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Prevalence and Factors Associated with Eye Diseases Among Diabetic Patients Attending GOPD Clinic of Isolo General Hospital, Lagos State.

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Abstract

Background information: Diabetes mellitus (DM) is a chronic clinical syndrome characterized by high blood glucose because of insulin deficiency either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces; insulin is a hormone that controls the metabolism of glucose, fat and amino acids. Insulin is a hormone that regulates blood sugar. Individual with diabetes mellitus suffer a reduced life expectancy and quality of life part of which is visual impairment.

Objective: Objective of the study was to assess the prevalence and identify the determinants of eye diseases among diabetic patients attending GOPD clinic of Isolo General Hospital, Lagos State.

Methodology: Cross-sectional descriptive study design was used. A semi-structured questionnaire was used to gather information from Two hundred and eighty diabetic patients attending GOPD clinic of Isolo General Hospital, Lagos State, selected through convenience sampling technique. Information were collected using a semi-structured self-administered questionnaire and analyzed with SPSS version 23. Descriptive statistics was done for all variables; association was done by using Chi-square test and logistic regression and level of significance was set at $p < 0.05$.

Results: A total of 280 diabetic patients were interviewed with a mean age +SD of (58.4 ±6.2) years. Majority (79%) of the respondents had good knowledge about diabetes and eye disease their religion, marital status, family size and employment status were significantly associated with respondents' knowledge about diabetes and eye disease with $p<0.05$. Many of the respondents were first diagnosed with diabetes at over 50 years (61.7%) were on oral hypoglycaemic agents (71.1%) with 38.3% being very good in adherence to their medications while 102 respondents had ever had eye examinations and only 9.8% of this had it every 6 months.

The prevalence of visual impairment and severe visual impairment from this study are 10.1% and 1.4% respectively. Respondents age, sex, religion, marital status, family type, educational status, family size, employment status, OGGT, Body Mass Index (BMI) and Waist and Hip Ratio (WHR) were significantly

associated with visual acuity status with p<0.05. Therefore, diabetic patients should have regular eye examinations (at least once in 6 months). Those who have co-existing hypertension should attend clinics regularly and take their drugs as at when due.

Keywords

Determinants, Diabetic patients, Family medicine clinic, Prevalence, Eye disease

Introduction

Diabetes mellitus (DM) is one of the most common chronic diseases in nearly all countries (David, R et al, 2011). It continues to increase in numbers and significance, as economic development and urbanization lead to changing lifestyles characterized by reduced physical activity, and increased obesity (David, R et al, 2011). The total burden of diabetes mellitus is due to the increasing number of new cases that are the result of inherited risk and changes in lifestyle (sedentary lifestyle, abnormal eating habits), as well as an increase in life span. Patients with diabetes mellitus now live longer because of better treatment modalities, thus preventing acute complications and premature death. As a result of this, there is now a larger population of diabetes mellitus patients who are at a higher risk of developing chronic diabetic complications (Omolase, C. et al; 2010).

Diabetes is beginning to receive more attention as the mortality rate due to this silent, chronic and yet debilitating disease is as high as annual mortality rates due to HIV and AIDS (IDF, 2013). For example in 2007, it was estimated that diabetes was responsible for 3.6 million deaths globally, a figure which is equivalent to 6% of the world's mortality rate. In addition there are concerns about the complications and co-morbidities of diabetes (IDF, 2013). Diabetic Mellitus is one of the leading causes of death, disability and economic loss globally. Diabetes has been on the increase in Nigeria, Africa and indeed the world. This is due to massive migration to towns with attendant change in lifestyle leading to poor nutrition and little physical activity (Bogunjoko, 2015).

Diabetes is one of the major health and development challenges of the 21st century. Diabetes mellitus has become a common disease that leads to chronic complications such as neuropathy, nephropathy, vascular diseases (cardiac, cerebral and peripheral) and visual impairments (retinopathy). The development of chronic complications is related to the duration of diabetes mellitus. Diabetes mellitus is a multi-organ disease and affects many parts of the body, including the eye, leading to visual impairment and blindness (David et al, 2011; WHO, 2017; Gale E, 2017).

Blindness is a severe vision impairment, not correctable by standard glasses, contact lenses, medicine, or surgery. It interferes with a person's ability to perform everyday activities. "Legal blindness" is defined as vision with best correction in the better eye worse than or equal to 20/200 or a visual field of less than 20 degrees in diameter. "Legal blindness" is significant in determining eligibility for disability benefits from the federal government, but it does not reflect the precise functional impairment and disability. Vision impairment (VI) is defined as having 20/40 or worse vision in the better eye even with eyeglasses. However, people with the slightest VI can experience challenges in their daily activities. For example, people with vision less than 20/40 cannot obtain an unrestricted driver's license in most 7states (CDC, 2011). Oye and Kuper in their study carried out in 2007 reported that persons with diabetes are more likely to be visually impaired than persons without the disease (Oye, J. & Kuper, H; 2007).

Studies have shown that glycaemic control among DM patients is poor worldwide (Khan, H. et al, 2011). Studies carried out in Nigeria by Adebisi et in 2009 and Godwin in 2013 have demonstrated a similar trend and this predisposes patients to eye diseases (Adebisi et al, 2009; Godwin, 2013). In industrialized countries, the magnitude of DR is high and it is the leading cause of blindness (Yau, J. et al 2012).

No previous report on visual impairment and blindness among people with DM in the attending GOPD clinic of Isolo General Hospital, Lagos State, was found in the literature, as at the time of writing this. Therefore, the purpose of this study is to report on the prevalence and determinants of eye diseases among diabetic patients attending GOPD clinic of Isolo General Hospital, Lagos State.

Methodology

Description of the study area

The study was conducted at the conducted in the General Out-Patients Clinic of Isolo General Hospital. This hospital commenced operation in the year 1987. It is a 500 bedded tertiary hospital located in Isolo the Lagos State, South western Nigeria. It has several units responsible for the care of the populace of which general out-patients unit is one of them. The general out-patients unit of the Isolo General Hospital, has 5 doctors, 10nurses, 3record officers, 1secretary and 1 office assistant.

