saúde EM DEBATE

ORIGINAL ARTICLE

Overweight and obesity: Time trend in the population residing in the city of Rio de Janeiro

Excesso de peso e obesidade: tendência na população residente no município do Rio de Janeiro

Sobrepeso y obesidad: una tendencia en la población residente en el municipio de Río de Janeiro

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DOI: 10.1590/2358-28982026151103281

ABSTRACT This is an ecological time-series study conducted between 2006 and 2021 using data from VIGITEL (Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey). The objective was to analyze trends in overweight and obesity among adults (≥18 years) living in the city of Rio de Janeiro. For temporal analysis, the Prais-Winsten regression model was applied using STATA software, version 13. An increasing trend in the prevalence of overweight was observed across several groups, particularly among individuals aged 65 years or older (APC: 1.18%; 95%CI: 0.78–1.59), Black and Brown individuals (APC: 14.12%; 95%CI: 4.73–24.35), and those with higher education (APC: 2.87%; 95%CI: 2.18–3.57). Regarding obesity, a decreasing trend was observed in the 65 years or older age group (APC: –1.7%; 95%CI: –2.59–0.81) and an increasing trend among those with 12 years or more of education (APC: 3.25%; 95%CI: 1.77–4.75), Black and Brown individuals (APC: 11.29%; 95%CI: 2.08–21.34), and single participants (APC: 2.60%; 95%CI: 1.36–3.86). The findings indicate that overweight and obesity remain significant public health challenges, highlighting the need for comprehensive health promotion strategies to reduce their prevalence and associated impacts.

KEYWORDS Obesity. Health surveys. Health promotion. Public health surveillance.

RESUMO *Estudo ecológico de série temporal, realizado entre 2006 e 2021, com dados do Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico. O objetivo foi analisar a tendência de excesso de peso e obesidade entre adultos (≥ 18 anos) residentes no município do Rio de Janeiro. Para a análise temporal, aplicou-se o modelo de Prais-Winsten, utilizando o software Stata versão 13. Observou-se tendência crescente da prevalência de excesso de peso em diversos grupos, sobretudo entre pessoas com 65 anos ou mais (APC: 1,18%; IC 95%: 0,78-1,59), pretos e pardos (APC: 14,12%; IC 95%: 4,73-24,35) e com maior escolaridade (APC: 2,87%; IC 95%: 2,18-3,57). Quanto à obesidade, houve tendência decrescente na faixa etária de 65 anos ou mais (APC: -1,7%; IC 95%: -2,59-0,81) e crescente entre indivíduos com 12 anos ou mais de estudo (APC: 3,25%; IC 95%: 1,77-4,75), pretos e pardos (APC: 11,29%; IC 95%: 2,08-21,34) e solteiros (APC: 2,60%; IC 95%: 1,36-3,86). Os resultados indicam que o excesso de peso e a obesidade continuam sendo desafios relevantes para a saúde pública, exigindo estratégias amplas de promoção da saúde e redução da prevalência dessas condições.*

PALAVRAS-CHAVE *Obesidade. Inquérito epidemiológico. Promoção da saúde. Vigilância em saúde pública.*

RESUMEN *Este estudio ecológico de series temporales, realizado entre 2006 y 2021, utilizó datos del Sistema de Vigilancia de Factores de Riesgo y Protección para Enfermedades Crónicas mediante Encuestas Telefónicas. El objetivo fue analizar la tendencia del sobrepeso y la obesidad en adultos (≥18 años) residentes en el municipio de Río de Janeiro. Para el análisis temporal, se aplicó el modelo de Prais-Winsten utilizando el software Stata versión 13. Se observó una tendencia creciente en la prevalencia del sobrepeso en varios grupos, especialmente entre personas de 65 años o más (APC: 1,18%; IC del 95%: 0,78-1,59), personas negras y mestizas (APC: 14,12%; IC del 95%: 4,73-24,35) y personas con mayores niveles de educación (APC: 2,87%; IC del 95%: 2,18-3,57). En cuanto a la obesidad, se observó una tendencia decreciente en el grupo de edad de 65 años o más (APC: -1,7%; IC del 95%: -2,59-0,81) y una tendencia creciente entre las personas con 12 o más años de escolaridad (APC: 3,25%; IC del 95%: 1,77-4,75), las personas negras y mestizas (APC: 11,29%; IC del 95%: 2,08-21,34) y las personas solteras (APC: 2,60%; IC del 95%: 1,36-3,86). Los resultados indican que el sobrepeso y la obesidad siguen siendo importantes desafíos para la salud pública, lo que exige estrategias integrales para la promoción de la salud y la reducción de su prevalencia.*

PALABRAS CLAVE *Obesidad. Encuesta epidemiológica. Promoción de la salud. Vigilancia en salud pública.*

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Introduction

The increase in the prevalence of overweight and obesity is a matter of great concern in both developed and developing countries, since they are risk factors for a series of chronic noncommunicable diseases (NCDs), with an impact on the increased risk of premature death and disability in adulthood[1,2]. According to the WHO – World Health Organization, the global prevalence of obesity tripled between 1975 and 2016 and, as a result of this scenario, approximately 1.9 billion adults worldwide were overweight in 2016, 650 million of whom were clinically obese, corresponding to 13% of the world population[3]. In 2023, the World Obesity Atlas highlighted that the impact of this problem on the Gross Domestic Product – GDP will be 3% in 2035, potentially costing the global economy more than US$ 4 trillion[4].

In addition to generating high costs for health systems, including expenditure on medicines, hospitalizations and long-term treatments, the treatment of diseases related to overweight and obesity affects quality of life and the economy more broadly, with loss of earnings in the labor market[3]. In the United States (USA), the per capita costs of a person living with overweight and obesity are 9.9% and 42.7% higher than those of individuals with a healthy body weight[5].

In Europe, overweight is one of the main determinants of disability and death, affecting almost 60% of adults and approximately 7.9% of children under 5 years of age, representing 4.4 million individuals in this age group[6]. The National Health and Nutrition Examination Survey (NHANES), carried out in the USA between 2017 and 2018, indicated that 32.7% of adults aged 20 years or over were overweight, 37.9% were obese and 7.7% were extremely obese[7]. Latin America has one of the highest body mass index (BMI) prevalences in the world[8] and Brazil follows the trend of the other countries in the region, although with important differences by income stratum, level of schooling, sex and race/skin color[9].

