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Assessment of Risk Factors Associated With Incidence of Diabetes Melliitus among Patients Attending Family Medicine in Two Teaching Hospitals in Lagos State, Nigeria

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Abstract
Nowadays, diabetes mellitus is continuing to be an increasing international health burden and rapidly increasing non-communicable diseases throughout the world. But greatest increases of this burden are now seen particularly in low and middle income countries. Therefore, this study assessed the risk factors associated with incidence of diabetes melliitus among patients attending family medicine in two teaching hospitals in Lagos State, Nigeria.
This study adopted a survey design. Total enumeration was used in which all patients attending outpatient clinics in the two teaching hospitals. One hundred and eighty-nine (189) participated from LASUTH and one hundred and seventy-seven (177) from LUTH making a total of three hundred and sixty-six (366) respondents in all. Data were collected using the structured WHO STEPS instrument/questionnaire for chronic disease risk factor surveillance. Four research questions were tested at 0.05 level of significance using of means, standard deviation, and Multiple Regression Analysis.
This study findings indicated the incidence of diabetics to be 9.6%. The dietary/nutritional practices that make individual prone to diabetes mellitus were taking of soft drinks like coke several times a week (53.8%), eating of fast food or bakery food item such as pizza, shawama, hamburgers, puff-puff, pies (54.4%), and eating only that which is available or only what they can afford irrespective of content. Non physical activities such lack of fitness or recreational (leisure) activities (62%); brisk walking for at least 30 minutes continuously (57.1%); and lack of walk or use a bicycle for at least 10 minutes(86.1%) will make individual prone to diabetes mellitus. Also, the result showed that age ($x^2 = 8.543$, $p = .000$) and gender ($x^2 = 5.987$, $p = .011$) were correlates of the incidence of diabetes among patients attending outpatient's clinics. It was further revealed that significant association existed between gender and insufficient physical activity ($x^2 = 8.049$, $p = .022$), BMI ≥25 kg/m^2 ($x^2 = 13.404$, $p = .000$), dietary problem ($x^2 = 12.321$, $p = .002$), smoking ($x^2 = 7.978$, $p = .017$), and use of alcohol ($x^2 = 9.003$, $p = .009$).
The study concluded that knowledge of factors (dietary practices, poor physical activities, and overweight or obese) associated with diabetes from this study will inform prevention and control strategies to reduce both social and economic costs of the disease. This may help in prompt treatment or preventive measures to avoid future complications. It was recommended, amongst others, that A comprehensive health education and promotive programme for diabetes is necessary in order to raise awareness.

Keywords: *Associated, Diabetes melliitus, Incidence, Outpatients clinic, Patients, Risk factors*

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I. Introduction

All over the world, diabetes and other non-communicable diseases are described as a public health emergency in slow motion because they now present a greater threat than infectious diseases such as HIV/AIDS, malaria and tuberculosis (Mbanya, 2010; Ogbera & Ekpebegh, 2014). Furthermore, from statistics, it seems like the world is on the cusp of losing the battle to contain diabetes (Mbanya, 2010). The world prevalence of diabetes in 2010 among adults (aged 20-79 years) was estimated to 6.4% affecting 285 million adults. By 2030 it is expected to increase to 7.7% and affecting 438 million adults. Between 2010 and 2030, there is an expected 69% increase in numbers of adults with diabetes in developing countries and a 20% increase in developed countries. 36% of the anticipated absolute global increase of 154 million people with diabetes is projected to occur in India and China alone (Shaw, Sicree, & Zimmet, 2010).

The problem of diabetes is escalating and some of the reasons for this increase is the lack of knowledge about the disease, changes in lifestyle, and an increase in obesity in the population.

In a study on prevalence of diabetes and pre-diabetes in Oke-Ogun region of Oyo State, Nigeria; Shittu, et al. (2017) reported that the prevalence of diabetes in their study was 4.6% (93.7% female, 6.3% male) and pre-diabetes 6.0% (85.0% female and 15.0% male). The prevalence was higher than 0.6% reported by Chinenye, Uloko, Ogbera, Ofoegbu, and Fasanmade (2012), 0.8% by Olatunbosun in Ibadan (1998), 1.43% by Erasmus et al. (1989) in Ilorin, 1.5% by Ohwovoriole, Kuti, and Kabiawu (1988) in Lagos, 10.5% in South Eastern Nigeria by Chris, Akpan, John and Daniel (2012).

