

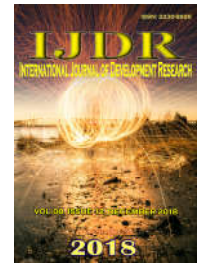


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## ADHERENCE TO TREATMENT FOR DIABETES AND RELATION WITH KIDNEY FUNCTION AND LIFESTYLE

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### ABSTRACT

This study evaluated adherence to treatment for diabetes and the relationship with kidney function and lifestyle. It is a descriptive study, carried out with 270 elderly people, with questionnaires during home visits. The mean age was 63.6±1.7 years, 62.6% female, 71.9% married, 76.3% hypertensive, 68.1% sedentary, 12.2% smokers, 69.3% report having healthy eating, 74.1% have incomplete elementary education. The average filtration rate was 70.8±23.6 ml/min. Glomerular filtration rate was lower in women and in the elderly over 60 years, but had no relation to adherence to treatment. Forty people (14.8%) were adherent to the drug treatment for diabetes and 230 (85.2%) not adherent. There was no significant association between adherence and sex, as well as regarding age, marital status, income, schooling and some health habits, such as having healthy eating, exercise, smoking and alcohol consumption. People who use multiple doses of medication and who omitted information about medications were the least adherent. Lifestyle was considered good for 69.3% and very good for 25.9% of diabetics. The importance of multiprofessional care in the care of diabetics, which is essential to improve adherence and reduce the risks of complications such as diabetic nephropathy, is important.

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### INTRODUCTION

The prevalence of diabetes in the countries of Central and South America has been estimated at 26.4 million people and has an estimated 40 million by 2030. In European countries and the United States this increase will be due to the increase in life expectancy, in contrast, in developing countries the increase will occur in all age groups, in the 45 to 64 age groups, the prevalence will be triplicated and doubled in the age groups from 20 to 44 years and over 65 years (Assunção; Ursini, 2008). Morbidity and mortality associated with diabetes is high, and adherence to treatment is an efficient measure to reduce these rates; however, the treatment is complex and involves changes in diet, regular physical activity and proper use of medication.

Integrating these lifestyle habits into the routine has been a challenge for diabetic patients, and adherence remains low among patients with chronic diseases such as diabetes (Costa et al, 2011). One of the complications related to the disease is diabetic nephropathy, which leads to the loss of kidney function in about 20% to 30% of diabetics (International Diabetes Federation, 2012). Diabetic nephropathy is a major cause of new dialysis cases, is an important chronic complication of diabetes and is related to the increase in mortality in patients (Kirsztajn, 2007). Estimating the renal function of diabetics, is therefore fundamental to ensure early diagnosis, and thus, adequate care and treatment (Maldaner et al, 2008). Several factors lead to loss of renal function in diabetics, such as genetic, environmental, socioeconomic, metabolic and hemodynamic factors, leading to weakening of the glomerular basement membrane, expansion of the mesangial matrix, reduction of podocytes, glomerulosclerosis and tubulointerstitial fibrosis (Amodeo, 2008). The adoption of

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healthy life habits such as glycemic control, blood pressure and lipids, cessation of smoking and alcoholic beverage consumption, and regular physical activity can positively interfere with the natural evolution of diabetic nephropathy (Zanatta *et al*, 2008). In addition to the change in lifestyle, adherence to treatment is also an important factor in preventing complications and mortality, but the literature indicates that patients with chronic diseases have low adherence to treatment, which contributes to the worsening of diseases and increased rates of hospitalizations (Tavares *et al*, 2016). Adherence to treatment involves changes in habits and behaviors, such as diet based on restriction of foods rich in carbohydrates, fats and proteins, regular physical activity and proper use of medication, however, the chronicity of the disease and the characteristics of the therapeutic regimen of the diabetes patients make adherence a complex challenge (Braga *et al*, 2016).

## MATERIALS AND METHODS

This study was carried out with diabetics, living in Santa Catarina, Brazil, assisted by the Family Health Strategies (FHS) of the municipality. The municipality has eight teams of Family Health Strategy and a Central Basic Unit of Health, and has 868 diabetics registered. The study included patients with DM for more than six months who used DM medication and those who did not have a creatinine test collected between 2017 and 2018 and those who were not at home at the time of the home visit in two occasions. The study was carried out through the application of questionnaires. The questionnaires were applied in home visits performed by the researcher, together with the Community Health Agents of each FHS. The project was approved by the Ethics and Research Committee of the University of Western Santa Catarina with the opinion 2,094,243, and all participants signed the Free and Informed Consent Term. For the analysis of life habits, the questionnaire "Fantastic Lifestyle" was used, which considers the behavior of the individuals in the last month and whose results allow to determine the association between lifestyle and health. The instrument has 25 questions divided into nine domains.