The World Obesity Atlas projected an obesity prevalence of 41% in the Brazilian adult population over the next 12 years, generating serious implications for both individuals and society[4].Considering that a preventive approach is essential to mitigate costs and promote a healthier population, the objective of this study is to describe the time trend in the prevalence of overweight and obesity in the population aged 18 years or over residing in the city of Rio de Janeiro.

Material and methods

Study design

Ecological time series study conducted on the basis of the data produced by VIGITEL, the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey, implemented by the Ministry of Health (MS) since 2006. This is a telephone survey whose objective is to monitor the situation of NCDs in the country by means of probabilistic samples of individuals aged 18 years or over; for this analysis, the population of the city of Rio de Janeiro was selected, for the period from 2006 to 2021, with a mean sample of 2,013 interviews/year. According to the established methodology, in each active residential line contact is made with an adult resident and, upon agreeing to participate in the study, the individual to be interviewed is randomly selected[10].

Study setting

This study analyzed VIGITEL data for the city of Rio de Janeiro, the second largest city in the country, with approximately 6.6 million inhabitants, whose HDI – Human Development Index in 2010 was 0.799, ranking 45th in the Brazilian ranking[11]. In addition to having the largest population concentration in the state, the city presents numerous areas with high

social vulnerability. The care model adopted is based on the Family Health Strategy, with coverage of 70% of the population. This locality was chosen because of the scarcity of evidence produced with the VIGITEL System, which is fundamental to guiding the formulation of more effective public policies focused on the health determinants related to NCDs.

Study outcomes

Overweight and obesity were used as outcomes, constructed from the calculation of the body mass index (BMI). Following the WHO recommendations, an individual was considered to be overweight when presenting a BMI equal to or greater than 25 kg/m² and lower than 30 kg/m², and to be obese when the BMI was equal to or greater than 30 kg/m²[12].

The prevalences of overweight and obesity in each year were estimated as: number of individuals with overweight/number of individuals interviewed multiplied by 100, and number of individuals with obesity/number of individuals interviewed multiplied by 100.

Statistical analysis

For the trend analyses, the Prais-Winsten linear regression model[13] was used, considering the prevalences of overweight and obesity as dependent variables and the year of the survey as the explanatory variable. The svy command, which takes the sample weights into account, was applied.

Initially, in order to reduce the heterogeneity of the variance of the residuals, a logarithmic transformation of the prevalence values of each outcome was performed, followed by the application of the Prais-Winsten autoregressive model.

The values of the model coefficients (b1) were estimated and, subsequently, the annual percent change (APC) was calculated; finally, the 95% confidence intervals (95%CI) were calculated[14].

$$\mathrm{APC} = \left[-1 + 10^{\mathrm{b1}}\right] * 100\%$$

$$\mathrm{IC}_{95\%} = \left[-1 + 10^{\mathrm{b_mínimo}}\right] * 100\%; \left[-1 + 10^{\mathrm{b_máximo}}\right] * 100\%$$

The b minimum and b maximum values correspond, respectively, to the minimum and maximum values of the Prais-Winsten confidence interval. For the interpretation of the annual percent change estimates, the following criteria were used: a 95% confidence interval (95%CI) not containing the value zero indicates an increasing trend when the APC is positive and a decreasing trend when the APC is negative. If the value zero is contained in the 95% confidence interval, the series is considered stationary. The variables were stratified by sex (male and female), age groups (18-24; 25-34, 35-44, 45-54, 55-64; 65 years and over), schooling in complete years (0-8, 9-11, 12 and more years), race/skin color (white, brown, black, yellow and indigenous) and marital status (single, married/stable union, widowed and divorced).The analyses were performed using STATA software version 13.

As this is a study that uses publicly available data (VIGITEL – Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey), it was exempt from the Free and Informed Consent Form (TCLE) and from ethical review under the terms of CNS Resolution No. 466/12.

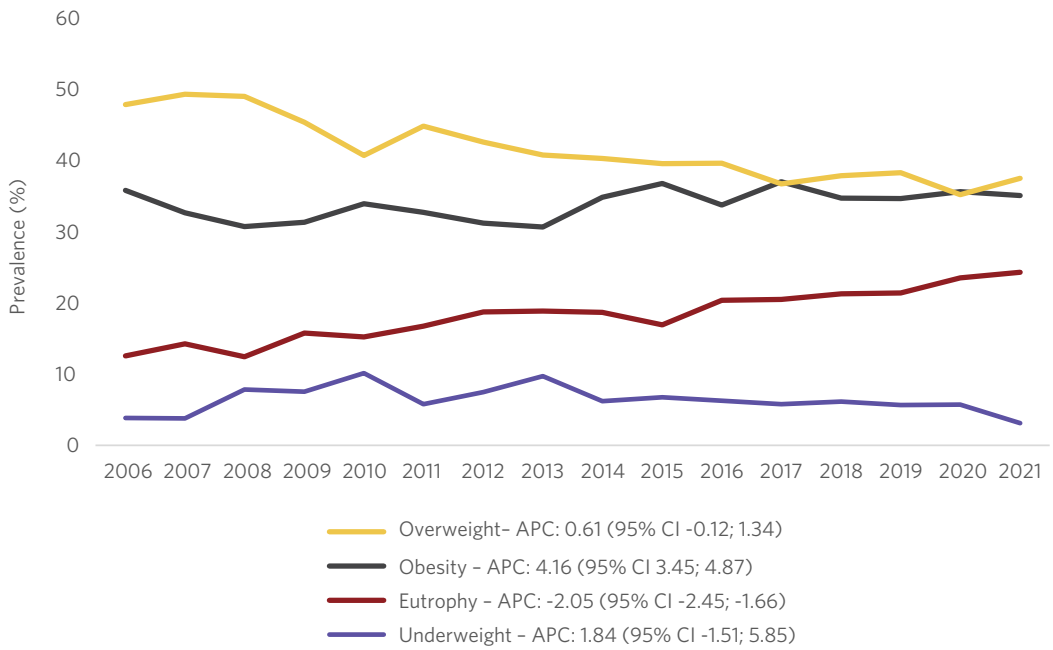
Results

The sample studied was composed of 53.5% women; the largest proportion of respondents was in the 9 to 11 years of schooling range (38.3%), 44% declared themselves to be white, approximately 50.5% were living in a stable union or were married and 22.6% of the participants were between 25 and 34 years of age.

