Practice of diabetes mellitus management among diabetic patients attending general hospitals in northern states, Nigeria

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Abstract
The study assessed the practice of diabetes mellitus management among diabetic patients attending general hospitals in Northern States of Nigeria. The study use descriptive survey research design which is a non-experimental design. The population comprises all diabetic patients attending Out-Patients Department in general hospitals across Northern States of Nigeria. A total of 405 respondents were randomly sampled and were distributed using purposive sampling. 400 copies of questionnaire were retrieved, using multi-stage sampling techniques. A modified four (4) points Likert measuring scale format was used to collect data. Descriptive statistics of frequency counts and percentages were used to describe demographic information of respondents; mean and standard deviation were used for the research questions, while inferential statistics of one Sample t-test, Independent sample t-test and ANOVA was used to test hypotheses. The analyses was conducted with a decision criterion of 0.05 alpha level of significance. Results revealed that practice of diabetes management among diabetic patients are significant, (P-value 0.00). There were no significant differences in the practice between male and female diabetic patients towards diabetes mellitus management, (P-value 0.176). The practice of diabetes mellitus management among diabetic patients of different educational status significantly differ, (P-value 0.004). While the practice of diabetes mellitus management do not significantly differ in the Northern States of Nigeria based on age (with P-values 0.230). In conclusion, diabetic patients have practice towards diabetes mellitus management in Northern States, Nigeria. The participants among male and female patients do not differ in their practice of diabetes mellitus management. Significant difference however existed in the practice of diabetic patients of different educational status. While the practice of diabetic patients of different age groups do not differ. Based on the conclusion, the following recommendation were made Health Educators should further a comprehension health education, further emphasis a comprehensive health promotion strategy for diabetes and its related risk factors to sustain their knowledge.

Keywords: diabetes, Management, attending, hospitals, practice

Introduction
Diabetes is now emerging as an epidemic of the 21st century. It threatens to overwhelm the health care system in the near future. Sadly, the majority of the people with diabetes in developing countries are within the productive age range of 45 to 65 years (IDF, 2016) [6]. These are the same individuals who are expected to drive the economic engines of these countries, in order to achieve the agreed international development goals. Besides their reduced productivity, diabetes further imposes a high economic burden in terms of health care expenditure, lost productivity and foregone economic growth (IDF, 2016) [6]. The burden of diabetes is growing owing to changes in lifestyle, urbanization and changes in traditional dietary patterns. Similarly, the prevalence of gestational diabetes is increasing and is accompanied by risks for a range of immediate complications including maternal hypertensive disorders, shoulder dystocia, macrosomia, preterm delivery and still birth (Syed, Javed, Yakoob, Bhutta, 2011) [18]. Furthermore, Gestational diabetes contributes to the potential future disease burden through an increased risk of developing manifest diabetes among women and neonates (Bellamy, Casas, Hingorani & Williams, 2009) [2].
High prevalence rate of diabetes is due to sedentary life style, urbanization (Moodley, 2007) [14], lack of knowledge about the disease, low literacy rate and socio-economic status (Mehta, Karki and Sharma, 2006). Apart from this, environmental factor and genetic susceptibility can also add in prevalence rate of diabetes (Moodley, 2007) [14]. According to WHO (2009) [21], old age, cigarettes, excessive consumption of alcohol or refined foods and lack of regular physical activity are significant determinants of diabetes. However, disparities in predisposing factors in diabetes vary from one local or regional community to the other, due to demographic and socio-economic pattern changes (Laakso, Ronnenaa, Tyorala, Kallio, Puukka & Penttila, 1988) [10].

Research Question
What is the practice of diabetes mellitus management among diabetic patients attending general hospitals in Northern States, Nigeria?

Hypotheses
1. Practice of diabetes mellitus management among diabetic patients attending general hospitals in Northern States, Nigeria is not significant.
2. There is no significant difference in the practice of diabetes mellitus management among diabetic patients

attending general hospitals in Northern States, Nigeria on the basis of gender.

3. Practice of diabetes mellitus management among diabetic patients based on educational status attending general hospitals in Northern States, Nigeria do not significantly differ.

4. The practice of diabetes mellitus management among diabetic patients based on age-groups attending general hospitals in Northern States, Nigeria, do not significantly differ.

