CORONARY RISK AND QUALITY OF LIFE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

RISCO CORONARIANO Y CALIDAD DE VIDA EN PACIENTES CON DIABETES MELLITUS TIPO 2

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ABSTRACT

Objectives: assessing the coronary risk by conicity index and the association with quality of life in patients with type 2 diabetes mellitus. Method: a cross-sectional, descriptive, analytical study, conducted with 219 patients with DM2, ascribed in for family health strategy (FHS) of the urban area of Ijuí/Rio Grande do Sul; clinical, anthropometric, biochemical and QOL variables were evaluated with the questionnaire WHQOL-abbreviated. The CI was obtained by the measures: body weight, height and waist circumference. The research project was approved by the Research Ethics Committee, protocol nº 91/2010. Results: according to the CI, 96.3% of patients with T2DM showed high coronary risk (HCR). The overall QOL (84.9±17.2 points) was good, being lower in patients with RCE. Conclusion: despite being ascribed in FHS actions with health education, patients with DM2 study showed that RCE. Descriptors: Abdominal Obesity; Quality of Life; Diabetes Mellitus Type 2.

RESUMO


RESUMEN

Objetivos: evaluar el riesgo coronario por índice de conicidad y verificar la asociación con la calidad de vida en pacientes con diabetes mellitus tipo 2. Método: estudio descriptivo, transversal y analítico con 219 pacientes con DM2, adscritos en la estrategia de salud de la familia (ESF) de la zona urbana de Ijuí/Río Grande do Sul; se evaluaron las variables bioquímicas, clínicas y antropométricas y la CdV con el cuestionario WHQOL-abbreviado. La IC se obtuvo por las medidas: peso corporal, talla y circunferencia de la cintura. El proyecto de investigación fue aprobado por el Comité de Ética de la Investigación, el protocolo nº 91/2010. Resultados: de acuerdo con el IC, el 96,3 % de los pacientes con DM2 presentaron alto riesgo coronario (RCE). La calidad de vida en general (84,9±17,2 puntos) era buena, siendo menor en los pacientes con ICE. Conclusión: a pesar de estar adscritos en las acciones de la ESF con la educación de la salud, los pacientes con DM2 estudio mostró que el RCE. Descriptores: Obesidad abdominal; Calidad de Vida; Diabetes Mellitus Tipo 2.
INTRODUCTION

Diabetes Mellitus (DM) is a major public health problem since it has a high morbidity and mortality rate, with a significant loss in quality of life, productivity and survival of individuals, besides involving high both economic and social costs in treating its complications. In recent years, advances in the treatment of DM have allowed an increase in life expectancy of diabetic patients, resulting in higher prevalence of complications, especially cardiovascular disease.¹

The incidence of coronary artery disease in patients with T2DM is about two to six times greater than that observed in the general population.²-³ Patients with T2DM have a risk of death from cardiovascular events up to four times higher than the general population being considered as similar to non-diabetic subjects who had acute myocardial infarction.⁴ The high prevalence of cardiovascular disease in patients with T2DM risk, besides being an important cause of morbidity and mortality, is of great socio-economic impact, therefore assumes great importance in the direct costs of the disease and the indirect costs due to lost productivity and early mortality.³

Although the DM can be considered as an equivalent of coronary artery disease in terms of cardiovascular risk, is now known that cardiovascular risk is not uniform in these patients²³, and that DM2 associated with obesity is primarily responsible for the occurrence cardiovascular disease and reduced survival in patient⁴, and is therefore important to identify those at higher risk for prevention and management of aggressive treatment.

It is known that obesity is a risk factor for diabetes and for numerous chronic diseases, but when is centered in the abdominal region of the negative repercussions, both as metabolic cardiovascular order, are more significant.⁷ Vague² rated fat in android that is characterized by localized fat in the upper or central body, particularly in the abdomen and gynoid, which is characterized by fat deposit located in the lower region of the body, particularly in the hips and thighs. Studies are highlighting the seriousness of the risk factors related to obesity is directly linked to body fat distribution, where a standard android, has been associated with increased incidence of cardiovascular affections, especially when compared with the gynoid pattern.⁹

In the 90s, it was proposed to index Taper-C index as a model for evaluating the distribution of physical fat.¹⁰ This index uses variables such as weight, height and waist circumference. It is based on the idea that people who accumulate fat around the central torso have a similar body shape of a double cone, two cones with a common base, while those with a smaller amount of fat in the central region would look like a cylinder.

