Original article

Prevalence of overweight and obesity in community health agents in the southern region of Rio Grande do Sul, 2017*

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Abstract

Objective: To analyze overweight and obesity prevalence among community health agents in southern Rio Grande do Sul, Brazil, according to sociodemographic, behavioral and health variables. **Methods:** A cross-sectional study was conducted using data collected in 21 municipalities between March 2016 and May 2017. Weight and height data were self-reported by participants. Multinomial logistic regression was used. **Results:** Data from 564 community health agents were analyzed, 0.5% were classified as underweight, 29.8% as having normal weight, 39.2% were overweight and 30.5% were obese. Presence of obesity was negatively associated with working in rural area health centers (OR=0.58 – 95%CI 0.34;0.98) and doing physical activity (OR=0.57 – 95%CI 0.36;0.90); presence of obesity was positively associated with anxiety (OR=1.97 – 95%CI 1.12;3.45), hypertension (OR=2.91 – 95%CI 1.63;5.18), and diabetes (OR=6.25 – 95%CI 2.15;18.21). **Conclusion:** Overweight and obesity prevalence was high and associated with chronic diseases, anxiety, physical inactivity and working in urban areas.

Keywords: Primary Health Care; Nutritional Status; Family Health Strategy; Cross-sectional Studies; Health Personnel; Occupational Health.

*Article derived from research with community health agents of the 21st Health Region of the state of Rio Grande do Sul, entitled 'Work process and its impacts on the health condition of Community Health Agents in the southern region of Rio Grande do Sul, 2017', submitted to the Federal University of Pelotas Nursing Postgraduate Program in 2017.

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Introduction

The Family Health Strategy (FHS) is comprised of a work team which has at least one doctor, one nurse, two nursing technicians and four to six community health agents (CHA),[1] who work in Primary Health Care exclusively within the Brazilian National Health System (SUS). The CHAs carry out disease prevention, treatment and rehabilitation activities as well as health promotion, forming links with the population under their care through individual or collective interventions in households or communities.[2] CHAs are part of a multiprofessional team, live in the area where they work and form the main link between the population and the FHS: they dedicate themselves to guiding families and planning, along with the other FHS team members, health actions to be undertaken in their communities.[3] However, at times, CHAs end up not taking care of their own health and diet and compromise their nutritional status.

> *Community health agents are part of a multiprofessional team, live in the area where they work and form the main link between the population and the Family Health Strategy.*

Nutritional status can be understood as being the balance between need for nutrients and their supply, and, when supply is greater than need, this results in excess weight.[4] Obesity is considered to be a syndrome, arising from a combination of genetic, metabolic and environmental factors, as well as from the interference of cultural and seasonal factors and socioeconomic and emotional conditions, among others.[5,6]

Data on the adult population show that prevalence of both obesity and overweight is increasing in both developed countries and in developing countries.[7] The 2016 Non-Communicable Disease Risk and Protective Factors Surveillance Telephone Survey (VIGITEL) conducted in all 26 Brazilian state capitals and the Federal District pointed to 54.0% prevalence of excess weight overall, while being higher in males (57.3%) compared to females (51.2%). Also according the VIGITEL survey, prevalence of obesity was 18.9%, with no difference between males and females.[8]

There are however few studies that directly assess the nutritional profile of CHAs. Standing out among these studies is that conducted in São Paulo city which found strong association between chronic non-communicable diseases and inadequate dietary habits among CHAs.[9] A study conducted in João Pessoa, capital of the state of Paraíba, found high prevalence of overweight (37.4%) and obesity (33.7%) among CHAs.[10]

The National Food and Nutrition Policy is aimed at professional qualification of health workers, implementing food and nutrition policies, programs and actions, as well as creating the Adequate and Healthy Food Promotion Policy.[11]

The objective of this study was to analyze overweight and obesity prevalence among community health agents in southern Rio Grande do Sul, Brazil, according to sociodemographic, behavioral and health variables.

Methods

This was a cross-sectional study forming part of a larger study with CHAs of the 21st Health Region of the state of Rio Grande do Sul, entitled 'Work process and its impacts on the health condition of Community Health Agents in the southern region of Rio Grande do Sul'.

