Positive self-perception of diet: a population-based study in the far south of Brazil*

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Abstract

Objective: to analyze prevalence of positive self-perception of diet and association with sociodemographic and behavioral factors, morbidity, self-perception of health and weight, and body weight care, in the city of Rio Grande, RS, Brazil, in 2016. **Methods:** this was a cross-sectional study conducted with adults and elderly people resident in the city of Rio Grande using 13 indicators of healthy eating and positive self-perception of diet (outcome); Poisson regression was used. **Results:** the sample consisted of 1,243 individuals, 72.4% of whom reported positive self-perception of diet; indicators such as weekly consumption of greens or vegetables (PR=133 – 95%CI 1.22;1.45) and fruit (PR=1.35 – 95%CI 1.22;1.48) were positively associated with the outcome; no significant difference was found between sexes. **Conclusion:** positive self-perception of diet is associated with healthy eating indicators among adults and the elderly and can be useful in epidemiological surveys.

Keywords: Food Consumption; Self Report; Health Surveys; Cross-Sectional Studies.

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Epidemiol. Serv. Saude, Brasília, 28(3):e2018197, 2019

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Introduction

The Brazilian People's Food Guide and the Ten Steps for Healthy Eating – official Ministry of Health document, is dedicated to the approach and recommendation of a adequate and healthy eating, being configured as instruments extremely important to achieve a behavior change in the Brazilian population.[1-3] When a person has an adequate level of information about health and nutrition and their individual perception is critical, it is possible for them to keep to a greater number of healthy indicators,[4,5] regardless of income. Income, or the cost of food, is one of the main factors influencing health behavior and, consequently, is an aspect to be assessed when choosing what food to buy.[6]

The relationship between a person's self-perception of the quality of what they eat and the occurrence of truly health eating habits is, however, little explored in the national and international literature. The studies existing on this theme have evaluated this outcome, mostly among school students and adolescents, and have identified a direct relationship between positive self-perception of diet and more adequate eating habits.[1,2,4] In research into food and nutrition, eating habits are evaluated by administering a questionnaire on eating frequency or through standardized surveys that generally require a long time to be conducted.[7,8] They are not very practical instruments for situations in which contact between health professionals and their patients is brief. The importance of proposing a question about self-perception, capable of identifying people's eating habits[4,9] and the risk represented by unhealthy eating habits, should be reflected in the indication of target groups for possible interventions.[10]

> *When a person has an adequate level of information about health and nutrition and their individual perception is critical, it is possible for them to keep to a greater number of healthy indicators, regardless of income.*

The objective of this article was to analyze the prevalence of positive self-perception of diet and its association with sociodemographic and behavioral factors, morbidities, self-perception of health/weight and body weight care in the municipality of Rio Grande, located in Rio Grande do Sul state, Brazil, in 2016.

Methods

This is a cross-sectional population-based study conducted in the south of Rio Grande do Sul state. It is part of a larger study entitled 'Health of the Population of Rio Grande-RS',[11] the purpose of which was to investigate diverse aspects of the health profile of the population of Rio Grande. This municipality iis located in the far south of the state, it had around 200,000 inhabitants and a human development index (HDI) of 0.744 In 2010.[13] In 2015, its economy continued to based mainly on its seaport and its gross domestic product (GDP) was close to BRL 35,000 per capita/per annum.

The study's target audience was comprised of individuals aged 20 years or over who lived in the urban area of Rio Grande. We excluded those who were institutionalized in hospices, hospitals and prisons, or who had physical and/or mental disabilities that prevented them from answering the questionnaire.

Sample size was calculated using as a parameter 51% prevalence for the outcome studied,[2,10,14] a 95% confidence level and an acceptable error rate of 3 percentage points. With regard to associated factors, we considered a prevalence ratio (PR)[13] of 1.5, a 95% confidence level, 80% power, exposed frequency of between 35% and 50%, as well as a design effect of 1.5, 10% for losses and 15% for control of confounding factors. The final sample size was 1152 individuals. Calculations were performed using Epi Info 7.0 (Centers for Disease Control and Prevention, Atlanta, United States). As this study was part of a larger study that had different outcomes, we decided to use the larger sample size calculated (n=1423) so as to make the study representative for the different independent variables investigated, whereby power of 90% was considered for this number (1423).

