



## NUTRITIONAL PROFILE OF ADULTS ASSISTED BY PRIMARY HEALTH CARE IN THE PERIOD FROM 2007 TO 2016

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### ABSTRACT

The aim of this study was to evaluate the nutritional profile of adults assisted by primary health care in the period from 2007 to 2016. A cross-sectional, retrospective study was conducted, based on previously collected data. To evaluate the nutritional status, the body mass index was used, and for cardiovascular risk assessment, the waist circumference index/sex was used. The samples was made up of 9.301 adults, of both sexes, with predominance of the female sex (76.2%). Relative to the nutritional status, 1.7% presented low weight, 28.7% were eutrophic; 32.1% overweight, and 37.5% obese; furthermore, 69.9% presented cardiovascular risk. There was an increase in obesity, which increased from 33% in 2006 to 39% in 2016, and these percentages increased as from 30 years of age. As regards waist circumference, the percentage of individuals with cardiovascular risk was always higher than that of those without risk, with the risk predominating in women (80.6%). Furthermore, the women had 9 times more chance of risk for cardiovascular diseases than the men. The inadequate nutritional status of the adults assisted by the primary health units was evident, with an elevated percentage of overweight and risk for cardiovascular diseases.

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### INTRODUCTION

The nutritional transition that is developing in Brazil presents two opposing situations, reduction in nutritional deficiency and increase in obesity, which has repercussions on the increase in

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the occurrence of non communicable chronic diseases, known for their capacity to result in a poor prognosis of morbidity and mortality (Silva *et al.*, 2016). Estimates have indicated that in 2050, almost 70% of Brazilian adults may be overweight, if present trends were sustained (Conde and Monteiro, 2014). Abdominal adiposity has been described as the type of obesity that poses greater risk to individuals' health. It has been cited as a risk factor for cardiovascular diseases and the metabolic syndrome, even in the absence of generalized obesity

**Table 1. Percentages (confidence intervals of 95%) for age group, nutritional status and waist circumference classification according to age group and sex, of 9,301 adults assisted by primary health care in Balneário Camboriú and Itajaí, between 2007 and 2016**

Variable	Sex		p*
	Male	Female	
Age Group (years)			
20 to 29	21.1 (20.2;-22.0)	21.3 (20.8;-21.8)	0.8414
30 to 39	22.8 (21.9;-23.7)	23.1 (22.6;-23.6)	0.7583
40 to 49	26.3 (25.4;-27.2)	28.4 (27.9;-29.0)	0.0530
50 to 59	29.8 (28.8;-30.8)	27.2 (26.7;-27.7)	0.0175
Nutritional Status			
Low Weight	1.5 (1.3;-1.8)	1.9 (1.8;-2.1)	0.2470
Eutrophy	28.9 (28;-29.9)	28.5 (28.0;-29.0)	0.6902
Overweight	33.4 (32.4;-34.4)	30.7 (30.1;-31.2)	0.0141
Obesity	36.1 (35.1;-37.1)	38.9 (38.3;-39.5)	0.0171
Waist Circumference			
Without cardiovascular risk	40.8 (39.7;-41.8)	19.4 (18.9;-19.9)	<0.0001
With cardiovascular risk	59.2 (58.2;-60.3)	80.6 (80.1;-81.1)	<0.0001

\*t-test between two proportions at the level of 0.05.

(Machado *et al.*, 2012). In compliance with the third guideline of the National Food and Nutrition Policy that deals with the evaluation and monitoring of the food and nutritional situation of the Brazilian population, the Food and Nutritional Surveillance System was implemented in Brazil to continually provide information about the nutritional conditions of the population cared for by the Brazilian Unified Health System throughout the country, within the scope of Primary Health Care (Bagni and Barros, 2012). Among the tools used by Food and Nutritional Surveillance System, anthropometry is one of the most important for evaluating nutritional status, and the anthropometric indicators, generated by means of body measurements, are important predictors of health conditions and survival of individuals and populations (Bagni and Barros, 2012). It is frequently used because it offers a series of advantages that have shown it to be the most applicable method, as it is low cost, harmless, simple to use and interpret, and has been applied as a risk indicator for non communicable chronic diseases (Machado *et al.*, 2012). The most widely used anthropometric indicator is the body mass index (BMI). However, the BMI is the indicator of generalized obesity, and is not capable of evaluating the fat accumulated in the abdominal region. Therefore, various studies have recommended the use of anthropometric indicators of central obesity, such as the waist circumference (WC), instead of, or associated with the BMI, as a routine part of clinical attendance and public health strategies (Machado *et al.*, 2012), because abdominal fat accumulation is related to obesity and development of non communicable chronic diseases, including cardiovascular diseases (Costa *et al.*, 2012). Therefore, the aim of this research was to evaluate the nutritional profile of adults assisted by primary health care in two municipalities in the state of Santa Catarina, Brazil, in the period between 2007 and 2016.

