

Factors associated with the quality of life of Brazilian adults and the elderly: a cross-sectional study

Fatores associados à qualidade de vida de adultos e idosos brasileiros: um estudo transversal

Factores asociados a la calidad de vida de adultos y ancianos brasileños: un estudio transversal

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Abstract

The objective of this study was to analyze the association between socioeconomic, demographic, lifestyle, health, nutrition and food insecurity factors and quality of life (QoL) in 295 Brazilian adults and the elderly residents in Natal-RN, using data from the *Brazilian Usual Consumption Assessment – BRAZUCA* survey. Multivariate analysis using Poisson Regression was used, to verify the association between the QoL, assessed by the WHOQOL-bref instrument, with the independent variables. Having age 40-59 years (PR=1.70; 95%CI 1.10-2.62) or age \geq 60 years (PR=1.55; 95%CI 1.00-2.40); having non-white skin (PR=1.56; 95%CI 1.10-2.19); and being in mild food insecurity (PR=2.70; 95%CI 1.75-4.19) moderate (PR=3.19; 95%CI 2.03-5.00) or severe (PR=3.12; 95%CI 1.80-5.42) were associated with a higher probability of Perceived QoL regular, poor, or very poor. Satisfaction with regular, unsatisfactory, or very unsatisfactory health was associated with mild food insecurity (PR= 1.73; 95%CI 1.26-2.37), emotional disturbances (depression or anxiety) (PR=1.88; 95%CI 1.43-2.49) and being hypertensive (PR=1.39; 95%CI 1.05-1.84). The results suggest the need for public policies that fight inequality, hunger, and promote healthy lifestyles.

Keywords: Adult; Aged; Food security; Quality of life; Socioeconomic factors.

Resumo

O objetivo deste estudo foi analisar a associação entre fatores socioeconômicos, demográficos, de estilo de vida, saúde, nutrição, insegurança alimentar e qualidade de vida (QV) em 295 brasileiros adultos e idosos residentes em Natal-RN, utilizando dados da pesquisa *Brazilian Usual Consumption Assessment - BRAZUCA*. Utilizou-se análise multivariada por Regressão de Poisson, para verificar a associação entre a QV, avaliada pelo instrumento WHOQOL-bref, com as variáveis independentes. Ter idade entre 40-59 anos (RP = 1,70; IC 95% 1,10-2,62) ou idade \geq 60 anos

(RP = 1,55; IC 95% 1,00-2,40); ter pele não branca (RP = 1,56; IC 95% 1,10-2,19); e estar em insegurança alimentar leve (RP = 2,70; IC 95% 1,75-4,19) moderada (RP = 3,19; IC 95% 2,03-5,00) ou grave (RP = 3,12; IC 95% 1,80-5,42) foram associados a uma maior probabilidade de QV percebida regular, ruim ou muito ruim. A satisfação com a saúde regular, insatisfatória ou muito insatisfatória foi associada à insegurança alimentar leve (RP = 1,73; IC95% 1,26-2,37), distúrbios emocionais (depressão ou ansiedade) (RP = 1,88; IC95% 1,43-2,49) e estar hipertenso (RP = 1,39; IC 95% 1,05-1,84). Os resultados sugerem a necessidade de políticas públicas que combatam a desigualdade, a fome e promovam estilos de vida saudáveis.

Palavras-chave: Adulto; Idoso; Segurança alimentar; Qualidade de vida; Fatores socioeconômicos.

Resumen

El objetivo de este estudio fue analizar la asociación entre factores socioeconómicos, demográficos, estilo de vida, salud, nutrición, inseguridad alimentaria y calidad de vida (CV) en 295 adultos y ancianos brasileños residentes en Natal-RN, utilizando datos de la encuesta *Brazilian Usual Consumption Assessment - BRAZUCA*. Se utilizó análisis multivariado por Regresión de Poisson para verificar la asociación entre la CV, evaluada por el instrumento WHOQOL-bref, con las variables independientes. Tener entre 40-59 años (RP = 1,70; IC 95% 1,10-2,62) o ≥ 60 años (RP = 1,55; IC 95% 1,00-2,40); tener piel no blanca (RP = 1,56; IC 95% 1,10-2,19); y la inseguridad alimentaria leve (RP = 2,70; IC 95% 1,75-4,19), moderada (RP = 3,19; IC 95% 2,03-5,00) o grave (RP = 3,00) 12; IC 95% 1,80-5,42) se asociaron con una mayor probabilidad de calidad de vida percibida regular, mala o muy mala. La satisfacción con la salud regular, mala o muy mala se asoció con inseguridad alimentaria leve (RP = 1,73; IC95% 1,26-2,37), trastornos emocionales (depresión o ansiedad) (RP = 1,88; IC95% 1,43-2,49) y ser hipertenso (RP = 1,39; IC 95% 1,05-1,84). Los resultados sugieren la necesidad de políticas públicas que combatan la desigualdad, el hambre y promuevan estilos de vida saludables.

Palabras clave: Adulto; Anciano; Seguridad alimentaria; Calidad de vida; Factores socioeconómicos.

