Factors associated with sedentary behavior based on computer, tablet, or cell phone use: data on 52,443 Brazilian adults

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Abstract

This study aims to verify the sociodemographic and lifestyle factors, health conditions, and self-perceived health levels associated with sedentary behavior based on computer, tablet, or cell phone use during leisure time in adults from the Brazilian capitals and Federal District. This is a cross-sectional study derived from the Vigitel survey, carried out in 2019 with individuals at least eighteen years old. The outcome was the time spent on computers, tablets, or cell phones (at least four hours per day). The study independent variables were sex, age, marital status, skin color, region of Brazil, education level, smoking status, excessive consumption of alcohol and processed foods, leisure time physical activity and physical activity recommendations, presence of obesity, diabetes, and hypertension, and self-perceived health, obtained through a questionnaire. The data analysis used binary logistic regression, the Wald heterogeneity test, and the linear trend test. Among the 52,443 participants, individuals who lived without a partner ($p<0.001$), who were black ($p=0.041$), had a higher education level ($p<0.001$), excessively consumed alcohol ($p<0.001$) and processed foods ($p<0.001$), and had worse self-perceived health ($p<0.001$) were more likely to use a computer, tablet, or cell phone for leisure compared to their peers. Older individuals ($p<0.001$) and those living in southern Brazil ($p=0.003$) had a lower chance of having the investigated outcome compared to younger participants and those from the north region, respectively. Factors such as age, marital status, and education level are more strongly associated with prolonged use of computers, tablets, or cell phones.

Keywords: Screen time; Leisure activities; Cross-sectional studies; Public health surveillance.

Introduction

In recent decades, the mass use of technology has brought a significant change related to increasing levels of sedentary behavior[1], characterized by activities in the waking state with very low energy expenditure while sitting, reclining, or lying down[2]. Although time spent in front of a television is still one of the most prevalent and studied components of sedentary behavior in the adult population[3,4], the new habits of modern society related to activities that reduced human movement[5] and the greater availability of electronic devices[1] contributed to the increasingly frequent and prolonged use of computers, tablets, and cell phones. The use of such equipment is already perceived in different domains, such as at work and, notably, for leisure[6,7].

However, several implications for the health of the adult population have been made evident when indicators of sedentary behavior are used for long periods[8,9]. According to Chau et al.[10], more extended periods of total daily sitting time are associated with a higher risk of mortality from all causes. In turn, a review of prospective studies found that longer screen times and sitting times were associated with an increased risk of fatal and non-fatal cardiovascular disease[11]. Findings from the use of direct and indirect measures also suggest that the total

volume of sedentary behavior is a potential risk factor for cancer mortality[12,13]. Additionally, it is important to highlight the fact that the different domains in which these behaviors may be performed (e.g., commute, home, work, and leisure) and their various indicators (e.g., time watching television, reading, using the computer) should not be interpreted only in their entirety, as they may have different consequences, although they directly affect health and quality of life[3,14].

Studies have revealed that activities developed in sitting, lying, or reclining positions are associated with different profiles, which may cause deleterious effects on health in a peculiar way[15,16]. According to the literature, some sociodemographic and lifestyle factors and health conditions may influence the strength and direction of the association, based on the type of behavior analyzed[17]. For example, while the time spent watching television was negatively associated with aerobic fitness and flexibility, computer time was associated with higher self-esteem scores, low energy intake, and negative overall health status[16]. For experts, the use of different indicators, such as time spent reading, watching television or using other devices, if analyzed separately, may not reflect the current pattern of total sedentary behavior, given that these activities involve different characteristics and interests for the people who use them[9,18]. Therefore, it is necessary to more appropriately identify the distribution and possible risk factors associated with the use of sedentary behavior indicators other than television time[19]. It is recognized that sociodemographic factors are not subject to change, but, together with other modifiable aspects or variables, the recognition of subgroups more exposed to specific sedentary behaviors allows a greater understanding of how these relationships happen.