## MATERIALS AND METHODS

The research was characterized as being cross-sectional and retrospective. A survey was conducted between the years 2007 and 2016 in the municipalities of Balneário Camboriú and Itajaí, both localized in the state of Santa Catarina, in the South of Brazil. Balneário Camboriú as an estimated population of 135.268 inhabitants, and in Itajaí there is an estimated number of 212.615 inhabitants (IBGE, 2017). The municipal public health system of Balneário Camboriú at present has seven primary health care units and Itajaí, 26 primary health care units. The population involved in the research comprised all adults (20-59 years of age), of both sexes, evaluated in the

Basic Health Units of the mentioned municipalities. The following variables were collected: weight, stature, waist circumference, age and sex. For nutritional evaluation the BMI was used, and for cardiovascular risk assessment, the Waist Circumference index/sex was used, with the cut-off points proposed by the Ministry of Health (Brasil, 2011). The research project was approved by the Research Ethics Committee of Vale of Itajaí University. For data analysis, the proportions (odds ratios) and their respective confidence intervals were calculated for the age group, nutritional status and waist circumference, for both sexes. The differences between the sexes and age groups were analyzed by means of the t-test between two proportions. A multivariate logistic model was estimated, based on the dichotomized outcome of the waist circumference risk classification and sex, age and nutritional status with predictor variables. The quality of the model adjustment was estimated by means of the Hosmer and Lemeshow and R<sup>2</sup> tests. In the temporal evaluation of the nutritional status, simple linear regression was applied between the years and nutritional status. All the analyses were performed at the level of significance of 0.05, with the support of the Stata application version 13.

## RESULTS

By means of the survey, a total of 9,301 adults evaluated in the period of 10 years (2007 to 2016) was obtained, of whom 23.8% (n=2,210) were of the male sex, and 76.2% (n=7,091) of the female sex. As regards the individuals evaluated, 70% (n=6,514) were from Balneário Camboriú, and 30% (n=2,787) from Itajaí. The mean age found was 40.7 ±11.35 years; weight 75.10±17.90 kg; height 1.61±0.08 m; BMI 28.83±6.39 kg/m<sup>2</sup> and waist circumference 94.18±15.19 cm. Relative to nutritional status, 1.7% (n=158) had low weight; 28.7% (n=2,669) were eutrophic; 32.1% (n=2,986) overweight; and 37.5% (n=3,488) obese. As regards cardiovascular risk, 69.9% (n=6,501) presented cardiovascular risk, while 30.1% (n=2,800) presented no cardiovascular risk. Table 1 demonstrates percentages and confidence intervals or the age group, nutritional status and waist circumference classification according to the sex of adults evaluated. There was significant difference between the sexes for the age group from 50-59 years, with a higher percentage among men. Overweight showed a higher percentage for men, and obesity for women. For waist circumference classification, the women showed a much higher percentage than the men. Comparison of the nutritional status among age groups (Table 2) pointed out a significantly higher percentage of eutrophic individuals in the

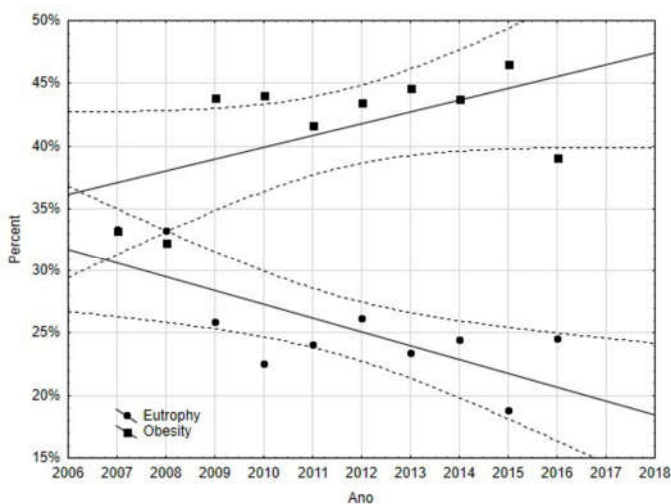
**Table 2. Percentages (confidence intervals of 95%) for nutritional status and waist circumference classification according to age group and sex, of 9.301 adults assisted by primary health care in Balneário Camboriú and Itajaí, Brazil, between 2007 and 2016**