1. Introduction

Demographic and epidemiological scenario observed worldwide, with the increase in population aging and life expectancy, as well as the increase in the prevalence of non-communicable diseases (NCD), highlights the need for special attention to the elderly, and the promotion of longevity with better quality of life (QoL) (Camelo, et al., 2016). Defined as "individuals' perception of their position in life in the cultural and value context in which they live and concerning their goals, expectations, standards and concerns" (The Whoqol Group, 1998), quality of life (QoL) is the object of several studies, playing an important role in explaining the unequal distribution of adverse health outcomes, which is a major public health problem (Rezaei, et al., 2018).

Several factors may expand or restrict people's health, such as gender, age, ethnicity, individual choices, culture, values, access to employment, income, education, adequate food, good health services, basic sanitation, housing, and transportation (The Whoqol Group, 1998; Camelo, et al., 2016; Ribas-Prado, et al., 2016; Liang et al., 2019). The interactions among these social determinants of health generate different results of perception of QoL and can act positively or negatively on health.

The knowledge of conditions that may be related to population QoL can help explain the heterogeneous distribution of adverse health outcomes, support managers in their decisions, and help governments expand actions to ensure better socioeconomic, nutrition and health conditions of the population. Therefore, the objective of this study was to analyze socioeconomic, demographic, lifestyle, health, nutrition and food insecurity factors that may be associated to adult and elderly QoL. The locus of the study was the municipality of Natal, in Northeast Brazil.

2. Methodology

Ethical aspects

The study was submitted to and approved by the Research Ethics Committee of the Federal University of Rio Grande do Norte (UFRN), CAAE no. 96294718.4.2001.5 292, opinion no. 3.531,721, according to the regulatory guidelines of the National Health Council, in relation to research involving human beings (Resolution 466/12). People participating in the

research were duly informed about the objectives, risks, and benefits, and only adults and elderly people who agreed and signed the Free and Informed Consent Term participated in the study.

Survey design and characteristics

This is a transversal, analytical and exploratory research, which used a sub-sample of – the Brazilian Usual Consumption Assessment (BRAZUCA) survey, a study developed among five Brazilian public universities, with the University of São Paulo - USP, as coordinator center. The data present details of a study conducted by the Federal University of Rio Grande do Norte - UFRN (BRAZUCA Natal Study). The survey considered a probability sample by conglomerates in two stages (census sectors and domiciles), with sixty-six (66) census sectors (60 permanent and 6 substitutes) from the city of Natal-RN, with probability proportional to size (number of domiciles), ordered, before the drawing, according to schooling indicators (demographic census of 2010). Up to two residents from different strata and over 20 years of age were selected to participate in the survey in each household. For this article, data were generated from interviews conducted between June and December 2019 of two hundred and ninety-five (295) participants, both male and female, living in the urban area of the municipality of Natal-RN.

Data collection

Interviews at home or in health centers were conducted by trained interviewers, using a digital platform questionnaire created in the EpiCollect5 application, available for smartphones (Android 4.4+ and IOS 8+), tablets, and the web (<https://five.epicollect.net/>). Weight was measured utilizing an electronic scale with 150 kg capacity and 50 g precision. The measurement of height was through a portable stadiometer with 1.0 mm accuracy and an anti-slip base. The classification of the anthropometric state was made from the Body Mass Index (BMI), using the classification of the World Health Organization (WHO) for adults, and the classification of Lipschitz (Lipschitz, 1994) for the elderly, considering the changes in body composition that occur in aging and the recommendations according to the Food and Nutrition Surveillance System (SISVAN) (Brasil, 2011). Thus, the anthropometric nutritional status for adults was classified as underweight BMI < 18.5 kg/m², normal weight BMI ≥ 18.5 - 24.9 kg/m², overweight BMI ≥ 25.0 - 29.9 kg/m² and obesity BMI ≥ 30.0 kg/m². For the elderly, the anthropometric status classification was underweight BMI ≤ 22 kg/m², normal weight BMI between 22 and 27 kg/m² and overweight BMI ≥ 27 kg/m². All equipment used in anthropometry was reviewed and calibrated.

Variables

Evaluation of QoL

The dependent variable was the QoL analyzed by the World Health Organization Quality of Life Assessment abbreviated version (WHOQOL-bref) instrument (Fleck et al., 2000). The instrument is divided into 26 questions, being 2 general questions: "How would you evaluate your QoL? (Variable: Perception of quality of life) and "How satisfied are you with your health? (Variable: Satisfaction with health), and 24 questions divided into four domains that analyze different aspects (facets) of quality of life: physical, psychological, social relations and environment. QoL is measured in scores ranging from 0 to 100 per domain and per general question. Higher scores indicate better QoL. To calculate the scores for each domain of WHOQOL-bref, we followed the guidelines described in the specific syntax for this instrument, analyzed in the program Statistical Package for the Social Science Statistics (SPSS) version 25.

Socioeconomic and demographic conditions

Sex, age, color/race, education, marital status, monthly family income in terciles, employment, daily availability of water at home, water used for drinking, and sanitary sewage system were evaluated.

Lifestyle

The following were evaluated: physical activity (active/very active, irregularly active, sedentary) evaluated by the International Physical Activity Questionnaire (IPAQ) (Matsudo et al., 2001), consumption of alcoholic beverages, tobacco consumption, and daily sleep duration.

