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SURVEY ARTICLE

STATISTICAL ANALYSIS USE ON DETERMINATION OF ASSOCIATED FACTORS WITH OVERWEIGHT AND ABDOMINAL OBESITY IN HEALTH WORKERS OF A BRAZILIAN NORTHEAST CITY

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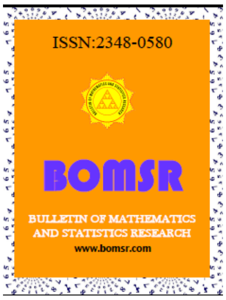

ABSTRACT

Currently health population presents tied to different personal and environmental factors that makes complex the study of these relations with diseases that involve different living habits, such as obesity. In order to clarify the impact of different factors on overweight and obesity, different statistical test are used, facilitating a broader view of a likely default multifactorial. Thus, the aim of this study was identify factors associated with overweight and abdominal obesity through application of associative statistical tests in workers of Ceara Health Services in Horizonte city. A cross-sectional study of association was made between 2015 February and June with 206 workers. The magnitude of association was assessed by logistic regression. There was a prevalence of overweight in 57.8% of workers and 78.6% had abdominal obesity. It found a significant association between overweight and abdominal obesity in this variables: age, education, sleep, hypertension, hypercholesterolemy and hypertriglyceridemia. After adjusting step, only remained abdominal obesity outcome, making the final model with females, adult age, and high school education. It was concluded that predictors analysis of overweight and especially abdominal obesity rests on rather sociodemographic than behavioral and clinic factors on approached group.

Keywords: Overweight, Abdominal Obesity, Worker's Health, Statistical Association.

1. INTRODUCTION

Obesity is a chronic multifactorial disease non-transmitted, characterized by excess body fat associated with high consumption of caloric foods, fruits and vegetables low intake, physical inactivity, cultural factors as well as genetic and metabolic factors (Nascimento et al. 2015, Sarturi, Neves, and Peres 2010). Currently it is cataloged in the International Classification of Diseases (ICD) and it is subdivided into: obesity due to excess calories (ICD10-66.0); obesity due to drugs (ICD10-66.1); extreme obesity with alveolar hypoventilation (ICD10-66.8); and unspecified obesity (ICD10-66.9) (Morais et al. 2014).

The increase of adipose tissue in abdominal region is known as abdominal obesity and it is considered a risk factor for various morbidities, representing a distinct risk when compared to other forms of body fat distribution (Pinho et al. 2013).

Industrialization, income and production mechanization, urbanization, greater Access to food in general, including processed one, and globalization of unhealthy habits produced a rapid nutritional transition, exposing more and more people to chronic disease risk, including obesity (Schmidt et al. 2011). According to the World Health Organization (2011), about 36 million annual deaths occur by this diseases group. Brazil has increased rapidly and progressively the number of overweight adults, with a prevalence of 52.1% for men and 44.3% for women (Brazil 2011).

Population Brazilian Studies have shown that sociodemographic and behavioral factors are associated with overweight (Oliveira et al. 2009, Pinho et al. 2013, Veloso, and Silva 2010). The major modifiable behavioral risk factors of obesity are: diet, smoking, alcohol, hypercholesterolemy, stress, and physical inactivity (Ferraz, and Machado 2008). Among these factors, studies have shown that regular physical activity has a prominent place in treating various diseases, including obesity (Carvalho et al. 1996, Pate et al. 1995, Thompson et al. 2007). Nevertheless, more than a half of global population still doesn't follow the daily minimum recommendation of 30 minutes of moderate to intensity physical activity (World Health Organization 2011).

Because of obesity high rates and its consequences, identifying it becomes necessary. Although there are more sophisticated methods of assessing abdominal fat, from an epidemiological point of view, Body Mass Index (BMI) and Waist Girth (WG) measures are practical, easy, and inexpensive for population studies (Peixoto et al. 2006, Pinho et al. 2013). The BMI is the indicator used to identify the overall obesity through weight and height measurements, while WG is used to identify abdominal obesity. Although BMI being within normal range, the abdominal fat accumulation is important to check, as it is considered a risk factor for endocrine, metabolic and cardiovascular diseases (Veloso, and Silva 2010).