The sum of all the points allows to arrive at a total score that classifies the individuals into five categories that are: "Excellent" (85 to 100 points), "Very good" (70 to 84 points), "Good" (55 to 69 points), "Regular" (35 to 54 points) and "Need to improve" (0 to 34 points). For the adherence analysis, the Brief Medication Questionnaire (BMQ) was used. The BMQ is divided into 3 domains, which identify barriers to adherence, considering regimen, beliefs and recall in relation to drug treatment. For the analysis of renal function, the simplified MDRD equation (Modification of Diet in Renal Disease) was used. The comparison of quantitative variables between groups was performed by Student's t-test, the association of quantitative variables between them was performed using the Pearson or Spearman correlation coefficient. Categorical data crossings were performed using the Chi-square test and Fisher's Exact Test. The level of significance was  $\alpha=0.05$ . The 868 medical records of diabetics were verified, of which 300 had the result of the creatinine test in the electronic medical record. A home visit was carried out for the application of the questionnaires, and of the 300 patients, 30 were not found in the two visits made by the researcher, so the final sample consisted of 270 diabetics.

## RESULTS

A total of 270 diabetics participated, mean age  $63.6 \pm 11.7$  years, 169 (62.6%) female, 194 (71.9%) were married or living with a partner, 164 (60.7%), white matter, 206 (76.3%) had systemic arterial hypertension, 200 (74.1%) had incomplete elementary education, 33 (12.2%) smokers, 184 (68.1%) , 3% reported having healthy food and 255 (94.4%) had income up to two minimum wages. The mean GFR was  $70.8 \pm 23.6$  ml / min, with a minimum of 12.9 ml / min and a maximum of 152.20 ml / min. The mean creatinine level was  $13 \pm 0.5$  mg / dL. The GFR was lower than 60 ml / min in 91 people, corresponding to 33.7% of the patients studied. The GFR was lower in women and people over 60 years, but there was no difference between the GFR according to the lifestyle (Table 1).

**Table 1. Glomerular Filtration Rate (GFR) related to gender, age and adherence to treatment**

Variables	GFR (ml/min $\pm$ DP)	p
Age		
≥ 60 years	66,2 $\pm$ 22,1	0,00
<59 years	78,0 $\pm$ 24,2	
Gender		
Male	76,4 $\pm$ 23,6	0,00
Female	67,4 $\pm$ 23,0	
Adherence to treatment		
Yes	69,9 $\pm$ 25,6	0,79
No	71,0 $\pm$ 23,3	
Lifestyle		
Excelent or very good	68,9 $\pm$ 22,6	0,40
Good or Regular	71,5 $\pm$ 5	

**Table 2. Adherence to treatment related to demographic variables**

Variables	Total n (%)	Adherents n (%)	Not adherents n (%)	p
Gender				
Male	101 (37,4)	17 (16,8)	84 (83,1)	0,47
Female	169 (62,5)	23 (13,6)	146 (86,3)	
Age				
>60 years	165 (61,1)	22 (13,3)	143 (86,6)	0,39
< 59 years	105 (38,8)	18 (17,1)	87 (82,8)	
Marital status				
Married or with partner	194 (71,8)	32 (16,4)	162 (83,5)	0,21
Single	76 (28,1)	08 (10,5)	68 (89,4)	
Income				
1 - 2 basic salary	255 (94,4)	36 (14,1)	219 (85,8)	0,16
>3 basic salary	15 (5,5)	04 (26,6)	11 (73,3)	
Regular physical activity				
Yes	86 (31,9)	13 (15,1)	73 (84,8)	0,92
No	184 (68,1)	27 (14,6)	157 (85,3)	
Healthy eating				
Yes	187 (69,2)	28 (15,0)	159 (85,0)	0,91
No	83 (30,7)	12 (14,4)	71 (85,5)	
Drink alcohol				
Yes	31 (11,5)	04 (12,9)	27 (87,1)	0,50
No	239 (88,5)	36 (15,1)	203 (84,9)	
Smokers				
Sim	33 (12,2)	04 (12,1)	29 (87,9)	0,43
Não	237 (87,8)	36 (15,2)	201 (84,8)	
Multiples medication				
Yes	228 (84,4)	22 (9,6)	206 (76,2)	0,00
No	42 (15,5)	18 (42,8)	24 (8,8)	
Omitted medication				
Yes	24 (8,8)	0	24 (100)	0,01
No	246 (91,1)	40 (16,2)	206 (83,7)	
Schooling				
Untill 4 years of study	231 (11,5)	33 (14,3)	198 (85,7)	0,55
>5 years of study	39 (14,4)	07 (17,9)	32 (82,1)	