Health and nutrition

Health conditions (self-reported) were analyzed through the questions "Do you have hypertension (high blood pressure)?", "Do you have diabetes? Do you have emotional disorders (depression, anxiety)?". The nutritional status was verified through the analysis of the Body Mass Index (BMI) evaluation according to classification for adults and elderly. For the bivariate analysis, the BMI variable was recategorized into deficit and excess weight, to make possible the association of the dependent variable (QoL) with the "excess weight" variable for all adults and elderly. Thus, adults classified as overweight or obese, and the elderly as overweight were considered "overweight".

Food insecurity

The state of Food Insecurity (FI) was evaluated by the Brazilian Scale of Food Insecurity (EBIA in Portuguese) (IBGE, 2014), a psychometric scale that measures the perception and experience of hunger and food insecurity at home, the difficulty of access to food, and the psychological and social dimensions of FI. The scale is categorized into levels that portray the concern with obtaining the necessary food for the near future, to the quantitative reduction of food for adults in the family, and more seriously, for children. Thus, EBIA is classified into food security (FS), mild food insecurity (mild FI), moderate food insecurity (moderate FI), and severe food insecurity (severe FI) (IBGE, 2014).

Statistical Analysis

The distribution of data was tested for quantitative variables, and these did not show normal distribution. In this case, non-parametric tests of Friedman, Mann-Whitney, and Kruskal-Wallis were used to identify differences in the distribution of the dependent variable (QoL) and independent variables. To check the association between general QoL questions and independent variables, Poisson's bivariate analysis was carried out to identify gross prevalence (RP) ratios, besides controlling confounding variables. After bivariate analysis, independent variables with less than 20% association ($p < 0.20$), entered the multivariate analysis by Poisson's regression with robust variance, remaining in the final model only variables with a 5% significance level ($p < 0.05$). Collinear variables were tested, remaining in the final model those that fit better. Considering that QoL and food insecurity can be influenced by sex and age, we chose to keep in the final model these variables, regardless of statistical significance. The SPSS software version 25 was used to perform the statistical analyses.

3. Results

We verified a population composed of low monthly family income ($32.4\% \leq$ US\$ 347.00), low schooling (46.9% studied less than 8 years and 8.2% never studied), and unemployed (35.2%). We point out that 23% of the population does not have daily availability of water and 44.1% of households do not have basic sanitation (Table 1).

Table 1. Socioeconomic and Demographic characteristics of Adults and Elderly (n=295).

Variables	n	%	CI 95%
Sex			
Male	121	41.0	35.4 – 46.9
Female	174	59.0	53.1 – 64.7
Age groups (Years)			
20 – 39	67	22.7	18.1 – 27.9
40 – 59	93	31.5	26.3 – 37.2
≥60	135	45.8	40.0 – 51.6
Skin color/race			
White	106	35.9	30.5 – 41.7
Non White	189	64.1	58.3 - 69.6
Schooling (full years)			
Never studied	24	8.2	5.3 – 11.9
1-8	138	46.9	41.1 – 52.8
9-11	96	32.7	27.3 – 38.3
≥12	36	12.2	8.7 – 16.6
Marital status			
With partner	188	63.7	59.0– 69.2
Without partner	107	36.3	30.8 – 42.0
Monthly Family income in terciles^a			
1st tercil (≤ US\$ 347.0)	90	32.4	26.9 – 38.2
2nd tercil (US\$ 347.0–620.0)	81	29.1	23.9 – 34.9
3rd tercil (≥US\$ 620.0)	107	38.5	32.7 – 44.5
Employment			
Yes	87	30.0	24.8 – 35.6
Retired/pensioner	101	34.8	29.4 – 40.6
No	102	35.2	29.7 – 41.0
Daily availability of water at home			
Yes	227	77.0	71.7 – 81.6
No	68	23.1	18.4 – 28.3
Water used for drinking			
Mineral or treated at home	257	87.1	82.8 – 90.7
No treatment at home	38	12.9	9.3 – 17.3
Sanitary sewage system			

Sanitary sewage	165	55.9	50.1 – 61.7
Septic Tank	118	40.0	34.4 – 45.8
Rudimentary	12	4.1	2.1 – 7.0

^aApproximate values in American dollars, after conversion of the Brazilian Real, on December 31st/2019. Source: Authors (2022).

Regarding lifestyle and health characteristics, 17% of individuals are sedentary, 34.2% are smokers or former smokers, 11.9% consume alcohol more than twice a week, and 37.1% sleep less than 7 hours/day. Hypertension was reported by 38.8% of participants, while 19.0% reported having diabetes mellitus. Emotional disorders such as depression or anxiety were reported by 32.1%. In the BMI analysis, overweight/obesity was found in 75.8% of adults and overweight in 64.4% of elderly. Food insecurity was observed in 48.5% of the interviewees, with 8.1% with severe FI (Table 2).

The perception of QoL was evaluated as “good or very good” by 60.9% of the interviewed individuals, and 60.0% were satisfied or very satisfied with their health (Table 2).

Table 2. Lifestyle, Health and QoL characteristics of Adults and Elderly (n=295).