Methodology

The study used descriptive survey research. According to Adewumi (1988) [1] and Bello and Ajayi (2000) [3], descriptive survey involves collecting data in order to test hypotheses or answer research questions concerning the current status of the study and report the way things are.

The population for the study comprised diabetic patients attending outpatient department in the general hospitals in Northern States, Nigeria. There are about 5 million people living with diabetes in Nigeria, while more than 1.56 million cases of diabetes were recorded in 2015 (Nigeria Television Authority, 2016) [15].

The sample size was four hundred and five (405) diabetic patients attending Out-patients Department in the twelve (12) General Hospitals across the six (6) states in the three (3) geo-political zones in Northern States, Nigeria randomly selected for the study. Al-yamani (1969); Kreycies and Morgan (1970) [9], Forces and Richer's (1978) [4] table of determining sample size from a given population, who opined that 384 is an adequate sample for a population of 1million and above. The researcher however decided to used four hundred and five (405) diabetic patients attending Out-patients Department in the General hospitals using Multi-

stage sampling technique. Multi-stage sampling technique refers to sampling plans where the sampling was conducted in stages using Smaller and Smaller sampling units at each stage (Research gate, 2015). Stratified random sampling procedure was used to select two states from each of the existing three (3) geo-political zones as strata (North-east, North Central and North West) using deep-hat method. Secondly, using deep-hat method or lucky deep two local government areas were selected from each of the states randomly selected for the study. Thirdly, one general hospital was randomly selected using lucky deep method from each of the local governments areas randomly selected from the randomly states selected from the three (3) existing geo-political zones of Northern States, Nigeria. Deep-hat method or lucky deep is a sampling technique whereby, three containers will be prepared with papers having names of states in each of the three (3) geo-political zones of Northern states, Nigeria. Each container was thoroughly shuffled, while three (3) people were made to pick from each of the containers without looking inside, until two states are picked from each container.

Proportionate sampling was used as the fourth stage to proportionately select 405 respondents from the twelve (12) local government area based on the total number of their populations, which means each local government was determined by their number relative to the entire population of the diabetic patients attending general hospital in the study area. This means each local government had the same sampling fraction.

Purposive sampling was used as the fifth stage. To select the needed sample from the population of the Out-patient Department, every diabetic patients that visited the Diabetes Out-patient Department on clinic days during the period of the research was purposively selected for this study.

Table 1: Sampled States, LGAs Health Facilities and Respondents

Geo-Political Zone	State	Local Government	General Hospital	Respondents
North Central	Niger	Agaie-(132,907)	G/Hospital Agaie	23
		Chanchaga-(201,429)	G/Hospital Minna	34
	Nasarawa	Nasarawa (92, 664)	G/Hospital Nasarawa	16
		Lafia (330, 712)	G/Hospital Lafia	56
North East	Bauchi	Itas/Gadau (229,996)	G/Hospital Itas	39
		Danbam (150, 922)	G/Hospital Danbam	26
	Taraba	Takum (84, 054)	G/Hospital Takum	14
		Wukari (241, 546)	G/Hospital Wukari	41
North West	Jigawa	Kazaure (161, 494)	G/Hospital Kazaure	28
		Roni (77, 819)	G/Hospital Roni	13
	Zamfara	Bungudu (383, 162)	G/Hospital Bungudu	65
		Maru (291, 900)	G/Hospital Maru	50
Total		2,348,409		405

***Sources*:** National Bureau of Statistics (2010)

To achieve the purpose of this study, a closed-ended structured questionnaire was used for data collection. Bello and Ajayi (2002) [3], stated that the use of a questionnaire has some definite advantages over other sources. A questionnaire is much more efficient in that, it elicits good data and requires less time or save time, it permits collection of data from a much larger sample as it has the ability to reach a number of respondents.

Descriptive statistics of frequencies and simple percentages were used to described the demographic characteristics of

respondents; mean and standard deviation was employed to answer the research questions on knowledge of diabetes mellitus management among diabetic patients in Northern States, Nigeria. Constant mean of 2.5 was used to determine whether a mean response is positive or negative. Inferential statistics of one sample t-test, Independent sample t-test and Analysis of Variance (ANOVA) was used to test the formulated hypotheses, at decision criterion of 0.05 alpha level of significance.