Variable	Age Group (years)			
	20-29	30-39	40-49	50-59
<b>Male</b>				
Nutritional Status				
Low Weight	44.1 <sup>a</sup> (35.6-52.6)	11.8 <sup>b</sup> (6.2-17.3)	23.5 <sup>ab</sup> (16.3-30.8)	20.6 <sup>b</sup> (13.7-27.5)
Eutrophy	33.2 <sup>a</sup> (31.3-35.0)	23.3 <sup>b</sup> (21.6-24.9)	22.3 <sup>b</sup> (20.7-24)	21.2 <sup>b</sup> (19.6-22.8)
Overweight	15.4 <sup>a</sup> (14.0-16.7)	21.0 <sup>b</sup> (19.5-22.5)	28.6 <sup>c</sup> (26.9)	35.1 <sup>d</sup> (±33.3)
Obesity	15.8 <sup>a</sup> (14.5-17.1)	24.6 <sup>b</sup> (23.1-26.1)	27.5 <sup>b</sup> (25.9-29.1)	32.2 <sup>c</sup> (30.5)
Waist Circumference				
Without cardiovascular risk	31.9 <sup>a</sup> (30.4-33.5)	23.5 <sup>b</sup> (22.1-25.0)	23.0 <sup>b</sup> (21.6-24.4)	21.5 <sup>b</sup> (20.2-22.9)
With cardiovascular risk	13.7 <sup>a</sup> (12.7-14.6)	22.3 <sup>b</sup> (21.1-23.4)	28.6 <sup>c</sup> (27.3)	35.5 <sup>d</sup> (±34.2)
<b>Female</b>				
Nutritional Status				
Low Weight	58.1 <sup>a</sup> (53.9-62.3)	11.0 <sup>b</sup> (8.3-13.7)	16.9 <sup>b</sup> (13.7-20.1)	14.0 <sup>b</sup> (11.0-16.9)
Eutrophy	31.3 <sup>a</sup> (30.3-32.4)	24.6 <sup>b</sup> (23.6-25.5)	24.9 <sup>b</sup> (24-25.9)	19.1 <sup>c</sup> (18.2)
Overweight	18.2 <sup>a</sup> (17.4-19.1)	22.6 <sup>b</sup> (21.7-23.5)	29.8 <sup>c</sup> (28.9)	29.3 <sup>c</sup> (28.3)
Obesity	14.6 <sup>a</sup> (13.9-15.2)	22.9 <sup>b</sup> (22.1-23.7)	30.4 <sup>c</sup> (29.5)	32.1 <sup>c</sup> (31.2)
Waist Circumference				
Without cardiovascular risk	38.4 <sup>a</sup> (37.1-39.7)	23.8 <sup>b</sup> (22.6-24.9)	22.1 <sup>b</sup> (21-23.2)	15.7 <sup>b</sup> (14.7-16.7)
With cardiovascular risk	17.2 <sup>a</sup> (16.7-17.7)	22.9 <sup>b</sup> (22.3-23.4)	29.9 <sup>c</sup> (29.3)	30.0 <sup>c</sup> (29.4)

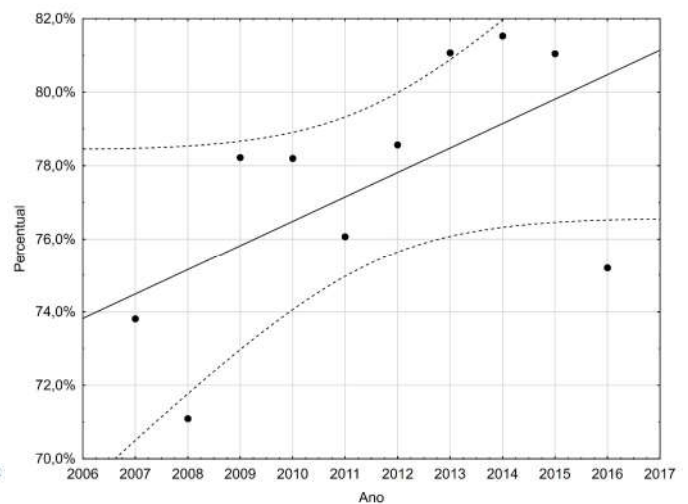
Note: equal superscript letters in the lines correspond to equal percentages.