From the statistical data relating to the high prevalence and incidence of cardiovascular disease in patients with TZDM combined with the assumption that central obesity potentially increases the risk of developing cardiovascular disease, the IC is a simple method that can define patients at higher risk developing a coronary event, since it uses variables that represent the central obesity. Thus, the identification and stratification of high coronary risk, can direct the actions in health, through prevention and treatment. Given the above, the objectives of this study are:

- Assessing the risk for coronary conicity index
- Checking the association with quality of life in patients with type 2 diabetes mellitus.

METHOD

Article compiled from the project << Institutional research profile of subjects with type 2 diabetes mellitus in the urban area of the municipality of Ijuí enrolled in the Family Health Program >> presented in defense of a monograph called << Cardiovascular risk in diabetic individuals type 2 programs belonging to the family Health Strategy in the Post >> Lato Sensu in Nursing, Intensive Care, Coronary Hemodynamics and the Department of Life Sciences - DCVida, the Regional University of Northwestern Rio Grande South (UNIJUI), Ijuí - RS, Brazil. 2013.

Cross-sectional study, analytical cut quantitative approach, held in the Family Health Strategy of the urban area of the municipality of Ijuí/Rio Grande do Sul, Brazil. The study population consisted of patients with diabetes mellitus type 2, of both sexes, ascribed the FHS. Exclusion criteria were: patients older than 75, the difficulty of understanding the proposed bedridden or commitments during ambulation procedures.

The sample size was calculated based on data from the 2009 estimated population, in which the city of Ijuí - RS had a total of 819 diabetic patients in nine FHS, in the urban environment. StatCalc the application of Epi Info 3.5.3 software was used, considering the prevalence of nonspecific outcome of 50%, 5% error and confidence level of 95%, which resulted in a sample of 269 patients. In anticipation of losses, was added a percentage of 5% of that number, totaling 283 patients with T2DM.
The invitation to participate in the study was done to patients in home visit with the monitoring of community health workers, when possible. At this time, the patient was explained the research objectives and was made to schedule the interviews with the patients who agreed to participate in it for the achievement of clinical and laboratory evaluation. This review was performed at the Clinic of Physiotherapy UNIJUÍ and clinical analysis of UNIJUÍ (UNILAB), respectively lab.

There were selected for household and invitation to participate in the study 283 patients with T2DM that fitted the inclusion criteria visit, according to data collected from health professionals FHS or the medical records of the patients belonging ESFs of the nine urban areas of the municipality Ijuí / RS, of which 64 patients were excluded from the study due to lack thereof at the time of the visit, the refusal of the patient to participate in the research, the failure to identify the entered address and not signed the consent, for a total sample of 219 patients with T2DM.

The study was designed in accordance with the Guidelines and Standards Regulating Research Involving Human Beings according to the Resolution of the National Health Council (CNS) nº 466/12. The research project was submitted to the Ethics Committee of UNIJUÍ (CEP), and concurred in the opinion embodied nº 91/2010. The term informed consent was signed by all patients after the procedures involved were explained in detail. The subjects were informed about the guarantee of privacy on the anonymity and the confidentiality of information and also that the results would be reported at scientific meetings and published in journals. It was also requested authorization from the City Health Department to conduct the study in which data on the study population were obtained.

Interviews and tests were performed by professionals trained health. Data collection was performed using a semi-structured instrument. The independent variables were: a) sociodemographic characteristics: age (30-39 years old, 40-49 years, 50-59, 60-69, 70-75); gender (female, male); b) health condition: time of diagnosis of T2DM (in years); c) associated comorbidities: presence of hypertension (yes or no); dyslipidemia (yes or not), diagnosed by means of biochemical tests; obesity (yes or no), when the value of BMI was ≥ 30,0 kg/m² \(^{11}\) for patients up to 59 years and ≥ 27,0 kg/m² \(^{12}\) for patients aged 60-75 years old; d) lifestyle: smoking (yes or no); alcohol consumption (yes or no); physical inactivity (yes or no); stress (yes or not); e) food habits investigated by questioning a high salt diet (yes or not).