In order to ensure sample representativeness, the sampling process occurred in two stages: census tract and household, in accordance with data from the 2010 Demographic Census.[12] Initially we identified the 293 census tracts of the urban area of Rio Grande and systematically selected from within them all the urban households (77,835), placed in decreasing order according to the average monthly income of the head of the household. After randomly selecting the first household, we then performed systematic selection, by "skipping" 1,080 households and thus selecting 72 census tracts.

Random selection was then performed to determine which households to be studied. We reached a total of 711 residences, with 32 residences being "skipped" and an expected average of 2.08 individuals per household.[12] Census tract and household selection was done based on probability proportional to the population and the number of households per census tract.

Data collection took place between April and June 2016 and was done by nine interviewers trained beforehand. The interviews were conducted in the selected households with all eligible dwellers, following the script of a questionnaire structured, standardized and previously tested comprised of sociodemographic and general health questions, pre-coded.

The study outcome, positive self-perception of diet, was investigated by asking the question "*How do you rate your diet?*" with the following answer alternatives: 'very good', 'good', 'regular', 'poor' or 'very poor'. For the purposes of analysis, this variable was dichotomized between positive (very good/good) and negative (regular/poor/very poor).

We used 13 indicators of healthy eating, collected over what was a usual week for participants. These indicators were established according to the Brazilian People's Food Guide recommendations. This publication, which was reformulated in 2014,[3] provides guidance as to giving preference to natural food or minimally processed food, rather than ultra-processed food, so as to have a diet comprised of healthy meals.[3] The following are the indicators we used:

I) having breakfast;
II) having lunch;
III) having an afternoon snack or coffee;
IV) having dinner;
V) having a snack or coffee before going to bed at night;
VI) habit of eating visible fat on red meat and/or eating chicken skin; and
VII) adding more salt.

Indicators I to VII were collected in a dichotomous manner (yes/no); for indicators I to V, appropriate consumption was when the answer was 'yes', while for indicators VI to VII is was when the answer was 'no'.

A further six indicators were collected relating to consumption frequency:

VIII) number of days a week you usually eat leguminous plants;
IX) number of days a week you usually eat greenery or vegetables;
X) number of days a week you usually eat fruit;

XI) number of days a week you usually eat fish;
XII) number of days a week you usually eat food containing sugar – ice cream, chocolate, cake, biscuits or confectionary –; and
XIII) number of days a week you usually drink soda or artificial fruit juice.

These indicators were collected in a polytomous manner: (a) never/hardly ever; (b) 1 to 2 days a week; (c) 3 to 4 days a week; (d) 5 to 6 days a week; (e) every day (including Saturday and Sunday). For the purpose of analysis these indicators were subsequently dichotomized based on adapted Brazilian People's Food Guide recommendations.[3] For indicators VIII to XI, consumption was considered to be adequate when frequency was equal to or greater than 3 times a week; while for indicators XII and XIII, adequate consumption was considered to be 'never/hardly ever' and '1 to 2 days a week'.

The following independent variables were included:
a) Sociodemographic
- sex (male; female);
- age (in years: 20-29; 30-39; 40-49; 50-59; 60 or more);
- self-reported race/skin color (white; black/brown/yellow/indigenous);
- marital status (married; single; divorced/separated/widowed);
- schooling (in years of study: 0-4; 5-8; 9-11; 12 or more); and
- income (in quartiles: 1st quartile [poorest], BRL 293.3 - BRL 520.0; 2nd quartile, BRL 750.0 - BRL 905.5; 3rd quartile, BRL 1,166.7 - BRL 1,500.0; and 4th quartile [wealthiest], BRL 2,200.0 - BRL 4,400.0), whereby the minimum wage in 2016 was BRL 880.00.
b) Behavior variables (answer options: 'yes' or 'no')
- tobacco smoking (non-smoker; former smoker/smoker);
- alcoholic beverage consumption (does not drink; drinks less than once a week /number of times drinks per week);
- physical activity in leisure time, measured as per the 'Leisure' section of the International Physical Activity Questionnaire (IPAQ-SHORT), which defines as being active a person who does ≥150 minutes of physical activity a week;[15]
c) Body mass index (BMI) (underweight; normal weight; overweight; obese);
d) Self-reported morbidities (presence or absence) - diabetes; - hypertension; - depression - this latter variable being collected as per the Patient Health Questionnaire (PHQ-9), which defines depression as ≥9;[16]