Regarding adherence to treatment, 40 (14.8%) are adherent to the drug treatment for diabetes and 230 (85.2%) are non-adherent. Eighteen people (6.7%) were able to name the drugs that cause discomfort, 172 (63.7%) report that they forget to take the medication sometimes, 258 (95.6%) believe the medication works well, 6% failed to list the medications they take, 167 (61.9%) reported any missed days or doses, and 14 (5.2%) reported having taken extra (longer than prescribed) medications. The analysis of adherence to treatment in relation to socio-demographic variables is described in Table 2. The major difficulties in using medications for diabetes are to remember to take the medicine and ingest several tablets at the same time (Table 3). Lifestyle analysis, according to the results of the Fantástico questionnaire, showed that 69.3% had a "good" lifestyle, 25.9% "very good", 2.6% "regular" and 2.2% "great". Lifestyle was not related to treatment adherence ( $p = 0.36$ ).

**Table 3. Difficulties referred in the use of diabetes medications**

How difficult is:	Very difficult n (%)	A little difficult n (%)	Not very difficult n (%)
Open / close the packaging	55 (20,4)	10 (3,7)	204 (75,6)
Read what is written on the packaging	88 (32,6)	31 (11,5)	151 (55,9)
Remember to take all the medicine	128 (47,4)	52 (19,3)	90 (33,3)
Getting the medication	21 (7,8)	39 (14,4)	210 (77,8)
Take several tablets at the same time	105 (38,9)	25 (9,3)	140 (51,9)

## DISCUSSION

In this study the GFR was lower in people over 60 years and female, but there was no association between GFR and adherence to treatment. Other studies have also reported a worse outcome in relation to GFR in women and the elderly over 70 years (Dalalcosta, Mitrus, Dallacosta, 2017). There was a high number of people with GFR below 60 ml / min, confirming the need for follow-up for the early detection of diabetic nephropathy. When analyzing the adherence to treatment, it was observed a predominance of low adherence and difficulty to report the medications in use. Along with this, there have been frequent reports of forgetting to take the pills or taking more or less than prescribed doses. The determining factors for adherence to the non-pharmacological treatment of patients with chronic diseases include trust in the multidisciplinary team and support networks, acceptance of the disease, level of schooling and side effects caused by medication (American Diabetes Association, 2004). Low drug adherence is common among the elderly, related to the complexity of drug regimens, lack of understanding, decreased visual acuity and forgetfulness (Mansour, Monteiro, Luiz, 2016).

A decisive factor to increase adherence to the treatment is the patient's trust in the health team, which involves from the time spent in the consultations, the warm care and the language to be appropriate to the patient (Leite, Vasconcellos, 2003). When linking adherence to the studied variables, it was found that people who use multiple doses of medication, and those who omitted medications at the time of the interview, were the least adherent. The complexity of the treatment is a significant factor for adherence or not to treatment, and patients who require multiple doses end up omitting medication and have greater difficulty adhering to treatment (Gellad, Grenard,

Marcum, 2011). It is considered that four factors directly interfere in the adherence to the treatment of a chronic disease: factors related to the disease itself, factors related to the person, the relationship with the professionals and the prescribed therapeutic scheme (Gimenes, Zanetti, Haas, 2013). Working to reduce or eliminate low adherence factors is a major challenge for multiprofessional teams working with diabetics.

## Conclusion

The population of this study consisted primarily of people over 60 years of age, female, living with a partner, hypertensive, sedentary, healthy eating, income up to two minimum wages and low schooling. Adherence to treatment was lower in subjects using multiple medications and in those who skipped doses. Glomerular filtration rate was lower in women and in the elderly over 60 years of age, but had no relation to adherence to treatment. Lifestyle was not related to adherence and renal function. The treatment of diabetes is complex and involves the triad: proper nutrition, physical exercise, and medication use. Ensuring constant adherence to a chronic disease remains a challenge for the multiprofessional team, and knowing the characteristics of the population to be worked on is a measure for actions to promote health and improve compliance to be implemented.

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