Marmara Pharmaceutical Journal 21/4: 1010-1014, 2017
DOI: 10.12991/mpj.2017.24

RESEARCH ARTICLE

# Prescribing pattern of antidiabetic drugs in type 2 diabetic patients of Noakhali city in Bangladesh

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**ABSTRACT**

The aim of the study was to describe the recent trends in the prescription pattern of antidiabetic drugs and sociodemographic characteristics of type 2 diabetic patients in Noakhali city of Bangladesh. This hospital based prospective, cross-sectional study was carried out in three diabetic hospitals of Noakhali during the period of December, 2016 to February, 2017. A total of 200 outpatients were included in this study by following simple random procedure. Among 200 participants, 73.5% were treated with monotherapy and 26.5% were treated with polytherapy with the highest percentage (37.5%) of commonly prescribed group drugs of sulfonylureas, but lonely metformin (biguanide) was the most commonest (28%) drug among oral hypoglycemic agents. The most accounted fixed dose combination was sulfonylurea with biguanide, and biguanide with glucodiase inhibitors. The highly prescribed insulin preparations was insulin mixtures (11%) among the patients. Drugs were prescribed by traditional brand names (100%) of different local or foreign companies and 15% of prescription were contained at least one multivitamin supplement. It was focused from this study that oral hypoglycemic agents (OHA) yet dominate the prescribing pattern, but there was a shifting trend towards insulin preparation in the management of Type 2 diabetes mellitus.

**Keywords:** Anti-diabetic drugs; diabetes; oral hypoglycemic agents (OHA); metformin; prescribing pattern.

## 1. Introduction

Diabetes mellitus (DM), often simply referred to as diabetes is not one disease, is a group of metabolic diseases characterized by hyperglycaemia (high blood glucose level). The most dominant form of diabetes mellitus is type 2 diabetes and it's typically appearance on later in life. The underlying metabolic causes of type 2 diabetes are the combination of impairment in insulin-mediated glucose disposal (insulin resistance) and defective secretion of insulin by pancreatic beta cells [1-2]. DM is the most common endocrine disorder by the year 2010 and it is estimated that more than 200 million people worldwide will have DM and 300 million will subsequently have the disease by 2025 [3-4].

The International Diabetes Federation (IDF) estimated that 7.2 million or 4.8 per cent of people living in Bangladesh had diabetes in 2007 and by 2025, that number is expected to grow to 9.2 million or 6.1 per cent of the population. This explosion in diabetes prevalence will place Bangladesh among the top ten countries in terms of the number of people living with diabetes in 2025 [5].

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**Submitted / Gönderilme:** 03.05.2017 **Revised / Düzeltme:** 01.07.2017
**Accepted / Kabul:** 07.07.2017

**How to cite this article :** Chowdhury A, Sen N, Banik S. Prescribing pattern of antidiabetic drugs in type 2 diabetic patients of Noakhali city in Bangladesh. Marmara Pharm J 2017; 21 (4): 1010-1014

Different classes of antidiabetic drugs including oral hypoglycemic agents (OHA) and insulin are commonly prescribed in the whole world for the treatment of diabetes, which acts by different mechanism to decline the blood glucose levels to maintain optimal glycemic control [6-7]. Monitoring of drug utilization among the respective patients is the evaluation of drug use in given healthcare against programmed criteria and standards to measure the relevance of drug therapy.

Therefore, the present study was conducted to find the modern prescribing pattern of anti-diabetic drugs in diabetic out-patients attending three diabetic hospital named M.A. Hashem diabetic Hospital, Bangladesh Diabetic Society Hospital, Shirazul Islam Diabetic Hospital in Noakhali district.

## 2. Results

A total of two hundred (n =200) patients of Type 2 diabetes were evaluated during the study period, out of which 44% (n=88) were male and 56% (n=112) female, that is predominated in female and 340 antidiabetic drug products were prescribed. The mean age of the sample was 36.71 years (SD 11.40 years, range 35-65). Table 1 represents the sociodemographic characteristics of the study subjects.

Among the respondents on the basis of duration of treatment most patients were in the group of 5-10 years (39%) followed by 1-5 years (32.5%), above 10 years (17.5%) and less than 1 year (11%). Base on BMI value 43.5% (n = 87) patients were obese, 30.5% (n = 61) were overweight and only 26% (n =52) were in normal weight.