e) Food insecurity, measured by the Brazilian Food Insecurity Scale (EBIA) (food security; mild food insecurity; moderate/severe food insecurity);[17]

f) Self-perception of health (excellent/very good; good; regular/poor)

g) Self-perception of body weight (normal; very thin/thin/slightly thin; very fat/fat/slightly fat); and

h) Body weight care. This variable was collected by asking *"Are you doing anything to lose weight or gain muscle mass?"*, with 'yes' or 'no' as the answer options.

All answered questionnaires were checked and input twice by different typists using EpiData® 3.1 (EpiData Association, Denmark). Quality control was performed by partially repeating 10.5% of the interviews using selected key questions in order to check the reliability of the instrument. The mean value of the Kappa coefficient for agreement between the questions was 0.80 (variation = from 0.27 [number of times a week spent walking in free time] to 0.93 [existence of landline telephone in household]), demonstrating substantial agreement.[18]

First of all we calculated the absolute and relative frequencies of the five Likert scale categories contained in the outcome (positive self-perception of diet), as well as prevalence and 95% confidence interval (95%CI) of the dichotomized outcome.

We used Poisson regression to study the impact of the independent variables on the outcome, taking into consideration the effect of the study design. We calculated the prevalence ratios (PR) and their 95%CI. We used a four-level hierarchical model. The first level was comprised of the demographic and socio-economic variables, while the second level was comprised of the behavioral variables. The third level contained variables relating to morbidity and food security, while the fourth level contained self-perception of health and self-perception of body weight and body weight care variables. Exposures of interest were adjusted for variables on the same level an on higher levels, so that only variables having p≤0.20 remained in the model. We used the Wald test as the statistical test.

We then estimated the PR and 95%CI of each of the food consumption indicators. Finally, applying the proportion test enabled us to analyze differences between the food consumption indicators and the 'healthy self-perception' outcome, stratified by sex.

Data analysis was performed using Stata® version 14.0 (StataCorp/College Station, United States). A significance level of less than 5% was adopted for the two-tailed tests and the sampling design effect was taken into consideration in all the analysis by using the survey (svy) command.

The research protocol was submitted to and approved by the Federal University of Rio Grande (FURG) Health Research Ethics Committee (CEPAS), under number 20/2016. All ethical principles were assured, the Free and Informed Consent form was presented to the respondents and all participants signed it, thus ensuring the right not to take part in the study and ensuring their right to confidentiality.

Results

A total of 1,243 questionnaires were answered (8.9% losses and refusals). The study outcome was answered by 1,240 individuals. More than half were females (56.4%), the majority self-reported having White race/skin color (83.1%) and average age was 47 years (standard deviation [SD]: ±16.6 years). Some 57% had more than 9 years of schooling, and median income was BRL 1,000.00 (P25: BRL 625.00-P75; BRL 1,764.00). The majority did not do physical activities in their leisure time (77.5%) and food insecurity was found in 34.5% of households (Table 1).

The frequencies of diet self-perception were: very good - 16.9%; good - 55.5%; regular - 23.2%; poor - 3.4%; and very poor - 1.0%. When this variable was dichotomized, prevalence of positive self-perception of diet was 72.4% (95%CI 69.9;74.9).