Results

Table 2: Demographic Characteristics of the Respondents

S/N	Variable	Frequency	Percentage
	Age range in years		
	a. 16-20 years	31	7.75
	b. 21-25 years	23	5.75
	c. 26 – 30 years	68	17.0
	d. 31 – 35 years	102	25.5
	e. 36 years and above	176	44.0
	Gender		
	a. Male	253	63.3
	b. Female	147	36.7
	Level of Education		
	a. Primary	54	13.5
	b. Secondary	107	26.8
	c. Tertiary	163	40.6
	d. Non formal education	51	12.8
	e. None	25	6.3
	Marital Status		
	a. Single	69	17.2
	b. Married	290	72.5
	c. Divorced	15	3.8
	d. Widow	20	5.0
	e. Separated	6	1.5
	Occupation		
	a. Full Housewife	71	17.7
	b. Civil Servant	134	33.5
	c. Business	63	15.7
	d. Farmer	56	14.0
	e. Student	76	19.1
	Year diagnosed with diabetes		
	a. 0 - 2 years	117	29.3
	b. 3 - 5 years	109	27.3
	c. 6 - 8 years	73	18.3
	d. 9 -11 years	47	11.6
	e. 12 years and above	54	13.5
	Total	400	100.0

Observation of Table one (1) shows that, majority (176; 44.1%) of the respondents were of ages 36years and above and the remaining respondents (102; 25.5%; 68; 17%; 31; 7.8%; 23; 5.6%; 31; 7.8%; 23; 63%) were of different age range as shown in the table two above. Furthermore, table one reveals that many (253; 63.3%) of the respondents were male patients and the remaining (147; 36.6%) were females. This implies that male diabetic patients responded more than their female counterparts. Concerning the respondents' level of education, the above table reveals that quite a number (163; 40.8%) of the respondents attended tertiary institution; 107 (26.8%), secondary; 54(13.5%), primary; 51(12.8%), non-formal education, while 25 (6.3%) did not attend any level of education. With regards to marital status, most (4,290; 72.5%) of the respondents were married; 69 (17.2%) were single; 20(5.0%) were widow; 15 (3.8%) were divorced and 6(1.5%) were separated respectively. Concerning the occupation of the respondents, the table reveals that majority (134; 33.5%) of the respondents were civil servants; 76(19.1%) were students; 71(17.7%) were full house wife, 63(15.7%) were business and 56(14.0%) of them were farmers respectively. 117(29.3%) had 0 to 2years; 109 (27.3%) had 3.5years; 73(18.3%) of the respondents had 6 to 8years; 54(13.5%) had 12years and above and 47 (11.6%) of them had 9 to 11years respectively.

Answering of Research Questions

Table 3: Mean score of responses of Practices of diabetes mellitus management by the Respondents. N=400

S/N		Mean	Standard Deviation
1	As a diabetic person, I engaged in physical exercise regularly	3.0025	.79629
2	Fruits and vegetable constituted greater part of my diet	3.1925	.70831
3	My spouse support me in carrying out my daily diet plan	3.0400	.74820
4	When not at home I do eat any type of foods I get	2.5750	.83434
5	I take herbal medicine or food remedy for diabetes mellitus for the past six months	2.5725	.88414
6	Monitoring and control of weight is always carried out at my home	2.8825	.77472
7	I attend education and counseling on diabetes mellitus	3.0550	.69511
8	Educational programmes on diabetes increase my knowledge about the disease, make me to always self-monitor my blood glucose levels.	3.1050	.63639
9	Taking daily recommended drugs for diabetes has been part of me for many months	3.1600	.62880

10	I always go for periodic eyes, dental, kidney, nerves etc checkup.	3.0300	.75201
11	I have problem of access to regular health care services (clinic) because of cost of drugs prescribed to me.	2.6675	.87399
	Aggregate Mean	2.934773	0.757482

Table 3 above, shows that, the mean scores of responses, for the aspect of practice of diabetic patients towards diabetes mellitus management, are greater than 2.5, because the aggregate mean was 2.93. Responses for each item were computed and the highest mean score of responses was 3.19, indicating that, majority of the respondents agreed that, fruits and vegetable constituted greater part of diet. The table shows that, all the responses from the items were positive, the aggregate means score of the items was 2.93, was found to be greater that benchmark score of 2.5. This implies that, diabetic patients have positive practice toward diabetic mellitus management.

