. A diabetes patient should therefore take less meat and poultry, dairy products, pastries, cereals, refined sugar and salt but more legumes, fish, fruits and vegetables. They should boil their food rather than frying or roasting it. Although the nutrition pattern of the participants was found to be satisfactory, most of them still need to increase their intake of legumes, fruits and vegetables and decrease their intake of cereals, dairy products, meat and poultry.

The mean score of the participants' QOL was 31.85 out of a total score of 75 with a standard deviation of 7.98. The highest scores of the participants which indicate poor QOL ranged from 39−58 with 19% in this category and the least scores which indicates good QOL ranged from 19−28 with forty participants (40%) in this category. This shows that the participants had a fairly good quality of life and this is in agreement with the finding of Issa and Bayewu (35) who stated that participants in their study had a fairly good quality of life.

CONCLUSION

Based on the findings of this study, the following conclusions were drawn: Type 2 diabetic patients from the selected hospitals were either overweight or obese and had a hypertension/diabetes co-morbidity which could make their condition difficult to control. Type 2 diabetic patients from the selected hospitals were not adequately engaged in physical activity, however, the quality of life of the patients was fairly good.

RECOMMENDATION

Patients with Type 2 diabetes should participate in weight reduction programmes and increase their physical activity level in order to reduce the risk of developing any complication associated with Type 2 diabetes.

A limitation of this study was the use of recall instruments as participants may forget important information/instructions. However, the questionnaires used had a maximum of seven days recall.

REFERENCES

1. Alberti KM, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus and its complications. Diabet Med 1998; **15:** 539−53.
2. World Health Organization. Reducing risks and promoting healthy life. Geneva: WHO; 2008.
3. Inzucchi SE, Sherwin RS. The prevention of Type 2 diabetes mellitus. Endocrinol Metab Clin N Am J 2005; **34:** 199−219.
4. World Health Organization. Reducing risks and promoting healthy life. Geneva: WHO; 2006.
5. UK Preventive Diabetic Study. Quality of life in Type 2 diabetic patients is affected by complications but not by intensive policies to improve blood glucose or blood pressure control. Diab Care 1999; **22:** 1125−36.
6. Colditz GA, Willett WC, Rotnitzky A, Manson JE. Weight gain as a risk factor for clinical diabetes mellitus in women. Ann Int Med J 1995; **122:** 481−6.
7. Helmrich SP, Ragland DR, Leung RW, Paffenbarger RS. Physical activity and reduced occurrence of non-insulin-dependent diabetes mellitus. N Engl J Med 1991; **325:** 147−52.
8. Lynch J, Helmrich SP, Lakka TA, Kaplan GA, Cohen RD, Salonen R et al. Moderately intense physical activities and high levels of cardiorespiratory fitness reduces the risk of non-insulin-dependent diabetes mellitus in middle-aged men. Archive Int Med 1996; **156:** 1307–14.

