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Original Research Article

Dietary Patterns of the Portuguese Population with and Without Self-Reported Diabetes: Data from the Fourth National Health Interview Survey

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ABSTRACT

Introduction: Given that it is not known how the dietary recommendations are followed in the diabetic population in Portugal, the general purpose of this work was to compare the dietary pattern reported by the Portuguese population with and without self-reported diabetes by combining self reported information about eating habits.
Materials and methods: The study sample was derived from the fourth Portuguese National Health Interview Survey (n=41,193 respondents, aged 15 years and older living in private households). After excluding subjects with incomplete data, the study population comprised 2973 individuals with diabetes (1246 men; 1709 women) and 32244 individuals without diabetes (15536 men; 16708 women). Latent Class Analysis (LCA) statistical techniques were used to classify individuals in different groups.
Results: Two latent classes: unhealthy dietary pattern (class 1) and healthy dietary pattern (class 2) were identified for people with and without diabetes. The highest proportion of participants was classified into the class of unhealthy dietary patterns both in individuals with and without diabetes. Analysis of the diet of people with and without diabetes was made including the following covariates: sex, age, marital status and education level.
Conclusions: The magnitude of the association between class membership and some covariates yielded differences between diabetic and non diabetic groups. Taking into account the larger size of the class denoted by unhealthy dietary patterns, an important gap in dietary habits seems to emerge in this study and suggests that health promotion activities should be tailored to improve dietary patterns of both people with and without diabetes.
Key words: *Diabetes, diet, survey*

INTRODUCTION

Diabetes represents a major public health problem in Portugal with an estimated prevalence of 11.7 %. [(1)] Knowledge of diet and nutrition patterns of people with diabetes is thus important for improving

their control measures, and is even more relevant since the burden of other chronic non-communicable diseases is growing in Portugal. [2] An unbalanced diet is a main risk factor for several chronic diseases, including obesity, stroke, cancer and type 2 diabetes mellitus. [3] Diverse diets have been shown to protect against chronic diseases such as cancer, as well as being associated with prolonged longevity and improved health status. [4] Intake of fruits and vegetables has been associated with a lower risk of cardiovascular disease as well as a lower risk of many diet-related cancers and other chronic diseases prevailing highly in Western societies. [5] The nutrients essential to meet nutritional requirements are not all found in a single food item but come from a diet composed of a number of foods[4]. A measure of the nutritional quality of the diet may therefore be its diversity and numerous proposals have been put forward to determine the best adapted diet. [4,6]

Assessing dietary adequacy is essential in order to formulate nutrition recommendations with respect to nutrient intake and dietary habits. [6] Currently, the nutritional recommendations for patients with diabetes do not differ from those for normal individuals without diabetes with respect to prevention of major chronic diseases. [6,7] Thus, dietary recommendations for people with diabetes should not differ appreciably from recommendations for the entire family. [9] Patients with diabetes usually receive extensive information on food to become more familiar with portion sizes and help monitor their dietary intake in order to achieve glycemic control. [8] The results of SU.VI.MAX study [6] indicate that patients with diabetes may be aware of the importance of diet in the management of their disease, and that they try to modify their dietary habits.

Conventional dietary studies are time consuming and costly, and under certain conditions very difficult to conduct. There is therefore a need for simple, low-cost methods for the assessment of the nutritional quality of diets. [4] The portuguese 2005/2006 National Health Interview Survey [10] included questions on dietary habits reported over a 24 hour period. However, this general health survey does not provide quantitative data on the consumption of specific food groupings.

Composing a dietary pattern indicator involves choices of the variables to be included and their scoring. [11] Most available indicators of dietary pattern include variables that represent current nutrition guidelines or recommendations, [11] namely the Diet Diversity Score (DDS) that reflects diet quality. The DDS is defined as the number of food groups consumed by each person, [4] and is not based on amounts or frequencies. This score takes into account only if the respondent consumed or not certain groups of foods during the reference period. This indicator reflects diet quality and is a simple tool that can be used for comparing groups within the population and to trace changes in diet variation and diet quality over time. [12] Also, a high DDS will reflect a consumption of foods from several of the food groups, and such a diet may therefore also have a higher nutritional quality. [4] It is possible to predict the nutritional adequacy of the diet by counting food groups in a DDS. [4]