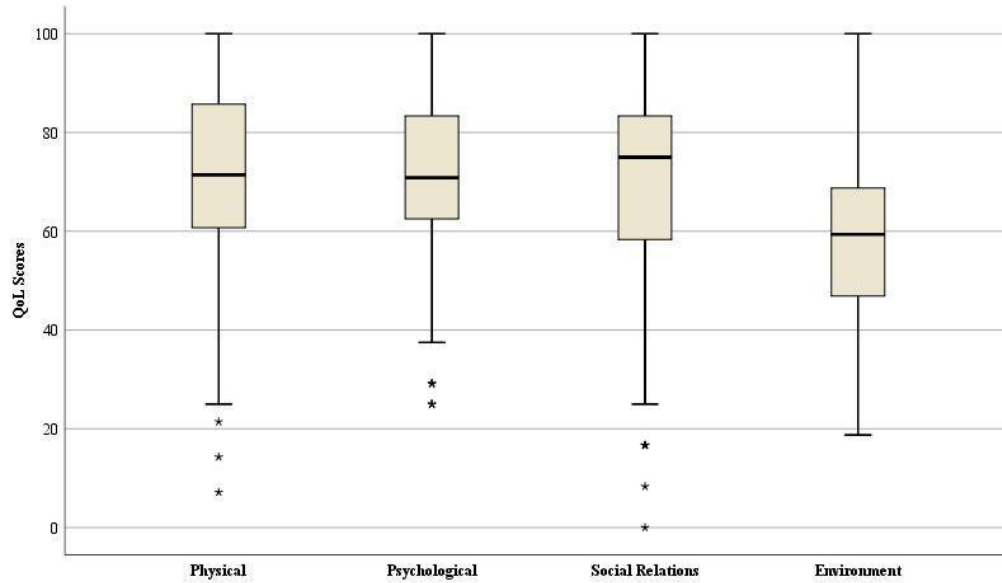
Variables	n	%	CI 95%
Physical activity			
Active/very active	142	48.3	42.5 – 54.2
Irregularly active	102	34.7	29.3 – 40.4
Sedentary	50	17.0	12.9 – 21.8
Consumption of alcoholic beverages			
Never	186	63.0	57.3 – 68.6
1 to 4 times a month	74	25.1	20.2 – 30.4
≥2 times a week	35	11.9	8.4 – 16.1
Tobacco consumption (is/was a smoker)			
No	194	65.8	60.0 – 71.2
Yes	101	34.2	28.8 – 40.0
Sleep duration (hours)			
≥7	178	62.9	57.0 – 68.5
<7	105	37.1	31.5 – 43.0
Emotional disorders (depression, anxiety, etc.)			
No	199	67.9	62.2 – 73.2
Yes	94	32.1	26.8 – 37.8
Hypertension			
No	177	61.2	55.7 – 66.9
Yes	112	38.8	33.1 – 44.6
Diabetes Mellitus			

No	235	81.0	76.0 – 85.4
Yes	55	19.0	14.6 – 24.0
BMI – adults			
Underweight	4	2.5	0.7 – 6.4
Normal weight	34	21.7	15.5 – 28.9
Overweight	63	40.1	32.4 – 48.2
Obesity	56	35.7	28.2 - 43.7
BMI – elderly			
Underweight	8	6.0	2.7 – 11.6
Normal weight	39	29.6	21.9 – 38.1
Overweight	85	64.4	55.6 – 72.5
Food Security (FS)			
Food security	152	51.5	45.7 – 57.4
Mild FI	86	29.2	24.0 – 34.7
Moderate FI	33	11.2	7.8 – 15.4
Severe FI	24	8.1	5.3 – 11.9
Perception of QoL			
Poor/very poor/regular	115	39.1	33.5 – 45.0
Good/very good	179	60.9	55.1 – 66.5
Health Satisfaction			
Unsatisfied/very unsatisfied/regular	118	40.0	34.4 – 45.8
Satisfied/very satisfied	177	60.0	54.2 – 65.6

Source: Authors (2022).

The average scores of the four domains of QoL of the population were 67.7 (SD 13.1) and a median of 68.8. In Figure 1, it is possible to observe that the distribution among the medians is different among the four domains of the variable, and lower values of scores are observed in the environmental domain.

