

## GENDER DIFFERENCES IN DIABETES: A STARTING POINT TO OPTIMIZE QUALITY OF LIFE

## DIFERENÇAS DE GÊNERO NA DIABETES: UM PONTO DE PARTIDA PARA OTIMIZAR A QUALIDADE DE VIDA

## DIFERENCIAS DE GÉNERO EN LA DIABETES: UN PUNTO DE PARTIDA PARA OPTIMIZAR LA CALIDAD DE VIDA

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### ABSTRACT

**Objective:** to evaluate gender differences in quality of life and anthropometric indicators among people with type 2 diabetes in comparison with people without diabetes. **Method:** Quantitative and cross-sectional study with 117 patients type 2 diabetes and 81 control aged 40 or over. Univariate analysis was used for sociodemographic variables and T-Student test was also used to compare the means in quality of life and anthropometric indicators. **Results:** women's quality of life was worse to a greater extent when compared to men in the presence of diabetes, especially in the mental component. Women presented higher values for anthropometric variables, what may be a factor that help to explain the lower quality of life. **Conclusion:** women have the worst results in the variables studied, what suggest the relevance to adopt a gender-oriented strategies in the assistance of people with diabetes making possible a better control of the disease.

**Descriptors:** Diabetes type 2; Gender and health; Quality of life.

### RESUMO

**Objetivo:** analisar as diferenças de gênero na qualidade de vida e nos indicadores antropométricos de pessoas com e sem diabetes tipo 2. **Método:** Estudo quantitativo de caráter transversal realizado com 117 indivíduos diagnosticados com diabetes tipo 2 e 81 controles  $\geq$  a 40 anos de idade. Utilizou-se análise univariada para as variáveis sociodemográficas e teste t de Student para comparação das médias na qualidade de vida e nos indicadores antropométricos. **Resultados:** a qualidade de vida das mulheres piora em maior medida comparada à dos homens na presença da doença, sobretudo do ponto de vista mental. Mulheres apresentam valores mais elevados para as variáveis antropométricas comparadas aos homens, o que possivelmente contribui para a menor qualidade de vida. **Conclusão:** mulheres apresentam piores resultados nas variáveis estudadas, sendo necessário adotar estratégias orientadas pelo gênero para uma melhor assistência às pessoas com diabetes, o que contribui para o melhor controle da doença.

**Descritores** Diabetes tipo 2; Gênero e saúde; Qualidade de vida.

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## RESUMEN

**objective:** analyze gender differences in quality of life and anthropometric indicators between people with type 2 diabetes. Method: Cross-sectional quantitative study with 117 individuals diagnosed with type 2 diabetes and 81 controls  $\geq 40$  years. Univariate analysis was performed for sociodemographic variables and Student's t test to compare the means of quality of life and anthropometric indicators. Results: the quality of life of women is much greater compared to men in the presence of diabetes, especially in the mental component. Women presented higher values in anthropometric variables, which helps to explain the lower quality of life. Conclusion: women present better results in the studied variables,

**Descriptors:** Type 2 diabetes; Gender and health; Quality of life.

## INTRODUCTION

Diabetes is a chronic disease that is advancing rapidly worldwide, where developing countries are particularly affected. It is believed that 8.8% of the world's adults aged between 20 and 79 years live with diabetes, with 79% of these residing in low and middle income countries, such as Brazil.<sup>1</sup>

In general, about 90% of cases diagnosed with diabetes are type 2, which is constantly associated with aging and changes in lifestyles. The latter contributing to overweight and obesity in the population, factors that are strongly associated with the development of type 2 diabetes mellitus (DM2).<sup>2</sup>

Currently, there are major difficulties in controlling diabetes in America Latina and more specifically in Brazil, which leads to the development of comorbidities associated with pathology both in the medium and long term.<sup>3</sup> Such comorbidities

negatively affect the functionality and quality of life of individuals, in addition to generating high costs for public health.<sup>4</sup>

Difficulty in containment recognition of the advances of diabetes in Brazil, the federal government initiated, in 2002, the so-called Reorganization Plan for Attention to Arterial Hypertension and Diabetes Mellitus, which aims to prevent and control the advances of hypertension and diabetes in Brazil. The main strategy of the program to contain the complications of diabetes and hypertension at the secondary level, has been the implementation of specialized care centers, the Hiperdia Centers.<sup>5</sup> These must be prepared to offer multidisciplinary care, in order to delay the advances of diabetes and favor the quality of life of individuals assisted by the program.

