Diabetes Mellitus in asians patients: descripticion of one population of one family health unit from the north of Portugal

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The authors declare that they have no conflits of interest.

ABSTRACT

Introduction: Asian Countries contribute more than 55% to the world's diabetic population. Compared with the European population, Asians develop diabetes with lower thresholds of body mass index and abdominal perimeter and at earlier ages.

Material and Methods: An observational, cross-sectional study was conducted based on a population of patients with diabetes of Asian origin enrolled in the USF Rainha D. Amélia. These patients were selected through the MIM@UF® program using the codes of the international primary health classification: T90 and T89.

Results: The population obtained consisted of 20 patients with Type 2 Diabetes, originary in Asian countries. At diagnosis the patients had a mean of 42.6 years, and in 30% (n = 6) the diagnosis was established before the age of 40 years. The mean duration of diabetes was 6.75 years. Pancreatic anti-islet antibodies were determined in 10 users, all with negative results, as well as the C-peptide values, which were within the normal range. There were statistically significant differences for total and LDL cholesterol in patients with glycated hemoglobin> 7% when compared to the group with lower values.

Discussion and Conclusion: Asian populations have a substantial risk of developing diabetes compared to other populations. In addition they develop the disease earlier and with lower body mass index. One possible reason for this difference is that, compared to Caucasians, Asians have more visceral adiposity, which contributes to lipotoxicity, insulin resistance and diabetes development.

Key Words: diabetes mellitus; asians

INTRODUCTION

The prevalence of *Diabetes Mellitus* (DM) has been increasing and is estimated to reach 438 million adults between the ages of 20 and 70 by 2030. This value represents more 153 million than in 2010[1]. Asian countries contribute more than 55% to the world's diabetic population[2], mainly at the expense of type 2 DM[3]. The estimated prevalence in China, India, Bangladesh is 9.7%, 9.1% and 6,3%, respectively[4,5].

The population density of India and China, urbanization, economic growth with changes in dietary patterns and ethnic and genetic background are the major contributors to the high prevalence of DM in Asia. Compared with the European population, Asians develop DM with lower thresholds of body mass index (BMI) and abdominal perimeter and at earlier ages[2]. According to the Joint Asia Diabetes Association, one in five individuals from Asia with DM are diagnosed before age of 40[6]. The onset at an early age conditions long duration of the disease and increases the risk of chronic complications, responsible for the rates of early morbidity and mortality. The main chronic microvascular complications of DM in these populations are renal (urinary excretion of elevated albumin and chronic renal disease); of macrovascular complications cerebrovascular disease is the most relevant. The available literature points to lower rates of peripheral arterial disease and coronary disease, compared to the European population[7,8].

The progressive and early decline in β-cell function, conditioned by a predominant phenotypic pattern of centripetal obesity and insulin resistance in these Asian patients[5], is the main pathogenic mechanism of type 2 DM. Poor control of the disease can be explained by the low adherence to non-pharmacological and pharmacological therapy, a statement supported by a study of compliance assessment that showed that oral antidiabetics, antihypertensive and antidislipidemic drugs were only 40-50%[9] identifying as the highest risk group the younger patients, with more comorbidities and with lower economic status. Language barrier, illiteracy and preference for traditional or alternative therapies may contribute to low compliance in these ethnic groups[10].

The increasing emigration of Asians, particularly to Portugal, makes it urgent to know the particularities of DM in this population, especially as regards the greater difficulty in the therapeutic approach, to which the linguistic barrier also contributes.

Thus, the main objective of this study was to characterize the Asian patients with DM type 2 enrolled in the Family Health Unit (FHU) Rainha D. Amélia in Porto, evaluating demographic, clinical and analytical parameters of this population. The secondary endpoints consisted of comparing patients with uncontrolled or controlled type 2 DM (assuming no control for HbA1c values greater than 7%) relative to therapeutically modifiable variables [blood pressure, total cholesterol, high density (HDL) cholesterol, low density cholesterol (LDL), triglycerides and BMI] and to variables not modifiable by therapeutics (sex, age and duration of DM).