Graph 1 shows the time trend in the prevalence of the 4 BMI categories (underweight, eutrophy, overweight and obesity) in adults. As can be observed, the annual percent change in the prevalence of obesity was 4.16% (95%CI:

3.45; 4.87), indicating an increasing trend between 2006 and 2021. For overweight, despite the positive APC, the trend was considered stationary for the period evaluated (APC = 0.61%; 95%CI: -0.12; 1.34). In turn, the underweight scenario has been decelerating each year by -1.14% (95%CI: -5.91; -3.73), as has eutrophy, by -2.05% (95%CI: -2.45; -1.66).

Graph 1. Temporal trend of the prevalence of the four BMI categories in adults residing in the municipality of Rio de Janeiro – VIGITEL, 2006 to 2021



Source: Own elaboration.

Table 1 presents factors related to the prevalence of overweight in adults in the city of Rio de Janeiro between 2006 and 2021, in which the following patterns are observed: both sexes maintained high percentages throughout the period, with men displaying higher values than women in most years. Young adults, aged 18 to 24 years, recorded the lowest prevalences throughout the entire historical series. With regard to schooling, individuals with fewer years of study (0 to 8 years) presented a progressive reduction in their percentages. From 2011 onwards, a change in the racial profile stands out, with a marked increase in prevalence among black and brown individuals. Finally, relatively stable patterns are observed for marital status throughout the whole period analyzed.

Table 1. Prevalence of overweight according to sociodemographic characteristics in the population residing in the municipality of Rio de Janeiro – VIGITEL, 2006 to 2021

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sex																
Female	32.03	27.51	27.98	30.45	30.8	27.19	28.94	29.15	32.13	32.83	30.95	36.08	34.84	32.94	33.61	30.45
Male	39.73	38.34	36.42	35.94	42.38	41.49	37.46	36.69	41.09	44.66	39.37	39.86	37.26	38.95	41.06	40.29
Age group																
18 to 24 years	8.28	8.62	10.05	8.17	10.25	9.2	9.19	9.22	9.08	10.08	7.9	7.87	6.14	5.77	4.24	7.78
25 to 34 years	20.35	23.87	22.27	20.29	21.86	20.74	20.26	21.39	22.46	21.3	18.95	20.53	23.96	23.23	21.81	22.83
35 to 44 years	26.83	23.04	21.39	20.42	20.7	23.9	22.94	22.82	21.11	21.12	21.49	23.16	19.7	20.33	21.88	20.93
45 to 54 years	18.66	16.93	18.09	18.39	17.71	15.45	17.15	16.16	19.88	17.18	21.89	16.65	17.59	19.66	17.39	17.78
55 to 64 years	12.43	13.25	15.08	16.9	16.03	16.21	15.33	15.05	12.13	14.92	15.8	16.31	16.87	15.13	17.57	14.46
65 years or over	13.45	14.29	13.13	15.83	13.45	14.5	15.12	15.36	15.35	15.39	13.95	15.48	15.75	15.88	17.12	16.23
Schooling																
0–8 years	41.46	42.51	36.36	39.4	37.84	34.45	36.2	35.17	32.57	33.84	33.77	29.7	26.37	28.26	24.61	22
9–11 years	37.8	33.96	36.68	38.87	36.89	39.94	37.32	37.29	41.86	37.38	36.37	42.2	39.1	35.73	46.18	43.06
12 years or older	20.74	23.54	26.96	21.73	25.27	25.6	26.48	27.54	25.57	28.79	29.86	28.1	34.53	36.01	29.21	34.94
Race/skin color																
White	42.44	43.9	38.11	43.6	41.25	48.1	49.27	45.82	49.66	49.99	50.08	44.19	46.69	43.58	45.95	45.9
Black and brown	9.06	10.88	8.19	9.95	8.97	49.48	47.92	52.24	47.64	45.12	49.14	55.01	52.21	55.18	50.85	53.28
Yellow	48.15	45.21	53.58	46.45	49.77	1.69	1.85	0.86	1.07	3.62	0	0.28	0.17	0.61	0.13	0
Indigenous	0.35	0	0.12	0	0	0.74	0.96	1.09	1.63	1.27	0.78	0.53	0.93	0.63	3.07	0.82
Marital status																
Single	28.95	26.15	31.64	28.52	28.92	31.49	26.61	30.74	35.94	32.82	31.31	28.82	35.36	32.51	28.39	32.03
Married/stable union	64.03	58.78	55.45	55.61	57.38	56.79	60.8	57.42	52.55	55.27	58.01	59.39	54.12	56.93	58.19	53.75
Widowed	7.02	8.55	7.79	8.12	7.9	5.61	5.74	6.52	7.32	6.17	4.61	6.88	4.73	5.35	5.75	4.9
Divorced	0	6.53	5.12	7.75	5.8	6.11	6.85	5.32	4.18	5.74	6.08	4.92	5.79	5.21	7.67	9.33

Source: Own elaboration.

When analyzing the time trend in overweight according to sociodemographic characteristics (*table 2*), significantly distinct patterns were found by age and schooling. Among young adults, aged 18 to 24 years, a significant decline was observed (APC: -2.82%; 95%CI: -5.35%; 0.27%), whereas in the 65 years or over age group the prevalence presented an increasing trend (APC: 1.18%; 95%CI: 0.78; 1.59).

A similar pattern was found for schooling: individuals with up to 8 years of study showed a significant reduction (APC: -3.67%; 95%CI: -4.57; -2.76) and, as the years of study increased, the trend rose in the population (APC: 2.87%; 95%CI: 2.18; 3.57). For the race/skin color variable, there was significant growth among black and brown individuals (APC: 14.12%; 95%CI: 4.73; 24.35), followed by indigenous individuals (APC: 10.91%; 95%CI: 0.63; 2.23). With regard to marital status, the group of widowed individuals was the only one to present a statistically significant decreasing trend for overweight (APC: -3.12%; 95%CI: -4.37; -1.85), while all the others remained within the stationarity range.