Several countries have concentrated efforts in Public Health Field for obesity prevention. The frequency of overweight among population groups, including public service workers, has been studied in recent years (Guh et al. 2009). In several professional categories were identified high frequencies of overweight and abdominal obesity (Castro, Anjos, and Lourenço 2004, Ell, Camacho, and Chor 1999, Silveira et al. 2013, Simon et al. 2014).

Overweight and its comorbidities seem to be associated to characteristics and to work environment and may reach different age groups and professional classes (Nascimento et al. 2015, Santos et al. 2013, Simon et al. 2014). Health care Professional has specific characteristics and peculiarities, which they should be worked out, do not interfering in their professional performance. This highlights the need for excess weight monitoring and their risk factors in this group, because early identification enables investment in health promotion actions.

However, being aware of relationships complexity, the aim of this study is to identify factors associated with overweight and abdominal obesity through application of association, statistical tests in health services workers of Horizonte city, Ceara State.

2. Materials and Methods

It is a cross-sectional association study with a quantitative approach and was carried out in Horizonte Health Services (town located 40 km from the capital, Fortaleza), Ceara, Brazil, from 2015 February to June. This town is part of the main practice settings of Integrated Health Residency with emphasis on Family and Public Mental Health. It was chosen from apparent prevalence observing of overweight/obesity among workers of different health services, made up of approximately 400 healthcare professionals.

The sample consisted of 206 workers from municipal health network. It was attended by people who have been exercising their labor functions on the interview day, being advised beforehand. They were excluded from research people under 18 years old, trainees, physical disability professionals, pregnant women, and workers with infectious illness during data collection.

Data collection occurred through an interview with workers straightforward approach, seeking related information to sociodemographic characteristics, such as gender, age, educational level, occupation, and work place; behavioral characteristics, such as alcohol abuse, smoking, sleep, daily food frequency, and physical activity level; and self-reported clinical features, such as hypertension, diabetes, hypercholesterolemy, hypertriglyceridemia, gastritis, reflux, and constipation; as well as holding a standardized anthropometric assessment, considering Body Mass Index (BMI) , and Waist Girth (WG).

For data analysis, participants were classified by age into two categories: young adults (less than 30 years old) and mature adult (30-59 years old) based on WHO guidelines (World Health Organization 2011). Educational level was classified into two categories: high school (complete or not) and higher education (complete or not). Work place was categorized into Primary Care Service (Basic Health Units), and Secondary Care Services (Psychosocial Care Center, Polyclinic, The Worker's Health Reference Center, Dental Specialty Center, Rehabilitation Center, Maternity Hospital Venancio Raimundo de Sousa, Emergency Unit, and Health Department). Food frequency was classified in to three meals per day and four or more meals per day. For physical activity, this was classified as insufficiently active (less than 150 minutes per week) and sufficiently active (equal or above 150 minutes per week).

To calculate BMI (weight/height.height) was necessary to identify body weight and height. Weight was measured using a digital weighing-machine (BAL 150 Cadence®), with a capacity of 180kg and 100g scale, with the individual barefoot and minimum possible clothing. For height measurement, it was used a portable personal stadiometer (Caprice Sanny®), where participant stay upright, barefoot, with their arms outstretched at sides, and heels, buttocks and head leaning against stepped bar equipment. The cutoff points for BMI were considered to calculate by Brazilian Health Ministry, and they were classified as underweight (<18.5 kg/m^2), normal weight (18.5 kg/m^2 to 24.9 kg/m^2), overweight (25 kg/m^2 to 29.9 kg/m^2), class I obesity (30 kg/m^2 to 34.9 kg/m^2), class II obesity (35 kg/m^2 to 39.9 kg/m^2), and morbidly obesity (>40 kg/m^2). Subsequently, for data analysis, they were classified into two categories: underweight/normal weight (less than 25kg/m^2), and overweight (greater than or equal to 25kg/m^2).

To WG measurement, it was necessary to use a fiberglass tape measure, lockable, 2 meter capacity, and 0,01 cm precision (Sanny®), where participant was upright and breathing naturally to measure the midpoint located between last rip and iliac crest. For abdominal obesity classification, the cutoff points were used according to sex defined by WHO (World Health Organization 2011), classified as normal (less than 80cm for women and 94cm for men) and high (greater than or equal 80cm for women and 94cm for men).