The crude PRs and the PRs adjusted for the outcome are shown in Table 2. In the adjusted analysis, outcome prevalence was lower among females when compared to males (PR=0.94 − 95%CI 0.80;1.00). Individuals aged 60 or over had 1.28 times more probability of having the outcome, compared to those in the 20-29 age range, probability was also greater for those in the highest income quartile (PR=1.17 − 95%CI 1.04;1.32), in relation to those in the poorest quartile. On the second level, the outcome increased among those who did physical activity for 150 minutes or more in their leisure time (PR=1.17 − 95%CI 1.08;1.26). On the third level, individuals who reported morbidities such as diabetes (PR=0.98 − 95%CI 0.84;1.14) and depression (PR=0.78 − 95%CI 0.81;0.95) were less likely to have positive self-perception of diet. With regard to food insecurity, the outcome was less likely among those facing mild food insecurity (PR=0.88 − 95%CI 0.81;0.95).

Table 1 – Description of the sample of adults and elderly people (n=1,243), Rio Grande, Rio Grande do Sul, 2016

Variables	Overall sample	
	N	%
Sex		
Male	542	43.6
Female	701	56.4
Age (in years)		
20-29	226	18.2
30-39	225	18.1
40-49	240	19.3
50-59	237	19.1
≥60	315	25.3
Race/skin color (n=1,241)		
White	1,301	83.1
Black/brown/yellow/indigenous	210	16.9
Marital status		
Married	476	38.3
Single	545	43.8
Divorced/separated/widowed	222	17.9
Schooling (in years of study) (n=1,241)		
0-4	190	15.3
5-8	343	27.6
9-11	367	29.6
≥12	341	27.5
Income in quartiles (n=1,123)		
1st quartile (poorest)	284	25.3
2nd quartile	306	27.2
3rd quartile	255	22.7
4th quartile (wealthiest)	278	24.8
Tobacco smoking		
No	1,003	81.5
Yes	230	18.5
Alcoholic beverage consumption (n=1,242)		
No	896	72.1
Yes	346	27.9
Physical activity in leisure time[a] (n=1,233)		
Insufficiently active	956	77.5
Sufficiently active	277	22.5

a) As per the 'Leisure' section of the International Physical Activity Questionnaire (IPAQ-SHORT), which defines as being active a person who does ≥150 minutes of physical activity a week.
b) As per the Patient Health Questionnaire (PHQ-9), which defines depression as ≥9.
c) Brazilian Food Insecurity Scale (EBIA).

Table 1 – Description of the sample of adults and elderly people (n=1,243), Rio Grande, Rio Grande do Sul, 2016

Variables	Overall sample	
	N	%
Body mass index (BMI) (n=1,189)		
Underweight	14	1.2
Normal weight	431	36.2
Overweight	458	38.5
Obese	286	24.1
Diabetes (self-reported) (n=1,239)		
No	1,149	92.7
Yes	90	7.3
Hypertension (self-reported) (n=1,242)		
No	879	70.8
Yes	363	29.2
Depression[b] (n=1,238)		
No	893	72.1
Yes	345	27.9
Self-perception of healthy eating habits (n=1,240)		
Negative	342	27.6
Positive	898	72.4
Food insecurity[c] (n=1,224)		
Food security	802	65.5
Mild food insecurity	330	27.0
Moderate/severe food insecurity	92	7.5
Self-perception of health		
Excellent/very good	263	21.2
Good	560	45.0
Regular/poor	420	33.8
Self-perception of body weight (n=1,242)		
Normal	123	9.9
Very thin/thin/slightly thin	563	45.3
Very fat/fat/slightly fat	556	44.8
Body weight care		
No	973	78.3
Yes	270	21.7
Total	1,243	100.0

a) As per the 'Leisure' section of the International Physical Activity Questionnaire (IPAQ-SHORT), which defines as being active a person who does ≥150 minutes of physical activity a week.
b) As per the Patient Health Questionnaire (PHQ-9), which defines depression as ≥9.
c) Brazilian Food Insecurity Scale (EBIA).

On the fourth level we found that positive perception of diet was lower among those whose self-perception of their health was regular or poor (PR=0.75 – 95%CI 0.66;0.86) (p=0.001), when compared to those who reported excellent or very good self-perception of their health. Those who reported being careful with their body weight were more likely to perceive their eating habits as being positive (PR=1.10 – 95%CI 1.01;1.21).

Ten of the thirteen indicators of adequate eating habits were significantly associated with the outcome (Table 3).