Table 2. Annual Percentage Change (APC) in overweight according to sociodemographic characteristics in the population residing in the municipality of Rio de Janeiro – VIGITEL, 2006 to 2021

Year	2006	2021	APC	IC 95%	Tendência	Período
Sex						
Female	32.03	29.92	0.8	-0.39; 2.01	Estacionária	2006-2021
Male	39.73	40.22	0.3	-0.48; 1.09	Estacionária	2006-2021
All	35.77	35.05	0.61	-0.12; 1.34	Estacionária	2006-2021
Age group						
18 to 24 years	8.28	7.78	-2.82	-5.31; -0.27	Decrescente	2006-2021
25 to 34 years	20.35	22.83	0.3	-0.57; 1.17	Estacionária	2006-2021
35 to 44 years	26.83	20.93	-0.84	-1.73; 0.07	Estacionária	2006-2021
45 to 54 years	18.66	17.78	0.3	-0.44; 1.05	Estacionária	2006-2021
55 to 64 years	12.43	14.46	0.85	-0.56; 2.28	Estacionária	2006-2021
65 years or over	13.45	16.23	1.18	0.78; 1.59	Crescente	2006-2021
Schooling						
0–8 years	41.46	22	-3.67	-4.57; -2.76	Decrescente	2006-2021
9–11 years	37.8	43.06	0.94	0.34; 1.54	Crescente	2006-2021
12 years or older	20.74	34.94	2.87	2.18; 3.57	Crescente	2006-2021
Race/skin color						
White	42.44	45.9	0.67	0.36; 1.70	Crescente	2006-2021
Black and brown	9.06	53.28	14.12	4.73; 24.35	Crescente	2006-2021
Yellow	48.15	0	-36.38	-45.29; -26.02	Decrescente	2006-2021
Indigenous	0.35	0.82	10.91	0.63; 2.23	Crescente	2006-2021
Marital status						
Single	28.95	32.03	0.83	-0.04; 1.70	Estacionária	2006-2021
Married/stable union	64.03	53.75	-0.42	-0.99; 0.15	Estacionária	2006-2021
Widowed	7.02	4.9	-3.12	-4.37; -1.85	Decrescente	2006-2021
Divorced	0	9.33	0.91	-2.18; 4.09	Estacionária	2006-2021

Source: Own elaboration.

CI = Confidence Interval.

Table 3 indicates important transformations in the epidemiological profile of obesity in the adult population of the city of Rio de Janeiro. Men and women presented similar patterns of growth, with prevalences that became equivalent by the end of the period analyzed. The young population (18-24 years) maintained the lowest indicators, in contrast with adults aged 25 to 44 years, who recorded the highest prevalences. A relevant transformation was observed in the educational profile: while the group with low schooling experienced a consistent decline, individuals with higher educational attainment presented an increase in the prevalence of obesity.

Table 3. Prevalence of obesity according to sociodemographic characteristics in the population residing in the municipality of Rio de Janeiro – VIGITEL, 2006 to 2021

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sex																
Female	13.38	14.52	12.59	14.45	16.19	17.05	19.8	16.76	18.32	20.47	20.28	20.73	22.75	22.64	24.29	23.2
Male	11.72	13.99	12.26	17.24	14.08	16.36	17.42	21.28	19.07	12.79	20.42	20.22	19.55	19.96	22.58	25.47
Age group																
18 to 24 years	5.31	1.65	4.56	8.52	5.56	5.27	2.98	3.22	3.8	3.86	4.24	4.6	3.45	3.21	3.85	3.75
25 to 34 years	18.81	20.32	18.55	20.28	19.85	22.15	25.27	19.26	23.12	23.64	18.98	14.9	24.58	24.92	20.6	25.96
35 to 44 years	18.85	22.92	19.27	22.32	24.3	17.78	23.5	24.71	28.39	26.67	25.65	23.09	23.91	21.84	20.93	20.55
45 to 54 years	19.68	22.03	20.7	21.2	22.17	27.16	22.88	21.83	15.19	20.62	21.61	23.75	19.18	20.34	24.54	19.04
55 to 64 years	20.95	20.99	20.15	15.34	14.29	15	13.69	18.07	17.15	13.54	16.71	19.76	16.3	17.78	20.18	19.8
65 years or over	16.4	12.09	16.77	12.35	13.82	12.65	11.68	12.9	12.35	11.67	12.81	13.89	12.57	11.9	9.9	10.89
Schooling																
0–8 years	48.68	51.57	50.31	47.93	39.15	35.25	38.31	42.74	37.59	35.35	37.35	36.9	34.52	23.49	24.19	26.98
9–11 years	28.07	29.42	32.06	31.23	38.2	40.24	35.29	32.54	39.45	40.21	35.13	38.69	39.85	45.11	42.56	38.31
12 years or older	23.25	19.01	17.63	20.85	22.66	24.51	26.4	24.71	22.97	24.44	27.52	24.41	25.63	31.4	33.25	34.71
Race/skin color																
White	46.17	37.18	45.18	40.03	42.11	48.55	45.62	41.54	44.3	46.08	42.62	44.01	49.97	45.68	46.04	39.35
Black and brown	13.77	14.18	10.7	8.56	15.83	47.14	50.72	56.79	54.43	51.91	56.17	54.46	49.02	53.66	53.27	58.15
Yellow	40.06	48.64	44	51.41	42.06	1.29	1.26	1.52	0.85	1.29	0.1	0.45	0.24	0.23	0.32	0.53
Indigenous	0	0	0.12	0	0	3.02	2.41	0.15	0.42	0.72	1.11	1.08	0.78	0.42	0.37	1.97
Marital status																
Single	27.06	21.45	26.11	28.47	24.83	29.26	27.5	23.3	25.47	28.85	36.46	30.23	31.33	32.47	29.59	45.48
Married/stable union	70.09	58.18	61.25	62.54	60.25	55.23	62.48	64.79	62.86	55.31	51.31	56.63	56.19	53.52	59.05	43.87
Widowed	2.85	11.55	8.14	3.36	7.38	8.59	5.53	5.21	6.28	9.12	6.15	6.22	6.27	6.57	4.37	5.5
Divorced	0	8.82	4.51	5.63	7.55	6.93	4.48	6.7	5.38	6.72	6.08	6.92	6.21	7.44	6.99	5.15

Source: Own elaboration.