The study was conducted between March 2016 and April 2017, in 21 cities of the 21st Health Region of Rio Grande do Sul: Amaral Ferrador; Arroio do Padre; Arroio Grande; Canguçu; Cerrito; Chuí; Cristal; Herval; Jaguarão; Morro Redondo; Pedras Altas; Pedro Osório; Pelotas; Pinheiro Machado; Piratini; Rio Grande; Santa Vitória do Palmar; Santana da Boa Vista; São José do Norte; São Lourenço do Sul; and Turuçu. Exceptionally, the Health Region's 22nd municipality, Capão do Leão, did not take part in the study because no CHAs were working there before data collection for the study was finalized.

The 21st Health Region of the state of Rio Grande do Sul (RS) is located in the far south of Brazil in the country's Southern macro-region. According to the 2010 census conducted by the Brazilian Institute of Geography and Statistics (IBGE),[12] the population of this health regional totaled 878,559 people, accounting for 7.76% of the state's total population. The human development index (HDI) for all the cities in the southern region of Rio Grande do Sul is lower than the HDI for the state as a whole (0.746), varying between 0.623 in São José do Norte and 0.744 in Rio Grande.[12]

Data collection occurred after consent for the study to be conducted had been obtained from the 3rd Regional Health Coordinating Body and from the Health Departments of the respective cities. Information provided by the Municipal

Health Departments showed that there were 753 CHAs working in the region. A census was conducted using a self-administered instrument in meetings arranged with the Health Departments. The process was coordinated by undergraduate and postgraduate students from the Federal University of Pelotas Faculty of Nursing (FEN/UFPel) who had been trained beforehand.

The criterion for inclusion in the study was that the CHAs had to be working, while the study excluded CHAs who were on annual leave, sick leave, pregnant or on maternity leave during the data collection period.

As mentioned above, a self-administered instrument was used. It contained questions involving sociodemographic and socioeconomic information, as well as information on work process and health conditions. The following independent demographic variables were used for this study:

a) sex (female; male);
b) age (in years: 20-30; 31-40; 41-50; 51 or over);
c) race/skin color (white; black; brown/other/not informed); and
d) marital status (single/separated)/divorced/widowed/not informed; married or with partner).

The socioeconomic variables related to:

a) schooling (incomplete or complete elementary education; incomplete or complete high school education/technical course; incomplete or complete higher education or post-graduation);
b) region in which the Primary Healthcare Center (PHC) where the CHAs worked was located (urban; rural); and
c) whether they had children (yes; no).

The behavioral variables studied were:

a) smoking habit (no; yes; former smoker);
b) frequency of alcohol use (never; once a month or less; 2-4 times a month; twice a week or more);
c) satisfaction with service (very dissatisfied; dissatisfied; indifferent; satisfied; very satisfied);
d) would change profession if they could (no; yes);
e) practices physical activity (no; yes); and
f) overworked (no; yes).

The health variables analyzed were:

a) overall level of stress (self-reported, related to work activities: none; slight; moderate; considerable; high); and
b) health problems
   - presence of one or more health problems (angina/ischemia/infarction; anxiety; asthma; cardiac arrhythmia; bronchitis; depression; diabetes *mellitus*; headache; spinal pain, back pain; knee pain; leg pain; gastritis/gastric/duodenal ulcer; insomnia; heart failure/enlarged heart; high blood pressure [systemic arterial hypertension: SAH]; rheumatism; skin and/or other lesions [yes; no];
   - use of any medication [no; yes]); and
   - diseases diagnosed by a health professional (anxiety [no; yes]; depression [no; yes]; SAH [no; yes]; and diabetes *mellitus* [no; yes]).

For the purposes of analyzing data on the outcome, we used the body mass index (BMI) proposed by the World Health Organization (WHO) in 1995 and 1997. BMI was calculated using self-reported weight and height, applied to the following formula: BMI = weight (kg)/height^2 (m). This calculation enabled adult nutritional status to be classified as established by WHO and defined on four levels: underweight (BMI <18.5kg/m^2), adequate weight (BMI ≥18.5 to <25kg/m^2), overweight (BMI ≥25 to <30kg/m^2) and obesity (BMI ≥30kg/m^2).[13] For the purposes of this study, the four nutritional status classification levels were grouped into three: underweight and adequate weight; overweight; and obesity. The means of obtaining self-reported weight and height data from the respondents in accordance with the means used in other studies provides a positive indication of the validity of the measurements.[8]

The answers to the questionnaires were transferred to Microsoft Excel and analyzed using Stata 14.2.