In total, 73.5% were treated with monotherapy (whereas 67.5% prescribed with oral hypoglycemic agents alone and 6% were with insulin alone) and 26.5% were treated with combination or polytherapy (whereas 7.5% prescribed with two oral hypoglycemic agents, 5% with three or more oral hypoglycemic agents and 14% with insulin and oral hypoglycemic drug combination (Table 2). Thus OHA's were the most common class of anti-diabetic drugs prescribed in this study. Among 200 prescriptions, sulfonylureas (37.50%) were the most commonly prescribed class of drugs, followed by biguanides (28%), dipeptidase inhibitors (8%), thiazolidinediones (4%), and alpha glucosidase inhibitors (2.50%) (Figure 1). The most accounted fixed dose

**Table 1.** Sociodemographic characteristics of study population

| Parameter | Male n (%) | Female n (%) |
|---|---|---|
| **Mean age (years)** | 33.66 ± 9.28 | 39.75 ± 13.50 |
| **Gender** | 88 (44) | 112 (56) |
| **Educational status** | | |
| Primary school | Nil | 70 (35) |
| Secondary school | 57 (28.50) | 42 (21) |
| Graduate and above | 31 (15.50) | Nil |
| **Duration of diabetes mellitus** | | |
| <1 year | 9 (4.50) | 13 (6.50) |
| 1-5 years | 40 (20) | 25 (12.50) |
| 5-10 years | 27 (13.50) | 51 (25.50) |
| >10 years | 12 (6) | 23 (11.50) |
| **BMI (kg/m$^2$)** | | |
| Normal (18.5-24.9) | 24 (12) | 28 (14) |
| Overweight (25-29.9) | 28 (14) | 33 (16.50) |
| Obese (above 30) | 36 (18) | 51 (25.50) |

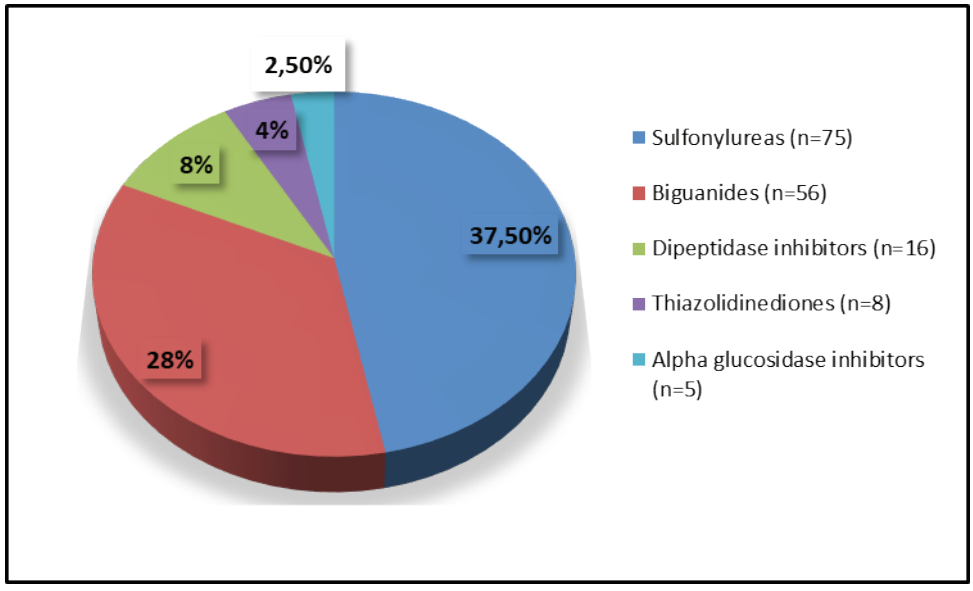


**Figure 1.** Prescribing frequency of different class of oral hypoglycemic agents (OHA)

**Table 2.** Treatment approach of antidiabetic medications

| Parameter | Values (%) |
|---|---|
| **Monotherapy** | **147 (73.5)** |
| Single OHA | 135 (67.5) |
| Only insulin | 12 (6) |
| | |
| **Combination therapy** | **53 (26.5)** |
| Two OHA | 15 (7.5) |
| Three or more OHA | 10 (5) |
| Insulin + OHA | 28 (14) |

