Use of medications for type 2 diabetes mellitus in the Brazil's family health strategy: gender differences

Rinaldo Eduardo Machado de Oliveira[1], Anderson Soares da Silva[1], Julieta Ueta[2], Laercio Joel Franco[1]

ABSTRACT

Introduction: The medications are the main therapeutic inputs in the treatment of type 2 diabetes mellitus. When properly used, they allow disease control and reduction of morbidity and mortality, resulting in improvements in quality of life. Thus, the purpose of this article is to characterize the use of medications for type 2 diabetes mellitus with emphasis on gender differences.

Methods: A cross-sectional study performed in Family Health Units in Ribeirão Preto, São Paulo, Brazil, with 100 men and 100 women. Sociodemographic characteristics, clinical data, lifestyle and use of medications were the variables of interest.

Results: Mean number of diabetes medications referred by study participants was 1.6 (SD = 0.7) for women and 1.5 (SD = 0.6) for men (p = 0.40). The use of metformin was mentioned by 70% of women and 65% of men, and adverse reactions were reported by 15% of women and 2% of men (p < 0.01). Medications were obtained mainly from public health system pharmacies in both genders.

Conclusions: Gender differences in the use of diabetes medications were found in reported adverse reactions, with more cases among women.

Keywords: *Drug therapy; pharmacoepidemiology; pharmaceutical care; chronic disease; diabetes mellitus; family health strategy*

Corresponding author:
Rinaldo Eduardo Machado de Oliveira
rinaldo.eduardo@usp.br
Social Medicine Department, School of Medicine of Ribeirão Preto, Universidade de São Paulo (USP)
Avenida Bandeirantes, 3900.
14049-900, Ribeirão Preto, SP, Brasil.

Noncommunicable diseases (NCDs) are a global health problem, and diabetes mellitus (DM) is a major focus of concern[1]. In 2014, the estimated DM prevalence was 8.5% worldwide[2]. The scenario in Brazil is worrisome. The estimated DM prevalence in the country was 5.5% in 2006 and reached 8.9% in 2016, which represents a 61.8% increase in the number of people diagnosed with DM in the last 10 years. The disease affects 9.9% of women and 7.8% of men[3,4].

Type 2 DM accounts for 90-95% of the cases and is characterized by deficient insulin action and secretion and poor regulation of hepatic glucose production[5,6]. Type 2 DM associated with other NCDs is responsible for high proportions of mortality, costs with outpatient procedures, use of medications and hospital admissions[7,8].

Prevention of complications related to type 2 DM is crucial. Disease control involves changes in lifestyle, including adoption of a diet plan and regular practice of physical exercise, as well as the use of medications[5,6].

Medications play an important role in diabetes care. The current drugs to treat type 2 DM have different safety and effectiveness profiles. Besides, they may have effects on insulin deficiency or resistance or on intestinal glucose absorption[5,6]. There are also drugs that act on the reabsorption of glucose in the kidneys[5,6]. In evidence-based practice, antidiabetic drugs may be prescribed as monotherapy or combination therapy depending on the characteristics of the patient and the disease. It is known that medications,

when properly used, are able to control diabetes and reduce morbidity and mortality, resulting in improved quality of life[9,10].

The literature shows that there are behavioral differences between men and women in diabetes care. Women are more alert to signs and symptoms and cherish self-care. Men usually seek health services in extreme situations or when they are unable to work[8,9].

There are few studies on the use of medications to treat DM in the Family Health Strategy (FHS) focusing on the differences between men and women. Thus, the aim of the present study was to characterize the use of medications for type 2 DM with emphasis on gender differences.

METHODS

This is a cross-sectional study conducted at Family Health Units (FHUs) of the Western Sanitary District in Ribeirão Preto, São Paulo, Brazil, with adult patients diagnosed with type 2 DM and using medications to treat the disease. Patients with cognitive deficit or communication difficulty, bedridden patients, those who depended on caregivers, and those with history of surgeries or admissions in the 3 months prior to the interview were excluded.

