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# Food consumption pattern and factors associated with adults

## Padrão de consumo alimentar e fatores associados em adultos

## Estándar de consumo alimentar y factores asociados en adultos

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This is a cross-sectional study with quantitative approach that aims to identify more frequent food consumption patterns in the population of the municipality of Pau dos Ferros-RN, Brazil, and socioeconomic and demographic factors associated with them, held in 2014 with 396 participants. Analyzing the frequency of food consumption of the target population, the majority follows what is recommended by the Ministry of Health, showing however excessive consumption of red meat (75.9%) and overweight (31.7%) and obesity (24.2%). The bivariate analysis results showed significance with respect to socio-economic aspects and the consumption of certain foods, as well as the practice of physical exercise and satisfaction with the body. These findings point to the need to form more trained professionals to work in an interdisciplinary way, relating health disciplines with the areas of physical education and psychology, being the junction of knowledge of paramount importance to better counter the problems experienced.
**Descriptors**: Feeding behavior; Food; Food consumption.

Trata-se de estudo transversal com abordagem quantitativa, tendo como objetivo identificar os padrões de consumo de alimentos mais frequentes na população do município de Pau dos Ferros – RN, e os fatores socioeconômico e demográfico associados, realizada em 2014 com 396 participantes. Analisando a frequência do consumo alimentar da população alvo, percebe-se que a maioria segue o que é recomendado pelo Ministério da Saúde, apresentando, porém, o consumo de carne vermelha exacerbado (75,9%) e sobrepeso (31,7%) e obesidade (24,2%). Os resultados da análise bivariada, mostrou significância com relação a aspectos socioeconômicos e o consumo de certos alimentos, assim como a prática de exercício físico e a satisfação sobre o corpo. Esses achados apontam para a necessidade de se formar cada vez mais profissionais capacitados para atuarem de modo interdisciplinar, relacionando as disciplinas da saúde com as áreas de educação física e psicologia, sendo de suma importância a junção de vários os saberes para um melhor enfretamento das problemáticas vivenciadas.
**Descritores**: Comportamento alimentar; Alimentos; Consumo de alimentos.

Se trata de un estudio transversal con abordaje cuantitativa, teniendo como objetivo identificar los estándares de consume de alimentos más frecuentes en la población del municipio de Pau dos Ferros – RN, Brasil, y los factores socio-económico y demográfico asociados, realizado en 2014 con 396 participantes. Analizando la frecuencia del consumo alimenticio de la población albo, se percibe que la mayoría sigue lo que es recomendado por el Ministerio de la Salud, presentando, sin embargo, el consumo de carne roja exacerbado (75,9%) y sobrepeso (31,7%) y obesidad (24,2%). Los resultados del análisis bivariado, mostró significancia con relación a aspectos socioeconómicos y al consumo de ciertos alimentos, así como la práctica de ejercicio físico y la satisfacción sobre el cuerpo. Esos hallazgos señalan la necesidad de formar cada vez más profesionales capacitados para actuar de modo interdisciplinario, relacionando las disciplinas de la salud con las áreas de educación física y psicología, siendo de suma importancia la unión de varios saberes para un mejor enfrentamiento de las problemáticas vivenciadas.
**Descriptores**: Conducta alimentaria; Alimentos; Consumo de alimentos.

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## INTRODUCTION

Changes in eating pattern of the brazilian population in recent years, have provided new models of nutrition and therefore favoured obesity[1]. Among the changes include increasing intake of high-fat foods, as well as the frequency of meat and sausages consumption and eating out habits; in contrast, there is the adoption of a healthy diet that could reduce the risk of non-communicable diseases deaths, considering that these correspond to 72% of the causes of deaths in Brazil[2,3].

The food scenario in Brazil today points to a greater presence of food with excess calories from high intake of simple sugars, saturated fat, and consequently less presence of fruits, vegetables, which leads to an accumulation of body fat, raising the number of obese peolpe[4,5].