Recently, alternative statistical analysis methods such as latent class analysis (LCA) have begun to be used in dietary research namely for identifying classes of individuals with comparable profiles. [13] When food intake is dichotomized, LCA is a technique suitable to combine dietary information from several food records or population subgroups for a food or food group of interest. [14] In LCA, individuals are assumed to belong to one of K mutually exclusive classes but for which

class membership is unknown. [15] LCA provides a new way to describe "usual" dietary patterns and to estimate the number and size of subgroups that display different food consumption patterns. [14]

In summary, the present study aimed to: (1) Identify indicators of an unhealthy / healthy dietary pattern based on self reported information about eating habits from the 2005/2006 Portuguese National Health Interview Survey, (2) Identify subgroups of the population with and without self-reported diabetes mellitus with different dietary patterns.

MATERIALS AND METHODS

Study population

The study sample was the Portuguese population aged 15 years and older living in private households which was part of the fourth Portuguese National Health Interview Survey [10] conducted between February 2005 and February 2006. The population living in collective households and other non classical households was not included in the survey. The total dataset consisted of 41,193 respondents that were selected from the five Mainland NUTS regions and the two NUTS autonomous regions of the Azores and Madeira. Participants younger than 15 years (n=3417) and with missing data were excluded because the prevalence of diabetes in individuals with less than 15 years is negligible. [10] The original sample is a probabilistic complex sample based on the results of population Census. [10] Data from questionnaires of individuals with and without self-reported diabetes hereinafter referred to as individuals with and without diabetes, were then analyzed. Informed consent from participants was obtained.

Definition of variables

Diabetes was measured using a single item. People were asked *"You have or had diabetes?"* People answering with two possible response alternatives: "yes" or "no".

Socio-demographic variables. Sex, age, marital status and level of education were included in this study (see Table 2).

Age in its original form is available with the values grouped in 19 categories. In this work the original variable was recoded in another variable with 6 categories. Age was categorised into five year bands: 15–34, 35–44, 45–54, 55–64, 65-74 and 75 and over.

Marital status. People were asked "What is your marital status? People answering with five possible response alternatives: "single", "married", "married if legally separated of people and goods", "divorced" and "windower". We recoded this variable in another variable with 4 categories: single, married, divorced and widower.

Education level. People were asked "Which is the highest education level you attend or attended? People answering with seven possible response alternatives: "none", "primary school- 1st cycle", "primary school- 2nd cycle", "primary school- 3rd cycle", "secondary school", "post-secondary school", "high school-bachelor", "high school- degree", "high school- master's degree", "high school-PhD", however it was recoded in another variable with the following categories: none, primary school, secondary school and high school.

Dietary pattern variables

The variables of the fourth National Health Interview Survey which reflect general dietary patterns were evaluated on this study as measures of dietary quality to define unhealthy dietary pattern indicators taking into account the current recommendations for a healthy diet. [16] The questionnaire included questions in which respondents were asked:" How many main meals usually you take each day?" In

addition, participants were asked: "Yesterday what did you eat in the main meals?" followed by a list of 11 food items. The answer options were "yes", "no", "not know".

To identify the indicators of an unhealthy dietary pattern based on the self reported information about eating habits from the 2005/2006 Portuguese National Health Interview Survey, we defined the following dietary pattern variables: i) dietary diversity, ii) consumption of fruit and vegetables and iii) number of main meals per day. The scoring system summarized in Table 1 was developed covering the different variables of dietary quality as follows: **1.** *Dietary diversity score:* Food items from three main meals reported over a 24 hour period. The score included 6 groups: Potato, cereal and cereal products; Pulses; Fruit; Milk and dairy products; Meat, fish and eggs and Vegetables, according to international recommendations [(11)] and in accordance to the Portuguese food guide. [(16)] The maximum score was 6, one point was given for each group consumed during the reporting period. Thus, dietary non diversity was present if the number of food groups, according to the food wheel, [(16)] consumed in the three main meals was less than 6. The sweets group was not considered in this score. **2**. *Consumption of fruit and vegetables score:* The score included 2 groups: Fruit and Vegetables, according to the food wheel. [(16)] The maximum score was 2, one point was given for each group consumed. Consumption of fruit and vegetables scoring 0 reflects an unhealthy dietary pattern. [(7)] **3**. *Number of main meals per day score*: The score situated between 1 and 9, one point was given for each meal, and according to the international recommendations [(11)] a score less than 3 indicates an unhealthy dietary pattern.