Hypothesis One: Practice of diabetic patients attending general hospitals towards diabetes mellitus management in Northern States of Nigeria are not significant.

Table 4: Result of One sample t-test on Practice of diabetic patients attending general hospitals towards diabetes mellitus management

	Mean	Std. Deviation	t-value	df	P-value
Aggregate mean	2.9348	0.7575	2.943	399	0.00
Constant mean	2.50	0.00			

t (399) = 1.972, P = < 0.05

A careful observation of Table 4 reveals one sample t test on practice towards diabetes mellitus management. This is because the one-sample t-test calculated value is 2.943 greater than the t-critical is 1.972 at degree of freedom 399 with probability value 0.00 is less than 0.05 level of significance. Thus, this result shows that the sub-hypothesis which states that practice of diabetes mellitus management among diabetic patients attending general hospitals in Northern States of Nigeria are not significant was therefore rejected. The sub-hypothesis was rejected, because the respondents revealed having positive practice with a P-value of 0.00 at 0.05 level of significant.

Hypothesis Two: Practice of diabetes mellitus management among male and female diabetic patients attending general hospitals in Northern States of Nigeria do not significantly differ.

Table 5: Result of Independent t-test Statistics on Difference between Male and Female diabetes patients attending general hospitals on the practice towards diabetes mellitus management

	Gender	N	Mean	SD	df	t	P
Practice of diabetes patients	Male	253	33.3715	3.74011	398	0.450	0.176
	Female	145	33.5241	4.49086			

T (398) = 1.972, P = < 0.05

Results of the independent t-test statistic showed that there is no significant difference between male and female diabetes patients attending general hospitals in their practice of diabetes mellitus management. This was because the calculated P-value of 0.330 is higher than the 0.05 alpha level of significance, while the calculated t-value of 0.364 is lower than the 1.972 t critical at df 398. This showed that gender of diabetes patients does not determine practice of diabetes mellitus management. Therefore, the null hypothesis which states that practice of diabetes mellitus management among male and female diabetic patients attending general hospitals in Northern States, Nigeria do not significantly differ. Thus, the null hypothesis 4c was hereby retained. It was retained because the P value of 0.330 is higher than the 0.05 alpha level of significant.

Hypothesis Three: Practice of diabetes mellitus management among diabetic patients of different educational status attending general hospitals in Northern States of Nigeria do not significantly differ.

Table 6: Result of ANOVA statistics on practice of diabetes mellitus management among diabetic patients of different education status attending general hospitals

Variable	Sum of Squares	Df	Mean Square	F	P-value
Between Groups	358.906	4	89.726	3.915	.004
Within Group	9052.172	395	22.917		
Total	9411.078	399			

F (4, 395) = 2.06, P = < 0.05

Observation of Table 6 shows that result was significant, because P-value of 0.04 observed is less than P-value of 0.05. The observed F-value of 3.915 is greater than the critical value of 2.06 at degree of freedom 4, 395 at df 4,395 at 0.05 level of significant. The result revealed that, there is significant difference in the practice of diabetes mellitus management among diabetic patients attending general hospitals in Northern States of Nigeria. Since the calculated F value indicates a significant difference, therefore, the need to investigate the causes by using Scheffe's post hoc test. The post hoc test using Scheffe, reveals that, there exist a significant difference between the levels of education of tertiary and no-schooling with a mean difference of 2.93791*. Therefore the null hypothesis was rejected. The sub-hypothesis was rejected because P-value of 0.00 is less than the 0.05 alpha level of significant.