The present study originates from the following master's dissertation: "Adherence to type 2 diabetes mellitus pharmacotherapy at the Family Healthcare Strategy: a gender perspective". The sample was calculated considering a 75% frequency of adherence to drug therapy, a margin of error of 5%, and an alpha of 5%. The sample size was then estimated in 200 participants, which were divided proportionally to the number of patients with DM who were registered in six FHUs of the Western Sanitary District. The sample was stratified into four groups as follows: I – 50 female patients with type 2 DM aged 18-59 years; II – 50 female patients with type 2 DM aged 60 years or more; III – 50 male patients with type 2 DM aged 18-59 years; and IV – 50 male patients with type 2 DM aged 60 years or more. A pilot test was performed in a non-registered FHU with 10 participants, who were not included in the final study sample.

This was a convenience sample, and the quota of each FHU was filled as patients sought the service. At the beginning of the interview, prescriptions, package inserts, blister packs and boxes of the medications used by each patient were requested. The instrument for data collection consisted of a questionnaire on sociodemographic data, health care, use of medications, and access to and use of health services. The Brief Medication Questionnaire was used to evaluate medications used, adherence and

adverse reactions[11]. Data collection was conducted between November 2015 and April 2016.

In descriptive data analysis, frequencies and percentages were obtained for qualitative variables, and measures of dispersion for quantitative variables. The Pearson's chi-square test was used to assess the association between variables of interest. The Student's t-test was used to compare means. When necessary, the significance level was set at $p < 0.05$. Statistical analyses were performed using SAS® version 9.2.

The research project was approved by the local Research Ethics Committee with protocol number 47811515.9.0000.5414. All participants signed an informed consent form.

RESULTS

The study sample was characterized by low income and low level of education. Regarding socioeconomic status, 43% of women and 53% of men were categorized as classes D/E according to the Brazilian Economic Classification Criterion[12]. Regarding level of education, 77% of women and 78% of men reported 8 or less years of schooling. The mean age was 63.9 years (SD = 13.7) in women and 59.5 years (SD = 13.9) in men. Most men and women reported being white (66% for both) and married (63% of women and 65% of men). Most men reported being employed/self-employed (57%) and most women reported being retired/pensioner (45%).

The mean number of medications used to treat DM was 1.6 (SD = 0.7) in women and 1.5 (SD = 0.6) in men (p = 0.40). Table 1 shows self-reported medications used to treat DM with a prevalence of metformin monotherapy in both genders. Metformin was the oral antidiabetic drug (OAD) most mentioned as a potential cause of adverse reactions, reported by 15% of women and 2% of men (p < 0.01) (Table 2). Diarrhea was reported as the main symptom by 13% of women and 1% of men (Table 3).

Medications were mostly or partially obtained from public health system pharmacies by 65% of women

Table 1: Self-reported medications for the treatment of type 2 diabetes mellitus in Family Health Units according to gender. Ribeirão Preto, SP, 2016.

Medications	Women n = 100	Men n = 100
Metformin alone	35	33
Sulfonylurea alone	12	14
Insulin alone	10	16
Metformin + sulfonylurea	22	18
Oral antidiabetic drug + insulin	17	17
Others	4	2

Table 2: Self-reported medications that caused adverse reactions according to gender. Ribeirão Preto, SP, 2016.

Medications that caused adverse reactions	Women n = 100	Men n = 100
Metformin	15	2
Insulin	2	1
Saxagliptin + metformin	1	0
Dapagliflozin	1	0

Table 3: Adverse drug reactions reported by study participants according to gender. Ribeirão Preto, SP, 2016.

Adverse drug reactions	Women n = 100	Men n = 100
Diarrhea	13	1
Hypoglycemia	2	0
Taste of blood in the mouth	1	1
Others	3	1

Table 4: Sources of medication acquisition for the treatment of type 2 diabetes mellitus reported by the study participants in Family Health Units according to gender. Ribeirão Preto, SP, 2016.

Sources of medication acquisition	Women n = 100	Men n = 100
Public health system pharmacy	55	60
Brazilian Popular Pharmacy Program	29	26
Commercial pharmacy	4	3
Public health system pharmacy + Brazilian Popular Pharmacy Program	10	11
Public health system pharmacy + Commercial pharmacy	2	0

and 71% of men. The Brazilian Popular Pharmacy Program (BPPP), a government program of co-payment in the private system, was used by 29% of women and 26% of men to obtain their medications (Table 4).