It was considered a smoker every patient who claimed to be smokers at the time of assessment, regardless of the quantity of cigarettes and alcohol who reported excessive alcohol consumption during the interview at any frequency. Excessive salt intake was measured by the question: “you eat too much salt in the food we consume?” And the stress was assessed by the question; do you consider yourself a stressed person? Been reported physically inactive patients who reported not engaging in any type of regular exercise, with minimum of three times a week.

Body weight (kg), height (m), waist circumference (cm) and hip circumference (cm); a review of the following anthropometric data was performed. The Body Mass Index (BMI) was calculated as the ratio between weight and height (kg/m\(^2\)) square. Body weight was measured in kilograms (Kg) obtained by means of a precision balance (Toledo®). For this evaluation, subjects were instructed to remain in light clothing and barefoot. \(^{13}\) Height was measured in meters, through staggered accessory centimeter ruler, barefoot individuals, keeping upright and looking front. Waist circumference was measured at the average distance between the last floating rib and the iliac crest at the end of a normal expiration, with the patient in the standing position, with the minimum of clothing. Hip circumference was measured at the point of greatest gluteal muscle. Flexible and inextensible standard tape measure was used, defining measure 0,1cm. \(^{10}\)

To determine the Conicity Index (CI) measurements of body weight, height and waist circumference were determined using the mathematical equation Valdez: \(^{10}\)

\[
\text{Índice C} = \frac{\text{Circunferência da cintura (m)}}{\sqrt{\text{Peso corporal (kg)} \times \text{Estatura (m)}}}
\]

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There were adopted cutoff of ≥ 1,25 and ≥ 1,18 for men and women, respectively, to determine high coronary risk (HCR), based on the study of Pitanga and Lessa. For blood collection, patients were instructed to fast for 12 hours did not perform physical exertion or consume alcoholic beverages 24 hours prior to collection. About 10 ml of blood by venipuncture, there were collected for biochemical measurement of total cholesterol (TC), low density lipoprotein (LDL-C), high density lipoprotein (HDL-C), triglycerides (TG) and glucose. Blood samples were processed and the serum (for TC, TG, LDL-C and HDL-C) and plasma (for glucose) were analyzed in the clinical laboratory analyzes UNJUI. Serum levels of TC, LDL-C and TG, and plasma glucose levels were determined by colorimetric enzymatic method. TG levels were analyzed photometrically after enzymatic reaction. LDLc levels were estimated to values lower than 400 mg/dL TG, using Fredrickson formula: LDL = TC - (HDL + TG/5).

To assess quality of the life questionnaire of World Health Organization Quality of Life Abbreviated (WHOQOL - BREF), simplified psychometric instrument developed by WHO to assess QOL from the original WHOQOL - 100 was applied, analyzing the quality of life, health and feelings in the past two weeks, financial resources (question 12), health and social care: accessibility and quality (question 24), the opportunity to acquire new information, ability (question 13), participation and opportunities for recreation/leisure (question 14), physical environment (question 9), transportation (question 25).

SPSS (version 18.0, Chigago, IL, USA) - For data processing the Statistical Package for the Social Sciences was used. Statistical analysis all variables were tested for normality by the Kolmogorov-Smirnov test (KS). Qualitative variables were presented by frequencies and percentages and quantitative variables as mean and standard deviation (mean ± SD). Mann-Whitney test for comparison of two independent groups with normal distribution and Student t test for variables with normal distribution tests were used to check the variable differences between the sexes. The correlation coefficient of Spearman or Pearson correlation was used to evaluate the correlation between the taper and quality of

RESULTS

Among the 219 patients with type 2 diabetes evaluated, the mean age was 61,4±9,5 years old with a minimum age of 33 and maximum of 88 years old, and 97 (44,3%) patients were aged between 60-69. Regarding gender, 64,8% (142) were women. The average time since diagnosis of diabetes was 7,4±6,8 years, with a minimum time of 6 months and maximum of 40 years.