Data collection quality control took place in two stages. Firstly, the coding of the instruments was reviewed by two of the study's supervisors, an undergraduate student and a Ph.D. student, when they received the questionnaires. Following this, 5% of the interviews were replicated by means of telephone contact with the respondents of 31 questionnaires, whereby they were asked to answer a reduced version of the questionnaire with eight questions, to check for authenticity by identifying similarity between the answers to the two questionnaires.

With regard to the analysis of the statistical data, a descriptive analysis was made of the variables studied. As such, BMI distribution was calculated according to the independent variable categories. As the study had a categorical nominal outcome, the crude analysis and the adjusted analysis were performed using multinomial logistic regression, whereby the 'underweight/adequate weight nutritional status' group was used as the reference

category. The adjusted analysis was based on the hierarchical model built for the purpose of controlling possible confounding factors, whereby possible associated factors were considered to be those indicated in the literature. The demographic variables were added on the most distal level, i.e. sex; age; race/skin color; marital status, as were the socioeconomic variables, i.e. schooling; PHC region; children. The behavioral variables were included on the intermediate level: smoking habit; frequency of alcohol use; satisfaction with service; would change profession if they could; practicing physical activity; and overworked. The health variables were included on the proximal level: overall level of stress; health problems; anxiety; any use of medication; depression; hypertension; and diabetes *mellitus*.

Variables found to be significant using this analysis (p-value<0.20) were kept in the model and were included in the adjustment of the next block, when the same procedure was repeated. The two-tailed test 5% significance level was used. The measurements presented were odds ratio [OR]) and 95% confidence interval (95%CI). The analysis of the ordinal variables was based on the p-value of the linear trend test, while the p-value of the heterogeneity test was used for the remaining variables.

The study project was submitted to and approved by the Federal University of Pelotas Faculty of Nursing Research Ethics Committee (CEO_FEN/UFPel): Opinion No. 51684015.1.0000.5316, dated December 18th 2015. After presentation of the objectives of the study and due clarification, and confidentiality and the right to withdraw from the study at any time being ensured, CHAs who agreed to take part signed a Free and Informed Consent form, as per the provisions of National Health Council Resolution No. 466, dated December 12th 2012, regarding research involving human beings.[14]

Results

Of the 753 CHAs found to be at work following contact with the Municipal Health Departments, 725 were found to be eligible, 599 of whom were interviewed, resulting in an 82.6% response rate. Of the 126 CHAs who did not take part, 41.3% (n=52) were not at work because of health/illness problems, 47.6% (n=60) were absent for other reasons and 11.1% (n=14) refused to answer the questionnaire.

Of the 599 participants, we analyzed 564 CHAs who provided data needed for the study outcome (94.16%), i.e. data to enable BMI to be calculated and nutritional status to be verified. Among the 564 CHAs, the following were predominant: being of the female sex (88.5%), age between 31 and 40 years (41.8%), white race/skin color (75.9%), being married or having a partner (61.7%), working at an urban PHC (73.9%), having health problems (75.0%), being satisfied or very satisfied with their work (71.4%) and being overworked (66.2%), as shown in Table 1.

Standing out with regard to nutritional status is that 70.2% did not have adequate weight: underweight (n=3), 0.5%; overweight (n=221), 39.2%; and obesity (n=172), 30.5%. One hundred and twenty-three (21.9%) reported having medical diagnosis of systemic arterial hypertension; and 31 (5.5%) reported diabetes *mellitus*.

Table 2 shows the odds ratios (OR) for overweight and obesity, based on crude and adjusted analysis, according to the independent variable categories. In the adjusted analysis, lower likelihood of overweight was found among CHAs who had children (OR=0.42 – 95%CI 0.26;0.69), those diagnosed as having systemic arterial hypertension (OR=0.27 – 95%CI 0.13;0.57) and those who had stopped smoking (OR=2.91 – 95%CI 1.07;7.95). Lower odds of obesity was found in the following groups: CHAs who worked in rural PHCs (OR=0.58 – 95%CI 0.34;0.98), practiced physical activity (OR=0.57 – 95%CI 0.36;0.90), had health problems (OR=0.45 – 95%CI 0.24;0.85) and depression (OR=0.46 – 95%CI 0.23;0.96). Higher odds of obesity were found among CHAs who had anxiety (OR=1.97 – 95%CI 1.12;3.45), systemic arterial hypertension (OR=2.91 – 95%CI 1.63;5.18) and diabetes *mellitus* (OR=6.25 – 95%CI 2.15;18.21).