Study population, sample and data collection

This was a descriptive cross-sectional study design. The study populations were patients with diagnosis of diabetic mellitus attending the general out-patients unit of the Isolo General Hospital, Isolo, Lagos State in Nigeria, which is estimated to be around 1200 per year. The sample size was calculated by using Leslie Fischer's formulae for population <10,000. Using the of eye disease among Diabetic patients as 32.6%. A total of Two hundred and eighty (280) population was sampled with additional non-response rate of 10% and a systematic random sampling technique was used at both clinics to recruit subjects for this study. An interviewer-administered semi-structured questionnaire, which was divided into three sections to collect relevant information that addressed all the stated objectives. Data was analysed by using a Statistical Package for Social Sciences (SPSSvs20) was used to run applications and routing procedures. Important variables were tested and the level of significance set at 0.05.

Results

Response rate: Two hundred and eighty questionnaires were distributed to respondents and two hundred and **seventy-seven were retrieved, giving a response rate of 98.9%.**

Table 1: Socio-Demographic Characteristics of the Respondents (N=277)

Variables	Frequency (n)	Percentage (%)
Age (years)		
≤40	15	5.4
41-50	35	12.6
51-60	97	35.0
61-70	91	32.9
>70	39	14.1
Sex		
Male	147	53.1
Female	130	46.9
Religion		
Christian	168	60.6
Islam	106	38.3
Traditional	3	1.1
Ethnic		
Yoruba	216	78.0
Hausa	22	7.9
Igbo	39	14.1
Marital status		
Married	217	78.3
Single	12	4.4
Divorced	6	2.2
Separated	6	2.2
Widowed	36	12.9
Family type		

Monogamous	146	52.7
Polygamous	78	28.2
Serial	53	19.1
Educational status		
Primary	85	30.7
Secondary	69	24.9
Tertiary	99	35.7
Postgraduate	24	8.6
Family size		
≤4	84	30.3
5-10	173	62.5
>10	20	7.2
If employed, nature of the work (n=250)		
Self employed	63	25.2
Government	169	67.6
Non-governmental organization	18	7.2

Table 1 above showed the socio-demographic characteristics of the respondents. A total of 280 diabetes patients were interviewed with a mean age +SD of (58.4 ±6.2) years. Majority (60.6%) of the respondents practiced the Christian religion with a male gender predilection (53.1%) and most were of the Yoruba ethnic group (78.0%). 146 respondents out of a total of 277 lived in a monogamous family settings with 62.5% having family sizes of 5-10 persons and about one third (35.7%) had tertiary level of education with 67.6% of the employed population being Government workers.

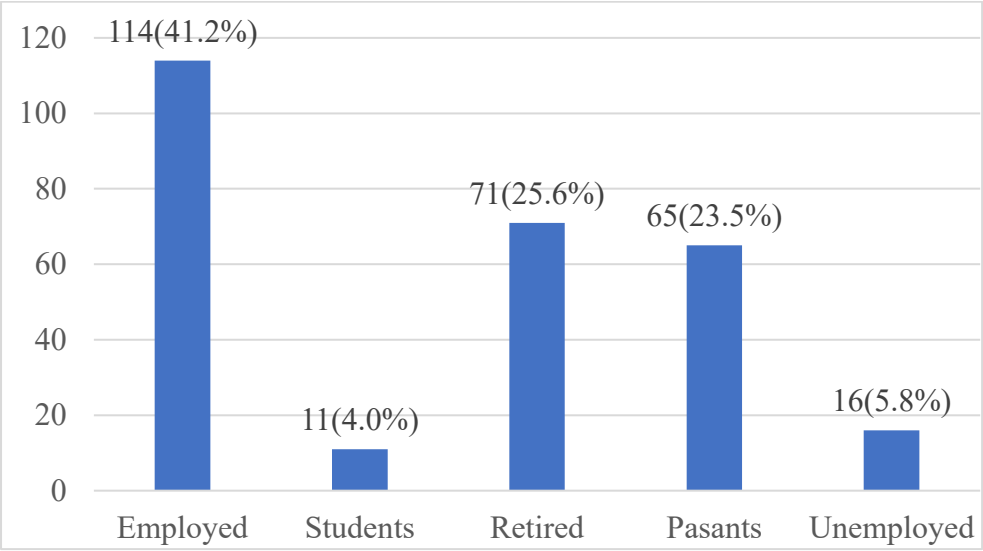

Figure 1: Distribution of respondents according to their occupational status

Above figure showed the distribution of respondents according to their occupational status. It shows that 114(41.2%) of the respondents were employed and 71(25.6%) were retiree while 11(4.0%) were students.

Table 2: Respondents' knowledge about diabetics and eye disease (N=277)

Variables	Frequency (n)	Percentage (%)
Respondents understanding on diabetes mellitus		
Good	212	76.5
Poor	65	23.5
Cause(s) of diabetes mellitus		
Correct	203	73.3
Wrong	43	15.5
No response	31	11.2
Type of diabetes mellitus managed for		
Type 1	26	9.4

Type 2	77	27.8
Gestational	2	0.7
Don't know	172	62.1
***Complications of diabetes mellitus known by respondents**		
Amputations	182	65.7
visual impairment	111	40.0
Body weakness	193	69.7
frequent urination	215	77.6
Loss of weight	221	79.8
lead to hypertension/stroke	107	38.6
Can Diabetes mellitus affect the eyes		
Yes	157	56.7
No	17	6.1
2on't know	103	37.2
***If yes, kinds of effect of diabetes on the eyes (n=157)**		
Softness of eye lid	25	15.9
Visual impairment	126	80.3
Too much sweating	31	19.7
Risk factors for diabetes mellitus		
Obesity	193	69.7
Smoking	158	57.0
Eating more food that contain carbohydrate	191	68.9
Balanced diet	37	13.4
***Causes of eye disease**		
Poor blood sugar control	217	78.3
High blood pressure	163	58.8
Duration of diabetes	130	46.9
Alcohol	184	66.4
Smoking	71	25.6
Age at onset of diabetes	72	26.0
Proteinuria	116	41.9
Witchcraft	49	17.7
Excessive reading	36	13.0
Others (wrong diet)	2	0.7

Multiple responses

Above table showed the Diabetic patients' knowledge about eye disease. It shows that 212 respondents (76.5%) had correct understanding of diabetes mellitus with 73.3% knowing the causes of diabetes. However, many of the respondents (62.1%) didn't know the type of diabetes they were managed for. Loss of bodyweight (79.8%) and amputations (65.7%) were the commonest complications known by the respondents while 157 out of the 277 respondents knew that diabetes can affect the eyes.