In recent years, studies on healthy eating habits have been frequent, dur to their important impact on prevention and treatment of cardiovascular disease (CVD), as well as chronic non-communicable diseases (NCD). It is useful as a strategy to know the food habits and related factors, in order to prepare the country to face and stop, in the coming years, these diseases and the morbidities related to them[5].

Thus, it is essential to get to know the individual or population group food behavior, in order to understand the factors associated with the food model adopted, which relates to social and cultural attributes, such as the of the individual or collective intrinsic subjective aspects, that are involved in the act of feeding or food itself[6].

We highlight, therefore, the need to know what are the individuals' eating habits and their related factors. So, within that context, the present study aims to identify the most frequent food consumption patterns in the population of the municipality of Pau dos Ferros-RN, and socioeconomic and demographic factors associated with them.

## METHOD

This is a cross-sectional study with a quantitative approach, carried out in the year 2014 through an explanatory household survey, whose target audience was the population of the urban area of the municipality of Pau dos Ferros, older than 18 years.

The household survey occurred in 2014 and covered several health-related issues, such as food, physical activity, medical and dental consultations, and others, while the focus of this study is the population's dietary habits.

The sample was based on the census sections of the urban area of Pau dos Ferros, selected by drawing the blocks from the census section, starting from the north, and traversed the blocks in the order of numbering in clockwise direction, addressing a family member every three households. Faced with a population of 20,037 inhabitants older than 18 years living in the urban area of Pau dos Ferros (IBGE), with CI 95%, error rate 5%, effect of layout. The sample of the study had 396 inhabitants, being 12 inhabitants per each census section, with a total of 33 sectors.

The questionnaires were applied individually, one per household. The study investigated the demographic socioeconomic profile and health behaviors, among them the frequency of food consumption of the population in relation to fruits, vegetables, meats in general, sausages among others.

When asked about these habits, the answer options were at least once a day, once every 2 to 3 days, about once a week, less than once a week. To facilitate the analysis, the questions were dichotomously classified as recommended and not recommended, according to the guidelines of the Health Ministry regarding healthy eating habits[2].

Some other variables were also recategorized for better analysis, such as sex (with partner and without partner), schooling (elementary school, high school, higher education), physical activity practice (practice and not practising), notion about the body and life (satisfied and dissatisfied).

We analyzed the results using the SPSS 20 software and, for statistical treatment, we used Pearson's chi-square test with a significance level of 5%.

This project was approved by the Research Ethics Committee of the Federal

University of Rio Grande do Norte (UFRN) under Caae 17959313.7.0000.5294, Opinion 356,895, issued on August 12, 2013.

**RESULTS**

There were 360 participants, in which 299 (83.1%) were female, 323(89.7%) had a partner, 171(47.5%) with a low education level, and 192 (53.3%) received an incomee of a minimum wage or less.

We verified that they 80 (31.7%) are overweight, 61 (24.2%) are characterized as obese, as in Table 1.

**Table 1**. Body mass index of the urban population older than 18 years old, Pau dos Ferros, RN, 2014.

| BMI | Nº | % |
|---|---|---|
| Low weight | 4 | 1,6 |
| Normal weight | 107 | 42,5 |
| Overweight | 80 | 31,7 |
| Obesity grade I | 50 | 19,8 |
| Obesity grade II | 9 | 3,6 |
| Obesity grade III | 2 | 0,8 |
| Total | 252 | 70,0 |
| Absent in the system | 108 | 30,0 |
| Total | 360 | 100,0 |

Analyzing the frequency of food consumption, we perceived that most of the partcipants follow what the Ministry of Health recommends. 268 (78.4%) consume fruits regularly, 183 (65.4%) avoid daily consumption of sausages, 288 (84.5%) consume vegetables often, 298 (83.7%) consume white meat at least once a day or every 2 to 3 days, 217 (60.3%) avoid fatty foods and 330 (91.7%) avoid daily intake of salt. The consumption of exacerbated red meat 255 (75.9%), is highlighted as shown in Table 2.