These predictions clearly indicate that the global burden of diabetes is growing and the greatest increase is seen particularly in low- and middle-income countries (Whiting, Guariguata, Weil, & Shaw, 2011), and Nigeria in particular (Ogbera & Ekpebegh, 2014; Shittu et. al, 2017). The most affected being the men and women of working age who are at the same time the breadwinners of their families. Nigerians have a wide range of socio-economic activities, religious and cultural values which may greatly influence their physical activity levels, dietary practices and knowledge, awareness and attitudes towards diet, obesity, and diabetes. Therefore, this research determined some risk factors (dietary practices, physical activities, and being overweight or obese) associated with incidence of diabetes mellitus among patients attending family medicine in two teaching hospitals in Lagos State, Nigeria.

Research Questions

In order to achieve the objectives of the study, the following questions were raised:

1. What is the incidence of diabetes mellitus among patients attending family medicine clinics?
2. What is the dietary practices that make individual prone to diabetes mellitus?
3. What is the non-physical activities that make individual prone to diabetes mellitus?
4. Would overweight/obese make individual prone to diabetes mellitus?
5. Would there be any significant relationship between patients' socio-demographic status and the incidence of diabetes.

II. Methodology

Research Design: The research design adopted in this study was a survey research design. This is because the study design helped the researcher to get precise information and make a conclusive result on risk factors associated with the incidence of diabetes among patients attending outpatient clinic in two tertiary hospitals in Lagos State.

Population: The study population consisted of all patients attending family medicine in the two teaching hospitals in Lagos State, Nigeria.

Sample size and sampling Technique:

The family medicine of Lagos University Teaching Hospital (LUTH), has approximately thirty-one (31) and fifty-three (53) patients daily and about one hundred and ninety-nine (199) patients in a week. Also, Lagos State University Teaching Hospital (LASUTH) has approximately forty-nine (49) and fifty-nine (59) patients daily and about two hundred and eleven (211) patients in a week. Hence, total enumeration was used in which all patients attending family medicine in the two teaching hospitals.

Instrumentation: To measure the factors associated with the prevalence of diabetics among diabetic patients in the two teaching hospitals in Lagos State, Nigeria, the researcher adapted and made use of the structured WHO STEPS instrument/questionnaire for chronic disease risk factor surveillance. The questionnaire included questions that assessed socio-demographic characteristics, diabetic risk factors, anthropometric measures, and biochemical parameters. The questionnaire included questions that assessed socio-demographic characteristics, history of diabetes, diabetic risk factors, and anthropometric measures.

Data Collection Procedure: The researcher obtained a letter of introduction from the School of Nursing, Babcock University, Ilishan-Remo to the selected teaching hospitals. The researcher and 4 trained research assistants (2 from each hospital) administered the instrument to the respondents chosen. The respondents were informed of the purpose of the study and were encouraged to ask questions on areas they need clarification, and explanations were provided. The questionnaires were given to respondents who satisfy the inclusion criteria and retrieved on the spot. Data collection was done over a period of two weeks. Participants who had fasted at least 8 hours were used. Blood glucose was measured using the WHO recommendations. Peripheral blood samples by finger puncture were collected and blood glucose level was measured with a Glucometer (ACCUCHECK). Fasting blood glucose levels were classified using the WHO Criteria. The FBG of the respondents was classified as normal (FPG < 100 mg/dl), pre=diabetes (100-125 mg/dl), diabetes (FPG ≥ 126 mg/dl). Anthropometric measurements were taken using standardized techniques and calibrated equipment. Height was measured using a stadiometer; participants stood in erect posture on barefoot, and the results were recorded to the nearest 0.5 cm. Weight was measured in kilograms, using a weighing scale with participants wearing light clothes and no

shoes on. Body mass index (BMI) was estimated as the ratio of weight in kilograms to the square of height in meters.

Data Analysis Procedure: Both descriptive and inferential statistical methods were employed to analyze the primary data collected in the field survey.