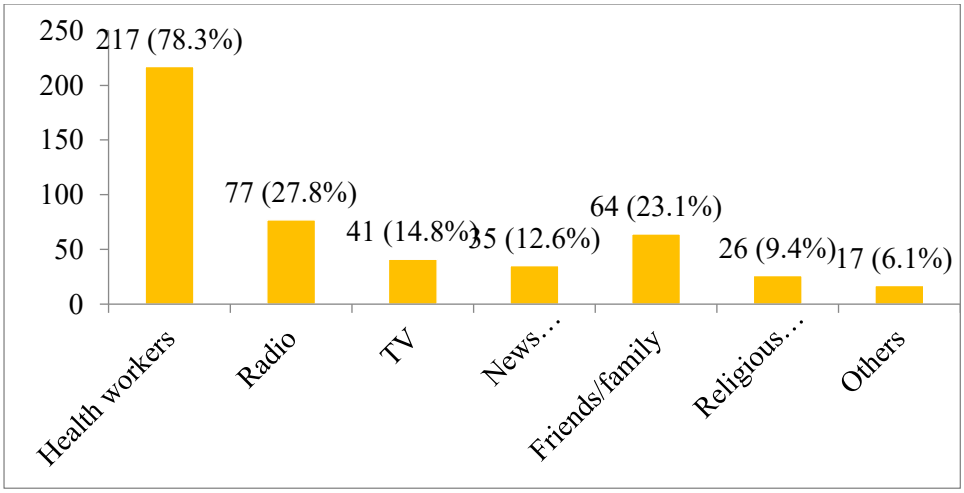

Figure 2: Respondents sources of information about eye disease in Diabetes.

Figure above showed that Health workers (78.3%) were the most common sources of information, electronic media like Radio (27.8%) and friends/family (14.8%) were the second and third commonest sources.

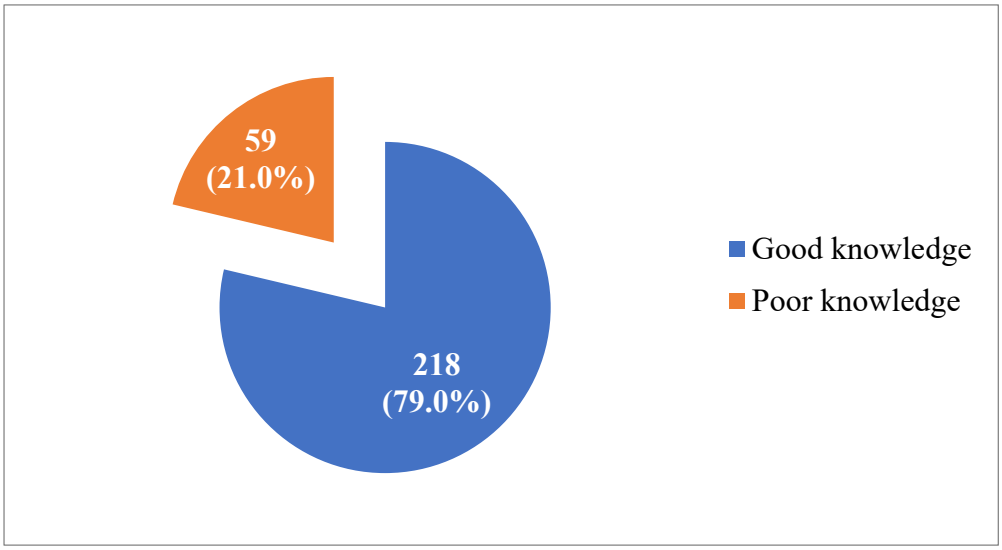

Figure 3: Respondents overall knowledge about eye disease

Above figure showed that majority (79%) of the respondents had good knowledge about eye disease while about one fifth (59 out of 277) had poor knowledge.

Table 3: Pattern of eyes diseases among respondents (N=277)

Variables	Frequency	percentage
Any eye complaints		
Yes	65	23.5
No	212	76.5
If yes, your complaints (n=65)		
Blurred vision	24	36.9
Pain	13	20.0
Redness	11	16.9
Watery eye	10	15.4
Itching	9	13.8
Physical eye examination		
Normal eye	267	96.4
Abnormal eye	10	3.6
Visual acuity examination		
Normal	245	88.4
Visual impairment	28	10.1
Severe visual impairment	4	1.4
Ever been diagnosed for eye problem		
Yes	33	11.9
No	244	88.1
Eye problem been diagnosed for		
Blure vision	17	6.1
Long sightedness	4	1.4
Short sightedness	9	3.2
Glaucoma	3	1.1

Above table showed the Pattern of eyes diseases among respondents. It shows that only 65(23.5%) had eye complaints and 24(36.9%) of them complain about blurred vision while 267(96.4%) had normal eye. few 33(11.9%) of then ever

been diagnosed for eye problem while 17(6.1%) were diagnosed for blure vision while 9(3.2%) were diagnosed for short sightedness.