Table 4 presents the APC, which proved to be increasing both for females (APC: 4.26; 95%CI: 3.53; 5.00) and for males (APC: 3.96; 95%CI: 2.56; 5.37). As for age group, only individuals aged 65 years or over presented a decreasing trend in obesity (APC: -1.70%; 95%CI: -2.59; -0.81), whereas, for all the other groups, the trend proved to be stationary. With regard to schooling, an increasing trend was observed for the groups with 9 to 11 years of study (APC: 2.28%; 95%CI: 1.13; 3.44) and 12 years or more (APC: 3.25; 95%CI: 1.77; 4.75).

Table 4. Annual Percentage Change (APC) in obesity according to sociodemographic characteristics in the population residing in the municipality of Rio de Janeiro – VIGITEL, 2006 to 2021

Year	2006	2021	APC	IC 95%	Tendência	Período
Sex						
Female	13.38	23.2	4.26	3.53; 5.00	Crescente	2006-2021
Male	11.72	25.47	3.96	2.56; 5.37	Crescente	2006-2021
All	12.57	24.33	4.16	3.45; 4.87	Crescente	2006-2021
Age group						
18 to 24 years	5.31	3.75	-1.14	-5.35; 3.26	Estacionária	2006-2021
25 to 34 years	18.81	25.96	1.03	-0.54; 2.64	Estacionária	2006-2021
35 to 44 years	18.85	20.55	-0.6	-1.23; 2.47	Estacionária	2006-2021
45 to 54 years	19.68	19.04	-0.22	-1.75; 1.32	Estacionária	2006-2021
55 to 64 years	20.95	19.8	-0.03	-2.58; 2.58	Estacionária	2006-2021
65 years or over	16.4	10.89	-1.7	-2.59; -0.81	Decrescente	2006-2021
Schooling						
0–8 years	48.68	26.98	-4.3	-5.93; 2.72	Estacionária	2006-2021
9–11 years	28.07	38.31	2.28	1.13; 3.44	Crescente	2006-2021
12 years or older	23.25	34.71	3.25	1.77; 4.75	Crescente	2006-2021
Race/skin color						
White	46.17	39.35	0.48	-0.19;1.16	Estacionária	2006-2021
Black and brown	13.77	58.15	11.29	2.08; 21.34	Crescente	2006-2021
Yellow	40.06	0.53	-32.30	-43.12; -19.41	Decrescente	2006-2021
Indigenous	0	1.97	7.02	-11.82; 36.74	Estacionária	2006-2021
Marital status						
Single	27.06	45.48	2.6	1.36; 3.86	Crescente	2006-2021
Married/stable union	70.09	43.87	-1.41	-2.19; -0.62	Decrescente	2006-2021
Widowed						
Divorced	2.85	5.5	-0.5	-3.71; 2.82	Estacionária	2006-2021
Divorciado(a)	0	5.15	0.5	-1.29; 2.32	Estacionária	2006-2021

Source: Own elaboration.

CI = Confidence Interval.

For this same table, in the analysis by race/skin color, the black and brown population presented a marked increase in obesity (APC: 11.29%; 95%CI: 2.08; 21.34) over time. Among indigenous individuals, although a positive APC of 7.02% (95%CI: -11.82; 36.74) was observed, it was not possible to establish statistical significance, and the trend was therefore considered stationary. For those who declared themselves to be white, the obesity situation remained stationary, and for those who reported themselves as yellow, there was a decrease over time, with an APC of -32.30% (95%CI: -43.12; -19.41). It should be noted that the information for participants of yellow and indigenous race/skin color must be viewed with caution, owing to the small sample size, which consequently generates a limitation regarding representativeness in the population. With regard to marital status, single individuals presented an increasing trend in obesity, with an APC of 2.60% (95%CI: 1.36; 3.86) and, in contrast, among married individuals the trend was decreasing, with an APC of -1.41% (95%CI: -2.19; -0.62).

Discussion

VIGITEL data showed that, although overweight presented a stationary trend between 2006 and 2021 for both sexes, obesity showed an important increase over the years, probably reflecting the behavioral changes that have been occurring in our society, mainly in relation to the type of diet and the pattern of physical activity. The 2019 National Health Survey (PNS) corroborates these findings, insofar as the proportion of obese individuals in the Brazilian population aged 20 years or over more than doubled between 2003 and 2019, rising from 12.2% to 26.8%[15]. Malta[16] found, in the Brazilian capitals and the Federal District, that the prevalence of overweight in adults increased from 43.2% in 2006 to 51.0% in 2012, with a mean annual increment of 1.37%. Another study conducted between 2006 and 2017 observed a higher prevalence among women, in individuals aged 25 to 44 years and at all levels of schooling[17].

In India, considered one of the countries with the lowest prevalence of obesity, the frequency in adults was estimated at 5.1%; however, there has been an upward trend over the last two decades[4]. Spain, in turn, considering the average of the 35 member countries of the Organisation for Economic Co-operation and Development (OECD), has one of the highest prevalences of obesity in adults in the European region[4].

The main factors that may contribute to overweight in adults are changes in the quality and quantity of meals, with a preference for fast food and ultra-processed foods with excess sugar and fat, low energy expenditure, genetics itself, stress and the use of certain medications, notably antidepressants, contraceptives and diabetes medications, which may contribute to weight gain in adults[15-18]. It is important to highlight that, among the countries of Latin America, Brazil has one of the lowest levels of physical activity[15]. When the profile of overweight and obesity is analyzed according to the age group variable, a stationary trend is observed in most groups, except for individuals aged 65 years or over, in whom overweight presented an increasing trend and obesity a decreasing one.