Unhealthy Dietary Pattern Indicators

Three unhealthy dietary pattern indicators were established: i) dietary non diversity, ii) non consumption of fruit and vegetables and iii) number of main meals per day bellow three. To define these indicators, we first derived variables from the above questions, secondly a scoring system was recorded to dichotomize the variables and therefore the indicators were created. The scoring for each variable was based on indices of overall diet quality [(17)] and the nutritional recommendations of public health organizations for making adequate food choices.

Description of LCA model selection

We applied LCA to identify dietary patterns of the Portuguese population with and without diabetes. In LCA individuals are assumed to belong to one of K mutually exclusive classes but for which class membership is unknown, and through a statistical model the latent class explains the associations among the observed variables. LCA is useful to study unobserved heterogeneity characterized by several unidentified groups that behave differently.

To study the underlying structure of these data, a series of LCA models were fit and examined. The optimal number of clusters can be determined in a variety of ways and no definitive method of determining the optimal number of clusters in a LCA exists. [(18)]

The literature [(19)] has shown that higher values of the log likelihood test statistic suggest better model fit. In addition, the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) are commonly used for LCA assessment. Parametric bootstrapping methods have also been used successfully. [(20)] When data might be sparse, for example, when there are a large number of variables or categories compared with the number of observations, the chi-squared distribution should not be used to determine the *p-value*, and bootstrap

p-values are recommended instead. [21] The optimal number of clusters is where the bootstrap *p-value* becomes non significant at the desired significance level. [18] A significant Bootstrap *p-value* ($p<0.001$) suggests that the model with one fewer class should be rejected in favour of the estimated model. [19] The results from this analysis have been shown to discriminate between groups of subjects and to associate with lifestyle factors.

Statistical analyses

Descriptive statistics was used to characterize the socio-demographic aspects of the population with and without diabetes. Subjects with incomplete data were excluded.

To find mutually exclusive groupings we used LCA. The LC Cluster procedure was used to estimate model parameters [22] for both groups (e.g. people with and without diabetes) separately. To select the appropriate number of classes, a two class model was first fitted to the data and compared to fitted models with an increasing number of latent classes (e.g., two versus three classes). Of these competing latent class models, the selection of the best fitting model was subject to several statistical fit measures as well as theoretical and practical considerations. [18-20,23,24]

Four statistical fit measures were used for comparing across several plausible models: the Log-likelihood value, the Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC) and Bootstrap *p-value* measure. Higher values of the log likelihood test statistic and the lowest values for the information criterion indices (AIC and BIC) suggest better model fit.

Furthermore, latent class models may accommodate covariates, [21] including sex, age, marital status and education level. All these factors are considered as possible influences of population heterogeneity on their diet quality.

To ensure that the maximum likelihood solution was appropriately identified within these models, 2500 Estimation-Maximization (EM) iterations and 500 Newton-Raphson iterations of each type of model (i.e., from two to three classes) were run using randomly generated seed values. Bootstrap *p values* based on 500 replications were determined to assess the model fit based on the Log-likelihood statistic. Latent Gold software uses both the EM and Newton-Raphson algorithms to estimate model parameters. [22] A problem that sometimes occurs in latent class analysis is that a local maximum, rather than the global best solution, is obtained. [19] To avoid this situation, 1,000 repeated runs were performed from random start values.

In addition, a subsequent analysis was performed using a binary logistic regression considering class 1 (unhealthy dietary patterns) and class 2 (healthy dietary patterns) as a dependent variable, in order to interpret the magnitude of the associations between class membership and the covariates: sex, age, marital status and education level using the odds ratio (OR) and their corresponding 95% confidence intervals (CI).

Statistical Package for Social Sciences (IBM SPSS Statistics 20) and Latent Gold 4.5 (Statistical Innovations Inc. Belmont, MA 02478) were used to conduct the statistical analysis.

RESULTS

The descriptive statistics of socio-demographics characteristics (sex, age, marital status and education level) of the individuals with and without diabetes are presented in Table 2. The study comprised of 2973 individuals with diabetes (1246 men; 1709 women) and 32244 individuals

without diabetes (15536 men; 16708 women).