According to Table 1, high prevalence of cardiovascular risk factors associated with type 2 diabetes mellitus in patients evaluated it was found, the most prevalent hypertension (74,9%), physical inactivity (55,3%), stress (53,40%) and obese (52,5%).
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**Table 1. Frequency distribution of cardiovascular risk factors associated with type 2 diabetes (n = 219), Ijuí-RS, 2010-2012**

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Women % (n)</th>
<th>Men % (n)</th>
<th>Total % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Dyslipidemia</td>
<td>43,7 (55)</td>
<td>38,9 (28)</td>
<td>41,9 (83)</td>
</tr>
<tr>
<td>Arterial Hypertension</td>
<td>78,9 (112)</td>
<td>67,5 (52)</td>
<td>74,9 (164)</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>2,8 (4)</td>
<td>15,6 (12)</td>
<td>7,3 (16)</td>
</tr>
<tr>
<td>Smoking</td>
<td>9,2 (13)</td>
<td>26,0 (20)</td>
<td>15,1 (33)</td>
</tr>
<tr>
<td>Hypersodic diet</td>
<td>16,2 (23)</td>
<td>24,7 (19)</td>
<td>19,2 (42)</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>57,0 (81)</td>
<td>51,9 (40)</td>
<td>55,3 (121)</td>
</tr>
<tr>
<td>Stress</td>
<td>54,2 (77)</td>
<td>51,9 (40)</td>
<td>53,4 (117)</td>
</tr>
<tr>
<td>Obesity</td>
<td>57,7 (82)</td>
<td>42,9 (33)</td>
<td>52,5 (115)</td>
</tr>
</tbody>
</table>

FR= Risk factors; * % valid responses =198; 126 women e 72 men.

In Table 2 there are revealed the descriptive and analytical statistics of anthropometric variables. It is observed that the average waist circumference (WC) presents increased for men (104,7 cm) and for women (104,4 cm) both being more significant the change in females. The Body Mass Index (BMI) showed an average of 31,9 kg/m² for women, indicating a higher prevalence of obesity class I and 29,1 kg/m² for men, indicating overweight. The CI had an average of 1,36 for females and 1,37 for males, both have a high coronary risk. There were statistically significant differences in anthropometric variables between the sexes, except for measures of waist circumference and hip (p = 0,518, p = 0,925), respectively.

**Table 2. Comparison of anthropometric measurements between women and men in the study (n = 219), Ijuí-RS, 2010-2012**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Women Average±SD</th>
<th>Men Average±SD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>77,3±16,4</td>
<td>83,2±13,1</td>
<td>0.001*</td>
</tr>
<tr>
<td>Height (m)</td>
<td>155,5±6,3</td>
<td>169,1±6,3</td>
<td>0.000*</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>31,9±6,6</td>
<td>29,1±4,2</td>
<td>0.001*</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>104,4±14,2</td>
<td>104,7±11,3</td>
<td>0.518</td>
</tr>
<tr>
<td>Hip circumference</td>
<td>107,7±12,8</td>
<td>102,4±10,9</td>
<td>0.925</td>
</tr>
<tr>
<td>Taper index</td>
<td>1,36±0,09</td>
<td>1,37±0,07</td>
<td>0.004*</td>
</tr>
</tbody>
</table>

Mann-Whitney Test; *p<0,05; SD=standard deviation; BMI= Body Mass Index.

It is observed in table 3 that 96,3% of the diabetic population studied presents high coronary risk, 63.0% being composed of women and 33,3% for men.

**Table 3. Coronary risk in women and men in the sample studied, according to the index of Taper (n = 219), Ijuí-RS, 2010-2012**

<table>
<thead>
<tr>
<th>Women</th>
<th>% (n)</th>
<th>% (n)</th>
<th>% (n)</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (n) women with low CR</td>
<td>2,8 (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) women with high CR</td>
<td>97,2 (138)</td>
<td>1,8 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) women with high CR on total sample</td>
<td>1,8 (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) women with high CR in total sample</td>
<td>63,0 (138)</td>
<td>1,8 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>% (n) men with low CR</td>
<td>5,2 (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) men with high CR</td>
<td>94,8 (73)</td>
<td>1,8 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) men with high CR on total sample</td>
<td>1,8 (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) men with high CR in total sample</td>
<td>33,3 (73)</td>
<td>1,8 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>% (n)</td>
<td>% (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) Total sample with low CR</td>
<td>3,7 (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% (n) Total sample with high CR</td>
<td>96,3 (211)</td>
<td>3,7 (8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CR= coronarian risk; Taper index cutoff point for women ≥1,18 and for men ≥ 1,25.