According to the literature, in many countries the prevalence of overweight and obesity among men tends to increase with age, up to 55 years, and decreases thereafter; among women, however, the prevalence of both continues to increase with advancing age[18,19]. Nevertheless, adult BMI standards for older adults are not consensual, mainly because the cut-off points may be inappropriate in view of the physiological modifications that occur with aging, generating changes in body composition. Although the MS has a classification according to SISVAN (Food and Nutrition Surveillance System) – an information system that monitors the nutritional status of the population – this study adopted the WHO parameters, based on a large American population-based study covering people of all ages, including older adults[20,21].

According to Sousa et al.[22], eating habits play a major role in the construction of human life and may change throughout life. A childhood with the consumption of caloric foods and low consumption of greens, fruits and vegetables tends to make individuals more prone, in adult life, to maintaining this habit, generally increasing the amount of calories in relation to what they expend, generating fat accumulation[22,23]. The rise in the gradient of overweight and obesity with increasing schooling is noteworthy. These findings were similar to the studies by Fildes et al.[23] and Xia et al.[24]; however, the authors drew attention to the fact that people with higher schooling tend to have greater access to treatment measures[24,25]. Among those who declared themselves to be black, brown and indigenous, there was an increasing trend in obesity, and different aspects may exacerbate this scenario.

In a complex city such as Rio de Janeiro, it is necessary to broaden the discussion of social and racial vulnerability and, undoubtedly, the social context in which black,

brown and indigenous individuals are inserted may have repercussions on the adoption or not of healthier behaviors, which may favor weight gain[23].

A study published in 2023 on weight increase in the white and black populations in Brazil showed, with VIGITEL data, that there is a more pronounced increase in the prevalence of overweight and obesity in black populations[26]. The authors also highlighted that black populations had a lower-quality diet when compared with the white population, demonstrating the need to understand and problematize structural changes in various segments that may have repercussions on health inequities.

A cross-sectional investigation with a sample of older adults aged 65 years or over living in communities in Brazil showed that the black race/skin color category was more associated with obesity, in comparison with the brown race/skin color category, even after adjustment for socioeconomic variables (schooling and family income)[27].

In the ELSA-Brasil cohort study, which involved public servants of Brazilian institutions aged between 35 and 74 years, there was also a higher incidence of overweight among black women and those with low schooling[28]. In a cross-sectional investigation with a sample of older adults aged 65 years or over living in communities in Brazil, the black race/skin color category was associated, among women, with general and central obesity, in comparison with the brown race/skin color category, even after adjustment for socioeconomic variables (schooling and family income)[29].

Although there is no clear relationship between marital status and overweight or obesity, some studies suggest that married people are more likely to have a higher BMI[30]; in our study, in turn, obesity follows an increasing trend among single individuals. For Meller et al.[31], marital status may be associated with differences in lifestyle, in that people with a partner may be more likely to share family meals and follow a more regular eating routine, which may positively influence health and reduce the risk of obesity. On the other hand, single or divorced people tend to have more freedom in their food choices and fewer family responsibilities, which may result in less healthy habits[32].

Given the multicausality involved in this problem, whose roots are systemic, public policy makers and managers need to strengthen care coordination in order to achieve a deceleration of overweight and obesity in the population. Various policies have been promoted by the Federal Government, such as the Strategic Action Plan to Tackle NCDs, 2021-2030, aligned with the targets of the 2030 Agenda formulated by the United Nations[33]. These are measures that recognize the need to act on the social determinants through adequate coordination of care among services. At the municipal level, tackling this problem – marked by food deserts, social inequalities and the fragility of the care network structure itself – depends on strengthening primary health care (PHC) as a unique space for preventing and treating overweight in the population, primarily because of its capillarity in the territories[32,33].

The implementation of Multiprofessional Teams – eMulti (formerly Family Health Support Centers – NASF) and of the Academia Carioca Program in PHC may contribute to tackling this problem, helping to enhance the integration of the promotion of adequate and healthy eating with physical and bodily activities[34,35]. Considering that eating habits may change throughout life[22], a childhood with the consumption of caloric foods and reduced intake of greens, fruits and vegetables tends to make adults more prone to maintaining this habit, generally increasing the amount of calories in relation to what they expend, generating fat accumulation[22,23].

Moreover, the food issue may be embedded in a social problem, given families that deal with the scarcity of healthy foods (fresh or minimally processed), whether because of low purchasing power or because of the

concentration of establishments offering healthy food in wealthier areas. Encouraging the production of and access to healthy foods by expanding the supply of *in natura* products in school meals, creating mechanisms to facilitate open-air markets and developing urban agriculture may help to promote sustainability, in favor of healthier eating habits, in addition to contributing to raising people's awareness and engagement, making them more protagonists of the process of change. The installation of community gardens may take place in public spaces, such as squares and gardens, or in locations designated by the city government, which would strengthen not only access to fresh foods but also social integration. This movement may help to break paradigms about the idea of complexity in preparation, as well as helping to recover the history and cultural identity that surround meals and real access to food[36,37].

One of the main technical areas of food and nutrition in the city, the Annes Dias Nutrition Unit (Unad), has sought to value this debate; even so, efforts do not always translate into strategic actions, owing to the political-institutional context[36], in which many projects have difficulty moving beyond the discourse of multidisciplinarity as concrete responses to complex problems[38].

Recently, the Obesity Prevention Strategy was established at the national level, with the purpose of promoting a reduction in the occurrence of these conditions, mainly among children, adolescents and populations in situations of greater vulnerability and social risk. It is expected that the city of Rio de Janeiro, in implementing this proposal, will broaden the articulation of public policies with initiatives for the production of, access to and consumption of healthy foods, from a food and nutrition security perspective, together with the promotion of physical activity and the fostering of urban mobility[39].

Finally, it is worth highlighting some limitations regarding the use of VIGITEL, which is restricted to individuals with a landline telephone and, currently, most people have been opting for mobile phones, which may imply selection bias; however, the methodology is widely used and recommended in the research field, in addition to being validated for Brazil. Another important point is that these differences were identified on the basis of anthropometric data self-reported by the interviewee, which may generate inaccuracies in the calculation of BMI, limiting the validity of this research.