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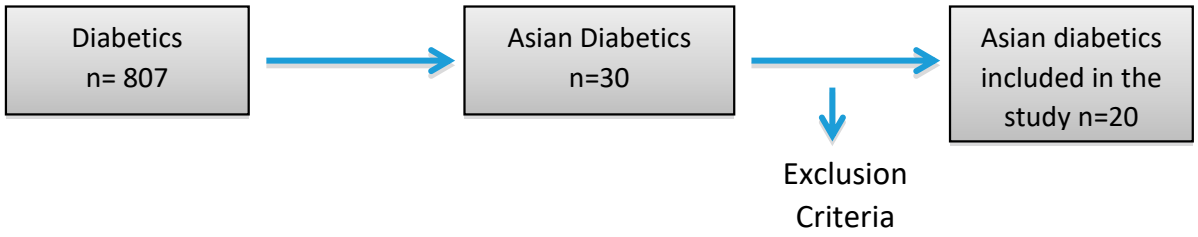
METHODS

An observational, cross-sectional study was carried out based on a population of patients with DM of Asian origin (Bangladesh, India, Pakistan and China) enrolled in FHU Rainha D. Amélia and who had at least one face-to-face consultation in the last four years. These patients were selected through the MIM@UF® program in November 2017 using the International Primary Health Care (ICPC-2) classification codes: T90 - non-insulin-dependent DM and T89 - insulin-dependent DM. Biometric and analytical data were collected through the SClinal® information system. Subsequently, these data were recorded and analyzed using Microsoft Excel 2013® and SPSS version 24.0®. All variables had a normal distribution, so we used the Student's t test to analyze independent samples. The level of significance was set at 0.05.

In the study, the inclusion criteria were those enrolled in the FHU Rainha D. Amélia, with a Family Physician assigned and diagnosed T89 or T90 in the list of problems and originated from Asian countries. The patients without medical consultation in FHU for more tanh 4 years were excluded (Fig. 1).

Figure 1. Selection of study participants



This study was carried out taking into account the principles by which research is conducted, with the individuals included in the sample being duly informed about all aspects intrinsic to the study and only participating after having decided of their own free will, taking into account the the principle of freedom of choice, informed consent and the guarantee of anonymity and confidentiality of the data collected.

RESULTS

The population obtained consisted of 20 type 2 DM patients from Bangladesh (n=12), Pakistan (n=3), India (n=3) and China (n=2) - table 1. Of these, 85% (n=17) were males. The mean age was 49.4 years. At diagnosis the patients had a mean of 42.6 years and in 30% (n = 6) the diagnosis was established before the age of 40 years. The mean duration of type 2 DM in the study population was 6.75 years ranging from 2 to 17 years. The mean value of glycated hemoglobin (HbA1c) at diagnosis was 8.0% (n=14); in 5 patients it was higher than 7% and at the time of the study in 9 patients the HbA1c value was higher than 7% . With regard to microvascular complications, these patients accounted for 20% (n=4) of the patients and 15% (n=3) had macrovascular complications.

In 10 patients the results of the C-peptide, whose value was doseable and within the reference values in all cases (mean of 3.06ng/mL, maximum of 4.45ng/mL, minimum of 1.45ng/mL, for a normal range of 1.1-4.4 ng/ml). Pancreatic anti-islet antibodies were determined in 10 users, all with negative results.

The main therapeutic classes used were biguanides in 90% (n=18) of the cases. Dipeptidyl peptidase 4 (DPPi4) inhibitors were prescribed in 50% (n=10) of patients, sulphonylureas in 25% (n=5) and insulin 15% (n=3).

About 75% (n=17) of the patients were non-smokers, while only 15% (n=3) smoke. Forty-five percent (n=9) of the patients had arterial hypertension (AHT). With respect to BMI, in the 14 patients in whom it was possible to get, they had a mean BMI of 27.6 kg/m^2 and at the time of the study the mean BMI of the total was 27.2 kg/m^2, with 60 % (n=12) to present a BMI ≥25 kg/m^2. Regarding the abdominal perimeter (n=15), all the women in the study population had values greater than 80cm (mean of 103.3cm, maximum of 120cm and minimum of 91cm) and 66.7% of the men had values more than 90cm (mean of 92.7cm, maximum of 102.5cm and minimum of 80cm).

Relatively to lipid profile more than half of the patients had total cholesterol values equal to or greater than 170mg/dL (n=12). It should be noted that in 4 patients a total cholesterol value above 200mg/dL was observed. Regarding HDL cholesterol, 10 of the 17 male patients and 1 of the 3 female patients had a value above 40 mg/dL and 50 mg/dL, respectively.