Table 4: Respondents risk of eye disease (N=277)

Variables	Frequency	Percentage
Frequency of been diagnosed as a diabetic		
<1	69	24.9
2-5	173	62.5
>5	35	12.6
Age as at first diagnosis with diabetes mellitus (years)		
≤40	35	12.7
41-50	71	25.6
>50	171	61.7
Treatment options receiving by respondents		
Oral Hypoglycemic agent + Diet	197	71.1
Insulin+ diet	21	7.6
Diet / exercise	34	12.3
OHA and Insulin + Diet	25	9.0
Rating of respondents adherence to medication		
Very good	106	38.3
Good	130	46.9
Fair	41	14.8
Are you a known hypertensive		
Yes	120	43.3
No	157	56.7
If yes, are you on treatment (n=120)		
Yes	109	90.8
No	11	9.2
Ever had eye examination done after diagnosis with diabetes		
Yes	30	10.8
No	247	89.2
Ever had eye examination before		
Yes	102	36.8
No	175	63.2
If yes, how regular (n=102)		
Every 6month	10	9.8
Every 24months	4	3.9
Only when I complain about eye	62	60.8
No pattern, just occasionally	26	25.5
If never done eye examination, reasons(n=175)		
Never recommended	143	81.7
Recommended but no response	16	9.1
Recommended but no equipment	14	8.0
Recommended but defaulted	2	1.1
Any relative with diabetes mellitus history		
Yes	105	37.9
No	172	61.2
If yes, relationship (n=105)		
Brother	14	13.3
Father	41	39.0
Mother	27	25.7
Uncle	7	6.7
Sister	9	8.6
Others (aunty, niece, husband etc.)	7	6.7

Above table showed the prevalence of eye disease among respondents. It shows that 173 (62.5%) of the respondents have been diagnosed for diabetic for the period of 2-5years and 171(61.7%) claimed that they were diagnosed for diabetes when they are above years old while 197(71.1%) were receiving Oral hypoglycemic agent+diet as the treatment option. About half 120(43.3%) of the respondents said they were known hypertensive patients and 109(90.8%) of them were on treatment while 62(60.8%) of those on treatment were on it only when they complain about eye. From the above table, 23.5% (65 of the 277) respondents had eye complaints and 54 out of the 65 complained of blurring of vision. However, based on physical examinations, 267 had normal eyes but only 245 had normal sight based on the visual acuity examination. Thus, the prevalence of visual impairment and severe visual impairment from this study are 10.1% and 1.4% respectively.

Table 5: Continuation on respondents risk of eye disease (N=277)

Variables	Frequency	Percentage
Ever satisfied with care you received		
Yes	265	95.7
No	12	4.3
Means of payment for treatment of diabetes mellitus		
Government	51	18.4
Self	195	70.4
Children	31	11.2
Ever take alcoholic beverages		
Yes	76	27.4
No	201	72.6
Ever smoke		
Yes	24	8.7
No	253	91.3
Ever involved in physical activities		
Yes	120	43.3
No	157	56.7
Fasting blood sugar (mmol/L)		
≤5.5 (Normal)	89	32.1
>5.5 (High	188	67.9
Random Blood Sugar (mmol/L)		
<5.5 (Normal)	91	32.9
5.5 – 11.0 (IGT)	169	61.0
>11.0 (High)	17	6.1
Body Mass Index(kg/m^2)		
Underweight	7	2.5
Normal	142	51.3
Over weight	108	39.0
Obese	20	7.2
Waist and hip ratio		
Normal	50	18.1
overweight	156	56.3
obese	71	25.6
Patronizig quack for eye treatment		
Yes	211	76.2
No	66	23.8
Irregular checking of blood glucose level		
Yes	231	83.4
No	46	16.6

Many 217(78.3%) of the respondents claimed poor blood sugar control as the causes of eye disease followed by 184(66.4%) who claimed alcohol while few 36(13.0%) claimed excessive reading. above one third 105(37.9%) said they have some relative with diabetes mellitus history and 41(39.0%) claimed father as their relative with diabetes. Few only 76(27.4%) out of 277 have ever took alcoholic beverages and only 24(8.7%) of them ever smoked cigarette while

120(43.3%) ever involved in physical activities. The clinical examination report by respondents that majority188 (67.9%) respondents had high fasting blood sugar and 61% had impaired glucose tolerance. About half (51.3%) had a normal Body Mass Index (BMI) while 56.3% were overweight based on the Waist-Hip ratio.

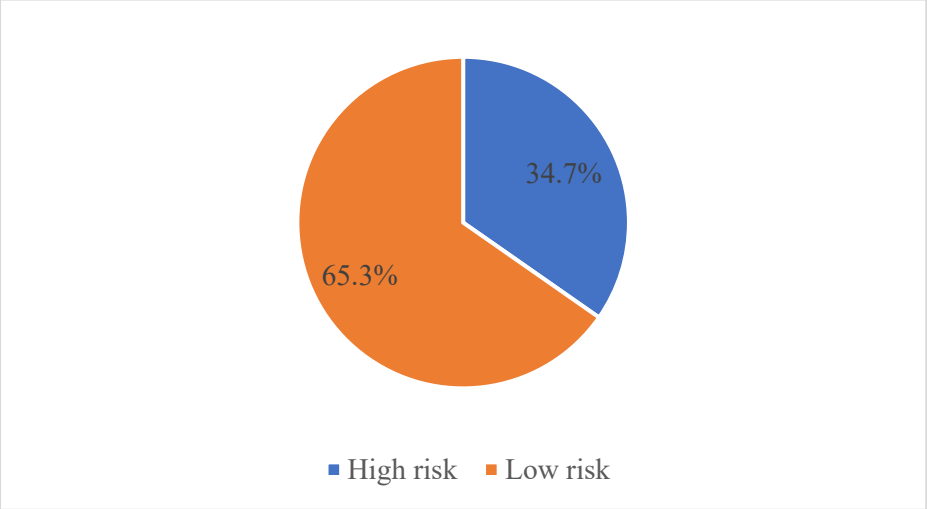

Figure 4: Overall risk exposure to eye diseases

Above figure shows the Overall risk exposure to eye diseases. majority 181(65.3%) were low exposed to risk of eye disease while 96(34.7%) were high exposed.