In general, studies indicate that people with DM have worse perception of quality of life in relation to the general population.<sup>6</sup> Specifically, individuals with DM have decreased physical performance, with

increased dependence on performing activities of daily living and reduced performance in psychosocial aspects, such as decreased cognitive ability and presence of symptoms depressive.<sup>7</sup>

The literature also shows that diabetes affects men and women<sup>8</sup> differently, both in prevalence and incidence<sup>9</sup>, in complications and control<sup>10</sup>, and in mortality<sup>11</sup>. Women have a worse quality of life compared to men in the presence of diabetes.<sup>6,12</sup> The social factors associated with gender discrimination would explain, in part, the worst health outcomes seen in women. Knowing the gender differences in quality of life, in people with and without DM2, in the most diverse Brazilian contexts, can contribute to optimize the assistance of the person diagnosed with the pathology and, consequently, improve the control of the disease in the country.

Based on the men above, the objective of this study was to evaluate the quality of life and the variables Body Mass Index (BMI), Abdominal Perimeter (BP) and sociodemographic characteristics of men and women with and without DM2 living in the city of Viçosa - Minas Gerais and assisted by the Hiperdia Program.

## **METHODS**

Cross-sectional quantitative study conducted through individual interviews with people diagnosed with DM2 and individuals without DM2, aged 40 years or over, living in the city of Viçosa-Minas Gerais. For the study group (people with DM2), users of the Centro Hiperdia de Minas Gerais (CHVM) were interviewed, selected by means of simple random sampling from the patient register provided by the health center. Inclusion criteria were: individuals who were being followed for at least three months by the CHVM and who did not have a state of severe or chronic severe disease and neither active ulcer and / or amputation. In addition to the study group, data were collected from a control group (individuals not diagnosed with DM2 and without acute or chronic pathologies in target organs of diabetes). For the selection of this group, the study cases themselves indicated individuals residing in a neighborhood equivalent and who did not have a family connection, of these, those who formed the sample were randomly selected.

Individuals who did not obtain a score greater than or equal to 15 points in the Mini Mental State Exam (MMSE) instrument were excluded from the study, considering the low level of education of the participants. The final sample consisted of 117 individuals with DM2 and 81 con-

trols (CTL), accounting for a total of 198 respondents. Of the total, 125 were women (63%) and 73 men (37%). Data collection took place between September 2013 and January 2014. Before we started the work, all individuals were informed about the study and signed the Free and Informed Consent Form.

For the sociodemographic characterization of the sample, the following variables were used: age, education, residence, marital status and occupation. For anthropometric assessment, individuals were asked to check weight and height to obtain the body mass index (BMI) and abdominal perimeter (BP), these data being recorded in the surveys of each of the participants. For data collection regarding weight, height and BP we used a Micheletti® digital scale model / code 1227, with attached stadiometer and a non-extensible measuring tape with marking in centimeters and millimeters. WHO criteria were used to classify individuals according to BMI, considering excess weight values greater than 25 and less than 30 (Kg / m<sup>2</sup>) and obesity, values greater than or equal to 30 (Kg / m<sup>2</sup>) .

In assessing health-related quality of life, we used the Medical Outcomes Study SF-36 version 2 (SF-36 v2®) translated and validated for Brazil. It is a generic instrument (not specific to any age group, disease or treatment) and easy to apply and understand. The SF-36 is a multidimensional

questionnaire consisting of two components, physical (FC) and mental (CM), which comprises eight health scales totaling thirty-six questions. Within the FC are the scales: physical function, physical performance, pain and general health. The CM covers the scales vitality, social function, mental performance and mental health. The instrument assesses the individual's last four weeks, both in negative (disease) and positive (well-being) aspects.

Data were analyzed using the IBM SPSS Statistics Version 21 program. A univariate descriptive analysis was performed for sociodemographic variables, represented by distribution of relative frequencies for categorical variables, and measures of central tendency (means and standard deviation) for variables continuous. For the analysis of the components and scales of the SF-36 and anthropometric indicators (BMI and BP) the means and standard deviation were calculated. To compare the means between the groups (CTL and DM2) in women and men, Student's t test was used, considering the significance level  $p < 0.05$ . The verification of the homoscedasticity of the variances and the normal distribution of the variables Quality of life, BMI and BP were performed respectively by Bartlett's tests and normal distribution. In the absence of homoscedasticity and normal distribution, the data were transformed using logarithms. In addition to comparing the means

using the Student's t test, the differences between the means of the CTL and DM2 groups in women and men were calculated.