To sample characterize, we used descriptive statistic through data absolute and relative distribution (percentage). In bivariate statistical analysis, it was verified association existence between overweight and abdominal obesity with other variables (sociodemographic, behavioral, and clinical ones) by nonparametric Pearson's chi-square test or likelihood ratio at a significance level of 5%. **Later, it was verified association strength between variables by calculating odds ratio with a confidence interval of 95%.**

In multivariate analysis, we used hierarchical logistic regression model to adjust for potential confounding effects. In this strategy, the ranking follows this sequence: Block 1 – variables situated in the lower hierarchical level can be determined with Overweight and Abdominal Obesity (sociodemographic characteristics); Block 2 – variables located in the effect next hierarchical level (clinical and behavioral ones). For inclusion in regression model, we adopted p value <0.20 obtained in the bivariate analysis.

Initially it was only checked block 1 variable's effects and after block 2 ones. For sequence, it was used as an inclusion criterion p<0.05. With Blocks 1 and 2 selected variables, it was performed the multivariate hierarchical logistic regression analysis to obtain the final model (considering p <0.05).

This work was appreciated and approved by Ceara Public Health School Ethics Committee, number 1013848.

3. Results

Sociodemographic, behavioral, and self-reported characteristics distribution are shown in Table 1. There was a predominance of female professionals (87.4%), 30-59 years old – mature adults (72.3%), with high school educational level (68.9%) and place work in Primary Health Care (86.4%).

For behavioral variables, it was observed prevalence among respondent of non-smokers (97.6%), non alcohol users (86.9%), peaceful sleep (70.9%), holding four or more distributed meals throughout the day (78.1%), and a physical activity practice insufficient per week (72.8%).

As regards self-reported morbidities, it was found prevalence of hypertension (85.4%), diabetes (95.1%), hypercholesterolemy (87.4%), hypertriglyceridemia (89.8%), constipation (74.3%), gastritis (82.5%), and gastroesophageal reflux disease (82.5%).

Table-1: Distribution of workers (n=206) according to sociodemographic, behavioral, and self-reported morbidities characteristics. Horizonte, Ceara, Brazil, 2015.

Variables		*f*	%
Gender	Female	180	87.4
	Male	26	12.6
Age	Young Adult	53	25.7
	Mature Adult	153	72.3
Educational Level	High School	142	68.9
	Higher Education	64	31.1
Place Work	Primary Health Care	178	86.4
	Secondary Health Care	28	13.6
Smoke	Yes	5	2.4
	No	201	97.6
Alcohol Use	Yes	27	13.1
	No	179	86.9
Physical Activity	Insufficiently Active	150	72.8
	Sufficiently Active	56	27.2

Sleep	Impaired	60	29.1
	Peaceful	146	70.9
Food Frequency	≤ 3	45	21.8
	≥ 4	161	78.2
Hypertension	Yes	30	14.6
	No	176	85.4
Diabetes	Yes	10	4.9
	No	196	95.1
Hypercholesterolemy	Yes	26	12.6
	No	180	87.4
Hypertriglyceridemia	Yes	21	10.2
	No	185	89.8
Gastritis	Yes	36	17.5
	No	170	82.5
Reflux	Yes	36	17.5
	No	170	82.5
Constipation	Yes	53	25.7
	No	153	74.3

Regarding nutritional status according to BMI, the sample showed 57.8% of overweight individuals (overweight/obesity) and 78.6% with abdominal obesity prevalence identified by WG on workers (Figure 1).