Table 2 – Prevalence and crude and adjusted analysis of factors associated with positive self-perception of diet among adults and elderly people (n=1,240), Rio Grande, Rio Grande do Sul, 2016

Variables	Prevalence of positive self-perception of diet (n=898) N (%)	Crude Analysis		Adjusted Analysis	
		PR[a] (95%CI[b])	p[c]	PR[a] (95%CI[b])	p[c]
1st level					
Sex			0.297		0.071
Male	400 (73.9)	1.00		1.00	
Female	498 (71.2)	0.97 (0.90;1.03)		0.94 (0.88;1.00)	
Age (in years)			<0.001		<0.001
20-29	142 (62.8)	1.00		1.00	
30-39	140 (62.2)	0.98 (0.84;1.14)		0.93 (0.80;1.08)	
40-49	163 (67.9)	1.08 (0.93;1.25)		1.06 (0.92;1.22)	
50-59	190 (80.2)	1.26 (1.12;1.44)		1.23 (1.09;1.39)	
≥60	263 (84.3)	1.33 (1.17;1.51)		1.28 (1.13;1.44)	
Race/skin color (n=896)			0.594		0.249
White	739 (71.9)	1.00		1.00	
Black/brown/yellow/indigenous	157 (74.8)	1.03 (0.93;1.14)		1.05 (0.95;1.16)	
Marital status			0.028		0.641
Married	360 (75.8)	1.00		1.00	
Single	367 (67.6)	0.90 (0.82;0.98)		0.99 (0.89;1.09)	
Divorced/separated/widowed	171 (77.0)	1.01 (0.93;1.11)		0.96 (0.87;1.05)	
Schooling (in years of study) (n=897)			0.081[d]		0.395[d]
0-4	144 (76.6)	1.00		1.00	
5-8	257 (74.9)	0.98 (0.88;1.10)		0.99 (0.88; 1.11)	
9-11	260 (71.0)	0.93 (0.82;1.06)		0.96 (0.83;1.11)	
≥12	236 (69.2)	0.92 (0.81;1.03)		0.95 (0.82;1.11)	
Income in quartiles (median; P25/P75 in BRL)[e] (n=810)			0.002[d]		0.017[d]
1st quartile - poorest (BRL 293.3 to BRL 520.0)	183 (64.4)	1.00		1.00	
2nd quartile (BRL 750.0 to BRL 905.5)	219 (72.3)	1.13 (1.01;1.25)		1.09 (0.98;1.22)	
3rd quartile (BRL 1,166.7 to BRL 1,500.0)	187 (73.3)	1.14 (1.01;1.28)		1.07 (0.95;1.20)	
4th quartile - wealthiest (BRL 2,200.0 to BRL 4,400.0)	221 (79.5)	1.24 (1.10;1.40)		1.17 (1.04;1.32)	
2nd level					
Current tobacco smoking			0.205		0.398
No	740 (73.2)	1.00		1.00	
Yes	158 (69.0)	0.94 (0.86;1.04)		0.95 (0.84;1.07)	
Alcoholic beverage consumption (n=897)			0.564		0.927
No	643 (71.0)	1.00		1.00	
Yes	254 (73.6)	1.03 (0.95;1.11)		1.00 (0.91;1.09)	
Physical activity in leisure time[f] (n=893)			<0.001		<0.001
Insufficiently active	667 (69.8)	1.00		1.00	
Sufficiently active	226 (81.6)	0.86 (0.80;0.92)		1.17 (1.08;1.26)	
Body mass index (BMI) (n=854)			0.009[d]		0.015[d]
Underweight	11 (78.6)	1.00		1.00	
Normal weight	325 (75.6)	0.96 (0.74;1.25)		0.90 (0.69;1.17)	
Overweight	329 (71.8)	0.91 (0.71;1.17)		0.86 (0.67;1.10)	
Obese	189 (66.1)	0.85 (0.65;1.09)		0.80 (0.62;1.05)	

a) PR: prevalence ratio.
b) 95%CI: 95% confidence interval.
c) P-value obtained using Wald's heterogeneity test.
d) P-value obtained using Wald's linear trend test.
e) Taking the Brazilian minimum wage of BRL 880.00 in 2016.
f) As per the 'Leisure' section of the International Physical Activity Questionnaire (IPAQ-SHORT), which defines as being active a person who does ≥150 minutes of physical activity a week.
g) As per the Patient Health Questionnaire (PHQ-9), which defines depression as ≥9.
h) Brazilian Food Insecurity Scale (EBIA).
Note: Sampling design effect taken into consideration.