**Table 2.** Frequency of the food consumption of the urban population older than 18 years old, Pau dos Ferros, RN, 2014.

| | Nº | % |
|---|---|---|
| **Frequency of fruits consumption** | | |
| Good Consumption /Recommended | 268 | 78,4 |
| Bad Consumption /No Recommended | 74 | 21,6 |
| No data | 18 | 5,0 |
| Total | 360 | 100,0 |
| **Frequency of sausages and cold cuts** | | |
| Recommended | 183 | 65,4 |
| Not Recommended | 97 | 34,6 |
| No data | 80 | 22,2 |
| Total | 360 | 100,0 |
| **Frequency of vegetables consumption** | | |
| Recommended | 288 | 84,5 |
| Not Recommended | 53 | 15,5 |
| No data | 19 | 5,3 |
| Total | 360 | 100,0 |
| **Frequency of white meat consumption** | | |
| Recommended | 298 | 83,7 |
| Not Recommended | 58 | 16,3 |
| No data | 4 | 1,1 |
| Total | 360 | 100,0 |
| **Frequency of red meat consumption** | | |
| Recommended | 81 | 24,1 |
| Not Recommended | 255 | 75,9 |
| No data | 24 | 6,7 |
| Total | 360 | 100,0 |
| **Avoid fatty foods** | | |
| Yes | 217 | 60,3 |
| No | 143 | 39,7 |
| Total | 360 | 100,0 |
| **Add salt to food** | | |
| Recommended | 330 | 91,7 |
| Not Recommended | 30 | 8,3 |
| Total | 360 | 100,0 |

The results of the bivariate analysis showed significance in relation to the habit of eating red meat and an income of a minimum wage or less (p=0.002) and low school level (p<0.001). Fruit consumption was significant in the population with an income above one minimum wage (p=0.005). We also perceived a certain relationship with salt intake and older age (p=0,019), as shown in Table 3.

**Table 3.** Frequency of consumption of food versus sociodemographic variables on population in Pau dos Ferros – RN, 2014.

| | | Recommended | | Not Recommended | | $X^2$ | Value-p |
|---|---|---|---|---|---|---|---|
| **Frequency of red meat consumption** | | | | | | | |
| **Features** | | N | % | N | % | | |
| **Monthly Income** | A minimum wage or less | 55 | 31,1 | 122 | 68,9 | 9,921 | 0,002 |
| | More than one minimum wage | 26 | 16,4 | 133 | 83,6 | | |
| | Total | 81 | 24,1 | 255 | 75,9 | | |
| **School level** | Elementary School | 53 | 34,0 | 103 | 66,0 | 18,296 | <0,001 |
| | High School | 24 | 19,0 | 102 | 81,0 | | |
| | Higher Education | 4 | 7,4 | 50 | 92,6 | | |
| | Total | 81 | 24,1 | 255 | 75,9 | | |
| | | | | | | | |
| **Frequency of fruit consumption** | | | | | | | |
| **Monthly Income** | A minimum wage or less | 132 | 72,5 | 50 | 27,5 | 7,812 | 0,005 |
| | More than one minimum wage | 136 | 85,0 | 24 | 15,0 | | |
| | Total | 268 | 78,4 | 74 | 21,6 | | |
| **Add salt to food** | | | | | | | |
| **Age Group** | 18-19 years old | 18 | 81,8 | 4 | 18,2 | 13,554 | 0,019 |
| | 10-29 years old | 54 | 83,1 | 11 | 16,9 | | |
| | 30-39 years old | 75 | 94,9 | 4 | 5,1 | | |
| | 40-49 years old | 68 | 94,4 | 4 | 5,6 | | |
| | 50 a 59 years old | 49 | 90,7 | 5 | 9,3 | | |
| | 60 years old or more | 66 | 97,1 | 2 | 2,9 | | |
| | Total | 330 | 91,7 | 30 | 8,3 | | |

Regarding body satisfaction, there was a strong influence in relation to fruit consumption (p=0.003), and the notion of normal weight (p<0.001), in Table 4.