Discussion

This study found high prevalence of excessive weight among CHAs of the 21st Health Region of Rio Grande do Sul, and its association with sociodemographic, behavioral and health factors. The excess weight (overweight e obesity) prevalence found in 69.7% of CHAs in the south region of Rio Grande do Sul is a nutritional diagnosis of great importance. Data from a study conducted in São Paulo-SP in 2008 revealed lower prevalence of excess weight – 46.6% – among CHAs working at five PHCs in the eastern region of the city;[9] another more recent study conducted in Northeast Brazil with a non-probabilistic sample, found 71.1% prevalence of excess weight among

Table 1– Demographic, socioeconomic, behavioral and health characteristics according to adult community health agent body mass index (n=564), southern region of Rio Grande do Sul state, March/2016-April/2017

Characteristics	Total	Underweight/ adequate weight 171 (30.3%)	Overweight 221 (39.2%)	Obesity 172 (30.5%)
	n (%)	n (%)	n (%)	n (%)
Demographic				
Sex (n=564)				
Female	499 (88.5)	152 (30.5)	189 (37.9)	158 (31.6)
Male	65 (11.5)	19 (29.2)	32 (49.2)	14 (21.6)
Age (in years) (n=564)				
20-30	138 (24.5)	52 (37.7)	49 (35.5)	37 (26.8)
31-40	236 (41.8)	73 (30.9)	90 (38.2)	73 (30.9)
41-50	140 (24.8)	34 (24.3)	60 (42.9)	46 (32.8)
≥51	50 (8.9)	12 (24.0)	22 (44.0)	16 (32.0)
Race/skin color (n=564)				
White	428 (75.9)	132 (30.8)	173 (40.4)	123 (28.8)
Black	69 (12.2)	18 (26.1)	26 (37.7)	25 (36.2)
Brown/other/not informed	67 (11.9)	21 (31.3)	22 (32.9)	24 (35.8)
Marital status (n=564)				
Single/separated/divorced/widowed/not informed	216 (38.3)	65 (30.1)	86 (39.8)	65 (30.1)
Married or with partner	348 (61.7)	106 (30.5)	135(38.8)	107 (30.7)
Socioeconomic				
Schooling (n=564)				
Incomplete or complete elementary education	34 (6.0)	8 (23.5)	16 (47.1)	10 (29.4)
Incomplete or complete high school education/technical course	336 (59.6)	107 (31.9)	121 (36.0)	108 (32.1)
Incomplete or complete higher education or post-graduation	194 (34.4)	56 (28.9)	84 (43.3)	54 (27.8)
PHC area[a] (n=563)				
Urban	416 (73.9)	122 (29.3)	156 (37.5)	138 (33.2)
Rural	147 (26.1)	49 (33.3)	64 (43.5)	34 (23.2)
Has children (n=562)				
No	134 (23.8)	59 (44.0)	41 (30.6)	34 (25.4)
Yes	428 (76.2)	112 (26.2)	180 (42.1)	136 (31.7)
Behavioral				
Smoking habit (n=564)				
No	457 (81.0)	133 (29.1)	188 (41.1)	136(29.8)
Yes	74 (13.1)	26 (35.1)	26 (35.1)	22 (29.8)
Former smoker	33 (5.9)	12 (36.4)	7 (21.2)	14 (42.4)
Frequency of alcohol use (n=557)				
Never	268 (48.1)	73 (27.2)	113 (42.2)	82 (30.6)
once a month or less	172 (30.9)	58 (33.7)	58 (33.7)	56 (32.6)
2-4 times a month	105 (18.9)	33 (31.4)	45 (42.9)	27 (25.7)
twice a week or more	12 (2.1)	3 (25.0)	3 (25.0)	6 (50.0)

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Table 1– Demographic, socioeconomic, behavioral and health characteristics according to adult community health agent body mass index (n=564), southern region of Rio Grande do Sul state, March/2016-April/2017

