CONSUMPTION ANALYSIS OF METFORMIN, SULFONYLUREAS, AND OTHER ANTIDIABETICS DRUGS IN MOROCCO (1991-2005)

MOHAMMED ABDESSADEK1,3*, AHMED EL ATTARI1, MARTIN DIARRA2, RABIA MAGOUL3, SELOUA EL OUEZZANI1, YOUSSEF KHBALL1, FARIDA AJDI1,2
1Department of Pharmacology and Pharmacovigilance, University Hospital of Fez, Morocco, Science Team Medicines-Medical Center of Biomedical and Translational Research, Faculty of Medicine and Pharmacy, Sidi Mohammed Ben Abdellah University, Fez, Morocco, 2Department of Endocrinology, Diabetology and Nutrition, University Hospital of Fez, Morocco, 3Laboratory of Neuroendocrinology and Nutritional and Climatic Environment, Faculty of Sciences, Atlas, Sidi Mohammed Ben Abdellah University, Fez, Morocco
Email: abdessadek.med@gmail.com

Received: 08 Jan 2016 Revised and Accepted: 20 Jun 2016

ABSTRACT

Objective: Type 2 Diabetes is one of the chronic diseases with a high prevalence and consequently a substantial socio-economic burden in Arab countries. In this paper, we evaluated the antidiabetic drugs consumption in Morocco during the period of 1991 to 2005, drug classes used and the effect of major studies on the consumption of the biguanides.

Methods: We used sales data from the subsidiaries of the Intercontinental Marketing Service Health. The consumption volume was converted to Defined Daily Dose (DDD).

Results: During 1991-2005 antidiabetic drugs consumption increased from 1.37 to 4.22 DDD/1000 inhabitants/day. In 2005 the sulfonylureas were the most consumed 2.96 DDD/1000 inhabitants/day followed by the Biguanides 1.06 DDD/1000 inhabitants/day) and glinides 0.1 DDD/1000 inhabitants/day. The largest consumption share in volume was held by sulfonylureas 72.22%, followed by the biguanides 22.22%.

Conclusion: This study documents progressive changes in the consumption of antidiabetic’s between 1991-2005 in Morocco. However, the significant increase in the utilization of antidiabetic’s drug is not the result of increased adherence but of increased patient number, since the use of metformin as first line therapy was still suboptimal and influenced by different studies as the Campbell and UKPDS study.

Keywords: Defined Daily Dose, Consumption, Metformin, Sulfonylureas, Antidiabetic

INTRODUCTION

Diabetes represents a major public health problem in Morocco as they do in both the industrialized and the developing countries. It is widely considered one of the world’s largest human health problems, as documented by its growing prevalence [1-2]. In addition, more than 240 million people worldwide are estimated to have diabetes, and this is likely to pass 360 million by 2030 [3].

The main therapeutic goals for the treatment of type 2 diabetes mellitus are to enhance insulin secretion and lower systemic glucose; an increased blood glucose level is associated with a greater risk of microvascular and macrovascular complications. It has been reported that macroangiopathy can affect up to one-third of patients diagnosed with type 2 diabetes [4]. Diabetic patients require multiple interventions to reduce their risk of microvascular and macrovascular complications. These complications not only diminish the health of the patients and may disable them but also put a high financial burden on the healthcare system. The United Kingdom Prospective Diabetes Study clearly proved the benefits of intensive glycemic control in patients with type 2 diabetes [5]. Previous studies have shown that increased adherence to oral antihyperglycemic drugs (OADHs) results in better metabolic control and, consequently, in decreased hospitalization rates and lowered total annual healthcare costs [6, 7]. Moreover, a systematic review of 20 reports showed that adherence to OAHD therapy varied widely, ranging from 36% to 93% [8].

In most Arab countries, including Morocco, the prevalence of diabetes was 6.6% and was similar for males and females [9]. The majority of diabetes patients are predominantly managed and treated by general practitioners and diabetologists. Today’s clinicians are presented with an extensive range of oral antidiabetic drugs for type 2 diabetes.

The main aim of the present study was to describe trends in the use of antidiabetic’s medications within and across different therapeutic classes using nationally representative data from 1991 to 2005, and to have an idea about the consumed antidiabetic’s drugs and the effect of major studies on the consumption of biguanides.

MATERIALS AND METHODS

We used sales data from the Moroccan subsidiary of Intercontinental Marketing Service Health (IMS Health), these data are for the drugs sold by private pharmacists or 90% of the global pharmaceutical consumption in Morocco. IMS Health conducts surveys of the market share and the volume of sales expressed in units. The collection of the data is essentially made from indirect sources, monthly from the pharmaceutical wholesalers and from direct sources and quarterly from pharmacies. The study involved the main antidiabetic classes with their Anatomical Therapeutic Chemical system (ATC). Data from IMS sales in units were converted to DDDs/1000 Inhabitants per day 

(DDD/1000 Inhabitants/day = [Number of DDD/Number of days * Number of inhabitants]*1000), the simplest and most accessible unit of measurement among the different methods of measuring consumption of drugs [10], normalized and validated by the World Health Organization (WHO). This unit of measurement allows comparisons at the international level by eliminating the difficulties associated with the heterogeneity of dosage forms, presentations, and dosages of drugs across countries. For the calculation of the DDDs, we have used the values in DDD proposed by the WHO, assigned to each dosage form of a drug, which is “an estimate of the maintenance’s average dose per day for a drug used for its main indication for an average adult.” Thus, for each drug of the ATC, a daily dose is given the value of a DDD. In this study, we used the ATC system version of the European Pharmaceutical Market Research Association [11].