**Table 4.** Satisfaction with the body and relationship between the variables in the population of Pau dos Ferros – RN, 2014.

| | | Satisfactory | | Unsatisfactory | | $X^2$ | Value-p |
|---|---|---|---|---|---|---|---|
| **Features** | | N | % | N | % | | |
| **Fruit consumption** | Recommended | 194 | 72,4 | 74 | 27,6 | 9,021 | 0,003 |
| | Not Recommended | 40 | 54,1 | 34 | 45,9 | | |
| | Total | 234 | 68,4 | 108 | 31,6 | | |
| **Notion about weight** | Overweight | 98 | 57,0 | 74 | 43,0 | 26,991 | <0,001 |
| | Normal weight | 124 | 83,8 | 24 | 16,2 | | |
| | Underweight | 26 | 65,0 | 14 | 35,0 | | |
| | Total | 248 | 68,9 | 112 | 31,1 | | |

Regarding the practice of physical exercise, there was a relationship with the male gender (p<0.001), with a greater participation of people in social groups (p<0.001), a certain relationship with the notion of weight, and people considered obese do not practice physical activity (p=0.015), as in Table 5.

**Table 5.** Practice of physical activity versus the variables found in the population of the municipality of Pau dos Ferros – RN, 2014

|  |  | Practice | | Not Pratice | | $X^2$ | Value-p |
|---|---|---|---|---|---|---|---|
| **Feature** |  | N | % | N | % |  |  |
| **Sex** | Feminine | 75 | 25,1 | 224 | 74,9 | 12,438 | <0,001 |
|  | Masculine | 29 | 47,5 | 32 | 52,5 |  |  |
|  | Total | 104 | 28,9 | 256 | 71.1 |  |  |
| **Participation in social groups** | Participate | 30 | 47,6 | 33 | 52,4 | 13,041 | <0,001 |
|  | Not Participate | 74 | 24,9 | 223 | 75,1 |  |  |
|  | Total | 104 | 28,9 | 256 | 71,1 |  |  |
| **Notion about weight** | Overweight | 57 | 54,8 | 115 | 44,9 | 8,462 | 0,015 |
|  | Normal weight | 43 | 41,3 | 105 | 41,0 |  |  |
|  | Underweight | 4 | 3,8 | 36 | 14,1 |  |  |
|  | Total | 104 | 28,9 | 256 | 71,1 |  |  |

In the variables eating habits of white and red meat, consumption of fatty foods, satisfaction with the body, practice of physical activity related to socioeconomic variables as well as eating habits (adding salt to food) and body/weight perception, we perceived homogeneity in the dispersion of the data found, without significant associations.

## DISCUSION
The sample studied represents the population of more than eighteen years old living in Pau dos Ferros/RN. At first, the study aimed to identify the target public with specific information related to socioeconomic aspects to, later, specifically address the population's dietary habits, associating them with aspects such as income, sex, education and others.

With regard to body mass index, we observed a higher prevalence of overweight/obesity, which estimates other researches in the area, which highlights an increase in weight in the Brazilian adult population of 7.8% from 2006 to 2012, with 1.37% of annual increment average calculated for the period. Estimates for 2020 indicate about 5 million deaths attributed to overweight[7].

The main factors for the weight increase are inadequate feeding, the decrease of physical exercise. Regarding food, industrialization and urbanization brought important changes in Brazilians diet, which generates increased calorie intake and decreased physical activity[8,9].

Porém a frequência do consumo de carne vermelha foi acentuadamente maior (pelo menos uma vez por dia/uma vez em cada 2 a 3 dias), registrando-se dessa forma como não recomendado, podendo estar atrelado ao nível econômico da população, a questão cultural e também a extensa produtividade pecuarista na região[14].

Regarding eating habits, the main results showed that much of the sample selected in the study meets the recommendations of adequate consumption of fruits and vegetables (at least once a day/once every 2 to 3 days). This contradicts many studies, which bring that the consumption of fruits is minimal (once a week/less than once a week), which would not take into account the recommendation of daily consumption of fruits and vegetables established by the WHO, highlighting as a positive point for the population of municipality studied[10,11].

