WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 5, 436-443. Research Article ISSN 2277– 7105

DO CLINICIANS SET GLYCEMIC TARGETS IN THE MANAGEMENT OF TYPE 2 DIABETIC PATIENTS: AN APPRAISAL OF TWO TERTIARY HOSPITALS IN SOUTH EASTERN NIGERIA

Ogbonna Brian O.[*1], Ejim Chukwuka E [2], Uzodinma Samuel U[1], Ikebudu Chiadichiem C[3], Orji Chima E[1] and Oparah Azuka C[4]

[1]Department of Clinical Pharmacy and Pharmacy Management, Faculty of Pharmaceutical Sciences, Nnamdi Azikiwe University Awka, Nigeria.

[2]Pharmacy Department, Enugu State University of Science and Technology Teaching Hospital, Enugu, Nigeria.

[3]Pharmacy Department, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

[4]Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin City, Nigeria.

Article Received on
07 March 2015,

Revised on 30 March 2015,
Accepted on 20 April 2015

***Correspondence for Author**
Ogbonna Brian O
Department of Clinical Pharmacy and Pharmacy Management, Faculty of Pharmaceutical Sciences, Nnamdi Azikiwe University Awka, Nigeria.

ABSTRACT

Background: Strict glycemic control is vital to the management of type 2 diabetes and their values are invaluable to appraisal of how well the patients are managed in any facility. **Objective:** The objective of this study was to identify the glycemic indicators used in the disease management and establish the patients' values in the hospitals. **Methods:** A cross-sectional retrospective study was conducted using the case files and folders of Type 2 Diabetic Mellitus (T2DM) patients. Study was conducted between April and October, 2014 to determine the glycemic indicators used in the patients management. All the case files and patients folders identified were used for increased reliability of data. Data was analyzed for descriptive and inferential statistics. **Results:** The mean age of patients in hospital A and B were 62.04±11.50 and 61.46±12.52 respectively. The population of patients in hospital A was 35(41.7%) and 49(58.3%) females while that of hospital B was 173 (57.9%) males and 126(42.1%) females. Systolic Blood Pressure (BP) was 135.96±21.65 for A and 144.07±21.34 for B while the mean diastolic BP was 82.95±12.84 for A and 87.87±12.67 for B. The mean fasting blood sugar was 182.13±6.8 for A and 238.62±10.6 for hospital B while

the mean random blood sugar was 262.74±13.3 for A and 341.61±11.9 for hospital B. **Discussion:** The key indicators used were systolic BP, diastolic BP, fasting and random blood sugar. There was poor immunization record. **Conclusion:** Findings suggest fairly controlled BP but poorly controlled FBC and RBCs. These predispose the patients on the long run to micro vascular and macro vascular complications with consequent increase in mortality.

Keywords: indicators, glycemic control, hospital, Type 2 diabetes, pharmaceutical care, Nigeria.

INTRODUCTION

Diabetes is a metabolic disorder characterized by the presence of hyperglycemia due to defective insulin secretion, insulin action or both. Type 2 diabetes is associated with relative insulin production or secretary defects and varying degree of insulin resistance and accounts for 85%-95% of diabetes in developed countries. An estimated 371 million people are affected globally with an estimated projection of 552 million people by 2030.[1] The population of people living with diabetes mellitus has greatly multiplied globally over the past three decades, making it one of the most important public health challenges in many nations. An estimated 5 million people have diabetes in Nigeria with a national prevalence rate of 2.2%. The average prevalence for male and females in Nigeria for people below 45 years was 1.8% and 5.5% for those above 45 years. The highest rate of 11% was found in densely populated urban Lagos mainland, 6.8% in coastal city of Port-Harcourt in south-south Nigeria and 0.65% in sparsely populated highland of rural Mangu in Plateau state of northern Nigeria.[2] Considering the high level of disabilities and morbidity associated with Type 2 diabetes, there is need to institute individualized patient approach while maintaining a standard level of care.

Type 2 diabetes when poorly managed predisposes the patients to life threatening macro vascular and micro vascular complications with consequent huge economic burden and varying levels of disabilities which in most cases are irreversible. The objective of this study was to identify the glycemic indicators used in T2DM management, establish their values in the hospitals and generate baseline data that will help in effective and proactive management of Type 2 diabetes towards stemming the morbidity and mortality associated with the disease state.

