



Diabetes Mellitus Therapy Adherence and Therapy Characterization in Northeast Portugal: Classical Vs Dipeptidyl Peptidase IV (DPP-4) Inhibitors

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Abstract

Introduction: Diabetes mellitus is a chronic disease characterizes by the absence of insulin production by the body or the inability of their effectively use.

Aim: To determine prevalence of diabetes types, the frequency of glycemic control, identify change in eating habits and physical activity, characterize the pharmacological therapy concerning classic and novel therapeutic approaches and verify the therapy adherence in diabetics of northeast Portugal.

Methods: A cross-sectional study was performed by applying an interview to 202 adult diabetics of Trás-os-Montes region (Portugal), based on a questionnaire, with MAT scale (measure of adherence to therapy) validated for the Portuguese population.

Results: The results showed 73,8% and 26,2% diabetics of type 2 and type 1, respectively. Most of the total diabetics (38,1%) have controlled the glycemic once a day, 60.4% have modified eating habits and 89.7% increased the frequency of physical activity. The drugs more used were metformin (63) and insulin (52) and the use of incretin mimetics was low (13.9%, 28), with more expression of the association of metformin and vildagliptin (21). The prevalence of diabetics adherents to therapy was 92,6%.

Conclusions: The majority of diabetics adhered to pharmacological therapy and the use of dipeptidyl peptidase IV (DPP-4) inhibitors remains low.

Keywords: Diabetes mellitus; Therapy Adherence; Drugs Therapy; Metformin; Dipeptidyl Peptidase IV (DPP-4) inhibitors

Introduction

Diabetes mellitus is a disease with an increasing prevalence. World Health Organization (WHO) estimated that 8.5% adults aged 18 years and older had diabetes in 2014 and in 2012 the disease was the direct cause of 1.5 million of deaths and high blood glucose was the cause of another 2.2 million deaths [1].

Diabetes is a chronic disease characterize by inability of the pancreas to produce enough insulin, the hormone that regulates blood sugar, or when the body cannot effectively use the insulin produced by pancreas. The most common types of diabetes are Type 1 diabetes, Gestational diabetes and Type 2 diabetes [1].

Type 1 diabetes causes remains unclear and the symptoms are characterized polyuria, polydipsia, constant hunger, weight loss, vision changes and fatigue. In this type of diabetes, the incapacity to produce insulin requires its daily administration [2,3].

Gestational diabetes is characterized by hyperglycaemia with blood glucose values above normal but below those diagnostic of diabetes, and occurs during pregnancy [1].

Type 2 diabetes is the most prevalent diabetes type and results of the body's ineffective use of insulin. It is clearly associated with unhealthy lifestyles such as diets rich in fats and carbohydrates and physical inactivity. The symptoms are similar to those of Type 1 diabetes but are often less marked, which may leads to the under diagnosis [2-6].

Uncontrolled hyperglycaemias over years leads to serious damage of the body's tissues and systems, especially in nerves, heart, blood vessels, eyes and kidneys, resulting in heart disease, stroke, kidney disease, eye problems, nerve damage and foot problems. In fact, diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation [1].

Type 2 diabetes treatment includes an adequate diet and physical activity, in order to control blood glucose levels and increase the patient's quality of life [2]. Additionally, and if these interventions are not sufficient, there is a large number of Antidiabetic drugs. The glycaemic control in Type 2 diabetes was achieved, in most of cases, with oral therapy combinations. For that, the available classes are biguanides, sulfonylureas, meglitinide derivatives, glitazones, alpha-glucosidase inhibitors. In the last 10 years, new drugs and drug classes becoming available for disease control such as glucagon-like peptide-1 (GLP-1) agonists, selective sodium-glucose transporter-2 (SGLT-2) inhibitors and dipeptidyl peptidase IV (DPP-4) inhibitors [3,7]. The last class, also called incretin mimetics is a recent therapy in Portugal and comprises linagliptin, saxagliptin, sitagliptin and vildagliptin. These anti-diabetic drugs are able to decreases postprandial and fasting glycaemia, decreases glycosylated hemoglobin levels, decreases glucagon release. Additionally decrease triglyceride levels, reduces body weight, also do not cause significantly hypoglycaemia and are well tolerated [3,8,9].