Table 1: Characterization of the study population according to the demographic, clinical and analytical variables

Variables	Values
Demographic variables	
Sex	Male: n=17 (85%); Female: n=3 (15%)
Age at diagnosis (mean)	42,6 years (maximum 54; minimum 30; SD 5,9)
Age at the moment of study (mean)	49,4 years (maximum 59; minimum 41; SD 5,3)
Country of origin	Bangladesh: n=12 (60%); Pakistan: n=3 (15%); India: n=3 (15%); China: n=2 (10%)
Clinical Variables	
Duration of DM (mean)	6,75 years (maximum17 anos; minimum 2 anos)
AHT	YES: n=9; NO: n=11
BMI at diagnosis (mean)	27,6Kg/m2 (maximum 44,3; minimum 21,6; SD 6,0)
BMI (mean)	27,2Kg/m2 (maximum 44,3; minimum 19,5; SD 5,8)
Abdominal perimeter (mean)	Male (n=12): 92,7cm (maximum 102,5; minimum de 80; SD 6,9) Female (n=3): 103,3cm (maximum 120; minimum de 91)
Smoking habits	YES: n=3 (15%); NO: n=17 (75%)
Microvascular complications	Peripheral Neuropathy: n=2; nephropathy: n=4; retinopathy n=3.
Macrovascular complications	Cerebrovascular disease: n=3; peripheral arterial disease: n=3; Coronary heart disease: n=3.
Therapeutic classes	Metformin: n=18 (90%); DPPi4: n=10 (50%); Sulphonylureas n=5 (25%); Insulin n=3 (15%)
Analytical Variables	
HbA1c at diagnosis (n=14; mean)	8% (maximum 13,1; minimum 6,6; SD 1,7)
HbA1c (mean)	7.57% (maximum 12,8; minimum 5,8; SD 2,0)
Total cholesterol (mean)	177,6mg/Dl
LDL cholesterol (mean)	101,2mg/dL
HDL cholesterol (mean)	Male: 39,2mg/dL; Female: 46mg/dL.
Triglycerides (mean)	176mg/dL

Legend: SD – Standard Deviation; DM – Diabetes *Mellitus*; AHT – Arterial Hypertension; BMI – Body mass index; DPPi4 – Dipeptidyl peptidase inhibitor 4; HbA1c – Glycated haemoglobin; HDL – High density; LDL – Low density.

From the comparative analysis of patients with uncontrolled or controlled type 2 DM, we found that in the group with good glycemic control there is a predominance of men (3 women for 8 men), while the group with inadequate glycemic control is composed only of men (table 2).

Table 2: Charaterization of the population as a function of DM control

Variables	Controlled DM	Not controlled DM
Sex	Male: n=8; female: n=3	Male: n=9; female: n=0
Age at diagnosis (mean)	42,8 years	42,3 years
Age at the moment of study (mean)	48 years	51 years
Country of origin	Bangladesh: n=7; China: n=2 (10%); Pakistan: n=1 (15%); India: n=1	Bangladesh: n=5; Pakistan: n=2; India: n=2; China: n=1
Duration of DM (mean)	5,2 years	8,7 years
AHT	YES: n=5; NO: n=6	YES: n=4; NO: n=5
BMI (mean)	28Kg/m2	26,3 Kg/m2
Abdominal perimeter (mean)	Male (n=7): 89,4cm || Female: 103,3cm	Male (n=5): 97,3cm
Smoking habits	YES: n=1; NO: n=10	YES: n=2; NO: n=7
Chronic complications	Microvascular: n=2 || Macrovascular: n= 1	Microvascular: n=3 || Macrovascular: n= 2
Total cholesterol (mean)	171mg/dL	185,8mg/dL
LDL cholesterol (mean)	95,8mg/dL	107,8mg/dL
HDL cholesterol (mean)	Male: 39mg/dL; female: 46mg/dL.	Male: 39,4mg/dL
Triglycerides (mean)	171,1mg/dL	181,9mg/dL

Legend: DM – Diabetes *Mellitus*; AHT – Arterial Hypertension; BMI – Body mass index; HDL – High density; LDL – Low density.