**Table 3. Odds ratios for classification of waist circumference, adjusted by sex, age and body mass index, of 9.301 adults assisted by primary health care in Balneário Camboriú and Itajaí, Brazil, between 2007 and 2016**

Variable	OR	IC 95%	P
<b>Sex</b>			
Male	1		
Female	9.14	7.64-10.93	<0.0001
<b>Age Group (years)</b>			
20 to 29	1		
30 to 39	1.50	1.24-1.81	<0.0001
40 to 49	2.05	1.71-2.47	<0.0001
50 to 59	2.63	2.16-3.19	<0.0001
<b>Nutritional Status</b>			
Low Weight	1		
Eutrophy	34.51	10.94-108.88	<0.0001
Overweight	638.00	200.80-2027.12	<0.0001
Obesity	8605.98	2613.49-28338.75	<0.0001



**Figure 1. Annual percentages of 9.301 eutrophic and obese adults, assisted by primary health care in BalneárioCamboriú and Itajaí, Brazil, between 2007 and 2016**



**Figure 2. Annual percentages of 9.301 adults with cardiovascular risk, assisted by primary health care in BalneárioCamboriú and Itajaí, Brazil, between 2007 and 2016**

age group from 20-29 years. In the other age groups, the percentage of individuals with obesity was significantly higher than that of the eutrophic individuals, and as from 40 years of age, the percentage of obesity was significantly higher than overweight in women. As regards the waist circumference classification, the percentage of individuals with cardiovascular risk was always higher than that of those

without risk. The multivariate model (Table 3) showed significance for all the predictor variables ( $p < 0.0001$ ), with 9 times more chances of risk for women, and 2.6 times more chance for those in the age group from 50 to 59 years. As expected, the nutritional status was the predictor with the highest odds ratios. The adjustment showed statistical significance and 47.8% of the variability could be explained by

the model. Longitudinal follow-up of the percentages of eutrophy and obesity in the period evaluated (Figure 1) revealed a complementary behavior between the two statuses: significant reduction in eutrophy (-74.3%;  $p=0.0138$ ) and increase in obesity (58.3%;  $p=0.0767$ ), close to significance. When the risk classification was examined by the waist circumference (Figure 2), an increase was observed in the percentage of individuals at risk, with values adjusted close to significance ( $p=0.0738$ ), with a positive correlation of 58.8%.

## DISCUSSION

Of the 9,301 adults who were evaluated at the basic health units of the two municipalities studied, we found that there was a greater demand by the female sex, with a percentage of 76.24% ( $n=7,091$ ). Leovorato *et al.* (2014) evaluating the factors associated with the demand for health services in the state of São Paulo, Brazil, revealed that women sought the health services 1.9 times more frequently compared with men. When Bega *et al.* (2014) interviewed women attended at a municipal emergency unit in the northeast of Paraná, Brazil, they showed that when women become ill they soon seek the health service, because they reported that being ill could limit them from performing their work activity, in addition to concern about affecting the family, especially when they had children. Another explanation for the reason why women seek more basic health care may be related to the larger offer of health care services for women comprising the pre-natal period, prevention of breast and cervical cancer, through to the relief of menopausal and climacteric symptoms. Furthermore, low demand for health services by men has been perceived, and this is restricted only to cases in which they are prevented from performing their daily functions. Solano *et al.* (2017) explained that this occurred due to diverse factors, some of these being the influence of the historical and cultural process of men, added to the dimension of gender and the patriarchal ideology, as well as the nonexistent focus on health services where programs directed towards men's health is concerned.

Another public that predominated in the study was that of adults as from the age of 50 years ( $p<0.0175$ ). This greater demand for primary health care by older individuals may be related to the fact that age is a risk factor for different diseases, such as arterial hypertension, diabetes and cardiovascular diseases, in addition to the fact that the aging process associated with work overload favors the appearance of non communicable chronic diseases (Magalhães *et al.*, 2014; Radovanovic *et al.*, 2014; Arantes *et al.*, 2016). The results of the present study also showed that over the course of the period researched, there was a significant increase in obesity, that rose from 33% in 2006 to 39% in 2016, in addition to the drop in eutrophy (from 33% to 25%). This result is alarming, considering that obesity is one of the main public health problems worldwide, with a growing trend over the last few years, and is associated with the increase in mortality, apart from being one of the main factors that complicate the control of non communicable chronic diseases (Tomasi *et al.*, 2014). The increase in obesity was also verified by the Ministry of Health in Brazil: it rose from 11.8% in 2006 to 18.9% in 2016, affecting almost one in every five Brazilians (Brasil, 2017). When the entire period from 2007 to 2016 was analyzed, the prevalence of obesity between men (36.1%) and women (38.9%) was noted; and so was overweight, with these percentages of overweight and obesity increasing as from 30 years of age. A study that evaluated the temporal trend of