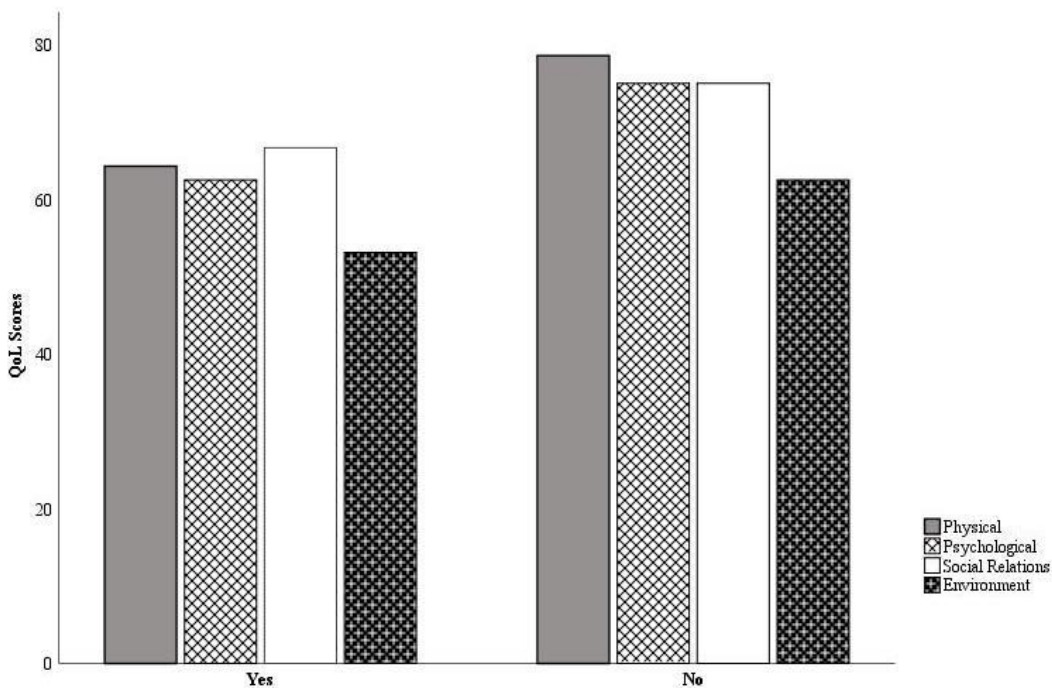
Figure 1. Boxplot of Physical, Psychological, Social Relations and Environmental Domains Distribution of QoL.



Source: Authors (2022).

Mental health, evaluated by the question "Do you have emotional disorders (depression or anxiety)?", was inversely associated with QoL scores in all analyzed domains. Respondents "yes" to this variable had significantly lower QoL scores than those who answered "no" (Figure 2).

Figure 2. Association between Self-reported Emotional Disorders (Depression or Anxiety) and WHOQOL-bref Instrument's Physical, Psychological, Social Relations, and Environmental Domain Scores in Adults and Elderly.



Mann-Whitney U-statistic. $p < 0.05$. All domains differ from the medians between having or not having emotional disorders ($p < 0.01$).

Source: Authors (2022).

In Poisson's multivariate analysis, we identified a higher probability of regular, poor or very poor QoL perception in individuals aged 40 to 59 years (PR=1.70; CI95% 1.10-2.62), non-white (PR= 1.55; CI95% 1.10-2.19) and those with mild FI (PR=2.76; CI95% 1.80-4.22) moderate FI (PR=3.36; CI95% 2.13-5.32) and severe FI (PR=3.21; CI95% 1.83-5.63). A higher probability of satisfaction with regular, unsatisfactory, or very unsatisfactory health was found in individuals with hypertension (PR=1.34; CI 95% 1.02-1.77), who present emotional disorders (PR=1.83; CI 95% 1.39-2.41) and in those with mild FI (PR= 1.75; CI 95% 1.28-2.39). (Table 3).

Table 3. Raw and adjusted Prevalence Ratios (PR) and Confidence Intervals (95%) of Variables Associated with "QoL Perception" and "Health Satisfaction" of Adults and Elderly.

Variables	Perception of QoL				Health satisfaction			
	I – Very good, good.		II – Regular, poor, or very poor.		I – Very satisfied, satisfied.		II - Regular, dissatisfied, very dissatisfied.	
	Raw PR (CI 95%)	P	Adjusted PR ^a (CI 95%)	P	Raw PR (CI 95%)	P	Adjusted PR ^a (CI 95%)	P
Age								
20 – 39	1.00		1.00			NS ^b		NS ^b
40 – 59	1.60 (0.97-2.63)	0.07	1.70 (1.10-2.62)	0.02				
≥60	1.31 (0.79-2.17)	0.30	1.55 (1.00-2.40)	0.05				
Skin color /race								
White	1.00		1.00			NS ^b		NS ^b
Non White	1.43 (0.98-2.11)	0.07	1.55 (1.10-2.19)	0.01				
Food security*								
FS	1.00		1.00		1.00		1.00	
Mild FI	2.53 (1.62-3.96)	<0.001	2.76 (1.80-4.22)	<0.001	2.03 (1.37-3.00)	<0.001	1.75 (1.28-2.39)	0.001
Moderate FI	3.18 (1.98-5.09)	<0.001	3.36 (2.13-5.32)	<0.001	1.65 (0.95-2.87)	0.08	1.52 (0.99-2.33)	0.06
Severe FI	2.86 (1.65-4.95)	<0.001	3.21 (1.83-5.63)	<0.001	0.99 (0.41-2.41)	0.98	1.36 (0.79-2.33)	0.27
Hypertension								
No		NS ^b		NS ^b	1.00		1.00	
Yes					1.64 (1.17-2.30)	0.004	1.34 (1.02-1.77)	0.04
Emotional Disorders								
No		NS ^b		NS ^b	1.00		1.00	
Yes					1.89 (1.35-2.65)	<0.001	1.83 (1.39-2.41)	<0.001

^aPR adjusted by Poisson regression, with a robust estimator for all variables included in the table and sex. ^bNS = Not significant. * χ^2 linear trends for QoL perception and food security <0.001. Source: Authors (2022).