According to WHO adherence to long-term therapy for chronic illnesses in developed countries averages only around 50% [10]. Therapy adherences are usually reduced in patients with chronic diseases which is associated with the long-term nature of the diseases [11]. Studies performed in patients with chronic diseases of northern Portugal indicates therapy

adherence prevalence between 69% and 96%, however have been carried out in elderly people whose adherence is higher [12-14].

In patients with diabetes, in addition to the nature of long term therapies, the complex regimen of drugs in many patients may compromise therapy adherence. The adherence to drug therapy and to healthy lifestyles is essential for therapeutic success and the control of the diabetes [15].

The aim of the present study is determine the prevalence of diabetes types, the frequency of glycemic control, identify changes in eating habits and physical activity, characterize the pharmacological therapy and verify the therapy adherence in diabetics of northeast Portugal. Other aims include the evaluation of the self-perception of the diabetic's quality of life and the opinion about the Incretin mimetic therapy.

Materials and Methods

A cross-sectional and descriptive-correlation study was carried out. The sample consisted of 202 diabetics of Trás-os-Montes region, in northeastern Portugal, over 18 years of age, who were interviewed based on a questionnaire, applied from January to April, 2016.

The questionnaire includes questions to allow evaluated the following: a) Socio-demographic characteristics such as age, gender, weight, height and type of diabetes; b) Eating and physical activity behaviors before and after the diagnosis of the disease; c) Classic pharmacological therapy and incretin mimetics therapy; d) Therapy adherence to anti-diabetic drugs using the MAT scale (measure of adherence to therapy), validated for the Portuguese population [16]. To assess therapy adherence, those whose average adherence levels were ≥ 5 , were called adherent.

Statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS) version 20.0. It was used descriptive statistics (absolute and relative frequencies) and measures of central tendency and dispersion (mean and standard deviation). The level of association between variables was studied through the qui-square and Fisher tests with a significance level of 5%.

The ethical aspects were guaranteed in this study. All participants received information explaining the research and the ethical considerations and those who were willing to participate in the study had signed informed consent forms. They were informed that a refusal or a termination of their participation would not have any negative consequence, being able to withdraw from the study at any time. To ensure confidentiality,

participant's codes were used instead of their names, as well as the guarantee of collective disclosure of results.

Results

The sample is made up of 62.4% women and 37.6% men. The majority (73.8%) has type 2 diabetes and the rest (26.2%) have type 1 diabetes. Most of the study sample registered aged between 71 and 80 years (40.6%).

Glycemic control occurs essentially once daily in 38.1%, once a week in 23.8% and monthly in 18.8% of diabetics.

Lifestyle and Quality Of Life Self-Perception

Figure 1 shows the lifestyle changes of the respondents regarding dietary habits and physical activity after diagnosis of diabetes. Although 89.6% of the participants in this study considered it important to change their lifestyles after the diagnosis of diabetes, only 60.4% (122) of diabetics changed eating habits, of which 92.62% reduced their consumption of sugar and 53.28% reduced their consumption of carbohydrates (Figure 1). On the other hand, of the 68 (33.7%) respondents who changed the frequency of physical activity practice, 89.7% increased their frequency (Figure 2).

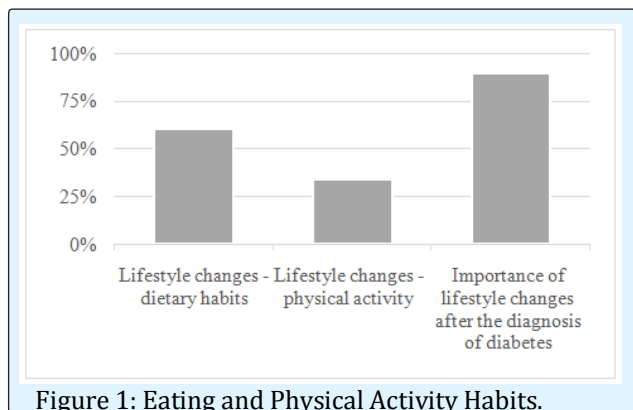


Figure 1: Eating and Physical Activity Habits.