Characteristics	Total	Underweight/ adequate weight 171 (30.3%)	Overweight 221 (39.2%)	Obesity 172 (30.5%)
	n (%)	n (%)	n (%)	n (%)
Satisfaction with service (n=561)				
Very dissatisfied	31 (5.5)	8 (25.8)	14 (45.2)	9 (29.0)
Dissatisfied	77 (13.7)	25 (32.5)	23 (29.9)	29 (37.7)
Indifferent	53 (9.4)	16 (30.2)	23 (43.4)	14 (26.4)
Satisfied	353 (62.9)	107 (30.3)	136 (38.5)	110(31.2)
Very satisfied	47 (8.5)	13 (27.7)	24 (51.1)	10 (21.2)
Would change profession if they could (n=563)				
No	218 (38.7)	69 (31.7)	84 (38.5)	65 (29.8)
Yes	345 (61.3)	102 (29.6)	136 (39.4)	107 (31.0)
Practices physical activity (n=558)				
No	314 (56.3)	86 (27.4)	116 (36.9)	112 (35.7)
Yes	244 (43.7)	84 (34.4)	103 (42.2)	57 (23.4)
Overworked (n=559)				
No	189 (33.8)	57 (30.2)	80 (42.3)	52 (27.5)
Yes	370 (66.2)	113 (30.5)	137 (37.0)	120 (32.5)
Health				
Overall level of stress (n=553)				
None	22 (4.0)	5 (22.7)	12 (54.5)	5 (22.7)
Slight	95 (17.2)	26 (27.4)	44 (46.3)	25 (26.3)
Moderate	218 (39.4)	78 (35.8)	83 (38.1)	57 (26.1)
Considerable	166 (30.0)	48 (28.9)	58 (34.9)	60 (36.1)
High	52 (9.4)	13 (25.0)	21 (40.4)	18 (34.6)
Health problems (n=563)				
No	141 (25.0)	50 (35.5)	55 (39.0)	36 (25.5)
Yes	422 (75.0)	120 (28.4)	166 (39.3)	136 (32.3)
Anxiety (n=562)				
No	366 (65.1)	115 (31.4)	152 (41.5)	99 (27.1)
Yes	196 (34.9)	54 (27.5)	69 (35.2)	73 (37.3)
Use of any medication (n=557)				
No	268 (48.1)	90 (33.6)	113 (42.2)	65 (24.2)
Yes	289 (51.9)	80 (27.7)	104 (36.0)	105 (36.3)
Depression (n=561)				
No	482 (85.9)	148 (30.7)	189 (39.2)	145 (30.1)
Yes	79 (14.1)	20 (25.3)	32 (40.5)	27 (34.2)
Hypertension (n=562)				
No	439 (78.1)	158 (36.0)	178 (40.5)	103 (23.5)
Yes	123 (21.9)	11 (8.9)	43 (35.0)	69 (56.1)
Diabetes *mellitus* (n=562)				
No	531 (94.5)	166 (31.3)	216 (40.7)	149 (28.0)
Yes	31 (5.5)	3 (9.7)	5 (16.1)	23 (74.2)

a) PHC: Primary Healthcare Center.

Table 2 – Adult community health agent body mass index association with the independent variables, southern region of Rio Grande do Sul state, March/2016-April/2017

