Comparative Analysis between Groups of Diabetic Patients in Denmark and Spain

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Abstract

Aim: To compare the degree of control of two groups of diabetic patients, one from Denmark and the other one from Spain.

Design: It is a cross sectional study.

Participants: 99 diabetic people who had been chosen randomly from a data base in the two health centres.

Main measurements: In this study, the variables in both health centres are compared: age, sex, figures of glycated haemoglobin, body mass index, LDL cholesterol and figures of systolic and diastolic blood pressure.

Results: In the sample from Seville the percentage was 53% of men and 47% of women while in the sample from Holbaek the percentage was 54% of men and 46% of women. In the total sample, there was a percentage of 53.54% of men and 46.46% of women. The average age of patients in each sample was 67.06 in Holbaek and 67.02 in Seville. The average BMI in Holbaek was 30.65 kg/m^2, whereas in Seville it was 30.14 kg/m^2. The average LDL in Holbaek was 78.64 mg/dL and in Seville it was 98.91 mg/dL. The average glycated haemoglobin in Holbaek was 6.8% whereas in Seville it was 6.6%. The average SBP in Holbaek was 125.39 mm Hg and in Seville it was 129.52 mm Hg. The average DBP in Holbaek was 81.25 mm Hg while in Seville it represented 76.87 mm Hg.

Conclusion: None of the compared variables showed significant differences statistically speaking, except from the figures of LDL that proved to be higher in Seville. According to information from the WHO, in Spain there are higher rates of overweight (obesity and physical inactivity) than in Denmark, which could be one of the potential causes of the prevailing difference.

Keywords: Diabetes mellitus type 2; Hemoglobin A; Risk factors

Introduction

Diabetes has turned into one of the most serious health problems of our time, with increasing figures about mortality and morbidity. The continuous rising in diabetes figures has led us to implement preventive measures, early-detection and life and treatment changes with the aim of preventing the disease or postpone its complications [1].

The International Diabetes Federation (IDF) publishes the prevalence of Diabetes periodically [2]. This prevalence depends on the values that are used for its diagnosis, whether they are taken from the plasma glucose levels, from the oral glucose overload or from the glycated haemoglobin [3,4].

From 1980, prevalence is growing regardless of the country. This fact is linked to the ageing of the population and to the increase of the body mass index [5,6]. This prevalence rising has been higher in low and middle income populations [7,8]. In 2014, prevalence at a global level was 422 million of adults. There are not any available estimates about separated prevalence in type 1 diabetes and type 2 diabetes. Most people affected have type 2 diabetes, which used to be exclusive of adults, but which is also being described now in children [9].

In Spain, diabetes prevalence is 9.4%, with men having a higher rate than women; while in Denmark prevalence is 6.1% and it is also higher in men [1].

In 2012, diabetes caused 1.5 million of deaths. The main complications were heart attack, ictus, blindness, kidney failure and lower extremity amputation [10-13].

As for the most relevant preventive measures, there should be noted those applicable to all types of population: healthy life habits, daily exercise, balanced diet, avoid smoking and drinking alcohol and taking the periodic checks on lipids and blood pressure.

Furthermore, the later diabetes is diagnosed; the worst the consequences might be for your health. That is the reason why it is important to have access to test results and to consult doctors in case of complications. With reference to already diagnosed people, there is a series of cost-effective measures that can improve results, such as glycemic control combined with a balanced diet and exercise. Also, control of blood pressure and lipids, eye, kidney and foot checks all that must be done periodically [14-17].

Diabetes leads to considerable costs for the health system and for the patient who suffers it [18].

In Spain as in Denmark, diabetes represents 3% of the total number of deaths by any cause or age. In Spain, there are a

higher percentage of people suffering from overweight, obesity and inactivity. With regards to the national strategy against diabetes, guidelines are similar in both countries, except for the registration of diabetes cases which was not carry out in Spain but in Denmark, according to WHO data.

Concerning resources, medicines availability, basic techniques and access to the health system, both countries take similar action by offering adequate health assistance to the population [1].