METHODS

The study was carried out in two tertiary government teaching hospitals in south eastern Nigeria. The two hospitals are referral centers with 350 bed capacity (Hospital A) and 500 bed capacity (Hospital B) respectively, which serve a catchment area with a population of approximately four million people. The people are predominantly traders, business men, farmers and artisans. The study was a cross-sectional retrospective study conducted using patients' case files. Study was conducted between April and October, 2014 to determine the glycemic indicators used in the patients management and to know if there are documented glycemic goals for each patient being treated.

An ethical approval was obtained from the research and ethics committee of the teaching hospitals as part of a larger work on the impact of pharmaceutical care on Type 2 diabetes. The case files of patients living with Type 2 diabetes who have been on treatment for more than one year from the time of commencement of the study and those whose data and writings were eligible were all sorted out and used. A data collection form was designed and used to extract just the relevant information. All the case files and patients folders identified were used for increased reliability of data. Data were entered into excel, double checked and analyzed for descriptive and inferential statistics. Data were analyzed at 95% level of significance and p-values <0.05 were considered significant.

RESULTS AND DISCUSSION

The total number of cases found were 383, an average of 192 per hospital. The mean age of patients in hospital A and B were 62.04±11.50 and 61.46±12.52 respectively. The population of males in hospital A was were 383, and 49(58.3%) females while that of hospital B was 173 (57.9%) males and 126(42.1%) females. This gave rise to an average of 42 males and 150 females. Systolic BP was 135.96±21.65 for A and 144.07±21.34 for B. Mean diastolic BP was 82.95±12.84 for A and 87.87±12.67 for B. The mean fasting blood sugar was 182.13±6.8 for A and 238.62±10.6 for hospital B. Mean random blood sugar was 262.74±13.3 for A and 341.61±11.9 for hospital B. The mean population who used insulin was 54.5% while 75.8% of the patients received routine immunization for pneumonia. The average number of antidiabetic drugs per prescription was 1.6±0.42.

Table: 1 Demographic and descriptive characteristics of participants

		Hospital A	Hospital B
Variables (indicators) in diabetes management		N (%)	N (%)
Sex	Male	35 (41.7)	173 (57.9)
	Female	49 (58.3)	126 (42.1)
	Total	84 (100)	299 (100)
Age ±SD		62.04±11.50	61.48±12.52
Documented set glycemic target	No	30 (35.7)	281 (94)
	Yes	54 (64.3)	18 (6)
	Total	84 (100)	299 (100)
No of Antidiabetic drugs	0	10 (11.9)	15 (5)
	1	25 (29.8)	206 (68.9)
	2	38 (45.2)	68 (22.7)
	3	9 (10.7)	10 (3.3)
	4	1 (1.2)	0 (0)
	6	1 (1.2)	0 (0)
	Total	84 (100)	100 (100)
Immunization	No	76 (90.5)	183 (61.2)
	Yes	8 (9.5)	116 (38.8)
	Total	84 (100)	299 (100)
Aspirin	No	24 (28.6)	150 (50.2)
	Yes	60 (71.4)	149 (49.8)
	Total	100 (100)	299 (100)
Insulin	No	72 (85.7)	15 (5.0)
	Yes	12 (14.3)	284 (95.0)
	Total	84 (100)	299 (100)
Prescription error	No	62 (73.8)	297 (99.3)
	Yes	22 (26.2)	2 (0.7)
	Total	84 (100)	299 (100)

SD: Standard Deviation

Table 2: Descriptive statistics of variables in the study

		Hospital A				Hospital B		
Variables	**Minimum**	**Maximum**	**Mean**	**Std.dev**	**Minimum**	**Maximum**	**Mean**	**Std.dev**
Systolic BP	80	180	135.96	21.65	72	210	144.07	21.34
DiastolicBP	50	120	82.95	12.84	40	130	87.87	12.64
FBS	85	359	182.13	6.8	60	689.40	238.62	10.6
RBS	80	508	262.74	13.3	115	864	341.61	11.9
Weight(kg)	Not indicated	Not indicated	Not indicated	-	47	109	74.90	7.63
BMI	-	-	-	-	19.80	39.30	28.30	4.47