At age we noticed that the mean was higher (51 versus 48 years) in the group with inadequate glycemic control, although not statistically significant. In the same way, we did not detect significant differences between the two groups regarding the duration of DM (5.2 versus 8.7 years). However, in the group with inadequate glycemic control, almost half (44%) had a duration of DM greater than 10 years. As for the variables modifiable by therapeutics, we detected only differences for total cholesterol and LDL, which was higher in the group with poor glycemic control. Total cholesterol was significantly higher in the group with inadequate glycemic control, p=0.018.

We did not find significant differences between the two groups regarding HDL cholesterol levels (p=0.856), triglycerides (p=0.399) or for BMI, although 77.8% (n=7) of the group with poor glycemic control being obese. As for LDL cholesterol, its value is significantly higher in the group with poor glycemic control, p=0.026.

DISCUSSION

Populations from South Asia present a substantial risk of developing diabetes compared to other populations[11]. In addition, in agreement with the literature, they develop the disease 5-10 years earlier (42.5 years versus 58 years in the Caucasian race)[12], in 20% of cases with early diagnosis (before 40 years)[6] and with lower BMIs[13]. One possible reason for this interethnic difference is that, compared with Caucasians, for any BMI value Asians have more visceral adiposity which contributes to the lipotoxicity, insulin resistance and development of type 2 DM[5]. An Asian epidemiological study demonstrated that patients with type 2 DM had significantly greater secretion and insulin resistance 10 years before the onset of diabetes. In addition, there was an abrupt decrease in insulin secretion during the last 2 years before the onset of diabetes[14].

Simultaneously, some genetic variants have been identified and associated specifically with the Asian diabetic population, which may explain the clinical characteristics of diabetes in this population.

The recognized ethnic disparities regarding the abdominal perimeter, as an estimate of subcutaneous and intra-abdominal abdominal adipose tissue, justified the different cut-offs of the abdominal perimeter of 90cm for men[15]. Additionally, different cut-offs of BMI were defined and adopted by the International Association for the Study of Obesity for these populations, defining an overweight BMI ≥ 23kg/m^2 and an obesity BMI ≥ 25kg/m^2.

The population analyzed included a total of 20 Asians with type 2 DM, predominantly of the male gender, which can probably be justified by the isolated movements of the male (versus the family) for professional reasons and the search for better living conditions.

More than half (60%) of the patients were obese (from the cut-offs of the Asian population), and 66.7% of the men and 100% of the women had an abdominal perimeter greater than 90 and 80cm respectively. Huxley et al.[12] reported a lower association between BMI and diabetes in Asians compared to Caucasians, justified by the risk of DM increasing to normal BMI in Asians, and total obesity (versus central) did not translate a good measure of cardiometabolic risk[12].

Despite the increased prevalence of DM in the Asian population, according to the InterASIA study[16], in the Chinese diabetic population, rates of disease awareness, treatment and control are relatively low. In this study DM control (fasting glycemia <126mg/dL) was achieved in only 35% of the patients, and control rates differed according to the urban / rural context but did not differ for the duration of diabetes.

It was our intention to statistically evaluate the data from the patients included in this study to identify which parameters might be more directly related to the DM control rate in this population so that it is possible for the clinician to identify at the outset which patients which may benefit from tighter surveillance. We obtained statistical significance in some modifiable parameters as in total cholesterol and LDL. The highest values of total cholesterol and LDL were found in the group of diabetics with inadequate glycemic control, which may be related to therapeutic failure.

As the cardiovascular risk is higher in Asian type 2 diabetics compared to Europeans, the approach also implies an optimization of dyslipidemia[13]. Statins appear to have similar efficacy in lowering cholesterol levels and mean cholesterol levels in South Asians and Europeans with diabetes are also overlapping[13].

Hypertension was observed similarly in the 2 groups. According to Ronald and his co-workers, blood pressure values are similar in South Asia and Europe with type 2 DM, but the use of antihypertensives appears to be lower in the early stages of the disease in the South Asian population, perhaps because of age more early diagnosis and lower rates of obesity[5].

Regarding non-modifiable parameters, although the group with uncontrolled DM was older, we did not obtain statistical significance. The same was observed for the gender and duration of DM, which allows us to infer that, in the analyzed population, these parameters alone do not seem to influence glycemic control.