4. Discussion

In summary, results from this study show that low QoL is related to social inequality, food insecurity, chronic diseases and factors that affect mental health.

The results of this study pointed out a deep influence of the social determinants of the health-disease process in the perception of QoL of this population, affecting not only physical health but also mental health. Among these, household food insecurity is a factor that has been widely studied and associated with QoL, not only related to pathologies resulting from food

deprivation in quantity and/or quality, such as malnutrition and nutritional deficiencies (Pérez-Escamilla, 2017), but also to poor physical and mental self-perceived health (Russel, et al., 2016; Lindemann et al., 2019). FI is related to low satisfaction with life and health, reflecting the presence of social inequities, such as social and economic problems experienced by the families involved, as described in the literature (Russel, et al., 2016; Pérez-Escamilla, 2017; Lund, et al., 2017).

Considering that employment is the largest source of income to guarantee family livelihood, unemployment, therefore, represents the limitation of access to food and a risk factor for FI (Santos, et al., 2018). Santos et al. (2018), analyzing the trend and factors associated with food insecurity in Brazil in 2004, 2009, and 2013, observed moderate and severe FI frequencies of 20%, 29%, and 26% higher in the homes of unemployed people, in the periods analyzed, compared to employees.

Another aspect to be highlighted is race. The non-white skin color has been observed as an indicator of social inequity and worse QoL (Camelo, et al., 2016; Bortolotto, et al., 2018). A study by Bortolotto et al. (2018) identified that non-white people had a greater chance of having a worse perception of QoL than white-skinned individuals. Camelo, et al. (2016) assessing the elderly, also found worse QoL, related to physical domain scores, in blacks. Another study on social inequalities by color or race in Brazil (IBGE, 2019) points out that black- and brown-skinned people, despite representing 56% of the Brazilian population, present worse indicators of schooling, income, housing conditions, access to services, goods, and labor market, besides being more subject to violence.

Regarding chronic diseases, low QoL scores have been found in individuals with hypertension and overweight (Muller-Nordhorn et al., 2014; Riley, et al., 2019). In hypertension, QoL scores are lower especially in the physical and mental domains, being worse in the presence of other comorbidities (Riley, et al., 2019; Wong, et al., 2019). Lower vitality and mental health scores were also found in low-income men with hypertension (Xiao, et al., 2019). Also, the QoL of hypertensive elderly people seems to be negatively influenced by sleep disorders (Uchmanowicz, et al., 2019). Regarding overweight, Muller-Nordhorn et al. (2014) also observed an association between increased BMI and decreased physical QoL component, particularly in obese individuals and women.

Depressive symptoms, anxiety, distress, and mental disorders are associated with lower QoL scores, especially among poorer and unemployed populations (Hassanzadeh, et al., 2016; Rong et al., 2019), indicating that possibly income is a determining factor for the presence of emotional disorders. In a study by Hassanzadeh et al. (2016), income was a factor directly and indirectly associated with mental health status, suggesting that changes in socioeconomic conditions can lead to positive changes in general health status and mental health.

Thus, the association between depressive symptoms/emotional disorders with inadequate sleep and low QoL is manifested mainly in socially vulnerable individuals, such as those experiencing food insecurity (Lee & Kim, 2019). Sleep disorders due to study or work, health problems (Uchmanowicz, et al., 2019), and dissatisfaction with life and physical inactivity (Barros, et al., 2019), can lead to a low perception of QoL.

Lower QoL scores in the environmental domain, like those found in our study, were observed in a survey conducted with users of health centers in Belo Horizonte/Brazil (Almeida-Brasil, et al., 2017) and among respondents from population-based studies in Pakistan (Lodhi, et al., 2019). These studies corroborate the fact that the QoL of socially vulnerable populations is influenced especially by aspects of their environment and highlight the importance of investing in public development policies and urban planning that improve the QoL of populations living in vulnerable areas (Almeida-Brasil, et al., 2017).

Regarding the daily availability of water in the household, it is worth mentioning that the worrying percentage of unmet households violates the right to health and adequate food, preventing these citizens from having basic conditions that allow them to live in dignity (Abrandh, 2013).

Aging, as well as low income and low schooling, is negatively associated with QoL and health, as QoL scores decrease significantly as age increases (Lodhi, et al., 2019). Our results corroborate the literature when we found that the group of 40 to 59 years old was associated with a higher probability of perceiving regular, poor, or very poor QoL, and the group with ≥ 60 remained at the limit of statistical significance. Loneliness increased chronic diseases and work in old age to continue maintaining the standard of living are the main causes of decreased QoL scores (Lodhi, et al., 2019).

This study has limitations. First, it is a cross-sectional study, which cannot determine the causes that explain the association between QoL and its determinants. Another important point is the homogeneity of the socio-economic profile of the evaluated population, of high socioeconomic vulnerability, constituted by almost 68% of interviewees with monthly family income less than 253 dollars and 55.1% with low or no schooling. This homogeneity of the sample may have made some analyses difficult and prevented QoL associations with other factors. The absence of analysis of risk factors differentiated between adults and elderly, and between men and women, was another limitation. The stratified analysis by life phase and sex could broaden the focus of discussion of differences in QoL and revealed particularities. However, the sample size did not allow such analysis. On the other hand, the limitations do not mitigate the results found.