Table 6: Association between respondents socio-demographic characteristics and respondents visual acuity status

Variables	Visual acuity status			Total	Statistics
	Normal	Visual impairment	Sever visual impairment		
Age (years)					
≤40	15(100)	0(0.0)	0(0.0)	15(100)	
41-50	35(100)	0(0.0)	0(0.0)	35(100)	χ^2=35.777
51-60	95(97.9)	2(2.1)	0(0.0)	97(100)	df=8
61-70	69(75.8)	18(19.8)	4(4.4)	91(100)	pvalue=<0.001*
>70	31(79.5)	8(20.5)	0(0.0)	39(100)	
Sex					χ^2=12.592
Male	139(94.6)	6(4.1)	2(1.4)	147(100)	df=2
Female	106(81.5)	22(16.9)	2(1.5)	130(100)	pvalue=0.002*
Religion					
Christian	154(91.7)	10(6.0	4(2.4)	168(100)	χ^2=11.318
Islam	88(83.0)	18(17.0)	0(0.0)	106(100)	df=4
Traditional	3(100)	0(0.0)	0(0.0)	3(100)	pvalue=0.023*
Ethnic					
Yoruba	188(87.0)	24(11.1)	4(1.9)	216(100)	χ^2=3.957
Hausa	22(100)	0(0.0)	0(0.0)	22(100)	df=4
Igbo	35(89.7)	4(10.3)	0(0.0)	39(100)	pvalue=0.412
Marital status					
Married	197(90.8)	16(7.4)	4(1.8)	217(100)	
Single	12(100)	0(0.0)	0(0.0)	12(100)	χ^2=26.775
Divorced	6(100)	0(0.0)	0(0.0)	6(100)	df=8
Separated	6(100)	0(0.0)	0(0.0)	6(100)	pvalue=0.001*
Widowed	24(66.7)	12(33.3)	0(0.0)	36(13.0)	
Family type					
Monogamous	126(86.3)	16(11.0)	4(2.7)	146(100)	χ^2=12.204
Polygamous	66(84.6	12(15.4)	0(0.0)	78(100)	df=4
Serial	53(100)	0(0.0)	0(0.0)	53(100)	pvalue=0.016*
Educational status					

Primary	69(81.2)	16(18.8)	0(0.0)	85(100)	
Secondary	59(85.5)	8(11.6)	2(2.9)	69(100)	χ^2=16.658
Tertiary	93(93.9)	4(4.0)	2(2.0)	99(100)	df=8
Postgraduate	24(100)	0(0.0)	0(0.0)	24(100)	pvalue=0.034*
Family size					
≤4	84(100)	0(0.0)	0(0.0)	84(100)	χ^2=17.106
5-10	145(83.8)	24(13.9)	4(2.3)	173(100)	df=4
>10	16(80.0)	4(20.0)	0(0.0)	20(100)	pvalue=0.002*
Employment status					
Employed	112(98.2)	2(1.8)	0(0.0)	114(100)	
Student	11(100)	0(0.0)	0(0.0)	11(100)	χ^2=39.866
Retired	63(88.7)	8(11.3)	0(0.0)	71(100)	df=8
Peasants	45(69.2)	16(23.6)	4(6.2)	65(100)	pvalue=<0.001*
Unemployed	14(87.5)	2(12.5)	0(0.0)	16(100)	

*Statistically significant <0.05

Table 6 above showed the association between respondents socio-demographic characteristics and respondents visual acuity status. It shows that respondents age, sex, religion, marital status, family type, educational status, family size and employment status were significantly associated with visual acuity status with p<0.05.

Table 7: Association between respondents risk factors of eye disease and respondents visual acuity status

Variables	**Visual acuity status**			**Total**	**Statistics**
	Normal	**Visual impairment**	**Sever visual impairment**		
Duration of being diagnosed as a diabetic(years)					
<1	10(100)	0(0.0)	0(0.0)	10(100)	χ^2=19.063
1-5	168(93.3)	10(5.6)	2(1.1)	180(100)	df=6
6-10	50(78.1)	12(18.8)	2(3.1)	64(100)	Pvalue=0.004*
>10	17(73.9)	6(26.1)	0(0.0)	23(100)	
Age as at first diagnosis (years)					
≤40					
41-50	35(100)	0(0.0)	0(0.0)	35(100)	χ^2=22.427
>50	71(100)	0(0.0)	0(0.0)	71(100)	df=4
	139(81.3)	28(16.4)	4(2.3)	171(100)	Pvalue=<0.001*
Are you a known hypertension					
Yes					χ^2=21.852
No	94(78.3)	22(18.3)	4(3.3)	120(100)	df=2
	151(96.2)	6(3.8)	0(0.0)	157(100)	pvalue=<0.001*
Any relative with diabetes mellitus history					χ^2=5.248
Yes	87(82.9)	16(15.2)	2(1.9)	105(100)	df=2
No	158(91.9)	12(7.0)	2(1.2)	172(100)	pvalue=0.073
Ever take alcoholic beverages					χ^2=2.179
Yes	70(92.1)	6(7.9)	0(0.0)	6(100)	df=2
No	175(87.1)	22(10.9)	4(2.0)	201(100)	Pvalue=0.336
Ever smoke					χ^2=3.432
Yes	24(100)	0(0.0)	0(0.0)	24(100)	df=2
No	221(87.4)	28(11.1)	4(1.6)	253(100)	Pvalue=0.180
Ever involved in physical activities					
Yes					χ^2=9.551
No	114(95.0)	6(5.0)	0(0.0)	120(100)	df=2
	131(83.4)	22(14.0)	4(2.5)	157(100)	Pvalue=0.008*
Ever had eye examination					χ^2=10.560
Yes	82(80.4)	18(17.6)	2(2.0)	102(100)	df=2
No	163(93.1)	10(5.7)	2(1.1)	175(100)	Pvalue=0.005*
Ever had dilated eye examination					

Yes					χ^2=10.480
No	22(73.3)	6(20.0)	2(6.7)	30(100)	df=2
	223(90.3)	22(8.9)	2(0.8)	247(100)	Pvalue=0.005*

*Statistically significant <0.05

Above table showed that the duration of being diagnosed as diabetes patients, age at first diagnosis, co-existing hypertension and undergoing eye examinations have significant relationship with the visual acuity status of the respondents. Family history of diabetes, intake of alcohol or smoking have no such significant relationships with p<0.05.