III. Results

Table 1: Incidence of diabetes mellitus among patients attending Outpatients Clinics

Characteristics (N = 366)		LASUTH		LUTH		Total
		Freq.	%	Freq.	%	(%)
Patients screened	High sugar level (eaten)	8 (38.1)	4.2	13 (61.9)	7.3	**21** (100)
	High sugar level (not eaten)	11 (78.6)	5.8	3 (21.4)	1.7	**14** (100)
	Normal blood glucose	170 (51.4)	90.0	161 (48.6)	91.0	**331** (100)
Total		**189**	**100.0**	**177**	**100.0**	

Out of 366 participants, 21 (5.7%) were classified to have high sugar level (eaten) with 8 (38.1%) were from LATH and 13 (61.9%) from LUSUTH. Out of the 14 participants screened to have high sugar level before eaten, 11 (78.6%) were from LASUTH and 3 (21.4%) from LUTH. Three hundred and thirty-one (331) were screened to have normal blood glucose. Out of these, 170 (51.4%) were from LASUTH and 161 (48.6%) from LUTH.

Table 2: Dietary/Nutritional practices that make individual prone to diabetes mellitus

S/N	how often do you eat:	Never or once per week	Several times a week	Once a day	Everyday
		F (%)	F (%)	F (%)	F (%)
1	Three meals per day?	33 (9.0)	201 (54.9)	30 (8.2)	102 (27.9)
2	At least one fruit per day?	217 (59.3)	23 (6.3)	49 (13.4)	77 (21.0)
3	Vegetables per day?	274 (74.9)	27 (7.4)	56 (15.3)	9 (2.5)
	how often do you drink:				
4	Juice (such as apple or pineapple juice)	77 (21.0)	121 (33.1)	96 (26.2)	72 (19.7)
5	Milk	289 (79.0)	11 (3.0)	27 (7.4)	39 (10.7)
6	Soft Drinks (such as Coke)	80 (21.9)	197 (53.8)	23 (6.3)	56 (15.3)
7	Water	-	63 (17.2)	3 (0.8)	300 (82.0)
	how many times do you:				
8	Eat fast food or bakery food item (such as pizza, shawama, hamburgers, puff-puff, pies)	58 (15.8)	199 (54.4)	48 (13.1)	61 (16.7)
9	Eat sugary things (such as candy bars, chocolates, and chewing gums)	179 (48.9)	44 (12.0)	95 (26.0)	48 (13.1)
10	Eat only that which is available or only what you can afford irrespective of content	17 (4.6)	202 (55.1)	110 (30.1)	37 (10.1)

From Table 2, the dietary/nutritional practices that make individual prone to diabetes mellitus were taking of soft drinks like coke several times a week (53.8%), eating of fast food or bakery food item such as pizza, shawama, hamburgers, puff-puff, pies (54.4%), and eating only that which is available or only what they can afford irrespective of content. The results further revealed that 59.3% of the respondents never eat at least one fruit per day, 48.9% never eat sugary things (such as candy bars, chocolates, and chewing gums), and, 79% never took milk.

Table 3: Non-physical activity that make individual prone to diabetes mellitus

SN		Yes	%	No	%
1	does your work involve vigorous intensity activity that causes large increase in breathing or heart rate for at least 10 minutes continuously	299	81.7	67	18.3
2	does your work involve moderate intensity activity that causes large increase in breathing or heart rate for at least 10 minutes continuously	311	85.0	55	15.0
3	do you do any vigorous intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like running or football for at least 30 minutes continuously	139	38.0	227	62.0
4	do you do any moderate intensity sports, fitness or recreational activities that cause a small increase in breathing or heart rate like brisk walking for at least 30 minutes continuously	157	42.9	209	57.1
5	do you walk or use a bicycle for at least 10 minutes to get to and from places	51	13.9	315	86.1
6	Is physical activity practice part of your daily life e.g. trekking	197	53.8	169	46.2

A majority of the respondents comprising of 81.7% agreed that their work involved vigorous intensity activity that causes large increase in breathing or heart rate for at least 10 minutes continuously. Further, 85% of the respondents agreed their work involved moderate intensity activity that causes large increase in breathing or heart rate for at least 10 minutes continuously. Also, 53.8% made physical activity practice part of their daily life.