DISCUSSION

This study included FHU patients who used at least one medication to treat type 2 DM. The results of the 2013 Brazilian National Health Survey showed that 80.2% of the participants who reported having diabetes used medications, with higher proportion in the South-East region and lower proportion in the North region. In addition, no significant differences were found between genders according to the point estimates for the Brazilian regions[11].

In the present study, the mean number of medications used to treat type 2 DM was higher among women. However, there were no statistically significant differences in the comparison of means between genders. This finding differs from a study with patients with type 2 DM in a Primary Health Care Unit in Ijuí, Rio Grande do Sul, in which the mean number of medications was 2.2 (SD = 1.0) in women and 2.7 (SD = 0.8) in men[13].

Metformin was the most mentioned medication by both genders. Current guidelines of the Brazilian Diabetes Association and the American Diabetes Association are consistent in terms of metformin prescription, associated with changes in lifestyle, for patients recently diagnosed with type 2 DM[5,6]. However, monotherapy may not be enough to obtain glycemic control, and it is often necessary to combine other OADs according to disease progression[10].

The literature suggests caution in the prolonged use of metformin, which may cause vitamin B12 deficiency. One of the likely causes of diabetic neuropathy is associated with this type of deficiency[14]. Also, although metformin has low potential for drug interaction, a careful evaluation should be performed when using it concomitantly with medications that cause harm to the renal function[15].

A pharmacotherapy study of type 2 DM conducted in a FHU in João Pessoa, Paraíba, found that 96.9% of men (who represented 50% of the sample) used OAD and the other ones used insulin alone. Of the participants who used OAD, 38.7% used metformin combined with glibenclamide, 32.3% metformin alone, 19.4% glibenclamide alone, 6.5% metformin combined with glimepiride, and 3.2% glimepiride alone. In addition, 12.5% of the study participants reported adverse reaction and attributed it to the use of OAD. The listed symptoms were stomach pain/discomfort or headache, and all patients who reported these used metformin. The authors did not specify the proportion of adverse reaction according to gender[16].

Potential adverse reactions to metformin were reported by both genders in the present study, predominantly in women. The literature shows that this OAD may cause abdominal discomfort, diarrhea and headache. It also shows that extended-release formulations of this medication may cause less adverse events[5,6]. A randomized clinical trial conducted in 27 health centers in the United States with 2,155 patients with type 2 DM divided into 2 groups – metformin and placebo – showed that women in the metformin group reported more adverse reactions (p = 0.002)[17].

In the present study, the main source of medications were the public health system pharmacies, followed by the BPPP, in both genders. Data from the 2014 Brazilian National Survey on Access, Utilization and Promotion of Rational Use of Medications showed that 78.6% (95% CI: 75.6-81.3) of diabetes medications were obtained free of charge[18].

The 2013 National Health Survey showed that 57.4% of patients with DM used at least one medication

provided by the BPPP. Higher proportions of acquisition through BPPP were found in black patients (69.4%) and in patients with lower level of education (≤ 8 years of schooling) (63.9%). Regarding gender, even without statistically significant differences, women from most regions tended to obtain more diabetes medications from the BPPP than men[19].

The present study contributed to expand the knowledge on type 2 DM pharmacotherapy, particularly in the FHS. Data presented here provide reflections to health care and chronic disease management. However, some limitations should be considered. Information on the continuous use of type 2 DM medications was collected. Conversely, information on home use of medications to treat other diseases, as well as on use of medications to treat acute conditions, phytotherapeutic drugs, homeopathic drugs and self-medication, was not collected. Also, pharmacotherapy quality was not assessed. Memory bias when describing medications used and adverse reactions is another limitation of this study. However,

prescribed medications were consistent with current guidelines for diabetes treatment[5,6].

The present study showed a prevalence of monotherapy for the treatment of type 2 DM in both genders. Metformin was the most mentioned OAD and was associated with potential adverse reactions in women more often. Most medications were obtained from public health system pharmacies or through the BPPP. It is worth highlighting the importance of the implementation of actions to promote the rational use of medications considering pharmacotherapy characteristics of men and women with type 2 DM in the FHS.

Conflicts of Interest

The authors declare no conflicts of interest.

Institution where the study was performed

School of Medicine of Ribeirão Preto, Universidade de São Paulo.

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