In addition to an adequate consumption of fruits and vegetables, the consumption frequency of sausages, fatty foods, white meats and the addition of salt in food are also adequate in view of what the Ministry of Health recommends. This does not corroborates this way with previous

estimates found in some studies that emphasize the poor adequacy of food consumption[12,13]. However, the frequency of red meat consumption was markedly high (at least once a day/once every 2 to 3 days), registered as not recommended, which may be linked to the economic level of the population, the cultural issue and the extensive livestock productivity in the region[14].

According to other Brazilian studies[9,10,14], the frequency of fruit and vegetable consumption was higher among individuals of economic class with higher purchasing power and higher schoollevel, corroborating the results found in the present study. Regarding the frequency of consumption of red meat, this was higher among individuals with lower purchasing power and lower school level, also associating other studies conducted in the area, contributing as a negative factor for the population[9,10,14].

This association between dietary habits, school level and economic class, derives from the food cost, the nutritional knowledge that food has and the consequent motivation to adopt a healthy diet. This factor contributes to the consumption of cheaper foods such as bad quality red meats with higher concentration of saturated fats to the detriment of white protein-rich meat, that is healthier[10,14].

With regard to salt consumption, we perceived that it has greater association with age, the older age the lower the consumption. This shows that healthier eating habits in advanced ages may be related to greater concern and care for health who, consequently, pays more attention to the orientations received from health professionals, due to an increased risk of emergence and development of chronic non-communicable dysfunctions with the age, especially hypertension associated with excessive sodium intake of the population[9,13].

Another finding relates to the satisfaction with the body associated with the consumption of fruits, in which people who feel satisfied with their body have a higher consumption of fruits. This may be linked to the influence that the media exert on people, as the diet includes the consumption of fruits and vegetables, constructing and deconstructing dietary procedures and esthetic patterns[15].

Besides the association with the consumption of fruits, satisfaction with the body relates to the appropriate weight, which contributes to identify that overweight/obese individuals see themselves dissatisfied with their body. However, dissatisfaction or satisfaction may also be associated with the subjective perception that a person has about their body, which may be more important than the objective reality, that is, its real appearance. In this sense, the weight (directly associated with BMI) alone may not be the only determinant of the degree of satisfaction or dissatisfaction with the body image[16].

Regarding the practice of physical activity, we perceived an association with sex, participation in social groups and notion about weight. Although the number of women is higher, we perceive a higher percentage of men that practice a physical activity than women, who are more sedentary, as demonstrated by another study[17].

As for participation in social groups and the practice of physical activity, the study shows that most of the population who participates in social groups also practice physical exercise. This demonstrates that they are more active and consider physical activity beneficial to physical and mental health, mainly related to participation in community groups, widely used for supporting treatment in depression, anxiety and other factors involving the individual' psychosocial component[18].

About the notion of weight, there is a significance between individuals who consider they are overweight and do not practice physical activity. It is evident that even considering they are overweight, they do not intend to change their reality practicing physical activity. This is a public health problem, considering that obesity and sedentarism represent adverse effects on cardiovascular and metabolic health at increasingly early ages[19].

## CONCLUSION

The results found in the study pointed to food habits close to the current recommendations, characterized by a more frequent fruits and vegetables consumption, less frequent consumption of high fat food, but a more frequent consumption of red meat in relation to white meat, possibly due to the socio-economic and cultural aspects of the population.

Despite this, the majority of the population surveyed presented overweight or obesity, a reality that is common in Brazilian society and due to several factors, such as physical inactivity, especially in women.

Thus, in addition to stimulating a healthy diet, it is also necessary to advise the practice of physical activity, emphasizing the need to adopt these habits to reduce excess weight and have better quality of life.

Among the limitations of the present study, we highlight the disproportion of the respondent sexes, as women were the, due to the greater presence of women in the residences at the time of the interviews, which might hamper some associations. In addition, the cross-sectional approach to data can limit the associations without considering the possibility of an inverse causality. Moreover, the information equivalent to dietary habits was self-reported, thus allowing possible memory bias or even biased statements that address what is desirable.

On the other hand, these findings point to the need to prepare more trained professionals to act in an interdisciplinary way, relating the subjects of health with the areas of physical education and psychology, being the junction of several knowledge of paramount importance for better coping with the problems experienced.

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