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Table 2 – Prevalence and crude and adjusted analysis of factors associated with positive self-perception of diet among adults and elderly people (n=1,240), Rio Grande, Rio Grande do Sul, 2016

Variables	Prevalence of positive self-perception of diet (n=898) N (%)	Crude Analysis		Adjusted Analysis	
		PR[a] (95%CI[b])	p[c]	PR[a] (95%CI[b])	p[c]
3rd level					
Diabetes (self-reported) (n=895)	0.972		0.761		0.071
No	829 (72.3)	1.00		1.00	
Yes	66 (73.3)	1.00 (0.88;1.14)		0.98 (0.84;1.14)	
Hypertension (self-reported)	0.791		0.094		<0.001
No	637 (72.6)	1.00		1.00	
Yes	261 (72.1)	0.99 (0.92;1.07)		0.93 (0.85;1.01)	
Depression[g] (n=896)	<0.001		<0.001		0.249
No	697 (78.1)	1.00		1.00	
Yes	199 (57.7)	0.74 (0.68;0.81)		0.78 (0.81;0.95)	
Food insecurity[h] (n=884)	<0.001		0.006		0.641
Food security	604 (75.5)	1.00		1.00	
Mild food insecurity	214 (64.9)	0.86 (0.80;092)		0.88 (0.81;0.95)	
Moderate/severe food insecurity	66 (71.7)	0.95 (0.81;1.12)		1.01 (0.85;1.22)	
4th level					
Self-perception of health	<0.001 d		0.001[d]		0.398
Excellent/very good	210 (79.9)	1.00		1.00	
Good	439 (78.4)	0.98 (0.91;1.06)		0.98 (0.89;1.07)	
Regular/poor	249 (59.7)	0.74 (0.66;0.83)		0.75 (0.66;0.86)	
Body weight care	<0.001		0.030		0.927
No	682 (70.3)	1.00		1.00	
Yes	216 (80.0)	1.15 (1.07;1.23)		1.10 (1.01;1.21)	
Self-perception of body weight (n=897)	<0.001		<0.001		<0.001
Normal weight	89 (73.0)	1.00		1.00	
Thin (very thin/slightly thin/thin)	452 (80.4)	1.09 (0.97;1.23)		0.99 (0.88;1.14)	
Fat (very fat/slightly fat/fat)	356 (64.1)	0.88 (0.77;1.00)		0.80 (0.69;0.95)	

a) PR: prevalence ratio.
b) 95%CI: 95% confidence interval.
c) P-value obtained using Wald's heterogeneity test.
d) P-value obtained using Wald's linear trend test.
e) Taking the Brazilian minimum wage of BRL 880.00 in 2016.
f) As per the 'Leisure' section of the International Physical Activity Questionnaire (IPAQ-SHORT), which defines as being active a person who does ≥150 minutes of physical activity a week.
g) As per the Patient Health Questionnaire (PHQ-9), which defines depression as ≥9.
h) Brazilian Food Insecurity Scale (EBIA).
Note: Sampling design effect taken into consideration.

The proportion of individuals with indicators of a healthy diet and positive self-perception of their eating habits was greater than 70.0%. There was no difference in the prevalence rates of healthy diet indicators between males and females (Table 4).

Discussion

Standing out among the main findings of this study is the prevalence of positive self-perception of diet and its association with ten indicators of adequate food consumption. Greater frequency of positive self-perception of diet was found among people who were older, had higher income and were considered sufficiently physically active, in contrast to those who reported depression and mild food insecurity.