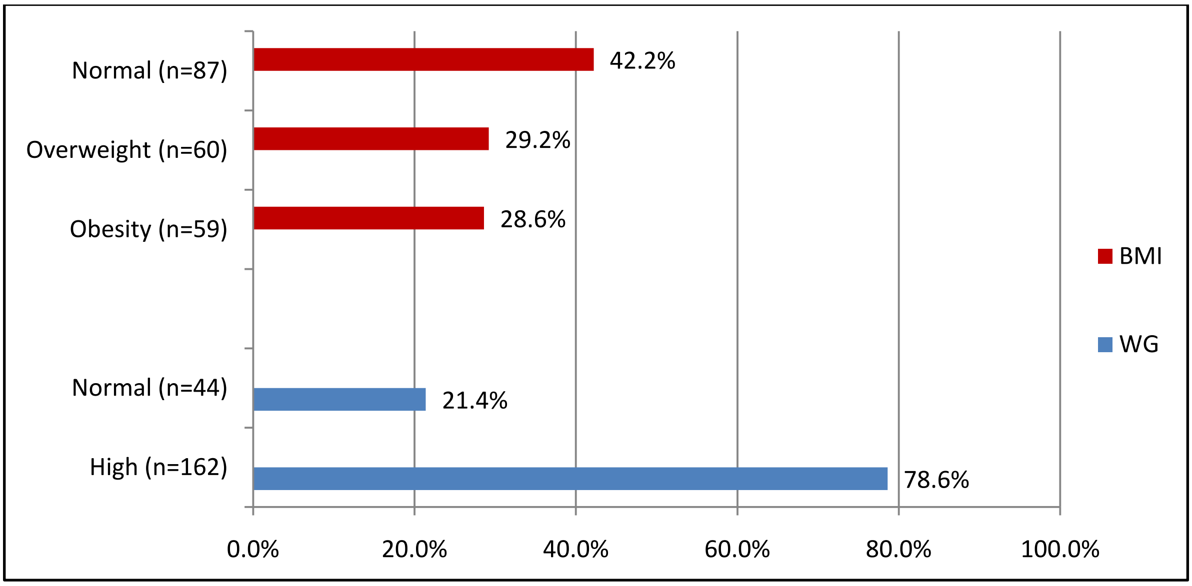

Figure-1: Distribution of health workers' nutritional status according to Body Mass Index (BMI) and Waist Girth (WG). Horizonte, Ceara, Brazil, 2015.

After univariate analysis, factors associated with BMI and WG were identified as shown in Table 2. There was a overweight and abdominal obesity workers predominance, mostly women over 30 years old, high school educational level, working in Primary Care Services, not referring alcohol and tobacco use, performing insufficient physical activity practice, and negative report of different morbidities.

In bivariate analysis, it was observed statistically significant difference (p<0.05) between BMI and age (p=0.000), educational level (p=0.001), sleep (p=0.049) hypertension (p=0.023), hypercholesterolemy (p=0.003), and hypertriglyceridemia (p=0.006). Health workers who have high school educational level, hypertension, hypercholesterolemy, and hypertriglyceridemia were more likely to have overweight. It was also found that Young adults are less likely to overweight.

Regard to WG, analysis showed that female professionals (p=0.000), with high school educational level (p=0.001), and with hypertension (p=0.012) are more likely to have abdominal obesity. In contrast, workers up to 30 years old (p=0.000) were less likely to develop abdominal obesity.

After analysis, variables that remained associated with BMI and WG were: age, educational level, and hypertension, with statistically significant difference.

Table-2: Relationship between sociodemographic, behavioral and self-reported morbidities characteristics, and Body Mass Index (BMI) and Waist Girth (WG) of Health workers. Horizonte, Ceara, Brazil, 2015.