The analysis data for the SF-36, BMI and BP variables were presented in separate tables for women (table 2) and men (table 3). This perspective of analysis disaggregated by sex (Women DM2 vs. Women CTL; Men DM2 vs. Men CTL) shows the difference between the averages of the groups CTL and DM2 in each sex. This allowed to verify greater or lesser differences in the averages of the studied variables, contributing to a better assessment of the impact of the disease according to sex.

The study presented here was approved by the Ethics Committee of the Faculty of Medical Sciences of the Universidade Nova de Lisboa (Portugal), by the Coordination for the Improvement of Higher Education Personnel (CAPES) and by the CHVM.

## RESULTS

Table 1 shows the sociodemographic variables of the studied population. Most of the interviewees live in an urban area, have an average age of 60 years and have a low level of education, which is found mainly among women with DM2 ( $4.1 \pm 3.2$  years). Mostly women (CTL: 54.5%; DM2: 42.9%) and men (CTL: 42.3%; DM2: 57.4%) said they were married. However, the percentage of widowed women is important (CTL: 30.9%; DM2: 27.1%). There is a higher percentage of men and women in CTL working on a paid basis (25.5% women and 30.8% men) when compared to the DM2 group (10% women and 12.8% men). In addition, the percentage of women who work exclusively in household chores stands out (CTL: 38.2%; DM2: 32.9%). DM2 men represent a higher percentage of retirees, either by length of service (34%),

**Table 1.** Means, standard deviation and frequency distribution of sociodemographic variables according to sex and the presence or absence of DM2.

Variables	Women	Women	Men	Men
	CTL (n = 55)	DM2 (n = 70)	CTL (n = 26)	DM2 (n = 47)
Age (MD $\pm$ SD)	61.4 $\pm$ 10	60.1 $\pm$ 9.9	57.1 $\pm$ 11.7	61.1 $\pm$ 11.8
Education (years)	5.5 $\pm$ 2.5	4.1 $\pm$ 3.2	4.4 $\pm$ 2.1	5 $\pm$ 3.1
<b>Residence</b>				
Urban	96.4%	92.9%	92.3%	87.2%

Rural	3.6%	7.1%	7.7%	12.8%
<b>Marital Status</b>				
Never been married	10.9%	11.4%	19.2%	14.9%
Married	54.5%	42.9%	42.3%	57.4%
separated or divorced	1.8%	4.3%	30.7%	12.7%
Widower	30.9%	27.1%	7.7%	4.3%
live together	1.8%	4.3%	-	10.7%
<b>Occupation</b>				
Paid work	25.5%	10%	30.8%	12.8%
Self-employed	5.5%	8.6%	11.5%	17%
Housewife	38.2%	32.9%	3.8%	-
Retired	25.5%	25.7%	26.9%	34%
Retired due to disability	-	7.1%	3.8%	25.5%
Unemployed	5.4%	15.7%	23%	10.7%

Table 2 shows the statistics univariable variables and t-test for SF-36 components and scales and anthropometric indicators (BMI and BP) of women CTL and DM2. The results show statistically significant differences for the physical and mental components of quality of life between the CTL vs. DM2 in women (FC:  $p < 0.05$ ; CM:  $p < 0.05$ ). Higher means were found in the CTL group (FC:  $53.4 \pm 6.2$ ; CM:  $52 \pm 11.8$ )

compared to the DM2 group (FC:  $42.3 \pm 10.1$ ; CM:  $46.9 \pm 12.4$ ), suggesting lower quality of life in the latter. Considering the eight scales of the quality of life components, it is possible to verify statistically significant differences for all CTL vs. DM2 in women ( $p < 0.05$ ). However, greater differences are observed in the physical function (26.8) and physical performance (27.7)

scales in the physical component, and in the vitality scale (22,

Regarding anthropometric parameters, the results show statistically significant differences between the CTL groups vs. DM2 in women for both BMI and BP ( $p < 0.05$ ). Higher means for both variables were found in women with DM2 (BMI:  $33.3 \pm 7.8$ ; BP:  $108.1 \pm 14.8$ ) compared to

their controls, with DM2 women being classified as obese. In addition, CTL women have averages that classify them in the overweight range, with mean BMI values close to obesity (BMI:  $29.8 \pm 5.7$ ). Regarding the AP, the results show that women (CTL:  $97.6 \pm 11.7$ ; DM2:  $108.1 \pm 14.8$ ) have values higher than those recommended by the IDF, revealing that they are in the cardiovascular risk range (Table 2).

