

# PATTERN OF ANTI DIABETIC DRUG PRESCRIPTION AT A HEALTH FACILITY IN JOS NORTH CENTRAL NIGERIA

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## ABSTRACT

**Introduction:** Type 2 diabetes mellitus is a disorder that can be managed with oral or parenteral medications. Oral agents are of different classes while insulin is the commonest parenteral agent. The choice of drug regimen is influenced by a variety of factors. This study aims to describe the pattern of anti diabetic drug prescription at a private health facility in North Central Nigeria.

**Methodology:** this was a retrospective study in which the records of 120 patients with Type 2 diabetes visiting the facility were reviewed and analyzed

**Results:** 64.2% of the study population were males. The mean ages for males and females were 54.2+/-8.4 and 54.3+/-10.4 years respectively with no significant difference. Majority of subjects (75%) were receiving polytherapy, the commonest combination being biguanide + sulphonylurea. Only 2.5% were receiving insulin alone.

**Conclusion:** Anti diabetic treatment regimen should be guided by laid down guidelines and recommendations. It should also be individualized, as no two persons with Type 2 diabetes are exactly the same.

**Keywords:** Diabetes, Biguanide, Sulphonylurea, Thiazolidenedione

## INTRODUCTION

Type 2 diabetes mellitus is a chronic metabolic disorder characterized by hyperglycaemia. Its prevalence is rising at a significant rate in both developed and developing countries. It is projected that by the year 2025 there will be 380 million persons worldwide with diabetes mellitus and 418 million persons with other forms of impaired glucose intolerance<sup>1</sup>. In the United States, it is estimated that as at the year 2000, 11 million Americans had diabetes mellitus, and that figure is expected to rise to 29 million by 2050<sup>2</sup>. In Nigeria, the prevalence of Non Communicable Diseases such as diabetes mellitus has almost exceeded the prevalence of communicable diseases, as a result of factors such as an aging population and rapid urbanization<sup>3</sup>. A review of endocrine-related admissions and mortality at a tertiary health centre in South Western Nigeria showed diabetes mellitus to be the leading cause<sup>4</sup>. The World Health Organization estimates Nigeria to have the highest number of persons with diabetes mellitus in Africa<sup>5</sup>. The burden of this disease places a great strain on the resources of countries. Diabetic patients cost twice as much to manage than non-diabetics<sup>6</sup>. A significant proportion of this cost is

seen in the need to procure anti-diabetic medications which are often taken for life. These medications may be orally or parenterally administered. Oral medications include the sulphonylureas, biguanides, thiazolidenediones, meglitinides, alpha-glucosidase inhibitors and Dipeptidylpeptidase IV inhibitors. Parenteral agents include insulin and others such as incretin analogues and amylin analogues. In addition to pharmacotherapy, diet therapy<sup>7</sup> and exercise<sup>8</sup> are other important aspects in the management of the disease.

## OBJECTIVES

This study looks at the different classes and combinations of anti diabetic drugs prescribed for diabetic patients and their relationship with the duration of the disease.

## MATERIALS AND METHODS

The records of 120 patients with Type 2 diabetes mellitus accessing care at a private health facility in Jos, North Central Nigeria between January and December 2009 were reviewed. Data obtained were age, sex, duration of diagnosis of diabetes, class and combination of anti diabetic medication being prescribed.

### STATISTICAL ANALYSIS

This was done using the Epi Info statistical software ( version 7.0 ). Quantitative variables ( age ) were expressed as means while categorical variables ( sex, drug class ) were expressed as proportions. The students t test was used in the comparison of means. The Mood's test for comparison of medians was used for data with skewed distribution ( disease duration ). In all cases, p value < 0.05 was considered statistically significant.

### RESULTS

The study population comprised 64.2% males and 35.8% females. Mean ages of male and female subjects were 54.2+/-8.4 years and 54.3+/-10.4 years respectively. There was no statistically significant difference between the two groups ( p = 0.95 ). 25% of patients were receiving monotherapy and 75% polytherapy. 4.2% received biguanides ( metformin ) alone, 18.3% sulphonylurea alone ( glimepiride mainly, less commonly glibenclamide ), 60.8% biguanide + sulphonylurea, 3.3% biguanide + sulphonylurea + thiazolidenedione ( pioglitazone ), 10.8% biguanide + insulin, and 2.5% were receiving insulin alone. Overall, 13.3% were receiving an insulin containing regimen ( insulin + metformin or insulin alone ) and 86.7% an insulin free regimen.