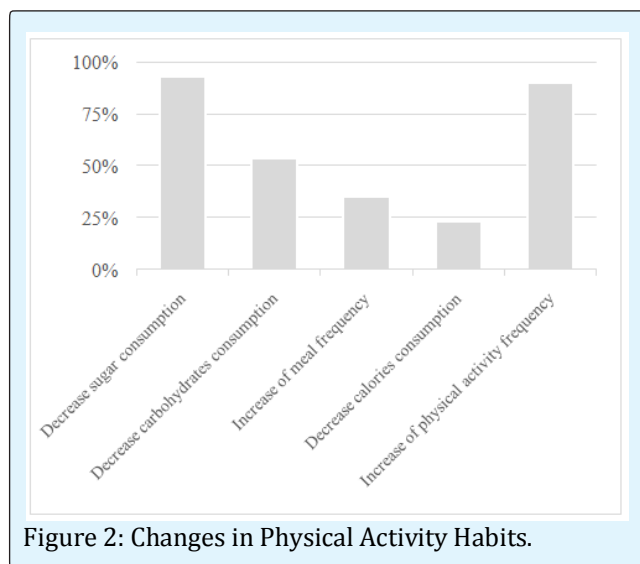


Figure 2: Changes in Physical Activity Habits.

The main reported reasons for the habit modifications are for decrease glycaemia levels with 66.9% following by 54.7% that refers that the reason is follow a healthy lifestyle as can shown in Figure 3.

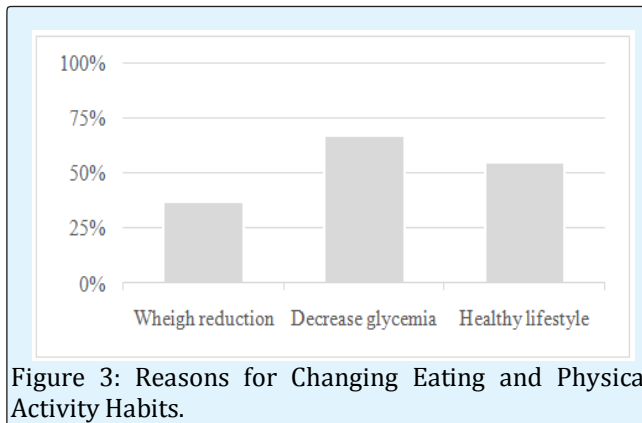


Figure 3: Reasons for Changing Eating and Physical Activity Habits.

Regarding self-perception of the current quality of life, the majority (43.6%) affirmed that it is neither good nor bad, but 37.1% consider it good. On the other hand, 52.0% of the respondents stated that they would have a much better quality of life if they did not have the disease.

Pharmacological Therapy

Concerning the use of classical medication, 67.8% of the respondents stated that they were taking anti-diabetics, 4.5% stated that they did not take it, and the remaining 27.7% did not know whether to take it or not. It is found that metformin is the medicine most used in the control of the disease by the respondents (n=63, 46.0%), followed by the insulin used by 38.0% (n=52) (Figure 4).

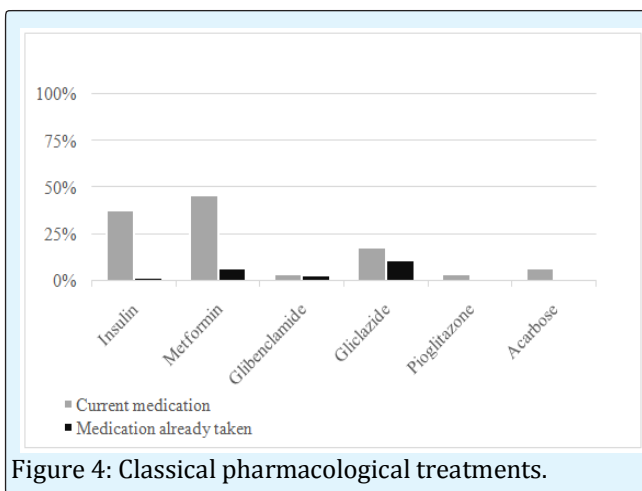


Figure 4: Classical pharmacological treatments.