Conversely, 62% of the respondents did not do any vigorous intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like running or football for at least 30 minutes continuously; 57.1% did not do any moderate intensity sports, fitness or recreational activities that cause a small increase in breathing or heart rate like brisk walking for at least 30 minutes continuously; and 86.1% did not walk or use a bicycle for at least 10 minutes to get to and from places

Table 4: Overweight/obesity that make individual prone to diabetes mellitus

SN		Yes	%	No	%
1	Have you been overweight before now?	29	7.9	337	92.1
2	Do you think you are overweight?	41	11.2	325	88.8
3	Have you ever tried to lose weight?	113	30.9	253	69.1
4	Have you ever tried losing weight on your own through diet or exercise	148	40.4	218	59.6
5	Have you ever tried losing weight with the help of your doctor through diet or exercise?	17	4.6	349	95.4
6	Do you consider yourself to be obese?	11	3.0	355	97.0
7	Have you ever tried one-on-one dietary counseling with a dietician before	33	9.0	333	91.1
8	Have you been on dietary supplements such as Herbal-life, Ephedrine, or Dexatrim?	47	12.8	319	87.2
9	Have you been on meal replacements such as Slim fast or Ensure	35	9.6	331	90.4
10	Has a doctor or other health professional ever told you that you are obese	9	2.5	357	97.5

From the findings it was observed that 92.1% of the respondents had not been overweight and 88.8% never thought they were overweight/obese. The item that measures whether the respondents had ever tried to lose weight showed that 69.1% failed to consent, 59.6% never tried losing weight on their own through diet or exercise, and 95.4% never tried losing weight with the help of their doctors through diet or exercise. Almost all (97%) the respondents never see themselves to be obese, 91.1% never tried one-on-one dietary counseling with a dietician before; 87.2% never been on dietary supplements such as Herbal-life, Ephedrine, or Dexatrim; 90.4% not on meal replacements such as Slim fast or Ensure, and 97.5% never been informed by a doctor or other health professional of being obese.

Table 5: Socio-demographic status and the incidence of diabetes among patients attending Outpatient Clinics identified to have blood glucose above normal

Variable (N =208)		Pre=diabetes (21)		Diabetes (14)		X^2	P
		Frequency	%	Frequency	%		
Age	< 20yrs	-	-	1	7.1	8.543	.000
	21-30yrs	5	23.8	1	7.1		
	31-40yrs	3	14.3	3	21.5		
	41-50yrs	9	42.9	5	35.7		
	51-60yrs	3	14.3	4	28.6		
	61yrs above	1	4.7	-	-		
Gender	Male	7	33.3	6	42.9	5.987	.011
	Female	14	66.7	8	57.1		
Religion	Christianity	11	52.4	7	50.0	2.009	.237
	Islam	9	42.9	5	35.7		
	Others	1	4.7	2	14.3		
Marital Status	Single	6	28.6	5	35.7	1.041	.289
	Married	15	71.4	9	64.3		
Ethnicity	Yoruba	12	57.2	5	35.7	1.973	.088
	Hausa	7	33.3	3	21.5		
	Igbo	2	9.5	5	35.7		
	Others	-	-	1	7.1		
Educ. background	No formal educ.	1	4.7	2	14.3	.997	.135
	Primary	2	9.5	2	14.3		
	Secondary	13	61.9	6	42.8		
	Tertiary	5	23.8	4	28.6		

The result in Table 5 shows that the chi-square value obtained for age is (x^2 = 8.543, p = .000) and gender (x^2 = 5.987, p = .011)were at the significant levels of less than 0.05 for the two variables respectively.

Since these p-values were less than 0.05 values, it could be said that age and gender are correlates of the incidence of diabetes among patients attending outpatient's clinics. However, for marital status ($x^2 = 1.041$, p = .289), religion is ($x^2 = 2.009$, p = .237), ethnicity ($x^2 = 1.973$, p = .088)and educational background ($x^2 = .997$, p = .135), the chi-square values obtained were at insignificant levels.

IV. Discussion of Findings

The outcome of the first research question revealed that about ninety percent of the participants screened to have normal blood glucose while almost ten percent were with high sugar level. Therefore, the incidence of diabetics in this study was 9.6%. The reason behind this rise in high sugar level among the patients that might likely lead to DM may be due to a change in eating habits and overall lifestyle emanating from increasing urbanization and economic development in the state. The implication of this is that more people may likely be diabetics in years to come if care is not taken due to their lifestyle, dietary, physical activities and the likes. Therefore, understanding pre-diabetes is important for future diabetes projections.