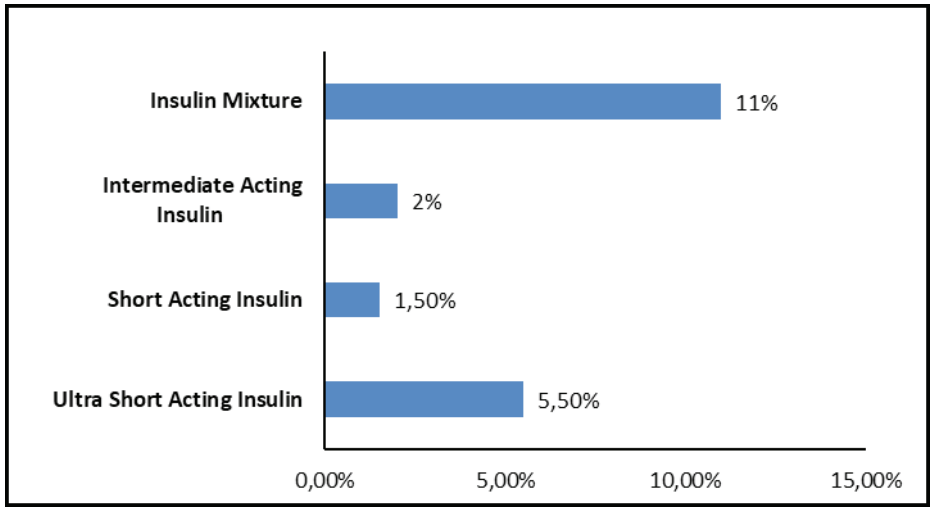


**Figure 2.** Prescribing frequency of different preparations of insulin

combination was sulfonylurea with biguanide and biguanide with glucodiase inhibitors. In case of insulin therapy, the most accounted insulin preparations was insulin mixtures (11%) followed by ultra-short acting insulin 5.5%, short acting insulin 1.5%, and intermediate acting insulin 2% (Figure 2).

## 3. Discussion

In this study, in total 200 subjects the prevalence of diabetes higher in female (n = 88, 44%) than male (n =112, 56%) and also the obese (BMI >30 kg/m$^2$) rate higher in female (n = 36, 18%) than male (n = 51, 25.50%).

The study revealed that OHAs were the highly prescribed and celling drug in our study area whereas 37.50% sulfonylureas were accounted as most prescribed class of drug which was in which was in accordance with previous studies [9-11]. All of the drugs were prescribed in the prescription by brand names (100%) and the number of anti-diabetic drugs per prescription varied from one to five. Besides anti-diabetic drugs 15% of prescription were contained vitamin supplement and some of the case hyperlipidemic drugs were prescribed (5%) in the prescription. Most of the cases noticed adverse drug reactions by the patients was hypoglycemia (35%) due to medication error or drug overdose. This study goes to some limitations because it was collected from outpatients attending few diabetic hospitals and thus may not be descriptive of the prescribing pattern across the state. Conversely, it gives an opportunity for carrying out further studies about prescription patterns by including more parameters of analysis to provide feedback to prescriber and to encourage rational prescribing because of this pilot study was conducted in 200 diabetic patients for short period of time.

## 4. Conclusion

The study settled that oral hypoglycaemic agents can still market leading preparations in the management of Type 2 diabetes mellitus, but there was a shifting trend towards the use of insulin preparation in most cases. Metformin was the commonest drug used in the every prescription. At last, one of the point noted in our study multidrug combinations appears to prescription compared to previous studies.

## 5. Materials and Methods

This prospective, cross-sectional, and survey based study was carried out in three diabetic hospitals of Noakhali District, a coastal area of Bangladesh. A total of 200 diabetic patients aged 35-65 years (88 males and 112 females) participated in the study during the session of December 02, 2016 to February 05, 2017. All the respondents willingly joined this study and provided written informed consent. The study protocol was approved by the ethics committee of the institution prior to the conduct of the study. After obtaining informed consent, elaborated information regarding sociodemographic data along with details of anti-diabetic drug therapy, duration of treatment, adverse drug reactions (ADR), and dieting/exercise activities were recorded by the patients with the help of trained personnel. The adopted questionnaire was divided into four portions: A, sociodemographic information; B, type of antidiabetic therapy; C, classes of antidiabetic drug used; D, adverse effects of oral hypoglycemic agents (OHA).

The BMI value of a patient is calculated as a way of weight in kilograms divided by height in meters squared (BMI = kg/m$^2$). Using BMI chart, it is feasible to categorize the level of obesity by reference to internationally accepted ranges, beginning from underweight (BMI < 18.5 kg/m$^2$), normal (BMI 18.5-24.9 kg/m$^2$), overweight (BMI 25.0-29.9 kg/m$^2$) and obese (BMI ≥30.0 kg/m$^2$) [8].

Descriptive statistics were calculated for all variables included mean and standard deviations (SD). All values were expressed in terms of the actual number, mean, and percentage.

## Authorship statement

Author contributions: Concept – S.B.; Design – S.B.,; Supervision – S.B.; Resource – A.C.; Materials – A.C.; Data Collection and/or Processing – A.C., N.S.; Analysis and/or Interpretation – S.B., A.C.; Literature Search – A.C., N.S.; Writing – A.C.; Critical Reviews – S.B., A.C., N.S.

## Conflict of interest

The authors declared no conflict of interest

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