On the other hand, 13.9% (n= 28) of the respondents reported taking incretin mimetics of dipeptidyl peptidase IV (DPP-4) inhibitors group and the most (75.0%) use the combination of metformin and vildagliptin (Figure 5).

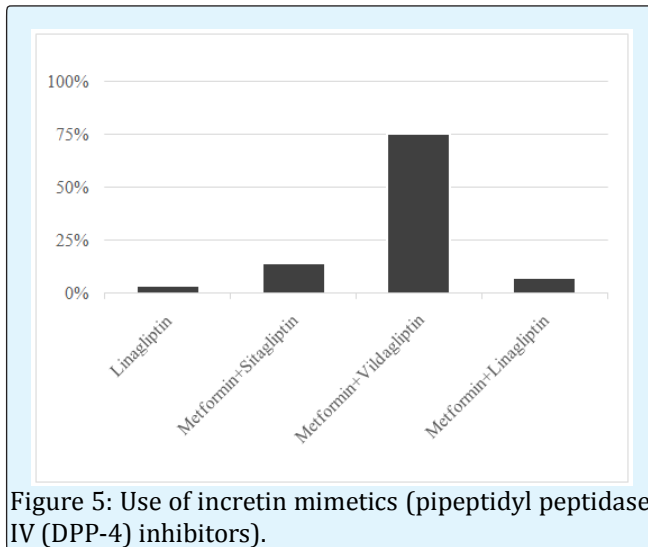


Figure 5: Use of incretin mimetics (pipeptidyl peptidase IV (DPP-4) inhibitors).

Among diabetics taking dipeptidyl peptidase IV (DPP-4) inhibitors, 50.0% reported a greater decrease in glycaemic levels with this medication. Additionally,

46.4% and 14.3% said they were satisfied or very satisfied, respectively, with this new therapy.

Therapy Adherence and Related Factors

Regarding therapy adherence, the mean score of responses obtained was 5.67 points (SD = 0.486, minimum = 3.29 and maximum = 6.00), which translates into a strong adherence to therapy. Subsequently, the global values that presented a mean of at least 5 points correspond to the adherent and the global values with a mean of less than 5 correspond to non-adherents. It was obtained that 7.4% were considered non-adherent and the majority (92.6%) were classified as adherents to the therapeutic regimen. Although most of the diabetics in the study sample adhere to therapy, 4.0% admitted to being frequently careless about the hours of taking medication and 2.5% frequently forget to take them (Table 1).

MAT scale items	n (%)						Mean
	Ever	Often	Frequently	Sometimes	Rarely	Never	
Have you ever forgotten to take the medicines for diabetes?	0(0,0)	0(0,0)	5(2,5)	32(15,8)	50(24,8)	115(56,9)	5,36
Have you ever been careless with the time of taking the medicines for diabetes?	0(0,0)	2(1,0)	8(4,0)	34(16,8)	57(28,2)	101(50,0)	5,22
Have you ever stopped taking the medicines for diabetes for feeling better?	0(0,0)	2(1,0)	3(1,5)	6(3,0)	13(6,4)	178(88,1)	5,79
Have you ever stopped taking the medicines for diabetes because you felt worse?	0(0,0)	0(0,0)	4(2,0)	3(1,5)	13(6,4)	182(90,1)	5,85
Have you ever taken more than one medicines for diabetes because you felt worse?	0(0,0)	0(0,0)	0(0,0)	7(3,5)	6(3,0)	189(93,6)	5,90
Did you ever stop the therapy because you let the medicines for diabetes run out?	0(0,0)	0(0,0)	3(1,5)	8(4,0)	18(8,9)	173(85,6)	5,79
Have you ever stopped taking the medicines for diabetes for any reason than not medical indication?	0(0,0)	0(0,0)	3(1,5)	8(4,0)	18(8,9)	173(85,6)	5,79

Table 1: Score of MAT scale items.