5. Conclusion

In summary, the results of this study showed that factors related to age, race, food insecurity, the presence of chronic diseases, such as hypertension and those related to mental health, such as depression and anxiety, were associated with quality of life.

We highlight the strong association observed between food insecurity and the population's quality of life. Considering that the data from this study predate the COVID 19 pandemic period, the situation found is worrying, and it was possibly aggravated by social and economic inequalities amplified by the pandemic.

These results present important questions for the monitoring of the analyzed indicators, for the elaboration and implementation of public policies, such as the planning of actions to promote health among adults and the elderly, and strategic plans to address health disparities, which highlights the importance of the study of the quality of life of populations.

In view of these findings, we suggest that future research address issues related to the association of food insecurity with quality of life, by sex and by life cycle, in addition to the development of studies on the promotion of healthy food systems, which aim to reduce chronic diseases in population groups of high social vulnerability.

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References

- ABRANDH. (2013). *O Direito Humano à Alimentação Adequada e o Sistema Nacional de Segurança Alimentar e Nutricional*. http://www.mds.gov.br/webarquivos/publicacao/seguranca_alimentar/DHAA_SAN.pdf
- Almeida-Brasil, C. C., Silveira, M. R., Silva, K. R., Lima, M. G., Faria, C. D. C. M., Cardoso, C. L., Menzel, H. J. K. & Ceccato, M. G. B. (2017). Qualidade de vida e características associadas: aplicação do WHOQOL-BREF no contexto da Atenção Primária à Saúde. *Cien Saude Colet.*, 22(5), 1705–1716. <https://doi.org/10.1590/1413-81232017225.20362015>
- Barros, M. B., Guimarães Lima, M., Ceolim, M. F., Zancanella, E., & Cardoso, T. A. M. (2019). Quality of sleep, health and well-being in a population-based study. *Revista de Saúde Pública*, 53, 82. <https://doi.org/10.11606/s1518-8787.2019053001067>
- Bortolotto, C. C., Mola, C. L., & Tovo-Rodrigues, L. (2018). Qualidade de vida em adultos de zona rural no Sul do Brasil: estudo de base populacional. *Revista de Saúde Pública*, 52(1), 1s-11s. <https://doi.org/10.11606/S1518-8787.2018052000261>
- Brasil. Ministério da Saúde. (2011). Orientações para a coleta e análise de dados antropométricos em serviços de saúde: *Norma Técnica do Sistema de Vigilância Alimentar e Nutricional. SISVAN*. https://bvsm.sau.gov.br/bvsm/publicacoes/orientacoes_coleta_analise_dados_antropometricos.pdf