In Table 4, are contained the values of biochemical variables evaluated in 147 patients with type 2 diabetes, whereas 72 patients did not attend the clinical analysis of UNIJUÍ for collecting blood and conducting biochemical laboratory examination. It is observed that the biochemical variables analyzed in patients with type 2 diabetes evaluated, are desirable and in neighboring groups, except in relation to triglycerides in both sexes and glucose in women, noting that women had worse control of parameters biochemical, no statistically significant difference between the sexes in relation to HDL (p = 0,01) and triglycerides (p = 0,05).
It is observed in table 5 that the averages of the general areas, physical, psychological and social development of WHOQOL-abbreviated questionnaire were lower than in women with elevated coronary risk when compared patients with coronary risk classification of coronary risk, both in men as in women.

Table 5. Comparison between the averages of the questionnaire of quality of life, WHOQOL-abbreviated as the classification of coronary risk (n = 219), Ijuí-RS, 2010-2012

<table>
<thead>
<tr>
<th>Domains of QOL WHOQOL-brief questionnaire</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low risk (4)</td>
<td>High Risk (138)</td>
</tr>
<tr>
<td>General</td>
<td>93,7±23,9</td>
<td>84,7±17,4</td>
</tr>
<tr>
<td>Physical</td>
<td>89,3±14,3</td>
<td>82,4±9,9</td>
</tr>
<tr>
<td>Psychological</td>
<td>85,4±10,5</td>
<td>82,7±9,9</td>
</tr>
<tr>
<td>Social</td>
<td>95,8±8,3</td>
<td>95,3±17,9</td>
</tr>
<tr>
<td>Environmental</td>
<td>84,4±12,7</td>
<td>86,9±11,3</td>
</tr>
</tbody>
</table>

Mann-Whitney Test; *p<0.05; QoL: quality of life; Bref: abbreviated.

Statistically significant correlation was observed between the rate of taper and the physical domain of the questionnaire of quality of life, WHOQOL-abbreviated, ($r = -0.142$, $p = 0.042$), being a weak inverse correlation. Statistically significant correlation was not observed in other General domains ($r = -0.129$, $p = 0.065$), psychological ($r = -0.117$, $p = 0.094$), social ($p = -0.026$, $p = 0.709$) and environmental ($r = 0.055$, $p = 0.43$).

**DISCUSSION**

The analysis of the present study demonstrated the predominance of females in the age group between 60 and 69 years old. These facts may be related to the tendency of women more frequently seek health services because they often are more concerned with their health and well-being, encouraging early diagnosis of the disease in this population and the increased incidence and prevalence of chronic diseases in elderly patients.

The high prevalence of cardiovascular risk factors in patients with type 2 diabetes participated in the study, demonstrates the need for a specific intervention and a multidisciplinary team with the goal of reducing the potential risk of cardiovascular events in these patients. There is consensus among the authors that hypertension is about twice as prevalent among diabetic subjects compared to the general population, and is present in 50% of patients at diagnosis of type 2 DM.

The high prevalence of patients with type 2 diabetes overweight has been shown by other epidemiological studies show that about 80% of patients with type 2 diabetes are overweight or obese and those with normal weight same predominance of fat may occur in the region abdominal.

In patients with type 2 diabetes evaluated the mean values for all anthropometric variables (BMI, waist circumference, IC) were above the cutoffs in both sexes. However, women had higher average cutoff points, reflecting a higher coronary risk. The slightest change in anthropometric variables in men may be related to increased physical activity, linked to industrial activities in men, and factors such as parity and hormonal changes in women.

The increased waist circumference above the reference values, postulated by the Ministry of Health, increases coronary risk. The increased abdominal fat may influence the elevation of the metabolic and cardiovascular risk by excessive production of free fatty acids in the visceral abdominal region, which is then distributed via the portal
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The results showed that high coronary risk was quite prevalent in the population studied, according to the IC, which reinforces the prediction of risk for development of cardiovascular disease in this population, especially among women who had a steeper CR compared to men. However, the quality of life of diabetics in general is good, and that individuals with a high CR have lower scores on quality of life when compared to diabetic CR low.

In this scenario, it is noteworthy that the major contribution of this study is the community diagnosis, which should serve as a basis for planning and building policies and strategies for health in the city studied, so that effectively reduces the risk of cardiovascular events and improve and promotes quality of life in this population.

CONCLUSION

The scientific literature offers few studies that determine the best cutoff CI to estimate coronary risk, as little research conducted specifically in individuals with type 2 diabetes are found. Known that CI is an indicator of abdominal adiposity comprehensive in that captures variations in body composition, an adaptation of the CC in relation to weight and height, allowing direct comparisons of abdominal adiposity among individuals and groups, occurring.

FINANCING

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