Variables	BMI						WG					
	Overweight		Normal		P value	OR (CI)	High		Normal		P value	OR (CI)
	N	%	N	%			N	%	N	%		
Gender*												
Female	105	58.3	75	41.7	0.665	1.20 (0.52-2.74)	150	83.3	30	16.7	***0.000***	***4.28 (1.80-10.17)***
Male	14	53.8	12	46.2			14	53.8	12	46.2		
Age*												
Young Adult	20	37.7	33	62.3	***0.001***	***0.33 (0.17-0.63)***	30	56.3	23	43.4	***0.000***	***0.18 (0.09-0.38)***
Mature Adult	99	64.7	54	35.3			134	87.6	19	12.4		
Education Level*												
High School	93	65.5	49	34.5	***0.001***	***2.77 (1.51-5.09)***	122	85.9	20	14.1	***0.001***	***3.19 (1.58-6.43)***
Higher Education	26	40.6	38	59.4			42	65.6	22	34.4		
Work Place*												
Primary Health Care	104	58.4	74	41.6	0.629	1.21 (0.54-2.71)	141	79.2	37	20.8	0.721	0.82 (0.29-2.32)
Secondary Health Care	15	53.6	13	46.4			23	82.1	5	17.9		
Smoke**												
Yes	3	60	2	40	1.000	1.09 (0.18-6.72)	5	100	0	0	0.586	-
No	116	57.7	85	42.3			159	79.1	42	20.9		
Alcohol Use*												
Yes	16	59.3	11	40.7	0.866	1.07 (0.47-2.44)	20	74.1	7	25.9	0.444	0.69 (0.27-1.77)
No	103	57.5	76	42.5			144	80.4	35	19.6		
Physical Activity*												
Insufficiently Active	86	57.3	64	42.7	0.837	0.93 (0.50-1.74)	116	77.3	34	22.7	0.184	0.56 (0.24-1.31)
Sufficiently Active	33	58.9	23	41.1			48	85.7	8	14.3		
Sleep*												
Impaired	41	68.3	19	31.7	***0.049***	1.88 (0.99-3.54)	51	85	9	15	0.218	1.65 (0.73-3.71)
Peaceful	78	53.4	68	46.6			113	77.4	33	22.6		
Food Frequency*												
Up to 3	30	66.7	15	33.3	0.172	1.61 (0.80-3.23)	38	84.4	7	15.6	0.363	1.50 (0.62 - 3.66)
4 or more	89	55.3	72	44.7			126	78.3	35	21.7		
Hypertension*												
Yes	23	76.7	7	23.3	***0.023***	***2.73 (1.11-6.71)***	29	96.7	1	3.3	***0.012***	***8.80 (1.16-66.65)***
No	96	54.5	80	45.5			135	76.7	41	23.3		
Diabetes**												
Yes	8	80	2	20	0.196	3.06 (0.63-	9	90	1	10	0.691	2.38 (0.29-

No	111	56.6	85	43.4		14.79)	155	79.1	41	20.9		19.33)
Hypercholesterolemy*					***0.003***	***4.70 (1.55-14.20)***					0.231	2.12 (0.60-7.43)
Yes	22	84.6	4	15.4			23	88.5	3	11.5		
No	97	53.9	83	46.1			141	78.3	39	21.7		
Hypertriglyceridemia**					***0.006***	***4.99 (1.42-17.52)***					0.259	2.62 (0.58-11.72)
Yes	18	85.7	3	14.3			19	90.5	2	9.5		
No	101	54.6	84	45.4			145	78.4	40	21.6		
Gastritis*					0.655	1.18 (0.56-2.46)					0.226	0.60 (0.26-1.37)
Yes	22	61.1	14	38.9			26	72.2	10	27.8		
No	97	57.1	73	42.9			138	81.2	32	18.8		
Reflux*					0.655	1.18 (0.56-2.46)					0.450	0.72 (0.31-1.68)
Yes	22	61.1	14	38.9			27	75	9	2/5		
No	97	57.1	73	42.9			137	80.6	33	19.4		
Constipation*					0.902	1.04 (0.55-1.96)					0.267	1.60 (0.69-3.73)
Yes	31	58.5	22	41.5			45	84.9	8	15.1		
No	88	57.5	65	42.5			119	77.8	34	22.2		

*Two-tailed χ^2 test p≤0.05; **Two-tailed Fisher's exact test p≤0.05. OR: Odds Ratio; CI: 95% Confidence Interval. BMI: Body Mass Index – Normal (<25kg/m^2) and Overweight (≥25kg/m^2). WG: Waist Girth.

For logistic regression model, the associations were used between variables with p>0.20. For overweight, there were these variables: age, educational level, hypertension, diabetes, cholesterol, triglycerides, sleep and meal. For abdominal obesity, there were variables: gender, age, educational level, physical activity, and hypertension. Blocks divisions were described in Table 3. After regression, the variables that remained associated with both overweight and abdominal obesity were: age, educational level, and hypertension.

Table-3: Absolute and Adjusted Odds Ratio of health workers' overweight and abdominal obesity. Horizonte, Ceara, Brazil, 2015.