BMI: Body Mass Index, Std. dev: standard deviation, RBS: random blood sugar, FBS: fasting blood sugar

Table3: Summary table of independent t-test

Variable	Hospital	N	Mean	Std.dev	t	P
Age	A	84	62.04	11.50	0.365	0.062
	B	299	61.48	12.52		
Systolic	A	84	135.96	21.65	-3.066	0.031*
	B	298	144.07	21.34		
Diastolic	A	84	82.95	12.84	-3.138	0.046*
	B	298	87.87	12.64		
FBS	A	80	182.13	6.8	-5.706	0.021*
	B	287	238.63	10.6		
RBS	A	31	262.74	13.3	-3.451	0.027*
	B	275	341.61	11.9		

The mean age of patients in this study was 61.5 and 62 years respectively. Studies have shown that Type 2 diabetes prevalence predominantly affected people between the fourth and seventh decade in life and higher in women compared to men. This was in line with a systematic review by Gloria et al where most of the studies reviewed had greater number of females than males. Studies in developing countries revealed that the prevalence of diabetes peaks between the age of 45-64 years and majority of the population in this study felled within this age range.[3, 9] The mean maximum and minimum age of patients in this study was 29.5 and 89 years Respectively and more than 70%of patients in this study felled within that range. Due to indidual differences in health care, there is the need to tailor patients care to suit individual differences and need while maintaining the optimum benchmark. This study suggests that only an average of 35% of the patients had clearly stated glycemic goals documented in their treatment files. A study carried out in western Nigeria by Onyia and Tayo indicated lack of treatment chart and documented treatment targets for tracking patients' progress.[4] Non documentation of the treatment goal could deprive the patients of vital contributions from other members of the health care team. The study revealed that an average of 75.8% of the patients received routine immunization. Diabetes weakens the immunity of patients leaving them prone to infections. Immunization is supposed to be religiously indicated for diabetic patients. The use of insulin in Type 2 diabetes is indicated when glycemic control is no longer achievable with more than two or more oral hypoglycemic agents. It is an indicator of the state of glycemic control and progression of the disease.[5] This study revealed that averages of 54.5% of the patients were placed on insulin. A study in Kano, northern Nigeria indicated that 43% of Type 2 diabetics were on insulin therapy.[6]

Other key glycemic indicators documented in this study were systolic and diastolic blood pressures. Optimum blood pressure control of ≤130/80 is vital in management of Type 2 diabetics. This value could further be reviewed downwards depending on patients' glycemic status. The study revealed a mean systolic and diastolic BP of 136/83. However, this value could be rated as satisfactory but definitely not ideal. Diabetics who are not hypertensive and poorly managed could be predisposed to hypertension, dyslipidemia and ultimately progress to metabolic syndrome. This is further compounded by complications and drug therapy problems associated with polypharmacy due to multiple disease state especially for those who developed the disease in their middle age.[5] It underscores the need for individualization of therapy tailored to meet patients need, treatment prioritization and proper documentation of individual patients' treatment target for proper follow-up. Older patients with more comorbid conditions are more predisposed to polypharmacy which further exposes them to potential and actual drug therapy problems. Considering the functional status of the organs of the elderly diabetics, the mean number of oral antidiabetic drugs per prescription was 1.6±0.42. It was an indication of rational prescription and it is better when compared to the result of a study obtained from Type 2 diabetic patients in northern Nigeria where the mean number of drugs per prescription was 5.2±0.098.[7] However, the mean for oral antidiabetic drugs in the prescriptions was not indicated. Another study by Bela et al in India reported the mean number of drugs prescribed as 7.8±2.5.[8] The mean FBS was 182mg/dl against the 80-110 ideal value. This was an indication of poor glycemic control and could be attributable to so many factors like: non-adherence to medications which could be associated with patients poor knowledge of the disease state, irrational drug use, wrong evaluation of patients true status, drug therapy problems, comorbidities and high cost of antidiabetic medications in a place where majority of the people live below US$1 per day. There was statistical significance noted between the two hospitals in systolic BP, Diastolic BP, FBS and RBS respectively at $p<0.05$.