Objective

Main objective

The main objective was to compare the degree of control of two groups of diabetic patients; one from Denmark and the other one from Spain. This was done by analyzing glycated figures, BMI, LDL cholesterol and blood pressure.

Secondary objectives

The secondary objective consists of valuing the degree of statistical registration in both systems along with establishing hygienic- dietetic improvements regarding the degree of control in these patients according to the results.

Looking for possible explanations in regards to lifestyle and habits according to the results is also part of the objective.

Materials and Methods

It is a cross curricular study based on a sample of 99 diabetic people who had been chosen randomly from a data base in two health centres located in two different countries: one health centre in Spain (Seville) and the other one in Denmark (Holbaek). In this study, the variables in both health centres are compared: age, sex, figures of glycated haemoglobin, body mass index, LDL cholesterol and figures of systolic and diastolic blood pressure. The information was collected from data bases which were requested to the management department in each centre and which had been collected between April and September 2015. The statistical analysis had been realised with R, version 3.3.1. We considered significant values less or equal to 0.05. The comparative analysis of means had been expressed using mean± standard deviation with the application of Student t test for quantive values and Chi square for qualitive values. Relative risk is determined for every risk factor with their own confidence interval.

Results

A total of 99 diabetic patients were analyzed, of which 49 belonged to a health center in the town, Seville (Spain) and 50 to a rural health center in Holbaek (Denmark) **(Figure 1)**.
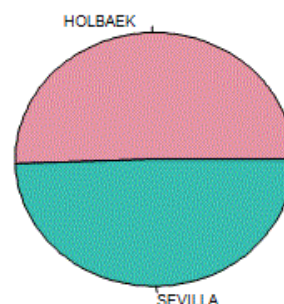

Figure 1 A total of 99 diabetic patients were analyzed, of which 49 belonged to a health center in the town, Seville (Spain) and 50 to a rural health center in Holbaek (Denmark).

Sex variable

In the sample of Seville, the percentage of men was 53% while that of women was 47%. In the sample in Holbaek, the percentage of men was 54% and that of women 46%. In the total sample, the percentage was 53.54% for men and 46.46% for women **(Figure 2)**.
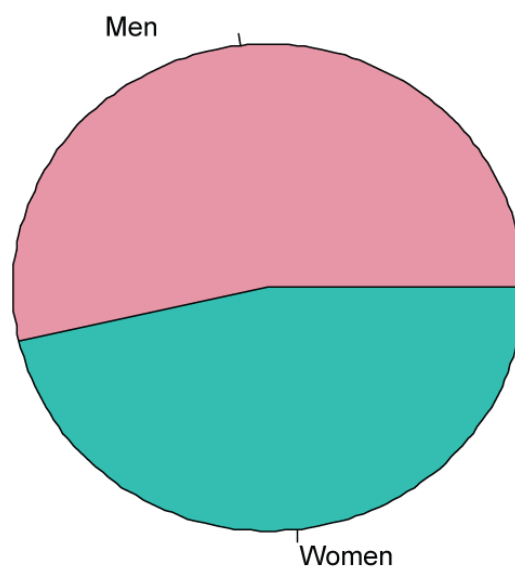

Figure 2 Sex variable.

Age variable

The average age in each sample was 67.06 years in Holbaek and 67.02 years in Seville.

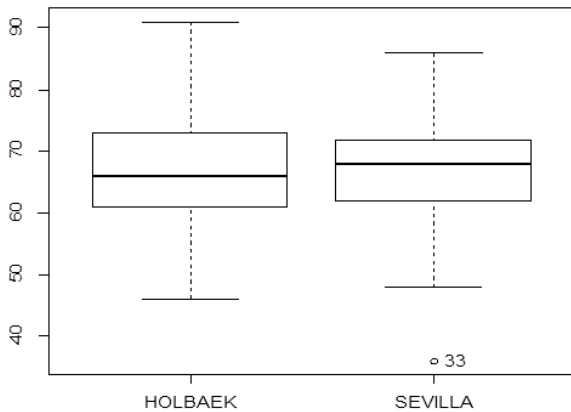An outlier was also noted in Seville, being this one 33 years old **(Figure 3)**.