Table 1. Dietary pattern variables

Variables	Scoring
Dietary diversity	Score <1 from each of six food groups
Consumption of fruit and vegetables	neither
Number of main meals per day	below 3

Table 2. Socio-demographics characteristics of individuals with and without diabetes

Socio-demographics characteristics		Diabetics (*n 2973*)		Non diabetics (*n 32244*)	
		n	%	n	%
Sex	Men	1246	42.5	15536	48.2
	Women	1709	57.5	16708	51.8
Age	15-34	88	2.9	9689	30.0
	35-44	184	6.2	5542	17.2
	45-54	426	14.3	5410	16.8
	55-64	737	24.8	4450	13.8
	65-74	925	31.1	4123	12.8
	≥ 75	613	20.6	3030	9.4
Marital status	Single	199	6.7	8944	27.7
	Married	2094	70.4	19425	60.2
	Divorced	82	2.8	1163	3.6
	Widower	598	20.1	2712	8.4
Education level	None	885	29.8	4394	13.6
	Primary	1892	63.7	19841	61.6
	Secondary	92	3.1	4462	13.8
	Higher	103	3.5	3530	11.0

Regarding the population with diabetes, 86.0 % of individuals have dietary non diversity, 7.0 % do not consume any fruit and vegetables and 5.7 % eat less than 3 meals a day. Concerning people without diabetes, 84.8 % have dietary non diversity, 8.8 % do not consume any fruit and vegetables and 8.1 % eat less than 3 meals a day. Differences in diet intake between diabetic and non diabetic groups were statistically significant ($p<0.001$), in terms of non consumption of any fruit and vegetables and the number of main meals per day below 3 (results not shown).

Table 3 shows the model fit statistics derived from LCA for the two to three latent class models for both groups (people with and without diabetes) when unhealthy dietary pattern indicators and the covariates sex, age, marital status and education level were included in the model. In selecting the final model, we examined the Log likelihood statistics, Bootstrap *p-value*, BIC and AIC criteria across models (see Table 3).

Results from LCA suggest a three classes solution based on Akaike and Bayesian Information Criterion´s and log-likelihood. However, when we test the two class model against three class model, according to the bootstrap p-values, assuming 1% and 5% significance levels, the plausibility of the two class model was pointed out. Thus, based on the principle of parsimony and the meaning of those two classes, this two class model seems to be more appellative.

The response probabilities for each of the three indicators associated with dietary patterns are presented for each of the latent classes in Table 4. These probabilities can be used to characterize the two latent classes. The two distinct latent classes of unhealthy dietary pattern indicators for individuals with and without diabetes who were aged over 15 years are as follows:

Class 1- This group reported the highest probabilities of unhealthy dietary pattern indicators from 0.78 (dietary non diversity) to 0.87 (non consumption of fruit and vegetables) for people with diabetes and 0.68 (dietary non diversity) to 0.81 (non consumption of fruit and vegetables) for people without diabetes. This class represented 81.9% and 73.9% of the individuals with and without diabetes, respectively. This class could be considered the less favorable diet.

Class 2- This class reported the lowest probabilities for the all unhealthy dietary pattern indicators, ranging from 0.13 (non consumption of fruit and vegetables) to 0.22 (dietary non diversity) for the people with diabetes and from 0.19 (non consumption of fruit and vegetables) to 0.32 (dietary non diversity) for the people without diabetes.

This class comprised 18.1% and 26.1% of the individuals with and without diabetes, respectively. This class could be considered the most favorable diet.

Based on this characterization we can classify the individuals with and without diabetes belonging to classes 1 and 2 as having an unhealthy dietary intake and healthy dietary intake, respectively. Overall, the unhealthy dietary pattern indicators were similar between people with and without diabetes for the two classes identified (see Table 4). However, there were dissimilarities in class percentages among the two groups.