Level – variable	Overweight[a]				Obesity[a]			
	Crude analysis		Adjusted analysis		Cruse analysis		Adjusted analysis	
	OR (95%CI[d])	p-value	OR (95%CI[d])	p-value	OR (95%CI[d])	p-value	OR (95%CI[d])	p-value
1. Sex		**0.327[c]**		**0.151[c]**		**0.055[c]**		**0.261[c]**
Female	1.35 (0.74;2.48)		1.62 (0.84;3.15)		1.91 (0.98;3.71)		1.53 (0.73;3.21)	
Male	1.00		1.00		1.00		1.00	
1. Age (in years)		**0.020[b]**		**0.225[b]**		**0.910[b]**		**0.699[b]**
20-30	1.00		1.00		1.00		1.00	
31-40	0.76 (0.46;1.26)		1.03 (0.59;1.78)		1.07 (0.63;1.82)		1.06 (0.60;1.88)	
41-50	0.53 (0.30;0.95)		0.75 (0.40;1.42)		1.01 (0.57;1.80)		0.96 (0.51;1.80)	
≥51	0.51 (0.23;1.15)		0.69 (0.29;1.62)		0.96 (0.44;2.08)		0.88 (0.39;1.99)	
1. Race/skin color		**0.612[c]**		**0.655[c]**		**0.125[c]**		**0.697[c]**
White	1.00		1.00		1.00		1.00	
Black	0.91 (0.48;1.72)		0.95 (0.49;1.83)		1.35 (0.74;2.45)		1.18 (0.64;2.19)	
Brown/other/not informed	1.25 (0.66;2.37)		1.20 (0.63;2.31)		1.53 (0.82;2.86)		1.49 (0.79;2.80)	
1. Marital status		**0.856[c]**		**0.378[c]**		**0.820[c]**		**0.709[c]**
Single/separated/divorced/ widowed/not informed	1.00		1.00		1.00		1.00	
Married or with partner(a)	1.04 (0.69;1.57)		1.22 (0.79;1.88)		1.05 (0.70;1.58)		1.08 (0.70;1.67)	
1. Schooling		**0.641[b]**		**0.254[b]**		**0.370[b]**		**0.211[b]**
Incomplete or complete elementary education	1.00		1.00		1.00		1.00	
Incomplete or complete high school education/technical course	1.77 (0.73;4.30)		1.49 (0.60;3.71)		1.43 (0.62;3.28)		1.41 (0.58;3.40)	
Incomplete or complete higher education or post-graduation	1.33 (0.53;3.32)		0.99 (0.38;2.60)		1.03 (0.43;2.43)		0.92 (0.36;2.35)	
1. PHC area[e]		**0.665[c]**		**0.711[c]**		**0.021[c]**		**0.042[c]**
Urbana	1.00		1.00		1.00		1.00	
Rural	0.95 (0.76;1.19)		0.91 (0.57;1.47)		0.59 (0.38;0.93)		0.58 (0.34;0.98)	
1. Has children		**≤0.001[c]**		**≤0.001[c]**		**0.605[c]**		**0.505[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.46 (0.30;0.69)		0.42 (0.26;0.69)		1.05 (0.87;1.27)		0.82 (0.47;1.45)	
2. Smoking habit		**0.041[c]**		**0.010[c]**		**0.044[c]**		**0.502[c]**
No	1.00		1.00		1.00		1.00	
Yes	1.41 (0.78;2.54)		1.73 (0.92;3.26)		1.17 (0.64;2.15)		1.09 (0.55; 2.15)	
Former smoker	2.42 (0.93;6.32)		2.91 (1.07;7.95)		2.76 (1.09;7.03)		1.44 (0.50; 4.18)	
2. Frequency of alcohol use		**0.357[c]**		**0.934[c]**		**0.707[c]**		**0.972[c]**
Never	1.00		1.00		1.00		1.00	
once a month or less	1.55 (0.97;2.47)		1.30 (0.79;2.12)		1.33 (0.83;2.12)		1.25 (0.76;2.04)	
2-4 times a month	1.13 (0.66;1.94)		0.87 (0.49;1.54)		0.83 (0.47;1.44)		0.79 (0.43;1.43)	
twice a week or more	1.55 (0.30;7.88)		1.34 (0.24;7.26)		2.76 (0.67;11.34)		3.67 (0.81;16.56)	

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Table 2 – Adult community health agent body mass index association with the independent variables, southern region of Rio Grande do Sul state, March/2016-April/2017