Figure 3 Age variable.

BMI

The BMI was similar in both places, being the BMI average 30.65 in Holbaek and 30.14 in Seville **(Figure 4)**.
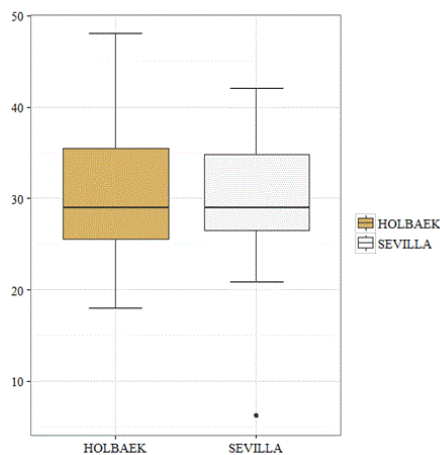

Figure 4 BMI.

LDL

LDL figures were the only values that really were different in both samples, being the average LDL 78.64 in Holbaek and 98.91 in Seville **(Figure 5)**.
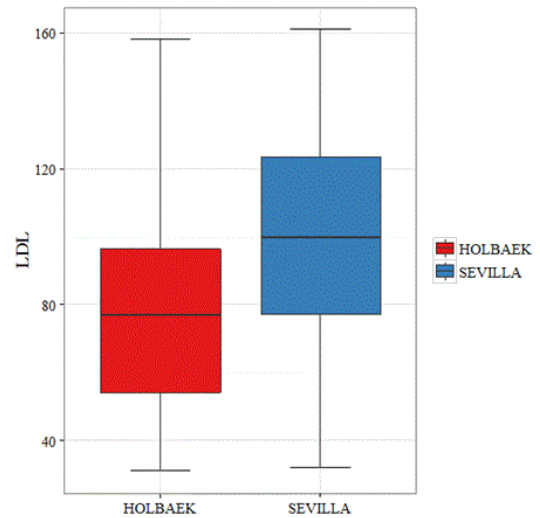

Figure 5 LDL.

HbA1c

Glycated hemoglobin values were similar in both samples, being the glycated average 6.8% in Holbaek and 6.6% in Seville. In this variable, we can note some outliers in both places **(Figure 6)**.
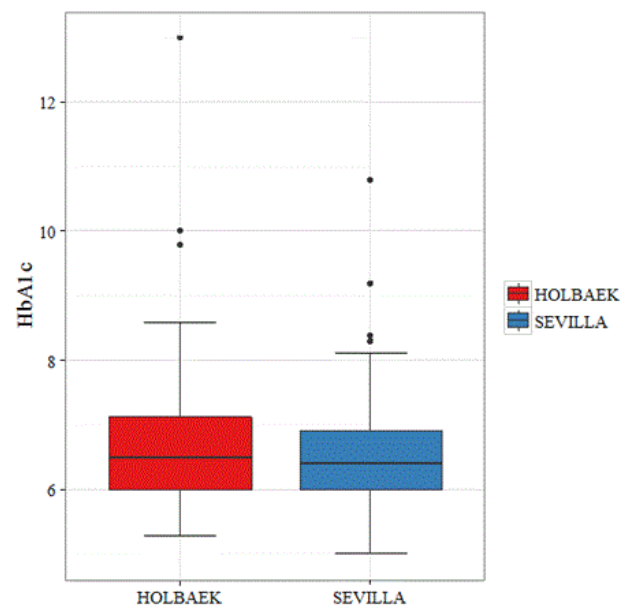

Figure 6 HbA1c.