Variables	Overweight				Abdominal Obesity			
	Absolute OR (CI)	P	Adjusted OR (CI)	P	Absolute OR (CI)	P	Adjusted OR (CI)	P
Block 1 Gender Female Male					4.28 (1.80-10.17)	0.000	*4.31 (1.67-11.13)*	*0.003*
Age Young Adult Mature Adult	0.33 (0.17-0.63)	0.001	*0.38 (0.19-0.74)*	*0.005*	0.18 (0.09-0.38)	0.000	*0.21 (0.09-0.45)*	*0.000*
Education Level High School Higher Education	2.77 (1.51-5.09)	0.001	*2.40 (1.28-4.48)*	*0.006*	3.19 (1.58-6.43)	0.001	*2.54 (1.18-5.45)*	*0.017*
Block 2 Physical Activity Insufficiently Active Sufficiently Active					0.56 (0.24-1.31)	0.184	0.57 (0.24-1.34)	0.201
Sleep Impaired Peaceful	1.88 (0.99-3.54)	0.049	1.51 (0.77-2.95)	0.230				
Food Frequency ≤ 3 ≥ 4	1.61 (0.80-3.23)	0.172	1.55 (0.74-3.23)	0.238				

Hypertension Yes No	2.73 (1.11- 6.71)	0.023	1.87 (0.71- 4.90)	0.201	8.80 (1.16- 66.65)	*0.012*	*8.75* *(1.15-* *66.35)*	*0.036*
Diabetes Yes No	3.06 (0.63- 14.79)	0.196	2.78 (0.53- 14.34)	0.222				
Hypercholesterolemy Yes No	4.70 (1.55- 14.20)	0.003	2.50 (0.63- 9.85)	0.188				
Hypertriglyceridemia Yes No	4.99 (1.42- 17.52)	0.006	2.28 (0.48- 10.83)	0.298				

OR: Odds Ratio; CI: 95% Confidence Interval. Overweight: BMI ≥25kg/m^2. Waist Girth: WG ≥80 cm to women and ≥94 cm to men.

For overweight, it was not possibly to realize logistic regression in blocks, because it does not shown statistics significance with $p<0.05$ on Block 2. However, the variables that remained in final model were: age and educational level. For abdominal obesity, after adjustments in individuals blocks, the variables remained were: gender, age, educational level, and hypertension. To compose the final model related to abdominal obesity, only remained the variables: gender (female), age (mature), and high school educational level, shown in Table 4.

Table-4: Logistic Regression Final Model to abdominal obesity on health workers. Horizonte, Ceara, Brazil, 2015.

	P value	Exp B	Inferior CI	Superior CI
Female	0,002	4,53	1,72	11,91
Age	0,001	0,26	0,11	0,57
Educational Level	0,014	2,62	1,21	5,68
Hypertension	0,110	5,62	0,67	46,68

Exp B: Exponentiation of the B coefficient; CI: 95% Confidence Interval

4. Discussion

Several studies have been conducted on workers to assess overweight prevalence. Study realized in a state bank (Ell, Camacho, and Chor 1999) there was a 34.2% overweight frequency. In a metallurgical company (Castro, Anjos, and Lourenço 2004) 44.6% of employees also were overweight. In Mato Grosso State (Nascimento et al. 2015), school workers had a 51.1% overweight frequency.

Health workers form a special group of people who have their own characteristics, fragmented activities division, rigid hierarchical structure, and insufficient professional quantity, impacting on workers health and nutrition status (Martins et al. 2009).

The overweight and abdominal obesity high prevalence of professionals identified in our study could reflects the obesity problem magnitude. Silveira et al. (2013) also observed that 68.9% of professionals from a Rio Grande do Sul State Emergency Center were overweight, and 61.0% were with abdominal obesity. This could be a nutritional transition process picture that our country is experiencing (Pinho et al. 2011).

Similar study conducted at Porto Alegre State Clinics Hospital (Simon et al. 2014) found that 60.8% of employees were overweight, and 77.3% had waist girth over normal levels, indicating abdominal obesity as a major risk to chronic diseases development.

This greater abdominal obesity prevalence than overweight percentage individuals identified in the Porto Alegre State Clinic Hospital study (Simon et al. 2014) also was found in our study (78.6%, and 57.8%, respectively). This finding is worrying because it indicates that some workers with BMI less than 25mg/kg^2 have abdominal obesity.