Table 2 shows the related factors to adherence to diabetes pharmacological therapy. It was found that the male subjects are the most adherent to treatment (97.4% male vs. 89.7% female, $p = 0.044$) and diabetics who control glycaemia at least daily, are more adherent to therapeutic regimen than those who control it weekly (97.5% daily vs 85.5% weekly, $p = 0.006$).

It is also verified that age, type of diabetes, altered eating habits, importance attributed to altered eating habits and practice of physical activity and the self-perception of current quality of life are not associated with therapy adherence (Table 2).

Variable	Categories	Nonadherent	Adherent	Total	p-value
		n(%)	n(%)	n(%)	
Gender	Female	13(10.3)	113(89.7)	126(100)	0.044
	Male	2(2.6)	74(97.4)	76(100)	
Age	≤ 60 years	2(8.0)	23(92.0)	25(100)	0.999
	61-70 years	3(6.8)	41(93.2)	44(100)	
	71-80 years	6(7.3)	76(92.7)	82(100)	
	>80 years	4(7.8)	47(92.2)	51(100)	
Diabetes Type	Type 1	3(5.7)	50(94.3)	53(100)	0.763
	Type 2	12(8.1)	137(91.9)	149(100)	
Time since diagnosis	Up to 10 years	7(7.7)	84(92.3)	91(100)	0.870
	From 11 to 20 years	6(8.1)	68(91.9)	74(100)	
	More than 20 years	2(5.4)	35(94.6)	37(100)	
Glycemic control	At least daily	2(2.5)	77(97.5)	79(100)	0.006
	At least once a week	12(14.5)	71(85.5)	83(100)	
	Monthly or Annually	1(2.5)	39(97.5)	40(100)	
Changes in eating habits	No	7(8.8)	73(91.3)	80(100)	0.561
	Yes	8(6.6)	114(93.4)	122(100)	
Importance in changing habits	No	4(19.0)	17(81.0)	21(100)	0.055
	Yes	11(6.1)	170(93.9)	181(100)	
Current quality of life	At least "Good"	3(3.8)	76(96.2)	79(100)	0.261
	"Neither good nor bad"	8(9.1)	80(90.9)	88(100)	
	"Bad" or "Very bad"	4(11.4)	31(88.6)	35(100)	

Table 2: Adherence to Diabetes Pharmacological Therapy and related factors.

Discussion and Conclusion

The majority of participants in this study are type 2 diabetics, the type of diabetes that affects more people worldwide [1]. Most of diabetics take metformin as classic therapy, while a minority use pipeptidyl peptidase IV (DPP-4) inhibitors, generally called incretin mimetics, and most of them are satisfied with this new therapy. These results are in line with the recommendations that considered insulin, metformin and sulphonylureas as three essential medicines for diabetes management [1]. The pipeptidyl peptidase IV (DPP-4) inhibitors are less used by several reasons which is in according to the literature who consider them as second-line antidiabetic therapy [17,18].

In the present study, the great majority of respondents were classified as adherents to the pharmacological regimen which are more encouraging results than other that, despite distinct methods used, indicating that the recommended glycaemic goals are been achieved by less than 50% of patients, which may be associated with decreased adherence to therapies in type 2 diabetics [15]. In another study, 70% patients have reported non-adherence to medication schedule [19]. Therapy adherence is, in this study, associated with the male gender and the daily frequency of glycaemic control. Although no statistical association with therapy adherence, the changes in eating and physical activity has been recognized as important by the diabetics. In fact, healthy diet and regular physical

activity are non-pharmacological therapy requires for treated, avoided consequences or delayed diabetes disease [1].

Overall, the majority of diabetics adheres to pharmacological therapy and use mostly metformin and insulin. The use of dipeptidyl peptidase IV (DPP-4) inhibitors for controlling disease remains low.

Conflict of interest

The authors confirm that this article content has no conflicts of interest.

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