**Table 2.** Comparison of scores between CTL and DM2 for SF-36 components and scales, and BMI and BP - Women

SF-36	CTL (n = 55)	DM2 (n = 70)	Difference	P value *
<b>Physical</b>	$53.4 \pm 6.2$	$42.3 \pm 10.1$	11.1	<0.05
Physical Fun-	$82.4 \pm 16.3$	$57.6 \pm 24.6$	26.8	<0.05
Physical Per-	$94.8 \pm 9.4$	$67.1 \pm 31$	27.7	<0.05
Ache	$77.5 \pm 23.9$	$54.8 \pm 33.7$	22.7	<0.05
General health	$71.7 \pm 22.9$	$49.2 \pm 24.1$	22.5	<0.05
<b>Mental Com-</b>	$52 \pm 11.8$	$46.9 \pm 12.4$	5.1	<0.05
Vitality	$71.9 \pm 25.2$	$49.3 \pm 22.8$	22.6	<0.05
Social role	$85 \pm 27.7$	$71 \pm 28.1$	14	<0.05
Mental Perfor-	$87.7 \pm 24.5$	$70.7 \pm 32.4$	17	<0.05
Mental health	$77 \pm 20.8$	$65.9 \pm 23.9$	11.1	<0.05
<b>**Body mass</b>	$29.8 \pm 5.7$	$33.3 \pm 7.8$	3.5	<0.05
<b>**Perimeter</b>	$97.6 \pm 11.7$	$108.1 \pm 14.8$	10.5	<0.05

\* Student t-test

\*\* For the analysis of the Body Mass Index and Abdominal Perimeter, CTL (n = 46) and DM2 (n = 61)

Table 3 represents data on the variable quality of life for men. As for the two

components of quality of life, the results of the analyzes show statistically significant

differences only for the FC ( $p < 0.05$ ), with higher means verified in the CTL group ( $52.6 \pm 7.4$ ) when compared to the group DM2 ( $46 \pm 8.5$ ). For the mental component, there was no statistically significant difference between the two groups ( $p > 0.05$ ). Regarding the scales of the quality of life components of men, there are statistically significant differences between the CTL and DM2 groups for the four SC scales and only for the social function scale of the mental component. When observing the differences in the means, it can be said that these are higher for the scales of body pain (20),

general health (16.4) and social function (14) (table 3).

As for the pairanthropometric measurements of men, the data also show statistically significant differences in the means of BMI and BP between the CTL and DM2 groups ( $p < 0.05$ ), with the means of men being DM2 (BMI:  $28.8 \pm 6.4$ ; PA :  $100.4 \pm 15.9$ ) higher when compared to CTL (BMI:  $25.3 \pm 2.8$ ; PA:  $89.3 \pm 7.4$ ), classifying DM2 men in the overweight range. Also, the mean BMI values in CTL men show the presence of overweight, while the mean BP for DM2 men is higher than that recommended by the IDF (Table 3).

**Table 3.** Comparison of scores between CTL and DM2 for SF-36 components and scales, and BMI and BP - Men

SF-36	CTL (n = 26) MD $\pm$ DP	DM2 (n = 47) MD $\pm$ DP	Difference between means (MD)	P value *
<b>Physical Component</b>	$52.6 \pm 7.4$	$46 \pm 8.5$	6.6	<0.05
Physical Function	$83.6 \pm 17.5$	$70.5 \pm 25.6$	13.1	<0.05
Physical Performance	$89.1 \pm 19.9$	$82 \pm 22.1$	7.1	<0.05
Ache	$78.1 \pm 27.1$	$58.1 \pm 27.5$	20	<0.05
General health	$76.5 \pm 20.4$	$60.1 \pm 23.9$	16.4	<0.05



<b>Mental Component</b>	55.5 ± 9.2	54 ± 9.5	1.5	> 0.05
Vitality	74.7 ± 20.4	65 ± 25.1	9.7	> 0.05
Social role	92.3 ± 17.3	78.3 ± 27.8	14	<0.05
Mental Performance	87.5 ± 24	87.4 ± 20.7	0.1	> 0.05
Mental health	85.3 ± 15.2	79.1 ± 19.8	6.2	> 0.05
<b>**Body mass index</b>	25.3 ± 2.8	28.8 ± 6.4	3.5	<0.05
<b>**Perimeter Abdominal</b>	89.3 ± 7.4	100.4 ± 15.9	11.1	<0.05