Table 8: Association between clinical examinations and visual acuity status among respondents

Variables	Visual acuity status			Total	Statistics
	Normal	Visual impairment	Sever visual impairment		
Fasting blood sugar (Mmol/L)					χ^2=2.154
≤5.5 (Normal)	81(91.0)	6(6.7)	2(2.2)	89(100.0)	df=2
>5.5 (High)	164(87.2)	22(11.7)	2(1.1)	188(100.0)	pvalue=0.341
Random blood Sugar (Mmol/L					
<5.5 (Normal)	77(84.6)	14(15.4)	0(0.0)	91(100.0)	χ^2=10.555
5.5 – 11.0 (IGT)	151(89.3)	14(8.3)	4(2.4)	169(100.0)	df=4
>11.0 (High)	17(100.0)	0(0.0)	0(0.0)	17(100.0)	pvalue=0.032*
Body Mass Index(kg/m^2)					
Underweight	7(100)	0(0.0)	0(0.0)	7(100)	χ^2=20.439
Normal	136(95.8)	6(4.2)	0(0.0)	142(100)	df=6
Over weight	86(76.6)	18(16.7)	4(3.7)	108(100)	Pvalue=0.002*
Obese	16(80.0)	4(20.0)	0(0.0)	20(100)	
Waist and hip ratio					
Normal	40(80.0)	10(20.0)	0(0.0)	50(100)	χ^2=12.724
Overweight	136(87.2)	16(10.3)	4(2.6)	156(100)	df=4
Obese	69(97.2)	2(2.8)	0(0.0)	71(100)	Pvalue=0.013*

Table above showed the association between clinical examination parameters and visual acuity status. It shows that body mass index, random blood sugar and waist-hip ratio have significant relationship with visual acuity status. However, fasting blood sugar did not show such significant relationship.

Discussion

Almost all the participants in this study responded to the questions, giving a response rate of 98.9% which is similar to the response rate of 92.3% in another study on eye disease conducted in Cameroon. In this study, the mean age was 58.4years with a standard deviation of 6.2 years and a modal class of 51-60 years. The modal age class in the Cameroonian study (41-50 years) was lower when compared to another study (Muhammad, et al, 2011), and this may be due to the fact that this study was carried out strictly among diabetes patient rather than the general population and thus expected to have a higher proportion of older age groups.

The prevalence of eye disease and severe eye impairment from this study are 10.1% and 1.4% respectively using visual acuity examination, while IGT 61.0% and 6.1% were diagnosed for diabetes mellitus at 0 and 1 hour of the test respectively. Although the overall prevalence of diabetic retinopathy in a systematic review conducted by Yau JW and co-workers in 2012 was 34.6%, the prevalence of eye impairment among diabetes patients was found to be 10.2% which agrees with the prevalence of eye impairment of 10.1% among the diabetes patients investigated in this study (Yau, 2012). Although this study was conducted among diabetes patients, the prevalence of eye impairment is in agreement with the results obtained in a Nigerian National blindness and eye Impairment survey in which 10% and 1.5% of the respondents have moderate and sever eye impairment respectively (Abdull, M. et al. 2009). In Ekiti State a research was conducted, the prevalence of visual acuity among diabetic patients in a 2016 study conducted by Ajayi,

Raimi and fellow researchers was 10.5% (Ajayi et al, 2016). The fact that both studies were conducted among fairly homogenous populations may explain the striking similarities in the values of the prevalence in both studies.

In this study, about one third of respondents has ever had eye examination, only 9.8% had it regularly every 6 months while only 3.6% had abnormal eye on examination. A similar study showed higher figure of one fifth of their respondents having a regular eye examination (Foster et al; 2016). In another study, it was reported that many of the patients (43.8%) did not know how frequent they should go for an eye check-up and 72.3% did not know what treatments were available (CDC, 2007). A regular check-up would lead to prevention of diabetic retinopathy and prevention of complications.

In our study, respondents understanding on diabetes mellitus were good among majority of respondents. In a similar study, most respondents had poor knowledge in all the three knowledge categories, total knowledge of diabetes, general knowledge of diabetes and knowledge of insulin use (Muunda, 2018). In yet another study, a lack of understanding on diabetic eye diseases (68.6%) was the main barrier for most patients for not coming for eye screening earlier (Tajunisah, et al; 2011). Diabetes being the precursor of retinopathy; a good information and awareness about DM could lead to looking for more information about DM retinopathy and going for screening and eye tests where retinopathy could be suspected, diagnosed and managed.

In our study, DM as a cause of eye problem was known to majority of respondents. In a similar supportive study, almost 86% of respondents were aware of diabetic eye complications. However, our figure was slightly higher than 83.5% from the previous study done among academic staffs (non-medical faculties) of University Malaya in 2004 (Chew et al; 2004). This study also showed a far higher percentage of awareness compared to study from India (37.1%), Australia and U.S. (65%) (Rani et al; 2008; Livingston et al; 2008).

However, our findings are at variance with the findings in a study conducted at the Korle- Bu Teaching Hospital, Ghana in which only 26.4% knew the types of diabetes they are suffering from and only 3.8% knew that diabetes can be a cause of eye disease (Ovenseri-Ogbomo et al; 2013). These values are also higher than the findings by a team of Indian Ophthalmologists working in Tamil Nadul who carried a study on 288 diabetic patients in which only 42% had good knowledge about diabetes but only 4.5% have good knowledge about retinopathy (Srinivasan et al; 2017). Differences in the socio-demographic backgrounds of the study populations may contribute to the observed differences in the levels of knowledge of diabetes and the links between diabetes and eye disease.

The overall knowledge about eye disease showed that two-third of the respondents had good knowledge about eye disease in diabetes. Good knowledge about eye disease in diabetes is often significantly associated with positive attitude towards diabetes with good practice patterns regarding eye disease and other forms of diabetic retinopathy (Srinivasan et al; 2017). In Port Harcourt, Southern Nigeria, a 2015 study conducted by Nathaniel have similar findings in which 56.9% of the patients were aware that diabetes can affect the eyes but 25.8% knew the specific eye complications of diabetes mellitus (Nathaniel et al; 2015). A possible explanation for the similarity is that this study and the Port Harcourt based study were conducted in teaching hospitals situated in capital cities and thus may attract educated patients.

There is low rate of family history of diabetes (less than four-fifth) in this study in contrast to the findings in a study at Uyo, Southern Nigeria in which there was history of diabetes in the first degree relatives in 60.1% of the patients (Godwin, 2013). The sex distribution is almost even (53.1% male) which is similar to the findings by Arugu and Maduka in 2017 study conducted in Southern Nigeria with equal numbers of the diabetics in a community based study (Arugu, & Maduka, 2017). This is slightly different from the findings at Ilorin, North-Central, Nigeria in which there was a female preponderance (56%) (Adebisi et al; 2009). The mean ± SD age at first diagnosis for diabetes in this study was (52.5± 8.9) years which is much higher than the mean age (44 years) at first diagnosis for diabetes in a hospital based study carried out in Yemen. Differences in the racial identities of the study populations may account for this observed difference.