About half of the Asians with Type 2 DM living in Portugal and with follow-up at FHU Rainha D. Amélia have sub-optimal glycemic control. The lack of knowledge about type 2 DM and awareness and the language barrier may have contributed to these results. Good glycemic control would result in lower cardiovascular risk. Thus, greater efforts and incentives are required for more intensive changes in lifestyle and/or early escalation of therapies in order to reduce progression to chronic complications and morbi-morbility.

The study demonstrates the importance of knowing the ethnic particularities / disparities of diabetes in Asian patients, as it is increasingly discussed with increasing immigration. The present work intends to adopt care aimed at health promotion and prevention of the disease in these populations, at the level of primary health care in Portugal.

REFERENCES

1. Ramachandran A, Snehalatha C, Shetty AS, Nanditha A. Trends in prevalence of diabetes in Asian Countries. World J Diabetes 2012; 3(6):110-117.
2. Chan JC, Bunnag P, Chan SP, Tan ITI, Tsai ST, Gao L, et al. Glycaemic responses in Asian and non-Asian people with type 2 diabetes initiating insulin glargine 100 units/mL: A patient-level pooled analysis of 16 randomised controlled trials. Diabetes Res Clin Pract. 2018; 135:199-205.
3. Sohal T, Sohal P, King-Shier KM, Khan NA. Barriers and facilitators for Type-2 Diabetes Management in south Asians: A Systematic Review. PLoS One 2015; 10(9):1-15
4. Ramachandran A, Snehalatha C, Wan Ma. Diabetes is South-East Asia: An Update. Diabetes Res Clin Pract. 2014; 103(2):231-7.
5. Ma R, Chan J. Type 2 diabetes in East Asians: similarities and differences with populations in Europe and the United States. Ann NY Acad Scl. 2013; 1281(1):64-91.

6 – Yeung RO, Zhang Y, Luk A, Yang W, Sobrepena L, Yoon KH, et al. Metabolic profiles and treatment gaps in young-onset type 2 diabetes in Asia (the JADE programme): a cross-sectional study of a prospective cohort. Lancet Diabetes Endocrinol. 2014; 2(12):935-43.

7. Saquib N, Khanam MA, Saquib J, Anand S, Chertow GM, Barry M, et al. High prevalence of type 2 diabetes among the urban middle class in Bangladesh. BMC Public Health 2013; 13:1032.
8. Clarke P, Glaszioun P, Patel A, Chalmers J, Woodward M, Harrap SB, et al. Event rates, hospital utilization, and costs associated with major complications of diabetes: a multicountry comparative analysis. PLoS Med. 2010; 7(2):e1000236.
9. Chong E, Wang H, King-Shier KM, Quan H, Rabi DM, Khan NA. Prescribing patterns and adherence to medication among South-Asian, Chinese and white people with Type 2 diabetes mellitus: a population based cohort study. Diabet Med. 2014; 31(12):1586-93.
10. Pieroni A, Sheikh QZ, Ali W, Torry B. Traditional medicines used by Pakistani migrants from Mirpur living in Bradford. Complement Ther Med. 2008; 16(2):81–86.
11. Bhurji N, Javer J, Gasevic D, Khan NA. Improving management of type 2 diabetes in South Asian patients: a systematic review of intervention studies. BMJ Open 2016; 6(4):1-16.
12. Huxley R, James W, Barzi F, Patel JV, Lear SA, Suryawongpaisal P, et al. Ethnic comparisons of the cross-sectional relationships between measures of body size with diabetes and hypertension. Obes. Rev. 2008; 9(1):53–61.
13. Sattar N, Gill JM. Type 2 diabetes in migrant south Asians: mechanisms, mitigation, and management. Lancet Diabetes Endocrinol. 2015; 3(12):1004-16.
14. Kwak SH, Park KS. Pathophysiology of Type 2 Diabetes in Koreans. Endocrinol Metab. 2018; 33(1):9-16.
15. World Health Organization – Regional Office for the Western Pacific. The Asia-Pacific Perspective: Redefining Obesity and its Treatment. Health Communications Australia. 2000.
16. Hu D, Fu P, Xie J, Chen CS, Yu D, Whelton PK, et al. Increasing prevalence and low awareness, treatment and control of diabetes mellitus among Chinese adults: the InterASIA study. Diabetes Res Clin Pract. 2008; 81(2):250–257.