\* Student t-test

\*\* For the analysis of the Body Mass Index and Abdominal Perimeter, CTL (n = 22) and DM2 (n = 43)

## DISCUSSION

The results of the present study show that, in relation to quality of life, DM2 men have a lower average score only for the physical component when compared to CTL men, while the mental component seems to be less affected by the disease. Unlike women, who had decreased quality of life for both components of the SF-36. More specifically, the differences in the means between CTL and DM2 in the two components of quality of life and in their scales (tables 2 and 3, columns “Differences between means”) are greater among women (CF: 11.1; CM: 5, 1) compared to men (FC: 6.6; CM: 1.5), especially in CM. However,

in the Social Function scale of this component, there is the same difference between both sexes (14 points of difference). With regard to the vitality scale, women showed the greatest differences in means between CTL vs. DM2 (22.6 points),

This indicates that, in general, in the presence As a result of the disease, the quality of life of women worsens to a greater extent compared to that of men, especially from a mental point of view, a result that is also confirmed by other studies.<sup>6,12</sup> Specifically, a study states that men are less likely to report symptoms of depression or anxiety, when compared to women<sup>13</sup>, which can contribute to the better quality of life seen in males. The performance of traditionally

female roles, and their influence on social pressures, chronic stress, overload with household responsibilities and low levels of satisfaction, is related to gender differences in health.<sup>14,15</sup> Therefore, female vulnerability, caused mainly by the situation of gender discrimination in society<sup>15</sup>, explain the worst results in the mental component of quality of life among women with DM2 in our sample. The worst state of mental health of women highlights the need for more comprehensive psychological assistance in the CHVM, making it essential to provide training on gender issues and their specific problems to health professionals. Thus, an improvement in women's mental health would contribute to the optimization of the disease's self-control with positive effects on quality of life.

With regard to anthropometric indicators the data show higher values in women when compared to men, both in the CTL group and in DM2, suggesting that women, in general, are more prone to obesity.<sup>16,17</sup> However, when comparing the difference between the CTL means vs. DM2 in men and women for anthropometric variables (tables 2 and 3, columns "Differences between means"), very similar differences are observed in women and men (3.5 points difference in BMI in women and men, and about 11 points in the PA in both women and men). Thus, in the presence of the dis-

ease, the results for anthropometric variables increase similarly in both women and men, which indicates that diabetes affects both sexes with regard to obesity. However, in addition to the aging process and changes in the lifestyles of individuals, obesity in women is also associated with social factors related to discrimination in society and their influence on socioeconomic conditions.<sup>18</sup> Therefore, it becomes relevant to consider the greater predisposition for obesity in women, where socioeconomic and gender factors are interrelated, in the implementation of specific interventions to control DM2 in the CHVM. On the other hand, some studies show that, in the general population, there is a relationship between increased BMI and negative well-being, and this relationship would be even more apparent in women.<sup>19</sup> Therefore, considering that BMI and BP are related to the quality of and that the women in the study have obesity and the highest results for BP,

Finally, it is worth mentioning the low level of education in the sample, especially among women. In general, low education hinders access to information, in addition to leading to reduced chances of comprehension of therapeutic guidelines, which, consequently, leads to greater difficulties for self-management of diabetes.<sup>20</sup> In this sense, it is important that health professionals do CHVM adapt therapeutic strategies

to the profile of users, considering the socio-economic conditions and the level of education of the people assisted by the Center, with special attention to women, since they had lower levels of education.

## CONCLUSION

The findings of the study show unfavorable results in the quality of life of women compared to men in the presence of DM2, especially from the mental point of view, and also the higher prevalence of obesity among women in general. Taking these results into account, it is convenient to plan the strategies of assistance to people with DM2 assisted by the CHVM guided by gender. This would make it possible to optimize the self-management of diabetes with positive effects on the quality of life of individuals with DM2.

Finally, the study has two main limitations. First, it is a cross-sectional study, which may partially explain the unfavorable results for quality of life in people with DM2. Second, it would be necessary to broaden and deepen the analysis of gender by considering other social variables, in addition to the educational level. Furthermore, considering the socio-cultural diversity of Brazil, further studies are necessary, in order to adapt the assistance to people with

DM2 to the different life contexts in the country.

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