The prevalence of positive self-perception of diet found in this study is similar to that found in other research conducted in Brazil.[10,19] In 2016, a study carried out in the country's southern region revealed 69% prevalence of positive self-perception of diet in a sample of adults and elderly people who used the urban primary health care network.[10] In the study conducted by the National Health and Nutrition Examination Survey (NHANES) 2005-2006, however, only 33% of the adult United States population perceived their diet as being

Table 3 – Association between positive self-perception of diet and indicators of healthy eating among adults and elderly people (n=1,240), Rio Grande, Rio Grande do Sul, 2016

Variables	Positive self-perception of diet	
	PR[a]	95%CI[b]
Having breakfast		
No	1.00	–
Yes	1.46	1.22;1.75
Having lunch		
No	1.00	–
Yes	1.77	1.00;3.13
Having an afternoon snack or coffee		
No	1.00	–
Yes	1.16	1.05;1.30
Having dinner		
No	1.00	–
Yes	0.95	0.84;1.07
Having a snack or coffee before going to bed at night		
No	1.00	–
Yes	1.19	1.11;1.27
Leguminous plant consumption[c]		
Inadequate	1.00	–
Adequate	1.18	1.04;1.32
Greenery or vegetable consumption[c]		
Inadequate	1.00	–
Adequate	1.33	1.22; 1.45
Fruit consumption[c]		
Inadequate	1.00	–
Adequate	1.35	1.22;1.48
Fish consumption c (n=1,177)[e]		
Inadequate	1.00	–
Adequate	1.15	1.04;1.26
Soda and artificial fruit juice consumption[d]		
Inadequate	1.00	–
Adequate	1.15	1.06;1.24
Sweetened food consumption d (n=1,239)[e]		
Inadequate	1.00	–
Adequate	1.01	0.93;1.09
Adding more salt [d]		
No	1.00	–
Yes	0.90	0.76;1.03
Habit of eating visible fat on red meat and/or eating chicken skin		
No	1.00	–
Yes	0.85	0.77;0.93

a) PR: prevalence ratio.
b) 95%CI: 95% confidence interval.
c) Adequate = when consumption 3 or more days a week reported.
d) Adequate = when consumption of up to 2 days a week reported.
e) Sample number available for this variable.
Note: Sampling design effect taken into consideration.

Table 4 – Association between positive self-perception of diet and indicators of healthy eating, stratified by sex, in adults and elderly (n=898), Rio Grande, Rio Grande do Sul, 2016

Variables	Occurrence of positive self-perception of diet		
	Female (n=498) n (%)	Male (n=400) n (%)	p-value[a]
Having breakfast	452 (73.6)	354 (78.7)	0.075
Having lunch	493 (71.8)	398 (74.3)	0.402
Having an afternoon snack or coffee	416 (72.5)	297 (77.8)	0.068
Having dinner	458 (70.7)	366 (73.9)	0.287
Having a snack or coffee before going to bed at night	145 (82.4)	131 (0.4)	0.443
Adequate consumption of leguminous plants[b]	387 (73.6)	332 (76.5)	0.319
Adequate consumption of greenery or vegetables[b]	360 (79.7)	248 (79.7)	1.000
Adequate consumption of fruit[b]	358 (79.6)	254 (81.2)	0.549
Adequate consumption of fish[b]	33 (82.5)	37 (82.2)	0.906
Adequate consumption of soda and artificial fruit juice[c]	231 (66.0)	225 (69.7)	0.238
Adequate consumption of sweet foodstuffs[c]	249 (71.5)	189 (73.4)	0.527
Does not add more salt to food	454 (71.2)	362 (75.7)	0.130
Does not eat eating visible fat on red meat and/or chicken skin	182 (63.4)	206 (68.2)	0.133

a) P-value obtained from proportion test.
b) Adequate = when consumption 3 or more days a week reported.
c) Adequate = when consumption of up to 2 days a week reported.

excellent or very good (high score) and 42% considered it to be good (medium score).[14] The prevalence of positive self-perception of diet found in the United States would have been close to that found in our study if the 'good' (medium score) classification in the United States study had been considered positive. Methodological differences, such as the type of instrument used to measure the outcome, can be seen between studies, thus highlighting the importance of defining evaluation criteria in the sense of enabling greater comparability between the literature.