9. Manson JE, Rimm EB, Stampfer MJ. Physical activity and incidence of non-insulin dependent diabetes mellitus in women. Lancet 1991; **338:** 774−8.
10. Wei M, Gibbon LW, Mitchell TL, Kampert J, Blair SN. Alcohol intake and incidence of Type 2 diabetes in men. Diab Care 2000; **23:** 18–22.
11. Ajani UA, Gaziano JM, Lotufo AP, Liu S, Hennekens CH, Buring JE et al. Alcohol consumption and risk of coronary heart disease by diabetes status. Circ 2000; **102:** 500−5.
12. Salmeron J, Ascherio A, Rimm EB. Dietary fiber, glycaemic load, and risk of NIDDM in men. Diab Care 1997; **20:** 545−50.
13. Vessby B. Dietary fat and insulin action in humans. Brit J Nutr 2000; **83:** S91–S96.
14. Hu FB, van Dam RM, Liu S. Diet and risk of Type II diabetes: the role of types of fat and carbohydrate. Diabetologia 2001; **44:** 805−17.
15. World Health Organization. Definition, diagnostic and classification of diabetes mellitus and its complications; 1999. [Accessed 23/02/2010]. Available from: www.who.int/diabetes
16. Frank BH, Manson JE, Meir J, Stampfer JM, Graham C, Simin L et al. Diet, lifestyle, and the risk of Type 2 diabetes mellitus in women. N Engl J Med 2001; **345:** 790−7.
17. Tuomilehto J, Lindstrom J, Eriksson JG, Valle TT, Hamalainen H, Ilanne-Parikka P. Prevention of Type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. New Engl J Med 2001; **344:** 1343–50.
18. Diabetes Prevention Program Research Group. Reduction in the incidence of Type 2 diabetes with lifestyle intervention or metformin. New Engl J Med 2002; **346:** 393–403.
19. Opalińska E, Strzemecka J, Latalski M, Goniewicz M. Health behaviour among patients with Type 1 and 2 diabetes mellitus as reported from a regional diabetic outpatients. Medicina 2003; **58:** 64−70.
20. Rutten A, Ziemainz H, Schena F, Stahl T, Stiggelbout M, Auweele YV. Using different physical activity measurements in eight European countries. Results of the European Physical Activity Surveillance System (EUPASS) times series survey. Publ Health Nutr 2002; **6:** 371−6.
21. Fasanmade OA, Okubadejo NU. Clinical profile of Nigerians with diabetes mellitus. Afri J Endocrinol Metab 2003; **4:** 91−5.
22. Burroughs TE, Desikan R, Waterman BM, Gilin D, McGill J. Development and validation of the diabetes quality of life brief clinical inventory. Diabet Spectr 2004; **17:** 41−9.
23. Willett WC. Nutritional epidemiology. New York: Oxford University Press; 1990.
24. Public Health Agency of Canada. Diabetes fact sheets 2007. [Accessed 27/10/2009]. Available from: www.phac.org
25. Lewis GF, Carpentier A, Adeli K. Disordered fat storage and mobilization in the pathogenesis of insulin resistance and Type 2 diabetes. Endocrine Review 2002; **23:** 201–29.
26. Raz I, Eldor R, Cernea S. Diabetes: insulin resistance and derangements in lipid metabolism. Cure through intervention in fat transport and storage. Diab Metab Res Review 2005; **21:** 3–14.
27. Centers for Disease Control and Prevention. Surgeon General's report on physical activity and health. J Am Med Asssoc 2006; **276:** 522.
28. Olatunbosun ST, Kaufman JS, Bella AF. Prevalence of obesity and overweight in urban adult Nigerians. Endocrinol Metab 2009; **12:** 67−70.
29. National High Blood Pressure Education Program Working Group. National high blood pressure education program working group report on hypertension in diabetes: Classification of hypertension. Hypert 1994; **23:** 145–58.
30. Haffner SM, Miettinen H, Gaskill SP, Stern MP. Decreased insulin secretion and increased insulin resistance are independently related to the 7-year risk of NIDDM in Mexican-Americans. Diabetes 1995; **44:** 1386–91.
31. Albright A, Franz M, Hornsby G, Kriska A, Marrero D, Ullrich I et al. Exercise and Type 2 diabetes. J Am Coll Sports Med 2000; **32:** 1345–60.
32. Grundy SM, Garber A, Goldberg R, Havas S, Holman R, Lamendola C. Prevention conference VI: diabetes and cardiovascular disease: Writing Group IV: lifestyle and medical management of risk factors. Circ 2002; **105:** 153–8.
33. American Diabetes Association. Physical activity/exercise and diabetes. Diabetes Care 2004; **27:** S58–S62.
34. Lakka HM, Laaksonen DE, Lakka TA, Niskanen LK, Kumpusalo E, Tuomilehto J et al. The metabolic syndrome and total cardiovascular disease mortality in middle-aged men. J Am Med Assoc 2002; **288:** 2709−16.
35. Issa BA, Bayewu O. Quality of life of patients with diabetes mellitus in Nigeria Teaching Hospitals. Hong Kong J Psych 2006; **16:** 27−33.