This outcome is in tandem with some national studies in the US and China that estimated adult pre-diabetes prevalence of 36.2% and 50.1%, respectively (Ning, Zhao, & Wang, 2013). One study projects that by 2030, 470 million people will have pre-diabetes globally (Ligthart, et al, 2016). Studies have suggested that progression to diabetes is occurring among those diagnosed with pre-diabetes (Tabak et al. 2012) and suggested that the risk of people with pre-diabetes developing diabetes is 5–10% per year (Olanrewaju & Adekanbi, 2017). Increasing incidence of diabetes mellitus is mainly due to modern life style and changed diets with balance titled towards refined foods especially sugar and fat. In people with strong genetic factor, environmental factors such as excessive intake of food especially sugar, obesity and lack of exercise act as precipitating agents (Ogbera & Ekpebegh, 2014; Shittu et. al, 2017).

This findings revealed that the dietary/nutritional practices that might make individual prone to diabetes mellitus were taking of soft drinks like coke several times a week, eating of fast food or bakery food item such as pizza, shawama, hamburgers, puff-puff, pies, and eating only that which is available or only what they can afford irrespective of content. This shows the reason why dietary management is seen as a key cornerstone modality in the attainment of good glycemic control in DM, and of course, dietary management of DM is targeted at improving the overall health by achieving and maintaining optimal nutritional status, attaining good glycemic control and preventing acute and long term complications of DM. This is line with the findings of Kahan and Manson (2017); Ley, Hamdy, Mohan, and Hu (2014), Ogbera and Ekpebegh (2017) that with urbanization and economic growth, many countries have experienced dietary changes favoring increased caloric consumption. Therefore, making many people to be predispose to diabetics. Findings of other researchers (Chinenye, Oko-Jaja, & Young, 2013; Menke, *et al.*, 2014; WHO, 2015) lend credence to this study. They reported that unhealthy diet such as fast food, excess refined sugar, excess salt, low fibre food will prone individual to DM.

It was revealed by this study that 86.1% did not walk or use a bicycle for at least 10 minutes to get to and from places, 62% did not do any vigorous intensity sports, fitness or recreational (leisure) activities and 57.1% did not do any moderate intensity sports or brisk walking for at least 30 minutes. The implication of this results is that poor physical activities may prone individual to diabetes. This corroborates the findings of Oyewole, Odusan, Oritogun, and Idowu, (2014) that regular physical activity (PA) is a key element in the prevention and management of type 2 diabetes mellitus (T2DM). Also, regular and moderate exercise training has been reported to have anti-oxidant and anti-inflammatory systemic protective effects in T2DM (de Lemos, Oliveira, Pinheiro, & Reis, 2012; Oritogun, 2017).

From the findings it was observed that almost all the respondents were neither overweight or obese. However, few of them at one time or the other have tried losing weight on their own through diet or exercise and on dietary supplements. This shows that the respondents were aware of the implication of being overweight or obese to their health.

The result the forth hypothesis on socio-demographic status and the incidence of diabetes shows that age and gender are correlates of the incidence of diabetes among patients attending Outpatients Clinics. This result corroborates the previous findings by Hwang and Shon (2014),Ugege, Ibitoye, & Jiya, (2013) who in their various studies have demonstrated that socioeconomic status has been positively associated with diabetes and that this relationship is modified by gender. Shittu, et al. (2017) reported that the prevalence of diabetes in their study was 4.6% (93.7% female, 6.3% male) and pre-diabetes 6.0% (85.0% female and 15.0% male).

This result was in line with the previous findings of Olanrewaju and Adekanbi (2017) that reported the risk of diabetes mellitus as independently associated with increasing age, modifiable factors related to rapid urban growth and changing lifestyle (i.e., obesity, sedentary lifestyle, lack of physical activity, diet, smoking, and physical and emotional stress), and non-modifiable factors such as family history of diabetes, age, and race/ethnicity. Also, Kautzky *et al.*, (2016) identified age and gender as risk factors for diabetes mellitus.

V. Conclusion

This study indicated that about 9.6% of the respondents were pre-diabetes which was somewhat an indicator of being diabetics later in life if care is not taken. This result is an alarming condition as it has been predicted that much of the global increase in DM is forecasted to be in developing countries including Nigeria. As the proportion of undiagnosed DM was high, there might be a large number of people who have DM in the study area but are not aware of it. Body mass index, insufficient physical activity, dietary problem, tobacco use and use of alcohol were significantly associated with the diabetes. These factors associated with DM were potentially modifiable. Therefore, targeting the prevention strategy to such modifiable risk factors might reduce the prevalence of diabetes mellitus in the area.