- Camelo, L. V., Giatti, L., & Barreto, S. M. (2016). Qualidade de vida relacionada à saúde em idosos residentes em região de alta vulnerabilidade para saúde de Belo Horizonte, Minas Gerais. *Rev Bras Epidemiol*, 19(2), 280–293. <https://doi.org/10.1590/1980-5497201600020006>
- Fleck, M. P. A., Louzada, S., Xavier, M., Chachamovich, E., Vieira, G., Santos, L., & Pinzon, V. (2000). Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida “WHOQOL-bref”. *Revista de Saúde Pública*, 34(2), 178–183. <https://doi.org/10.1590/S0034-89102000000200012>
- Hassanzadeh, J., Asadi-Lari, M., Baghbanian, A., Ghaem, H., & Rezaianzadeh, A. (2016). Association between social capital, health-related quality of life, and mental health: a structural-equation modeling approach. *Croat Med J*, 57, 58–65. <https://doi.org/10.3325/cmj.2016.57.58>
- IBGE. (2014). Pesquisa Nacional por Amostra de Domicílios. *Segurança alimentar 2013*. ftp://ftp.ibge.gov.br/seguranca_alimentar_2013/pnad2013_seguranca_alimentar.pdf
- IBGE. (2019). *Desigualdades Sociais por cor ou raça no Brasil*. <http://decada-afro-onu.org/index.shtml>
- Lee, Y. S., & Kim, T. H. (2019). Household food insecurity and breakfast skipping: Their association with depressive symptoms. *Psychiatry Research*, 271, 83–88. <https://doi.org/10.1016/j.psychres.2018.11.031>
- Liang, Z., Zhang, T., Lin, T., Liu, L., Wang, B., Fu, A. Z., Wang, X., Xu, X., Luo, N., & Jiang, J. (2019). Health-related quality of life among rural men and women with hypertension: assessment by the EQ-5D-5L in Jiangsu, China. *Quality of Life Research*, 28(8), 2069–2080. <https://doi.org/10.1007/s11136-019-02139-3>
- Lindemann, I. L., Reis, N. R., Mintem, G. C., Andrés Mendoza-Sassi, R., Grande, R., Rio, G., & Rs, B. (2019). Autopercepção da saúde entre adultos e idosos usuários da Atenção Básica de Saúde. *Ciencia & saude coletiva*, 24(1), 45–52. <https://doi.org/10.1590/1413-81232018241.34932016>
- Lipschitz, D. A. (1994). Screening for nutritional status in the elderly. *Primary Care - Clinics in Office Practice*, 21(1), 55–67. [https://doi.org/10.1016/S0095-4543\(21\)00452-8](https://doi.org/10.1016/S0095-4543(21)00452-8)
- Lodhi, F. S., Montazeri, A., Nedjat, S., Mahmoodi, M., Farooq, U., Yaseri, M., Kasaecian, A., & Holakouie-Naieni, K. (2019). Assessing the quality of life among Pakistani general population and their associated factors by using the World Health Organization’s quality of life instrument (WHOQOL-BREF): a population based cross-sectional study. *Health and quality of life outcomes*, 17(1), 9. <https://doi.org/10.1186/s12955-018-1065-x>
- Lund, T. B., Holm, L., Tetens, I., Smed, S., & Nielsen, A. L. (2017). Food insecurity in Denmark-socio-demographic determinants and associations with eating-and health-related variables. *The European Journal of Public Health*, 28(2), 283–288. <https://doi.org/10.1093/eurpub/ckx121>
- Matsudo, S., Araújo, T., Matsudo, V., Andrade, D., Andrade, E., Oliveira, L. C., & Braggion, G. (2001). Questionário Internacional de Atividade Física (IPAQ): estudo de validade e reprodutibilidade no Brasil. *Atividade física & Saúde*, 6(2), 1–14. <https://doi.org/10.12820/rbafs.v.6n2p5-18>
- Muller-Nordhorn, J., Muckelbauer, R., Englert, H., Grittner, U., Berger, H., & Sonntag, F. (2014). Longitudinal Association between Body Mass Index and Health-Related Quality of Life. *PLOS ONE*, 9(3), e93071. <https://doi.org/10.1371/journal.pone.0093071>
- Pérez-Escamilla, R. (2017). Food Security and the 2015–2030 Sustainable Development Goals: From Human to Planetary Health. *Current Developments in Nutrition*, 1(7), e000513. <https://doi.org/10.3945/cdn.117.000513>
- Rezaei, S., Hajizadeh, M., Salimi, Y., Moradi, G., & Nouri, B. (2018). What Explains Socioeconomic Inequality in Health-related Quality of Life in Iran? A Blinder-Oaxaca Decomposition. *J Prev Med Public Health*, 51, 219–226. <https://doi.org/10.3961/jpmph.18.012>
- Ribas-Prado, M. C., Calais, S. L., & Cardoso, H. F. (2016). Stress, Depressão e Qualidade de Vida em Beneficiários de Programas de Transferência de Renda. *Interação Psicol.*, 20(3), 330–340. <http://dx.doi.org/10.5380/psi.v20i3.35133>
- Riley, E., Chang, J., Park, C., Kim, S., & Song, I. (2019). Hypertension and Health-Related Quality of Life (HRQoL): Evidence from the US Hispanic Population. *Clinical Drug Investigation*, 39(9), 899–908. <https://doi.org/10.1007/s40261-019-00814-4>
- Rong, J., Chen, G., Wang, X., Ge, Y., Meng, N., Xie, T., & Ding, H. (2019). Correlation Between Depressive Symptoms And Quality Of Life, And Associated Factors For Depressive Symptoms Among Rural Elderly In Anhui, China. *Clinical Interventions in Aging*, 14, 1901–1910. <https://dx.doi.org/10.2147%2FCIA.S225141>
- Russel, J. C., Flood, V., Yeatman, H., Wang, J., & Mitchell, P. (2016). Food insecurity and poor diet quality are associated with reduced quality of life in older adults. *Nutrition & Dietetics*, 73, 50–58. <https://doi.org/10.1111/1747-0080.12263>
- Santos, T., Silveira, J., Longo-Silva, G., Ramires, E., & Menezes, R. (2018). Tendência e fatores associados à insegurança alimentar no Brasil: Pesquisa Nacional por. *Cad. Saúde Pública*, 34(4), 66917. <https://doi.org/10.1590/0102-311X00066917>
- The Whoqol Group. (1998). Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. *Psychological Medicine*, 28(3), 551–558. <https://doi.org/10.1017/S0033291798006667>
- Uchmanowicz, I., Markiewicz, K., Uchmanowicz, B., Kołtuniuk, A., & Rosińczuk, J. (2019). The relationship between sleep disturbances and quality of life in elderly patients with hypertension. *Clinical Interventions in Aging*, 14, 155–165. <https://doi.org/10.2147/CIA.s188499>
- Wong, E. L. Y., Xu, R. H., & Cheung, A. W. L. (2019). Health-related quality of life among patients with hypertension: population-based survey using EQ-5D-5L in Hong Kong SAR, China. *BMJ Open*, 9, 32544. <https://doi.org/10.1136/bmjopen-2019-032544>
- Xiao, M., Zhang, F., Xiao, N., Bu, X., Tang, X., & Long, Q. (2019). Health-Related Quality of Life of Hypertension Patients: A Population-Based Cross-Sectional Study in Chongqing, China. *Int. J. Environ. Res. Public Health*, 16, 2348. <https://doi.org/10.3390/ijerph16132348>