Table 7: Scheffe post hoc test on the practiceof diabetes mellitus management among diabetic patients of different education status attending general hospitals

Multiple Comparisons						
(I) Level of Education	(J) Level of Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Primary	Secondary	-1.06888	.79910	.004	-3.5420	1.4042
	Tertiary	-1.80754	.75165	.008	-4.1338	.5187
	Non formal education	.31155	.93474	.009	-2.5813	3.2044
	None	1.13037	1.15804	.007	-2.4536	4.7143
Secondary	Primary	1.06888	.79910	.004	-1.4042	3.5420
	Tertiary	-.73866*	.59563	.020	-2.5820	1.1047

	Non formal education	1.38043	.81457	.000	-1.1406	3.9014
	None	2.19925	1.06342	.001	-1.0919	5.4904
Tertiary	Primary	1.80754	.75165	.018	-.5187	4.1338
	Secondary	.73866*	.59563	.020	-1.1047	2.5820
	Non formal education	2.11909	.76808	.009	-.2580	4.4962
	None	2.93791*	1.02824	.008	-.2443	6.1202
Non formal education	Primary	-.31155	.93474	.009	-3.2044	2.5813
	Secondary	-1.38043	.81457	.000	-3.9014	1.1406
	Tertiary	-2.11909	.76808	.009	-4.4962	.2580
	None	.81882	1.16877	.004	-2.7984	4.4360
None	Primary	-1.13037	1.15804	.017	-4.7143	2.4536
	Secondary	-2.19925	1.06342	.001	-5.4904	1.0919
	Tertiary	-2.93791*	1.02824	.008	-6.1202	.2443
	Non formal education	-.81882	1.16877	.004	-4.4360	2.7984

The Scheffe post hoc test analysis also shows significant difference in practice of diabetes mellitus management among diabetic patients of different education status attending general hospitals in Northern States of Nigeria.

Hypothesis Four: Practice of diabetes mellitus management among diabetic patients of different age groups attending general hospitals in Northern States of Nigeria do not significantly differ.

Table 8: Result of ANOVA statistics on practice of diabetes mellitus management among diabetic patients of different age group attending general hospitals

Variable	Sum of Squares	Df	Mean Square	F	P-value
Between Groups	264.973	4	66.243	.861	.23
Within Group	9146.105	395	23.155		
Total	9411.077	399			

$F_{(4, 395)} = 1.13$, $P = < 0.05$

Observation of Table 8 shows that result was not significant, because P-value of 0.23 observed is greater than P-value of 0.05. The observed F-value of 0.861 is less than the critical value of 2.06 at degree of freedom 4,395 at 0.05 level of significant. This means that the null hypothesis which stated that attitude of diabetes mellitus management among diabetic patients of different age groups attending general hospitals in Northern States of Nigeria do not significantly differ and was therefore retained. It was retained because P-value of 0.23 is higher than 0.05 alpha level of significant.

Discussion
Practice of diabetes management, the result of the study revealed that, practice of diabetes management among diabetic patients attending general hospitals is significant. This is in line with Shrivastava and Ramasamy, (2013) [17], who opined that, diabetes can significantly reduce the chances of developing long term complications by improving self-care practice. Despite this fact, compliance or adherence to these practices has been found to be low, especially when looking at long term changes. The process of delivering adequate support, health care providers should not blame the patients even when their compliance is poor (Marrero et al., 2000). In a study conducted among diabetic patients only 30% were compliant with drug regimens and non-compliance was higher among the lower socio-economic groups (Kotwani et al., 2007) [8]. One of the realities about DM2 is that only being compliant to self-care practice will not lead to good metabolic control. Research work across the globe has documented that; metabolic control is a combination of many variables not just patient

compliance (Harris, 2001; Toljamo & Hentinen, 2001) [5, 19]. In an American trial, it was found that participants were more likely to make changes when each change was implemented individually, success, therefore, may vary depending on how the changes are implemented, simultaneously or individually (Wing, Goldstein, Kelly, Birch, Jakic & Sallis, 2001 in Shrivastava & Ramasamy, 2013) [17, 20]. Some of the researchers have even suggested that health professionals should tailor their patient self-care support based on the degree of personal responsibility the patient is willing to assume towards their diabetes self-care management (Ockleford, Shaw, Willars & Dixon-Woods, 2008) [16]. The finding was higher than the study done in Bangladesh (18%) (Islam, Chakrabarti, Dirani et al. 2014) [7], Kenya (49%) and India (17.6%) (Maina et al, 2015) [11]. This might be that the study was hospital-based and they have better access to a health education program.

Recommendation
- Health Educators in collaboration with community leaders should put more effort in sensitising the people to go to hospitals for proper management of diabetes mellitus.
- Health Educators should further a comprehension health education, further emphasise a comprehensive health promotion strategy for diabetes and its related risk factors to sustain their knowledge.

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