Table 3. Criterion to assess model fit for LCA models with covariates

Number of classes	Diabetics		Non diabetics	
	2 class	3 class	2 class	3 class
LL	-581225.95	-567743.72	-8258470.52	-8233679.88
AIC_{LL}	1162489.91	1135557.45	16516979.04	16467429.76
BIC_{LL}	1162707.05	1135957.45	16517243.26	16467916.48
N par	19	35	19	35
Bootstrap *p-value*	-	0.082	-	0.050

LL, log-likelihood; AIC, Akaike's Information Criterion; BIC, Bayes' Information Criterion; N par, Number of parameters

Table 4. Latent class analysis with covariates among people with and without diabetes: probability of latent class membership (last row) and item response probabilities within each of the two classes

Unhealthy dietary indicators	Diabetics		Non diabetics	
	Class 1	Class 2	Class 1	Class 2
1. Dietary non diversity	0.781	0.219	0.684	0.316
2. Non consumption of fruit and vegetables	0.873	0.127	0.808	0.192
3. Number of main meals /day < 3	0.837	0.163	0.769	0.231
Probability of latent class membership	0.819	0.181	0.739	0.261

Class 1, unhealthy dietary pattern; Class 2, healthy dietary pattern

DISCUSSION

The present study was carried out in order to investigate the dietary patterns in a group of individuals with and without self-reported diabetes and based on the identification of unhealthy dietary pattern indicators, using the data from the 2005/2006 National Health Interview Survey. The use of dietary patterns to capture the overall dietary habits of the population has received much attention in recent years. [(26)]

Table 5. Estimated Odds Ratios (OR) and 95 % Confidence Intervals (CI) between classes with covariates across diabetic and non diabetic groups

	Diabetics class 1 *v.* class 2		Non diabetics class 1 *v.* class 2	
	OR adj	95% CI	OR adj	95% CI
Sex				
Men	1.056	1.035, 1.077	1.767	1.759, 1.775
Age (Ref. ≥ 75)				
15-34	14.729	14.082, 15.407	1.466	1.452, 1.482
35-44	3.806	3.653, 3.965	1.223	1.210, 1.235
45-54	2.862	2.761, 2.966	1.139	1.127, 1.151
55-64	0.665	0.642, 0.689	0.606	0.599, 0.613
65-74	1.050	1.020, 1.080	0.668	0.661, 0.674
Marital status (Ref.Widower)				
Single	0.426	0.407, 0.447	1.098	1.086, 1.110
Married	0.713	0.693, 0.732	0.598	0.592, 0.604
Divorced	13.954	13.369, 14.565	1.205	1.189, 1.222
Education level (Ref. Higher)				
None	5.379	5.103, 5.669	5.532	5.474, 5.591
Primary	1.527	1.454, 1.602	2.883	2.860, 2.907
Secondary	0.273	0.247, 0.301	1.120	1.109, 1.132

Class 1,unhealthy dietary pattern; class 2, healthy dietary pattern. Binary logistic latent class regression

The selection of variables (dietary diversity, consumption of fruits and vegetables and number of main meals per day) used to built the proposed indicators of unhealthy dietary pattern was based on literature suggesting risks associated with these eating behaviors. Individuals who do not consume one food from each of six food groups, namely individuals who do not consume fruit and vegetables, are more likely not to have a healthy dietary pattern. The nutritional quality of the diet improves with increasing number of food items and food groups. [(12)] We identified in our study three unhealthy dietary pattern indicators: dietary non diversity, non consumption of fruit and vegetables and number of main meals per day bellow three. In a British cross-sectional study, [(27)] a dietary pattern characterized by a high consumption of fruit

and vegetables was inversely associated with type 2 diabetes risk.

We identified two distinct groups of individuals (unobserved groups) in people with and without diabetes using different dietary patterns based on the LCA. The LCA procedure using simultaneously the three unhealthy dietary patterns indicators is relevant because this procedure uses more information than the comparison of the variables one by one in identifying dietary patterns.

Since nutritional recommendations for patients with diabetes do not differ from those for normal individuals without diabetes [(6)] and considering that the food consumption patterns reflect dietary preferences, it could be expected that the identified patterns do not differ between people with and without diabetes and this was confirmed by our results showing a homogeneous dietary behaviour among diabetic and non diabetic groups. However, the percentage of the individuals with diabetes with poor dietary pattern is higher than in individuals without diabetes (81.9% *v.* 73.9%).

The highest proportion of participants was classified into the class denoted by unhealthy dietary patterns (class 1) for both groups. Overall, the two classes of the individuals with and without diabetes identified by LCA were predicted by sex, age, marital status and education level.