RESULTS

During the study period from 1991 to 2005, the total consumption of antidiabetic’s went from 1.37 to 4.22 DDD/1000 inhabitants/day...
(DID), in 2005 the sulfonylureas was the most consumed 2.96 DID for each one, followed by the short acting Biguanides 1.06 DID. The consumption of other classes of drugs namely the glinides and inhibitor of alpha-glucosidase witnesses a much slower evolution. However, there was a much slower evolution of other classes such as glinides glitazones as shown in (table 1).

<table>
<thead>
<tr>
<th>Classes of Antidiabetic Drugs</th>
<th>1991 DID</th>
<th>2000 DID</th>
<th>2005 DID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfonylureas</td>
<td>1.061</td>
<td>2.598</td>
<td>2.969</td>
</tr>
<tr>
<td>Glinides</td>
<td>-</td>
<td>-</td>
<td>0.075</td>
</tr>
<tr>
<td>Glitazones</td>
<td>-</td>
<td>-</td>
<td>0.075</td>
</tr>
<tr>
<td>Biguanides</td>
<td>0.316</td>
<td>0.563</td>
<td>1.065</td>
</tr>
<tr>
<td>Alpha-glucosidase inhibitors</td>
<td>-</td>
<td>-</td>
<td>0.081</td>
</tr>
<tr>
<td>Total</td>
<td>1.377</td>
<td>3.236</td>
<td>4.229</td>
</tr>
</tbody>
</table>

DID: Defined Daily Dose/1000 Inhabitants/Day

In 2005 the most consumed products were the sulfonylureas 2.96 DID follow by biguanides 1.06 DID and the alpha-glucosidase inhibitors 0.08 DID. We most note that during the period of our study, new drugs have been introduced into the market and became the most widely consumed in Morocco for 2005 as shown in (table 2).

<table>
<thead>
<tr>
<th>Classes/INN</th>
<th>ATC</th>
<th>1991</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfonylureas</td>
<td>A10BB12</td>
<td>1.061</td>
<td>2.598</td>
<td>2.969</td>
</tr>
<tr>
<td>Gliclazide</td>
<td>A10BB09</td>
<td>0.35</td>
<td>0.948</td>
<td>1.122</td>
</tr>
<tr>
<td>Glibenclamide</td>
<td>A10BB01</td>
<td>0.44</td>
<td>1.191</td>
<td>1.122</td>
</tr>
<tr>
<td>Glipizide</td>
<td>A10BB07</td>
<td>0.11</td>
<td>0.16</td>
<td>0.118</td>
</tr>
<tr>
<td>Glitazones</td>
<td>A10BB08</td>
<td>-</td>
<td>0.046</td>
<td>0.034</td>
</tr>
<tr>
<td>Carbutamide</td>
<td>A10BB06</td>
<td>0.11</td>
<td>0.031</td>
<td>0.01</td>
</tr>
<tr>
<td>Chlorpropamide</td>
<td>A10BB02</td>
<td>0.01</td>
<td>0.006</td>
<td>0</td>
</tr>
<tr>
<td>Tolbutamide</td>
<td>A10BB03</td>
<td>0.05</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Biguanides</td>
<td>A10BB04</td>
<td>-</td>
<td>-</td>
<td>0.011</td>
</tr>
<tr>
<td>Metformin</td>
<td>A10BB02</td>
<td>0.31</td>
<td>0.563</td>
<td>1.065</td>
</tr>
<tr>
<td>Acarbose</td>
<td>A10BF01</td>
<td>-</td>
<td>0.075</td>
<td>0.081</td>
</tr>
</tbody>
</table>

Table 2: Consumption trends of antidiabetic drugs in international non–proprietary name (INN)

INN: International Non–proprietary Name/ATC: Anatomical, Therapeutic and Chemical classification/DID: DDD/1000 Inhabitants/Day

Similarly the number of antidiabetic commercial specialties in Morocco from 6 in 1991 to 16 in 2005. In 1991 antidiabetic consumption, in DDD was represented by the sulfonylureas 72.22%, biguanides 22.22%, glinides 2.22% and inhibitor of alpha-glucosidase 2.22%, but in 2005, it was 71.77% for the sulfonylureas, 25.38 for biguanides, 1.72% for the inhibitor of alpha-glucosidase and 1.15% for glinides as shown in (fig. 1).

The evolution of the consumption of oral antidiabetic drugs during this period of study is influenced by major studies on prescribing the drug and publishing the results of these randomized studies have involved oral medications in evaluating their influence on consumption of metformin compared with other oral antidiabetic agents. We will mention the most important for the most prescribed families.
The increase in the number of DDD of metformin during this period was influenced by the results of UKPDS and Campbell study from 1995 to 1998 as shown in (Fig. 2).

**CONFLICT OF INTERESTS**

Declared none

**REFERENCES**


How to cite this article