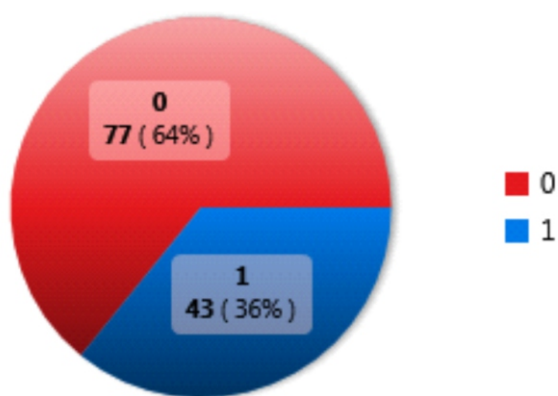


Figure gender distribution of subjects ( 0 = males 1 = females )

Table 1: distribution of the different treatment regimens

Regimen	Percentage of recipients
Biguanide alone	4.2%
Sulphonylurea alone	18.3%
Biguanide + sulphonylurea	60.8%
Biguanide + sulphonylurea + thiazolidenedione	3.3%
Insulin + Biguanide	10.8%
Insulin alone	2.5%

The median disease duration for those receiving insulin containing regimen was 7 years and that for those receiving insulin free regimen was 4 years. No statistically significant difference existed between the two using the Mood's test for comparing medians (  $X^2 = 3.08$ ;  $df = 1$ ;  $p = 0.07$  )

### DISCUSSION

The pattern of prescription of anti diabetic medications exhibits variations depending on the population being studied. In this study, we found out that the use of sulphonylurea alone was the commonest form of monotherapy, followed by monotherapy using biguanide alone and then insulin alone. No one was receiving monotherapy using a thiazolidenedione. Similar results were obtained by other workers on the same subject<sup>9,10</sup>. Guidoni et al<sup>11</sup> who also found sulphonylurea to be the commonest form of monotherapy prescribed for diabetics, observed glibenclamide to be the most frequently prescribed sulphonylurea. Our findings however, showed glimepiride to be the most frequently prescribed. There are studies that do not support the finding that sulphonylureas are the most frequently prescribed form of monotherapy in diabetic patients. They found biguanides ( precisely metformin ) to be the most frequently used form of monotherapy<sup>12,13</sup>. The reasons for the differences in the preferred choice of monotherapy is not entirely clear, but may be due to factors such as patient's

choice, patient characteristics ( for example, a biguanide would usually be preferred to a sulphonylurea in an individual who is obese ) or even the manufacturers of the pharmaceutical agent being used. In our study population, biguanide + sulphonylurea was the commonest combination therapy. This is what is obtained in some other populations<sup>14</sup>. We also found out that thiazolidenediones were not a commonly prescribed anti diabetic agent, a finding shared by some other authors<sup>9,14</sup>. Thiazolidenediones are relatively new compared to other anti diabetic agents. They were introduced a little less than 20 years ago<sup>15</sup>. The popularity of the use of these agents by clinicians will probably grow over time as they acquire more experience with the use of these agents.

It is understandable why only a small proportion of our study population (13.3%) were receiving an insulin containing regimen considering the fact that they all have Type 2 diabetes and not Type 1 diabetes ( were the use of insulin is a necessity ). In the United States, it was reported that from 1995 to 2007, a survey showed a gradual decline in the use of insulin among persons with Type 2 diabetes<sup>16</sup>. The fact however is that majority of type 2 diabetics will be unable to achieve or sustain normoglycaemia without the introduction of insulin at some point in their treatment, either as monotherapy or in conjunction with other oral agents<sup>17</sup>. This is due to the inevitable gradual decline in beta cell function in these individuals. Addition of insulin to oral agents in Type 2 diabetes has been shown to improve glycaemic control and reduce the risk of microvascular complications<sup>18</sup>. It will be expected that the duration of diagnosis of diabetes will be significantly longer in those on an insulin containing regimen than in those yet to commence an insulin containing regimen. This is based on the earlier argument that insulin will eventually be required over time in type 2 diabetes. We did not find any statistically significant difference between the duration of disease in the two groups. This could probably be explained by the fact that the information on the time of diagnosis of diabetes given by the patient does not necessarily correspond to the actual duration of the disease since type 2 diabetes is often present asymptotically long before it is actually diagnosed.

## CONCLUSION

There are guidelines and recommendations by different national and international scientific

bodies on the choices of anti diabetic medications to be used in the management of diabetes. Physicians should strike the delicate balance of complying with these recommendations and at the same time administering agents based on individual needs of patients. This is because no two persons with type 2 diabetes are exactly the same.

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