overweight indicators in adults in the Brazilian capital cities between the years 2006 and 2013, showed that there was a trend towards growing overweight and obesity in both sexes, and that these percentages increased as from the time individuals were 25 years of age (Malta *et al.*, 2016). The study of Andrade *et al.* (2015), who evaluated the factors associated with overweight adults resident in the area of two sanitary districts in the state of Minas Gerais, Brazil, demonstrated that of the 2,935 individuals evaluated, 52.3% had a prevalence of overweight, comprising over half the studied population, and this prevalence increased as from 30 years of age.

This link between the increase in overweight and obesity with again may be explained by the relationship between the ingestion of food and energy expenditure, because the level of physical activity is reduced with the increase in age-range (Malta *et al.*, 2016). The results also indicated that relative to the waist circumference classification, the percentage of individuals with cardiovascular risk was always higher than that of those without risk. This is cause for concern, considering that the cardiovascular diseases are ranked in first place among the causes of death in the world, and these diseases cause irreversible damage, such as limitations and dependence that have a direct influence of the quality of life of the population (Teston *et al.*, 2016). Cardiovascular risk predominated among the women (80.6%), and this pattern has been described in other studies. Silva *et al.* (2016), who evaluated overweight in users of basic health units in the state of São Paulo, Brazil, verified that increased waist circumference among women was relatively higher than that of men: 70% and 11%, respectively. Barroso *et al.* (2017), who evaluated the association of central obesity with the incidence of diseases and cardiovascular risk factors in 39 women, showed that 37 of them had increased waist circumference, revealing a percentage of 95%. The study of Oliveira *et al.* (2015), with 456 individuals registered with the Family Health Strategy in the in the state of Bahia, Brazil, showed that of the 302 women evaluated, 230 presented high risk for cardiovascular disease, representing a percentage of 76.90%, and of the 154 men evaluated, 50 presented this risk (32.90%). Covatti *et al.* (2016), who studied the risk factors for cardiovascular diseases in adults and the elderly in a university hospital in the state of Mato Grosso do Sul, Brazil, verified that of the 146 adult women evaluated, 71.20% ( $n=104$ ) presented increased waist circumference, while of the 138 men evaluated, 39.90% ( $n=55$ ) presented this risk.

The higher prevalence of women with increased waist circumference could be attributed to the larger concentration of body fat, commonly related in the female sex, because of gestations, hormonal and climacteric differences (Pinho *et al.*, 2013). In contrast with these results, the study of Gadani *et al.* (2015), who evaluated the prevalence of overweight and obesity of 402 adult individuals in the in the state of Mato Grosso do Sul, Brazil, noted that the men had greater prevalence of abdominal adiposity, when compared with the women. In the present study, women were also observed to have 9 times more chance of risk for cardiovascular diseases than men and 2.6 times more chance for those in the age group from 50 to 59 years. Other studies have found this relationship, such as that of Pinho *et al.* (2013), who evaluated the presence and factors associated with abdominal obesity in individuals in the age-range from 25 to 59 years, from urban and rural areas in the state of Pernambuco, Brazil. They pointed out that

women between the ages of 40 and 49 years had 1.42 times more chance of risk for cardiovascular diseases, while the risk was 1.08 for men in the same age-range; and women between 50 and 59 years of age had 1.57 times more chance of risk for cardiovascular diseases, with this chance being 1.54 for men in the same age-range. Another study that showed this relationship was that of Sabóia *et al.* (2016), who evaluated abdominal obesity and associated factors in adults cared for at an outpatient nutritional clinic of a school, in adults in the state of Maranhão, Brazil, with adults of both sexes. They showed that women between the ages of 40 and 49 years presented 3.37 times more chance of risk for cardiovascular diseases, while for men in this same age-range this prevalence was lower, with 2.64 times the chance for this risk, reinforcing the fact that women tended to have a larger waist circumference when compared with men. Important to point out is that the scope of this research covered only adults attended by primary health care, and this fact certainly contributed to the results - raising cause for concern - that were verified relative to overweight and cardiovascular risk. Population-based studies in the municipalities studied, in addition to the health services, possibly showed more positive results relative to the nutritional status and cardiovascular risk.

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