In a study conducted by Onakpoya, Kolawole and other workers at The Wesley Guild Hospital, Ilesha which is about 30Km from the study area, about three-fifth of the patients have had diabetes for 1-5years, about three quarter were on Oral Hypoglycaemic Agent (OHA) and while a little less than two thirds have never had eye examinations done

(Onakpoya et al, 2015). These findings are similar to the findings in this study in which a similar less than two thirds of the diabetic patients studied had never had any eye examinations done, majority are on oral hypoglycaemic agents (OHA) and majority had been diagnosed as diabetes patients between 1-5 years.

In our study, a very good adherence on DM medications was among about four-fifth of respondents. This is in contrast with a finding in which compliance with medication, exercise and a special diet was seen in 73, 40.3 and 49.7 % respectively (Hamzeh, 2019).

Based on the measurements of the Body Mass Index (BMI) in this study, about two thirds and very few percentages were overweight and obese respectively which is in partial agreement with the values obtained in Northern Nigeria in which 21.6% and 7.5% were overweight and obese respectively (Dahiru et al; 2008). This prevalence of overweight/obesity may also explain the rising prevalence of DM as obesity has been linked with a number of chronic diseases including diabetes mellitus. It has been reported that overweight and obesity now ranks as the fifth leading global risk for mortality (Murthy, G. et al; 2013). In addition, 44% of the diabetes burden, 23% of the is chaemic heart disease burden and between 7% of certain cancer burdens are attributable to overweight and obesity (Murthy, G. et al; 2013). According to World Health Organization estimates, by the year 2020, non-communicable diseases will account for approximately three quarters of all deaths in the developing world (Rosenberg, & Klie, 2016).

The results of this study showed that prominent among the factors associated with visual acuity status of the respondents were duration of diabetes, age, sex, religion, level of education and employment status of the respondents have significant associations with their visual acuity status while family history and ethnic identification has no such significant association. These findings are quite similar to the findings in studies conducted in other parts of Nigeria and in other countries. Occular findings in a diabetes clinic in Southwest Nigeria by Ajayi et al showed significant association between the female sex and visual impairment87 in agreement with the findings in this study (Ajayi et al; 2016). Such similarity may be due to the fact that both studies were conducted in the South western part of Nigeria with near homogenous populations. Female hormones may also have a yet to be identified as a risk factor for visual impairment among diabetics patients.

Apart from the socio-demographic factors, this study also examined the clinical, physical and anthropometric risk factors for visual impairments among the diabetic patients. The types of diabetes, glycaemic control using fasting and random blood sugar level weren't significantly associated with visual impairment in this study. This is however in contrast with the results obtained in a study conducted in Qatar by Elshafei et al in which poor glycaemic control was significantly associated with visual impairments and other forms of diabetic retinopathy (Mabaso, R. G. & Oduntan; 2014). The difference could be due to the fact that fasting and random blood sugar levels were used in this study to measure the glycaemic control while Elshafei and co-researchers used glycosylated haemoglobin test as their measure of glycaemic control. Glycosylated haemoglobin is a measure of long term glycaemic control (a strong factor that affect visual impairment) unlike fasting and random blood sugar levels which measure glycaemic control at points in time.

In a hospital based study of 156 diabetic patients in Croatia, Obesity (classified as BMI≥30) and uncontrolled hypertension were independent risk factors for diabetic retionopathy (Katusic et al; 2015). These were also obtained in this study. There is partial similarity with the outcomes of this study because longer duration of diabetes and uncontrolled hypertension were both significantly associated with visual impairment but the female sex rather than the male sex was associated with visual impairment in this study. This study didn't also find any significant relationship with glycaemic control and the use of insulin.

The knowledge about eye disease DM among the respondents was significantly associated with the religion, marital status, educational status, family size and employment status. The association was such that Christians had better knowledge than their counterpart, those married and those who had up to tertiary educational attainments were more likely to have adequate knowledge about visual impairment DM than the others while those with large family size and employed had better knowledge about visual impairment in DM. As earlier opined, the educational status is an important of most health outcomes. The association with marital status may be due to the fact that the better the education, the later the marriage is likely to be. The educational status may also be the reason why the respondents had good knowledge than the others. This further underscores the importance of knowledge in the prevention of

diseases as it has been demonstrated in this study. An adequate or good knowledge about visual impairment in DM was found to be associated with better preventive practices and lower risk for DM.