There was no record of other anthropometric measures like body mass index, waist-hip ratio and wrist-ankle ratio. Other clinical parameter like glycosylated hemoglobin was sparingly documented. This could be attributed to the high cost of the laboratory test which goes for an average of US$2-US$3 for one test run. Running this test becomes a problem for patients in a place where majority of the people live below US $2 per day.[10] Many variants of glycosylated hemoglobin (Hb) have also been reported among black Type 2 diabetics which alters the true reading/values of the test for patients. The interferences are caused by Hb

variants and conditions that affect red blood cells turn over. The Hb variants most common with Nigerians are HbS followed by HbC and HbE. [2] One of the hospitals did not record body mass index (BMI). Hospital B recorded high mean body weight of 74.9 kg with a satisfactory mean BMI of 28.3kg/m^3. The patients had relatively high mean body weight with moderate BMI's. This suggests that body weight and height could not account for all the necessary explanations for BMI. It could be a potential area for further studies and discuss.

CONCLUSION

This study demonstrates that some vital glycemic indicators were either partly used or completely omitted in Type 2 diabetic patients' management. Individualized patients glycemic targets were also not documented for majority of the patients studied. This could be harnessed in the design of intervention studies on the importance of the use of glycemic indicators in the management of this category of patients. There is a need for comprehensive input, process, output, outcome and impact measure for Type 2 diabetic patients to stem complications and ultimately improve patients' quality of life.

Limitations

This study was not without some limitations which need to be noted for better understanding and use of the study information. The data used was based on documented information in a manual data base which is subject to human limitations. The sample size may also have been minimal and data collection and interpretation may not have been perfectly done. However, inspite of these limitations, findings reflect true situations obtainable at the facilities.

Disclosure of interests: No financial support was received from anybody as assistance for this work.

Regulatory approval: The submitting author confirms that local regulatory approval has been obtained as required by local laws.

Author consent: All the authors have read and approved the work for submission. Authors indicated no conflict of interest

REFERENCES

1. Wild S, Roglec C, Green A, Sicree R, Keng H. Global prevalence of diabetes estimates for the year 2000 and projections for 2030. Diabetes care. 2004; 22: 1047-1033.

2. Diabetic Association of Nigeria. Clinical guideline for diabetes management in Nigeria. Bekdik Press. 2013; (2): 3-4.
3. Gloria J. Nichols-English, Melanie Provost, Dayin Koompalum, Hua Chen and Masood Athar. Strategies for Pharmacists in the Implementation of Diabetes Mellitus Management Programs, New Roles in Primary and Collaborative Care. Dis Manage Health Outcomes. 2002; 10(12): 783-803.
4. Onyia CC and Tayo F. Treatment targets and quarterly review chart for persons living with Diabetes. West African Journal of Pharmacy. 2011; 22(1): 105.
5. Etie M. Management of Type 2 diabetes mellitus in Older Patients: Concurrent and Emerging Treatment Options. Diabetes Ther. 2013; 4: 239-256.
6. Ayekame TU, Chijioke O, Andrew TU. Assessment of insulin in Type 2 diabetic patients at the diabetes clinic of Aminu Kano Teaching Hospital Kano, Nigeria. West African Journal of Pharmacy. 2012; 23(1): 91.
7. Olurishe CO, Gyang SS, Temidayo O, Shekarau TT. Drug Utilization Review of Antidiabetic medications in a tertiary hospital in northern Nigeria. West African Journal of Pharmacy. 2012; 23(1): 91-92.
8. Bela P, Bhaviz O, Kamlesh PP, Supriya DM, Varsha JP. Pattern of antidiabetic drugs use in type 2 diabetic patients in a medicine outpatient clinic of a tertiary care teaching hospital. Int J Basic Clin Pharmacol. 2013; 2(4): 485-491.
9. Hasniza ZH, Hoo FW. Drug related problems in Type 2 diabetes patients with hypertension: a cross sectional retrospective study. BMC Endocrine Disorders. 2013; 13(2): 1-12.
10. Ezenduka C, Ogbonna B, Ekwunife O, Okonta M, Esimone C. Drugs use pattern for Uncomplicated malaria in medicine retail outlets in Enugu urban, southeast Nigeria: implications for malaria treatment policy. Malar J. 2014; 13: 243.