Level – variable	Overweight[a]				Obesity[a]			
	Crude analysis		Adjusted analysis		Cruse analysis		Adjusted analysis	
	OR (95%CI[d])	p-value	OR (95%CI[d])	p-value	OR (95%CI[d])	p-value	OR (95%CI[d])	p-value
2. Satisfaction with service		**0.554[b]**		**0.367[b]**		**0.236[b]**		**0.729[b]**
Very dissatisfied	1.00		1.00		1.00		1.00	
Dissatisfied	1.90 (0.67;5.36)		2.28 (0.74;6.99)		1.96 (0.72;5.33)		1.78 (0.63;5.08)	
Indifferent	1.22 (0.41;3.58)		1.39 (0.43;4.46)		0.95 (0.32;2.76)		0.84 (0.27;2.59)	
Satisfied	1.38 (0.56;3.40)		1.39 (0.52;3.69)		1.26 (0.52;3.02)		1.36 (0.55; 3.36)	
Very satisfied	0.95 (0.31;2.85)		0.86 (0.26;2.85)		0.65 (0.21;1.98)		0.79 (0.24;2.55)	
2. Would change profession if they could		**0.541[c]**		**0.243[c]**		**0.613[c]**		**0.588[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.89 (0.61;1.29)		0.76 (0.49;1.20)		0.96 (0.82;1.12)		0.88 (0.56;1.39)	
2. Physical activity		**0.745[c]**		**0.617[c]**		**0.567[c]**		**0.017[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.99 (0.97;1.02)		1.11 (0.72;1.72)		1.00 (0.99;1.02)		0.57 (0.36;0.90)	
2. Overworked		**0.318[c]**		**0.339[c]**		**0.308[c]**		**0.251[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.99 (0.97;1.01)		1.25 (0.79;1.98)		0.96 (0.89;1.03)		1.31 (0.82;2.08)	
3. Overall level of stress		**0.442[b]**		**0.264[b]**		**0.027[b]**		**0.555[b]**
None	1.00		1.00		1.00		1.00	
Slight	1.42 (0.45;4.48)		1.12 (0.34;3.70)		1.36 (0.45;4.48)		1.37 (0.36;5.27)	
Moderate	2.25 (0.76;6.69)		1.88 (0.60;5.85)		1.65 (0.76;6.69)		1.73 (0.47;6.30)	
Considerable	1.99 (0.65;6.03)		1.65 (0.51;5.31)		2.48 (0.82;7.49)		2.60 (0.70; 9.68)	
High	1.48 (0.42;5.19)		1.66 (0.43;6.32)		2.06 (0.61;6.96)		2.02 (0.47;8.59)	
3. Health problems		**0.580[c]**		**0.318[c]**		**0.819[c]**		**0.014[c]**
No	1.00		1.00		1.00		1.00	
Yes	1.04 (0.89;1.24)		0.75 (0.43;1.31)		1.02 (0.85;1.22)		0.45 (0.24;0.85)	
3. Anxiety		**0.878[c]**		**0.664[c]**		**0.022[c]**		**0.019[c]**
No	1.00		1.00		1.00		1.00	
Yes	1.03 (0.67;1.59)		1.13 (0.65;1.95)		1.62 (1.07;2.46)		1.97 (1.12;3.45)	
3. Use of any medication		**0.865[c]**		**0.414[c]**		**0.007[c]**		**0.900[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.96 (0.65;1.44)		1.23 (0.75;2.02)		1.75 (1.17;2.64)		1.03 (0.60;1.79)	
3. Depression		**0.460[c]**		**0.435 [c]**		**0.737[c]**		**0.038[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.80 (0.44;1.45)		0.75 (0.36;1.55)		1.10 (0.63;1.92)		0.46 (0.23;0.96)	
3. Hypertension		**≤0.001[c]**		**≤0.001[c]**		**≤0.001[c]**		**≤0.001[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.29 (0.14;0.58)		0.27 (0.13;0.57)		2.77 (1.77;4.35)		2.91 (1.63;5.18)	
3. Diabetes *mellitus*		**0.737[c]**		**0.853[c]**		**≤0.001[c]**		**≤0.001[c]**
No	1.00		1.00		1.00		1.00	
Yes	0.78 (0.18;3.31)		0.87 (0.19;3.86)		6.67 (2.48;17.90)		6.25 (2.15;18.21)	

a) 'Underweight/adequate weight' nutritional status taken as reference (comparison group)/OR = odds ratio.
b) P-value calculated using the Wald linear trend test.
c) P-value calculated using the heterogeneity test.
d) 95%CI: 95% confidence interval.
e) PHC: Primary Healthcare Center.

CHAs working at 40 Family Health Centers in the municipality of João Pessoa-PB in 2017,[10] this being a result similar to that found by our study. Research has concluded that obesity and overweight have become a serious Public Health problem, with identification of diverse causes and determinants.[8,10,15]

Increase in obesity has multifactorial causes associated with sociodemographic determinants such as, for instance, family income, sex, age, schooling and region of residence; notwithstanding, inadequate diet contributes significantly to obesity, with excessively high intake of processed and ultra-processed food with high levels of fat, salt and sugar and high caloric value.[11] In addition, insufficient physical exercise is prone to increasing as age increases, and tends to reduce as schooling increases, both in males and females.[8]

In this study, CHAs were predominantly female, as in other studies conducted in Brazilian municipalities.[9,10,15] There is a predominance of women working in health services, arising from historical factors concerning division of labor when caring for peoples' health.[16]

With regard to age range, a Brazilian study of an adult CHA population in the metropolitan region of Belo Horizonte in 2004, involving a probabilistic sample, found higher overweight prevalence among older individuals, i.e. 51 years old or more.[15] That result was also found in our study, which identified higher percentage of overweight among CHAs in the same age group, possibly explained by aging leading to increased chronic diseases. Changes in body composition also occur as age increases: the percentage of lean mass decreases and, frequently, adiposity increases in intra-abdominal and intramuscular regions, instead of being found subcutaneously, as is the case of young people.[17]