References

1) Abdull, M. et al. (2009). Causes of blindness and visual impairment in Nigeria: The Nigeria National Blindness and Visual Impairment Survey. Invest Ophthalmol Vis. Sci50, 4114–8.
2) Adebisi, S., Oghagbon, E., Akande, T. & Olarinoye, J. (2009). Glycated haemoglobin and glycaemic control of diabetics in Ilorin. Niger J Clin Pr.12, 87–89.
3) Ajayi, I. A., Raimi, T. H., Omotoye, O. J. & Olumide, K. (2016). Ocular findings in a diabetic retinopathy screening clinic in Southwest Nigeria. Sky J. Med. Med. Sci.4, 23–27.
4) Arugu GM, Maduka O. (2017). Risk factors for diabetes mellitus among adult residents of a rural district in Southern Nigeria: Implications for prevention and control.Niger J Clin Pract; 20:1544-9
5) Bogunjoko, T. (2015). Knowledge, attitude and practices among medical officers and diabetic patients regarding diabetic retinopathy in Ogun state of Nigeria. J. Ophthalmol. East. Cent. South. Africaentral South. Africa 27–33.
6) Casagrande SS, Burrows NR, Geiss LS, Bainbridge KE, Fradkin JE and Cowie C (2012). Diabetes Knowledge and Its Relationship with Achieving Treatment Recommendations in a National Sample of People with Type 2 Diabetes. Diabetes Care; 35(7): 1556-1565.
7) Centre for Disease Control (CDC). Blindness and Vision Impairment. (2011). Available at: https://www.cdc.gov/healthcommunication/ToolsTemplates/EntertainmentEd/Tips/Blinness.html.
8) Chew YK, Reddy SC, Karina R. (2004). Awareness and Knowledge of Common Eye Diseases Among the Academic Staff (Non-Medical Faculties) of University of Malaya. Med J ofMalaysia;59(3):305–311
9) Dahiru, T., Jibo, A., Hassan, A. & Mande, A. (2008). Prevalence of diabetes in a semi urban community in northern Nigeria. Niger. J Med.17, 414–416.
10) David, R., Whitinga, L. G., Clara, W. & Jonathan, S. (2011). IDF Diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030. Diabetes Res. Clin. Pract.94, 311–321
11) Foster T, Mowatt L and Mulling J. (2016). Knowledge, Beliefs and Practices of Patients with Diabetic Retinopathy at the University Hospital of the West Indies, Jamaica. Journal of Community Health;41(3):584–592
12) Gale, E. Epidemiology of diabetes mellitus. Living Textbook of Diabetes (2017). Available at: https://www.diapedia.org/introduction-to-diabetes-mellitus/11040851147/epidemiology-of-diabetes-mellitus.
13) Glover, S. (2012). Prevalence of diabetic retinopathy, cataract and visual impairment in patients with diabetes in sub-Saharan Africa. Br J Ophthalmol. 96, 156–161.
14) Godwin, E. (2013). Ocular Health Status of Diabetes Mellitus Patients in Uyo , South- South Nigeria. J. Dent. Med. Sci. 9, 24–28.
15) Hamzeh A, Almhanni G, Aljaber Y, Alhasan R, Alhassan R and Alsamman MHD. (2019), Awareness of diabetes and diabetic retinopathy among a group of diabetic patients in main public hospitals in Damascus, Syria during the Syrian crisis. BMC Health Services Research, 19 Article number: 549.
16) International Diabetes Federation. IDF Diabetes Atlas 2013.
17) Katusic D, Tomic M, Jukic T, Kordic R, Sikic R. (2015); Obesity- a risk factor for diabetic retinopathy in type-2 diabetes? Coll Antropol. 29 Suppl 1: 47-50
18) Khan, H., Lasker, S. & Chowdhury, T. (2011). Exploring reasons for very poor glycaemic control in patients with Type 2 diabetes. Prim Care Diabetes5, 251 – 255.
19) Mabaso, R. G. & Oduntan, O. A. (2012). Prevalence and causes of visual impairment and blindness among adults with diabetes mellitus aged 40 years and older receiving treatment at government health facilities in the Mopani District , South Africa. South African Optom.73, 8–15.
20) Mahfouth, A., Abdallah, A. & Rajiv, B. (2009). Diabetic retinopathy, visual impairment and ocular status among patients with diabetes mellitus in Yemen: A hospital-based study. Indian J. Ophthalmol.57, 293–298.
21) Murthy, G. (2013). Prevalence and risk factors for hypertension and association with ethnicity in Nigeria: results from a national survey. Cardiovasc J Afr24, 1–7.

22) Mufunda E. (2018). Limited knowledge of diabetes in patients attending an outpatient diabetes clinic at a referral hospital in Zimbabwe: a cross-sectional study. The Pan African Medical Journal; 29:144
23) Mwangi, WM., Githinji, GG.,Githinji, W. (2011); Knowledge and Awareness of Diabetic Retinopathy amongst Diabetic Patients in Kenyatta National Hospital, Kenya. International Journal of Humanities and Social Science, 1(21) 140.
24) Nathaniel GI, Adio O. (2015). Awareness and attitude of diabetic patients on diabetic eye complications in Port Harcourt, Nigeria. Niger J Med; 24(3): 252-5.
25) Omolase, C., Adekanle, O., Owoeye, J. & Omolase, B. (2010). Diabetic retinopathy in a Nigerian community. Singapore Med J 51, 56–59.
26) Ovenseri-Ogbomo GO, Abokyi S, Koffuor GA, Abokyi E. (2013). Knowledge of diabetes and its associated ocular manifestations by diabetic patients: A study at Korle-Bu Teaching Hospital, Ghana. Niger Med J: 54: 217-23.
27) Oye, J. & Kuper, H. (2007). Prevalence and causes of blindness and visual impairment in Limbe urban area, South West Province, Cameroon. Br J Ophthalmol,91, 1435 – 1439.
28) Onakpoya, O., Kolawole, B., Adeoye, A. & Okunoye, O. (2015). Compliance with diabetic retinopathy screening in a Nigerian tertiary hospital. African J. Diabetes Med.23, 20 – 22.
29) Rani, P. K.,Raman, R., Subramanis, O., Perumala, G., Kamaramanickavel, G., Sharma, T. (2008); Knowledge of diabetes and diabetic retinopathy among rural populations in India and the influence in India and the influence of knowledge of diabetic retinopathy on attitude and practice; 8(3):838. Epub. 8:1-6
30) Rosenberg, T., Klie, F. (1996); Current trends in newly registered blindness in Denmark. Acta Ophthalmol Scand. 74: 395-398.
31) Srinivasan NK, John D, Rebekah G, Kujur ES. (2017). Diabetes and Diabetic retinopathy: Knowledge, Attitude, Practice (KAP) among Diabetic Patients in a Tertiary Eye Care centr. J Clin Diagn Res.
32) Tajunisah I, Wong PS, Tan LT, Rokiah P and Reddy SC. (2011); Awareness of eye complications and prevalence of retinopathy in the first visit to eye clinic among type 2 diabetic patients. Int J Ophthalmol. 4(5): 519–524.
33) World Health Organization (WHO). Diabetes Mellitus: Fact sheet. (2017). Available at: http://www.who.int/mediacentre/factsheets/fs138/en/.
34) Yau, J. (2012). Global prevalence and major risk factors of diabetic retinopathy. Diabetes Care35, 556–564.
35) Zhang X, Saaddine JB, Chou CF. Prevalence of diabetic retinopathy in the United States, 2005 2008. JAMA. 2010: 304: 649-656