Our study identified subgroups of the population with and without diabetes with different dietary patterns. Thus, these findings suggest that men with and without diabetes were more likely to belong to the unhealthy dietary pattern (class 1) *v.* healthy dietary pattern (class 2) than women, which corresponds with the previous findings from literature. Men with diabetes were more than one time more likely to be in class 1 *v.* class 2 than women were, whereas men without diabetes were nearly two times more likely than women to be in class 1 rather than class 2. For example, Beardsworth *et al.* [(28)] showed that women were more likely to make dietary changes in line with recommendations and women had higher levels of health knowledge than men.

For diabetic and non diabetic groups, people who had 15-34 years were more likely to belong to the unhealthy dietary pattern (class 1) *v.* healthy dietary pattern (class 2), which is consistent with Waijers & Feskens [(5)] findings that older age were generally predictors of better diet scores. Between 15 and 64 years old, when the age is increased, the odds ratio in class 1 *v.* class 2 decreased in the diabetic and non diabetic groups, however the association was more significant in the diabetic group. For example, individuals with diabetes with 15-34 years old were almost fifteen times more likely to be in class 1 *v.* class 2 than people's aged over 74 years old. Individuals without diabetes of the same age were one and half times more likely to be in class 1 *v.* class 2 than individuals aged over 75 years old.

The magnitude of the association between class 1 membership and marital status is higher in the divorced than single people in diabetic and non diabetic groups when compared to widowers. This finding is consistent with Schafer *et al* [(29)] who provided clear evidence of the importance of family food interactions for the diet quality of marital partners, and demonstrated that transition from married to unmarried status is associated with an increase in negative health behaviour. In our study the marital status was more significantly associated with class membership in the people with diabetes than in the people without diabetes. For example, the odds ratio in class 1 *v.* class 2 were almost fourteen times higher and less than two times for divorced, in the people with and without diabetes, respectively, than for widower people.

Both people with and without diabetes with the lowest level of education were also more likely to be in the least favourable dietary group, which is consistent with Worsley *et al.* [30] that found that higher educated people were associated with the regular consumption of a wider variety of foods. In our study people with no education level were nearly five times more likely to be in class 1 than class 2 either for individuals with and without diabetes, when compared with people who reported a higher level of education. As diabetic and non diabetic people´s education level increased, the odds ratio in class 1 *v*. class 2 decreased.

Limitations

Although the Portuguese National Interview Survey is still the only population based toll regularly producing nationally representative data on food consumption in Portugal it does not provide quantitative diet information. The National Survey only use a few questions about food intake reported over a 24 h hour period, however some authors consider that detailed information, characteristic of nutrition surveys, is not always necessary when the objective is to characterize and classify the population into big categories of food habits. [31,32] The new National Health Interview Survey is ongoing and to date, there is no other system in Portugal to monitor and investigate dietary patterns at the national level. A limitation of self-reported dietary assessment methods is under-reporting or over-reporting, [33] and this may have introduced bias to the data. As the questions from the survey do not allow to directly measure and quantify the diet, the Portuguese National Health Interview Survey gave insufficient information on food consumption. The approach was based on the characterization of a dietary pattern using current nutrition knowledge and LCA statistical techniques. New strategies to make surveys more efficient and timely such as quantitative information on food consumed are needed to simplify the dietary assessment of the Portuguese population based on international recommendations.

CONCLUSIONS

An unhealthy dietary pattern was identified including dietary non diversity, non consumption of fruit and vegetables and number of main meals per day below three as indicators. LCA identified two major groups of the population with and without self-reported diabetes mellitus with different dietary patterns. The study showed that large percentages of participants, people with and without diabetes (81.9% *v.* 73.9%) have an unhealthy dietary pattern (Table 4). The dietary patterns were differentially associated mainly with sex, age, education level and marital status values among individuals with and without diabetes. The classification of individuals into these groups may help and contribute to future analysis where the information about individuals with an unhealthy dietary pattern is important. To our knowledge, there are no studies that have evaluated dietary patterns derived by latent class analysis in a Portuguese population with and without diabetes.

The foregoing analysis offers some insights into the dietary habits of the Portuguese population and provides useful information about dietary behaviour that was hitherto unavailable nationally. From a public health perspective, results from dietary pattern analysis can be easily translated and incorporated into dietary recommendations for the public. [26]

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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