Differently to what has been described in the literature,[8,15] this study did not find association between low schooling and obesity. The low proportion of respondents with less than nine years schooling (6%) may explain, albeit partially, this finding. Prevalence of CHAs with higher education qualifications (15.6%) found here was higher when compared to prevalence found by a study conducted in São Paulo (1.1%).[10] Level of schooling, together with income, as well as other social determinants, can directly interfere in a population's eating habits and, consequently, have an impact on prevention of overweight and obesity.[18]

Individuals who were married or had partners were more likely to be overweight (22%) and obese (8%) in relation to single, separated, divorced or widowed individuals. This result is in keeping with the result of another study which identified odds 1.60 times greater of overweight in people who had partners, compared to those who did not.[15] One of the possible reasons for this may lie in the fact of people having more meals involving more food in a family environment.[19]

There is evidence of the existence of a relationship between having children and adiposity. A study conducted with women[20] in the state of Paraná in 2013 revealed association between obesity and having children, especially when there were three or more children. However, our study did not find greater probability of overweight among CHAs who had children and did not identify association between having children and obesity. In order for this hypothesis to be verified, further studies need to be conducted with the aim of assessing the relationship with weight gain over the years.

With regard to tobacco smoking, CHAs who had stopped smoking were at greater risk of being overweight, compared to non-smokers and smokers. A possible explanation of this result could be lack of tobacco being compensated by caloric food, thus affecting BMI, as confirmed by other studies.[8,16]

Excess weight was found to be more prevalent among sedentary participants, in relation to those who practiced physical activity. Physical activity can help to prevent excessive weight and can also contribute to a person developing a healthier lifestyle.[15] This study corroborates this association: percentage obesity was higher among CHAs who did not practice physical activity. Obesity and physical inactivity are preponderant causes of risk of cardiovascular diseases and are widely associated with the etiology of many chronic diseases, such as hypertension and obesity among adults.[21]

Another relevant result of this study was higher prevalence of obesity among CHAs who took medication. A study conducted in Northeast Brazil[22] related excess weight to use of medication: people who took medication continuously were two and a half times more likely to develop overweight and obesity, when compared to those who did not take medication continually.

Obesity is a condition characterized by increase in body fat mass, causing serious harm to health. According to another study conducted in the Southern region of Brazil in 2019,[23] approximately 30% of people with anxiety disorder were obese.[23,24] In this study, positive association was found between obesity and people suffering from

anxiety. However, as this study had a cross-sectional design and was conducted at a single period in time, this prevents a more in-depth analysis of this event, i.e. the relationship between anxiety disorders and associated causes.

Standing out as a positive point of this study is the use of an instrument comprised of simple questions which were easy for the respondents to answer. The high proportion of participation and the methodological rigor in all stages of the study also contributed to its internal validity.

With regard to limitations, as mentioned above the study's cross-sectional design prevents examination of the temporal relationship between exposures and outcomes. Another important methodological limitation is the use of self-reported anthropometric measurements.[25] Self-reported weight and height data should be used prudently in epidemiological studies, principally when the intention is to use them as continuous numerical variables to check for associated factors.[26] However, studies such as the VIGITEL survey,[8] conducted in all the Brazilian state capital cities and the Federal District, have used self-reported measurements as this facilitates the work involved, reduces logistic difficulties, covers a larger number of participants and ensures economic use of resources. Moreover, reported measurements are in close agreement with measured ones.

This study found high overweight and obesity frequency among CHAs in the southern region of Rio Grande do Sul. According to the National Primary Healthcare Policy, an attribution of CHAs is to strengthen and intensify activities aimed at promoting health and preventing diseases and other health conditions.[27] Notwithstanding, they also need to take care of their own health.

These points should be used by health service managers to encourage healthy eating and weight control among health workers, thus contributing to prevent certain diseases and conditions that are prejudicial to health, by promoting healthy eating habits and lifestyles. Moreover, measures to be taken by health service managers should take into account the socioeconomic and behavioral conditions of CHAs, involving making physical activity and health care available to them.

In conclusion, the results presented can be useful for proposing nutritional education interventions for the population. Community agents are Health professionals who disseminate important information that is fundamental in the development of actions to promote health and prevent illness among the population they care for.

Authors' contributions

Silveira FC, Fernandes CG, Almeida MD, Aldrighi LB, Jardim VMR contributed to and took part in all stages of preparing this manuscript, including the study concept and design, data analysis and interpretation and drafting the article. All the authors have approved the final version and are responsible for all aspects thereof, guaranteeing the reliability of the data and the integrity and accuracy of the information.

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