VI. Recommendations

This study is a means of preventing development of diabetes mellitus in the future. This study will assist nurses working in various level of healthcare to be aware of factors that predisposes an individual to diabetes mellitus. It is therefore concluded that knowledge of factors associated with diabetes from this study will help the nurses to be informed on prevention and control strategies to reduce both social and economic costs of the disease. This study will also add to the body of knowledge of nursing discipline in area of quality care as it may help in prompt treatment or preventive measures to avoid future complications.

References

[1]. Chinenye, S, Oko-Jaja, R. I, & Young, E. E. (2013). Diabetes and other non-communicable diseases in Nigeria: the need for primary care in the rural setting. *Africa Health*; 36: 24–7.

[2]. Fasamade, O. A, Ogbera, A. O, & Chima P, et al. (2011).*Diabetes and Diet: A Simple Guide for Diabetes Health Care Providers.* Lagos, Nigeria: Lagos University Teaching Hospital.

[3]. Hwang, J. & Shon, C. (2014). Relationship between socioeconomic status and type 2 diabetes: results from Korea National Health and Nutrition Examination Survey (KNHANES) 2010–2012. BMJ Open, 4(8), article e005710.

[4]. Kahan, S. & Manson, J. E. (2017). Nutrition counseling in clinical practice: how clinicians can do better. *JAMA* 2017; 318: 1101-2.

[5]. Ley, S. H, Hamdy, O, Mohan, V. & Hu, F. B. (2014). Prevention and management of type 2 diabetes: dietary components and nutritional strategies. *Lancet*; 383(9933): 1999-2007.

[6]. Lim, S. S, Vos. T., Flaxman, A. D, et al. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380: 2224–60.

[7]. Mbanya, J. C. N., Motala, A. A., Sobngwi, E., Assah, F. K. & Enoru, S. T. (2010). Diabetes in sub-Saharan Africa. *The Lancet*, 375(9733): 2254–2266.

[8]. Menke, A, Rust, K. F, Fradkin J, et al. (2014). Association between trends in race/ethnicity, aging and body mass index with diabetes prevalence in the United States: a series of cross sectional studies. *Ann Intern Med*; 161: 328–35.

[9]. Oyewole, O. O, Odusan, O, Oritogun, K. S, & Idowu, A. O. (2014). Physical activity among type-2 diabetic adult Nigerians. *Ann Afr Med*; 13:189-94

[10]. Ozougwu, J. C., Obimba, K. C., Belonwu, C. D., & Unakalamba, C. B. (2013). The pathogenesis and pathophysiology of type 1 and type 2 diabetes mellitus. *Academic*, *4*(4), 46–57.Oritogun, 2017).

[11]. Ogbera, A. O & Ekpebegh, C. (2017). Diabetes mellitus in Nigeria: The past, present and future. *World J Diabetes*; 5(6), 905-911.

[12]. Ogbuji, C. A & David-Chukwu, N. P. (2016). Glycemic Indices of Different Cassava Food Products. *European Journal of Basic and Applied Sciences*; 3(3): 1-7.

[13]. Olanrewaju, O. & Adekanbi, Q. (2017). Prevention of type 2 diabetes: The role of exercise, dietary interventions, obesity and smoking cessation. *Experimental & Clinical Cardiology*, 23(1), 229–249.

[14]. Shaw, J. E., Sicree, R. A. & Zimmet, P. Z. (2010). Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Research and Clinical Practice*, 87(1): 4–14.

[15]. Whiting, D. R., Guariguata, L., Weil, C. and Shaw, J. (2011). IDF Diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030. *Diabetes Research and Clinical Practice*, 94(3): 311–321.

[16]. WHO (2016). *Global Report on Diabetes*. Paris, France.

Ayodele, Adewunmi Mary, etal. "Assessment of Risk Factors Associated With Incidence of Diabetes Melliitus among Patients Attending Family Medicine in Two Teaching Hospitals in Lagos State, Nigeria". *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 9(01), 2020, pp. 07-12.