TAS

TAS average values were 125 mmHg in Holbaek and 129 mmHg in Seville. In this graphic, it is possible to see more outliers in Holbaek than in Seville **(Figure 7)**.
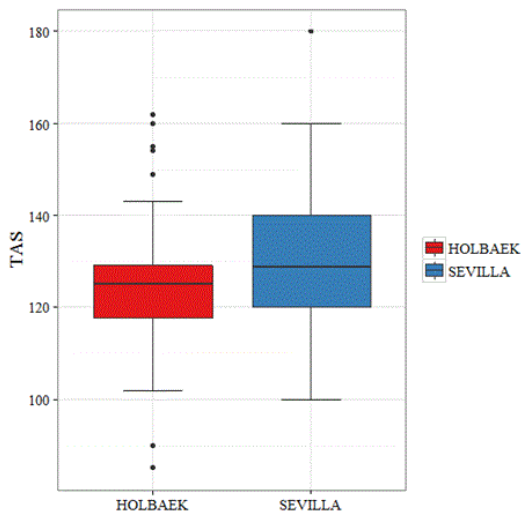
Figure 7 TAS (Systolic blood pressure).

TAD

TAD average values were 81 mm Hg in Holbaek and 76 mm Hg in Seville **(Figure 8)**.
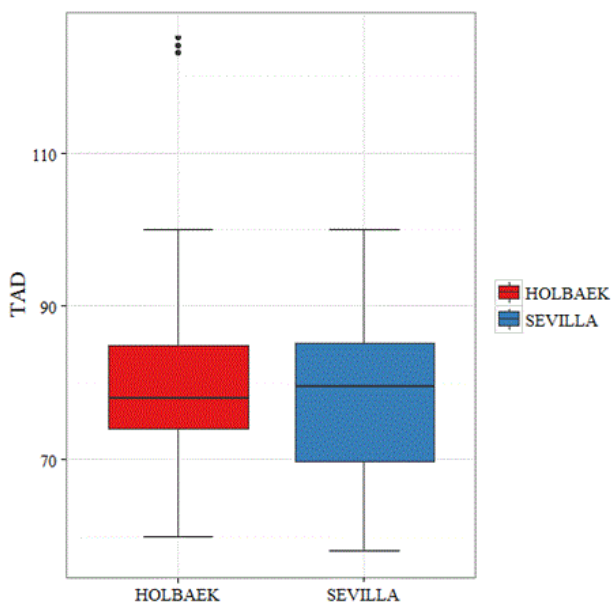

Figure 8 TAD (Diastolic blood pressure).

Discussion

Even though samples were taken randomly, they were quite homogeneous in both cases, being the percentages for men and women similar. Average age of patients was 67 years old.

When comparing the BMI in both groups, there weren't any significant differences statistically speaking; being the BMI average 30 kg/m^2 in both places.

Significant differences were only found when analysing LDL figures. Average LDL in Holbaek was 78.64 mg/dL, while it was 98.91 mg/dL in Seville.

No other variable from the study presented any significant differences statistically speaking. There were similar values concerning glycated hemoglobin, being the average 6.8% in Holbaek and 6.6% in Seville. The average TAS was 125 mm Hg in Holbaek and 129 mm Hg in Seville. The average TAD values were 81 mm Hg in Holbaek and 77 mm Hg in Seville.

As for LDL cholesterol figures, differences could be explained by the differences in the lifestyles predominant in both cultures.

According to WHO, we count in Spain with higher rates of obesity, overweight and physical inactivity than in Denmark. There are studies which confirm the suitability of the Mediterranean diet in order to improve prevention and the management of diabetic patients [12,18]. If we observe these results, we could think that this typical diet in Spain is becoming obsolete. At the same time, the continuous use of the bike in Denmark as the way of transport could be another possible explanation for the fact mentioned above.

The current trend would consist of increasing obesity and physical inactivity rates even more [14].

Therefore, insistence about the importance of keeping a healthy diet along with practising exercise periodically should be one of the main objectives for these patients11; especially, in order to stop prevalence from rising in this disease [9].

It should be noted that there are not enough articles comparing differences in both countries on which to base this study.

Conclusion

Results are similar due to the fact that samples do not represent each of these countries but the whole diabetic population. This explains the resemblance of diabetic population regardless where it comes from, since this is a direct consequence of the same unhealthy lifestyle, including a poor diet and the lack of physical activity.

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