Differences in positive self-perception of diet can also occur for other reasons, in particular cultural differences (different considerations as to what is adequate, according to countries and cultures) and time differences (different periods of time in which studies are conducted). Firstly, it is important to define adequate diet according to Ministry of Health recommendations – such as the Brazilian People's Food Guide –,[3] taking into consideration the variability of the concept over time, according to the reasons mentioned above, and their influence on what each person considers to be adequate in terms of their own diet.

In this study, ten of the thirteen indicators of healthy diet studied were associated with the outcome. Association between self-perception of diet and health and food outcomes has been reported in other noteworthy studies in the literature.[14,19-21] Self-perception of diet can therefore be a simple and feasible means of inferring the quality of a person's diet.[4,22]

Females had lower positive perception of diet than males. This can possibly be explained by the fact of women paying more attention to aspects relating to taking care with health and diet and therefore identifying better what is healthy and being more judicious in their self-evaluation.[10] As males have been historically associated with taking less care of their health, having a diet with more fat and greater intake of alcoholic beverages, they may possibly have less perception of the impact of these habits on maintaining a healthy life.[10,19]

Age was associated with better self-perception of diet. It is known that older people demonstrate greater variety in food intake.[6,8,14,20] The elderly may also restrict intake of some types of food, as a preventive or treatment measure in the face of chronic diseases and, as a consequence of this attitude, may consider

their diet to be healthier.[8,14] In our study, schooling did not show any statistical difference with perception of diet. Notwithstanding, other studies have found that individuals with less schooling have less perception of diet, less access to information and to health care.[23,24]

Both income and food security were associated with the outcome. It is known that among poorer individuals, price is a criterion affecting choice of purchasing food products and can influence not only reduced quantity of food but also loss of its nutritional quality and variety,[6,23] thus impacting negatively on healthy food consumption behavior.[5,6,21]

We found that individuals with poor perception of their state of health had reduced positive perception of their diet, on the contrary to individuals considered to be physically active whose perception was better in relation to the physically inactive. It is consensus in the literature that individuals with a better perception of health are more prone to looking after their health as a whole, thus presenting healthier behaviors.[10,19,21,25,26]

Poorer perception of diet was found among those assessed as having depression. This reinforces the importance of paying attention to diet in this group. Depressed individuals can demonstrate unhealthy behaviors such as, for instance, poor diet, compensatory food intake according to their current mood, sedentariness and sleep alterations.[14]

This study has some limitations. The first lies in its cross-sectional design, since it is possible that individuals with positive self-perception of diet may have made recent changes to their eating habits and that the healthy diet they reported may have been a more recent habit and not a longstanding one. There may also be other types of bias, such as bias related to food intake and the possibility of people giving answers they think are more adequate or even more socially acceptable, especially when the question is posed by someone else. However, food intake items were significantly associated with questions about positive self-perception, suggesting that the respondents' answers were consistent. A cross-sectional design is useful for identifying target groups such as, for example, individuals who intend or feel duty-bound to improve their diet, or who already have morbidities – diabetes, hypertension, hypercholesterolemia –, and who need effective and specific actions. Another limitation was related to the use of subjective questions, the answers to which are conditioned by the individual's interpretation of what is being asked.

Standing out among the study's strong points is its population-based design and the low number of losses and refusals, thus reducing the likelihood of selection bias, as well as interviewer training and the quality control measures applied.

In conclusion, the findings showed that positive self-perception of diet was related to ten of the thirteen diet indicators evaluated. Negative self-diagnosis of diet can stimulate the need for behavior change, as well as provoking the process of adopting adequate dietary habits. This information can be useful for health professionals directly involved in providing people with health guidance. Nevertheless, further studies on this theme are needed in order to gain better understanding of how self-perception is reflected in dietary practices.

Authors' contributions

Machado KP took part in the study design and field work, analyzed the data collected, interpreted the results and was responsible for writing the manuscript. Vaz JS contributed to data analysis and to writing and revising the manuscript. Mendonza-Sassi RA contributed to supervising the study, right from its conception though to its conclusion, as well as revising the data analysis and participating in interpreting the results and critically reviewing the contents of the manuscript. All the authors approved the final version and are responsible for all aspects of the work, including the guarantee of its accuracy and integrity.

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