Final considerations

This study sought to contribute to the understanding of the epidemiological scenario of overweight and obesity in the city of Rio de Janeiro. The evidence base showed that sociodemographic characteristics may have an influence on the trend of these phenomena, with a higher prevalence of obesity among those with 9 years or more of schooling, older adults and black individuals. However, it must be considered that differences are found when anthropometric measures are self-reported by the interviewee, with possible inaccuracies in the calculation of BMI, limiting the validity of this research.

The results reinforce the need to invest in intersectoral and interdisciplinary actions, beyond the health sector, in order to change the perspective on life habits and behaviors.

Investing in urban architecture to expand spaces for the practice of physical activity, as well as advancing food and nutrition surveillance with a family-based approach to obesity that goes beyond the focus on blaming the individual, will help to enhance the organization of care for patients.

These are efforts that may increase the chances of recognizing obesogenic environments, helping to strengthen practices that can prevent, control and treat overweight and obesity throughout life so as to leave no one behind in terms of the benefits that can be obtained from health-promoting actions.

Authorship contributions

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References

1. Bennett JE, Stevens GA, Mathers CD, et al. NCD Countdown 2030: worldwide trends in noncommunicable disease mortality and progress towards Sustainable Development Goal target 3.4. Lancet. 2018;392(10152):1072-88. DOI: https://doi.org/10.1016/s0140-6736(18)31992-5

2. Bahia L, Coutinho ESF, Barufaldi LA, et al. The costs of overweight and obesity-related diseases in the Brazilian public health system: cross-sectional study. BMC Public Health. 2012;12:440-7. DOI: https://doi.org/10.1186/1471-2458-12-440

3. World Health Organization. World Obesity Day 2022 – Accelerating Action to Stop Obesity [Internet]. Geneva: WHO; 2022 [acesso em 2025 out 20]. Disponível em: https://www.who.int/news/item/04-03-2022-world-obesity-day-2022

4. Lobstein T, Jackson-Leach R, Powis J, et al. World Obesity Atlas 2023 [Internet]. London: World Obesity Federation; 2023 [acesso em 2025 out 20]. Disponível em: https://www.worldobesity.org/resources/resource-library/world-obesity-atlas-2023

5. Ferrari G, Giannichi B, Resende B, et al. The economic burden of overweight and obesity in Brazil: perspectives for the Brazilian Unified Health System. Public Health. 2022;207:82-7. DOI: https://doi.org/10.1016/j.puhe.2022.03.015

6. Wickramasinghe K, Williams J, Rakovac I, et al. Key messages of the WHO European Regional Obesity Report. Eur J Public Health. 2022;32(Supl 3):ckac129.354. DOI: https://doi.org/10.1093/eurpub/ckac129.354

7. Hales CM, Fryar CD, Carroll MD, et al. Trends in obesity and severe obesity prevalence in US youth and adults by sex and age, 2007–2008 to 2015–2016. JAMA. 2018;319(16):1723-5. DOI: https://doi.org/10.1001/jama.2018.3060

8. Organização Pan-Americana da Saúde. Doenças cardiovasculares [Internet]. Washington, DC: OPAS/OMS; 2022 [acesso em 2025 out 20]. Disponível em: https://www.paho.org/pt/topicos/doencas-cardiovasculares

9. Monteiro dos Santos JE, Crispim SP, Murphy J, et al. Health, lifestyle and sociodemographic characteristics are associated with Brazilian dietary patterns: Brazilian National Health Survey. PLoS One. 2021;16(2):e0247078. DOI: https://doi.org/10.1371/journal.pone.0247078

10. Ministério da Saúde (BR). Vigitel Brasil 2017: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico [Internet]. Brasília, DF: Ministério da Saúde; 2018 [acesso em 2025 out 20]. Disponível em: https://bvsms.saude.gov.br/bvs/publicacoes/vigitel_brasil_2017.pdf

11. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílios Contínua trimestral – PNADC/T [Internet]. Rio de Janeiro: IBGE; 2018 [acesso em 2025 out 20]. Disponível em: https://www.ibge.gov.br/

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12. Khaleghi AA, Salari N, Darvishi N, et al. Global prevalence of obesity in the older adults: A meta-analysis. Public Health Pract (Oxf). 2025;9:100585. DOI: https://doi.org/10.1016/j.puhip.2025.100585

13. Prais SJ, Winsten CB. Trend estimators and serial correlation. Chicago: Cowles Commission; 1954. (CCDP statistics; no. 383).

14. Antunes JLF, Cardoso MRA. Uso da análise de séries temporais em estudos epidemiológicos. Epidemiol Serv Saúde. 2015;24(3):565-76. DOI: https://doi.org/10.5123/S1679-49742015000300024

15. Brito RC, Oliveira AGR. Validation of self-reported measures of nutritional status: a study based on the PNS 2019. Rev Saúde Pública. 2024;58:28. DOI: https://doi.org/10.11606/s1518-8787.2024058005505

16. Malta DC, Silva AG, Tonaco LAB, et al. Tendência temporal da prevalência de obesidade mórbida na população adulta brasileira entre os anos de 2006 e 2017. Cad Saúde Pública. 2019;35(9):e00223518. DOI: https://doi.org/10.1590/0102-311X00223518

17. Rache B, Aguillar A, Rocha R, et al. Doenças crônicas e seus fatores de risco e proteção: tendências recentes no Vigitel. Nota Técnica nº 25 [Internet]. São Paulo: IEPS; 2022 [acesso em 2025 out 20]. Disponível em: https://ieps.org.br/pesquisas/notas-tecnicas/nota-tecnica-25

18. Bento IC, Esteves JMM, Franca TE. Alimentação saudável e dificuldades para torná-la uma realidade: percepções de pais/responsáveis por pré-escolares de uma creche em Belo Horizonte/MG, Brasil. Ciênc saúde coletiva. 2015;20(8):2389-400. DOI: https://doi.org/10.1590/1413-81232015208.16052014

19. Santos IKS, Conde WL. Variação de IMC, padrões alimentares e atividade física entre adultos de 21 a 44 anos. Ciênc saúde coletiva. 2019;24(11):4269-80. DOI: https://doi.org/10.1590/1413-81232021269.2.23562019