Among professionals that work in different health care equipments, the study reveals that nursing field professionals shown greater risk for gaining inappropriately weight, with obesity prevalence higher than other professional groups, and it might be influenced by occupation conditions imposed (Coelho et al. 2014).

Worldwide there is higher abdominal obesity prevalence in women, as indicated in our study. This finding is consistent with results reported in other association Population studies (Oliveira et al. 2009, Pinho et al. 2011). This higher fat accumulation prevalence in female abdominal region could be attributed to pregnancy, hormonal differences, and climacteric (Pinho et al. 2013).

Young adult group, classified in our study as workers up to 30 years old, showed a statistically significant association with overweight and abdominal obesity, indicating less likely occurrences, both bivariate and multivariate analysis, remaining in final model only for abdominal obesity.

The higher overweight frequency in low education workers was similar to that found in Simon et al. (2014) study conducted at Porto Alegre Clinics Hospital, where 64.2% of professionals were overweight and lower educational level.

It is suggested that increasing age might influence weight gain. Study conducted in Mato Grosso (Nascimento et al. 2015), Para (Silva, Santos, and Moura 2010), and Santa Catarina States (Sousa et al. 2011) reaffirm our findings, where so men and women showed direct overweight association with age. The growth hormone natural decline, basal metabolic rate, and reduced physical activity levels may explain this observed association as indicated above (Nascimento et al. 2015).

Obesity is a multifactorial disease, whose causes are not only individual, but either social or environmental, predisposing the individual to a variety of risk factors (Pinho et al. 2013, Santiago, Moreira, and Florêncio 2015). Among factors that influence in this pathology, we found in our study association between obesity and educational level, indicating that lower educational level, greater the developing overweight and abdominal obesity chances. A study conducted at Porto Alegre Clinics Hospital (Simon et al. 2014) also presents significative association (p=0.023) similar our findings, where 64.2% of employees who had up to high school educational level were overweight. Corroborating theses data, a similar survey conducted in South Brazil (Silveira et al. 2013) also observed that overweight occurrence was more significant in non graduated professionals.

In recent decades it has been identified an obesity prevalence increase in individuals with low educational level, indicating that these ones tend to consume a higher fat diet and lower cost (Fernandes, and Vaz 2012, Monteiro, Conde, and Castro 2003). Thus, a higher educational level might enables greater knowledge and access to a healthier lifestyle (Pinho et al. 2013).

Although no association was found between overweight and abdominal obesity with tobacco use in our data, studies (Oliveira et al. 2009, Pinho et al. 2013, and Pinho et al. 2011) have evaluated its relationship on overweight and central obesity. To Pinho et al. (2011), non-smokers overweight prevalence can be explained by protection attributed to nicotine that induces appetite suppression.

Hypertension is reported in the literature as a weight gain result (World Health Organization 2011). In this study it was found that hypertension self-reported diagnosis was significantly related to overweight and abdominal obesity, presenting twice greater chance of developing overweight and eight times greater chances of abdominal obesity developing. Study realized with Brazilian Northeast Young adults (Santiago, Moreira, and Florêncio 2015) identified that hypertensive patients have seven times greater chances of overweight developing. Simon et al.

(2014) also observed significant association (p=0.004) between overweight and arterial hypertension.

Investigative study on overweight and obesity prevalence among women in São Paulo State (Cristóvão, Sato, and Fujimori 2011), using logistic regression model, it found that overweight was more frequent in hypertensive ones, maintaining statistical significance association ($p<0.05$) on adjusted analysis with three times more likely than normotensive ones Likewise, hypertensive women have about five times greater chances of having abdominal obesity than normotensive ones.

Obesity is result of a complex web factors that are associated and interact. Although genetic factors are known, environmental and lifestyle factors are the most expressive ones to overweight and abdominal obesity occurrence (Oliveira et al. 2009).

5. Conclusion

In this study it was identified a significant number of overweight and abdominal obesity individuals. The multivariable logistic model indicated a statistically significant association between abdominal obesity and gender, age, and educational level.

The use of more than one anthropometric indicator provided additional information to identify overweight and abdominal obesity prevalence, and their association with sociodemographic, behavioral, and self-reported morbidity factors.

We conclude that overweight and especially abdominal obesity predictor's analysis rests preferably more on sociodemographic factors than behavioral and clinical ones in this health works group.

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