20. Barbosa BB, Baltar VT, Horta RL, et al. Food and Nutrition Surveillance System (SISVAN) coverage, nutritional status of older adults and its relationship with social inequalities in Brazil, 2008–2019: an ecological time-series study. Epidemiol Serv Saúde. 2023;32(1):e2022595. DOI: https://doi.org/10.1590/s2237-96222023000100003

21. Silva LES, Oliveira MM, Stopa SR, et al. Tendência temporal da prevalência do excesso de peso e obesidade na população adulta brasileira, segundo características sociodemográficas, 2006-2019. Epidemiol Serv Saúde. 2021;30(1):e2020294. DOI: https://doi.org/10.1590/S1679-49742021000100008

22. Sousa APM, Pereira IC, Araujo LL, et al. Prevalência e fatores associados ao excesso de peso em adultos nas capitais e no Distrito Federal, Brasil, 2019. Epidemiol Serv Saúde. 2021;30(3):e2020838. DOI: https://doi.org/10.1590/S1679-49742021000300014

23. Fildes A, Charlton J, Rudisill C, et al. Probability of an obese person attaining normal body weight: cohort study using electronic health records. Am J Public Health. 2015;105(9):e54-9. DOI: https://doi.org/10.2105/ajph.2015.302773

24. Xia Y, Kelton CML, Guo JJ, et al. Treatment of obesity: pharmacotherapy trends in the United States from 1999 to 2010. Obesity (Silver Spring). 2015;23(8):1721-8. DOI: https://doi.org/10.1002/oby.21136

25. Orakaa CS, Faustino DM, Oliveira E, et al. Raça e obesidade na população feminina negra: uma revisão de escopo. Saúde Soc. 2020;29(3):e191003. DOI: https://doi.org/10.1590/S0104-12902020191003

26. Alvim Matos SM, Duncan BB, Bensenor IM, et al. Incidence of excess body weight and annual weight gain in women and men: results from the ELSA-Brasil cohort. Am J Hum Biol. 2022;34:e23606. DOI: https://doi.org/10.1002/ajhb.23606

27. Moretto MC, Fontaine AM, Garcia CAMS, et al. Associação entre cor/raça, obesidade e diabetes em idosos da comunidade: dados do Estudo FIBRA. Cad Saúde Pública. 2016;32(10):e00081315. DOI: https://doi.org/10.1590/0102-311X00081315

28. Silva AG, Andrade FMD, Ribeiro EG, et al. Temporal trends of morbidities, and risk and protective factors for noncommunicable diseases in elderly residents in Brazilian capitals. Rev Bras Epidemiol. 2023;26:e230009. DOI: https://doi.org/10.1590/1980-549720230009.supl.1

29. Bell CN, Thorpe Jr RJ. Income and marital status interact on obesity among Black and White men. Am J Mens Health. 2019;13(1):1557988319829952. DOI: https://doi.org/10.1177/1557988319829952

30. Liu J, Garstka MA, Chai Z, et al. Marriage contributes to higher obesity risk in China: findings from the China Health and Nutrition Survey. Ann Transl Med. 2021;9(7):564. DOI: https://doi.org/10.21037/atm-20-4550

31. Meller F, Grande AJ, Quadra MR, et al. Qualidade de vida e fatores associados em trabalhadores de uma universidade do Sul de Santa Catarina. Cad saúde colet. 2020;28(1):87-97. DOI: https://doi.org/10.1590/1414-462X202028010327

32. Ramos DBN, Burlandy L, Dias PC, et al. Propostas governamentais brasileiras de ações de prevenção e controle do sobrepeso e obesidade sob perspectiva municipal. Cad Saúde Pública. 2020;36(6):e00116519. DOI: https://doi.org/10.1590/0102-311X00116519

33. Pinheiro MC, Moura ALSP, Bortolini GA, et al. Abordagem intersetorial para prevenção e controle da obesidade: a experiência brasileira de 2014 a 2018. Rev Panam Salud Publica. 2019;43:e58. DOI: https://doi.org/10.26633/RPSP.2019.58

34. Padilha MA, Oliveira CM, Figueiró AC. Estudo de avaliabilidade do Programa Academia Carioca da Saúde: desafios para a promoção da saúde. Saúde Debate. 2015;39(105):375-86. DOI: https://doi.org/10.1590/0103-110420151050002006

35. Cavalcante EFL. Planejamento e coordenação de ações de alimentação e nutrição: enfrentamento do sobrepeso e da obesidade no Município do Rio de Janeiro [tese]. Rio de Janeiro: Escola Nacional de Saúde Pública Sergio Arouca, Fundação Oswaldo Cruz; 2017.

36. Assis CN. Práticas de cuidado às pessoas com excesso de peso no Sistema Saúde: onde ficam os sujeitos e a subjetividade? [dissertação]. Rio de Janeiro: Universidade do Estado do Rio de Janeiro; 2017.

37. Silva ACR. Organização da linha de cuidado da obesidade no Estado do Rio de Janeiro [trabalho de conclusão de curso]. Niterói: Faculdade de Nutrição Emilia Jesus Ferreiro, Universidade Federal Fluminense, 2019. 34 f.

38. Burlandy L, Teixeira MRM, Castro LMC, et al. Modelos de assistência ao indivíduo com obesidade na atenção básica em saúde no Estado do Rio de Janeiro, Brasil. Cad Saúde Pública. 2020;36(3):e00093419. DOI: https://doi.org/10.1590/0102-311X00093419

39. Presidência da República (BR) [Internet]. [Brasília, DF]: Presidência da República; 2025. Governo institui a Estratégia de Prevenção da Obesidade; 2025 out 21 [atualizado em 2025 out 21; acesso em 2025 out 22]. Disponível em: https://www.gov.br/planalto/pt-br/acompanhe-o-planalto/noticias/2025/10/governo-institui-a-estrategia-de-prevencao-da-obesidade-1

Received on 03/13/2025
Approved on 02/10/2026
Conflict of interest: Non-existent
Data availability: The research data are contained within the manuscript itself
Financial support: Non-existent

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