To the best of our knowledge, until now, the factors associated with the use of computers, tablets, or cell phones are little known, especially in low- and middle-income countries such as Brazil. Thus, understanding these associations in the adult population may contribute to the development and implementation of projects, programs, or public policies directed at raising awareness and promoting strategies that help reduce these behaviors and increase the adoption of healthy habits. Given the above, this study aimed to verify the association of sociodemographic and lifestyle factors, health conditions, and self-perceived health indicators with the time spent on computers, tablets, or cell phones during leisure time by adults in the Brazilian capitals and Federal District. The hypothesis is that men, younger individuals, living without a partner, with higher education and negative lifestyle patterns and health conditions spend more time on the computer, tablet or cell phone than their peers.

Methods

This study had a cross-sectional design and was derived from a secondary analysis of data from the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey (Vigitel), carried out in 2019. The target population consisted of individuals at least eighteen years old who lived in the 26 state capitals and Federal District of Brazil and had at least one landline in their homes. For calculating the sample, we used parameters and estimates of outcome prevalence of 50%, a 95% confidence coefficient, and a maximum error of about two percentage points, setting a minimum sample size of 2,000 individuals in each municipality investigated. Additional information on methodological aspects may be found in a previously published report[20].

The categorization of time spent on computers, tablets, or cell phones was estimated from the following questions: "In your free time, do you usually use a computer, tablet, or cell phone to participate in social networks such as Facebook, watch movies, or play games?" and "On average, how many hours per day of your free time (excluding work) do you spend using computers, tablets, or cell phones?". A cutoff point of at least four hours per day was considered for the use of these devices. Although there is no consensus in the literature regarding the best cutoff for sedentary

behavior, systematic reviews identified a risk for morbidity and mortality based on analyses using this time as a parameter[7,9].

The independent variables of the study were the following: sex (male or female), age group (18 to 39, 40 to 59, or at least 60 years old), marital status (with and without a partner), skin color (white, black, brown, or others), region of Brazil (north, northeast, central-west, southeast, or south), education level (at most 4, 5 to 8, 9 to 11, or at least 12 years of study), smoking status (non-smoker, former smoker, or current smoker), alcohol abuse (at least 5 drinks for males and 4 drinks for females), processed food consumption (at least 5 processed foods the day before the survey), performing physical activity during leisure time (yes or no), meeting of physical activity recommendations, taking into account commuting, leisure, and occupational domains (at least 150 min per week of moderate activity or 75 min per week of vigorous physical activity), presence of obesity (determined by the body mass index greater than or equal to 30 kg/m², calculated from the self-reported height and mass values), diabetes, arterial hypertension, and self-perceived health (very good/good, regular, bad/very bad). It is noteworthy that the Portuguese version of the questionnaire applied to the participants is available in a technical report[20].

For the statistical analysis, crude and adjusted binary logistic regression was used, with the results expressed in odds ratio (OR) and with 95% confidence intervals (95%CI). The Wald heterogeneity test was used for nominal categorical variables, and the linear trend test for ordinal categorical variables, considering a statistical significance at $p \leq 0.05$. For statistical modeling, the backward selection strategy was adopted, along with a critical level of $p \leq 0.20$ for the permanence of the variable in the model, to control possible confounding factors. The analysis model considered the adjustment of variables in five hierarchical levels: demographic, social, lifestyle, health conditions (related to the presence of the investigated chronic diseases), and self-perceived health. Thus, all variables were adjusted for those at the same level and those at higher levels. The data were analyzed using the statistical software Stata® Standard Edition, version 15.0 (StataCorp LP, United States).

Regarding the ethical aspects, Vigitel was approved by the Brazilian National Human Research Ethics Commission of the Ministry of Health (CAAE: 65610017.1.0000.0008).

Results

Among the 75,789 eligible landlines, a total of 52,443 participants were interviewed, indicating a system success rate of 69.2%. The majority of the sample was represented by women (54%) and individuals who lived without a partner (53.6%). The average age of the respondents was 42.7 years (± 14.3), with most individuals aged from 18 to 39 years (47.1%). Among the variables related to lifestyle, the most prevalent unhealthy characteristic was leisure time physical inactivity (47.6%), followed by non-compliance with physical activity recommendations (44.8%) and excessive alcohol consumption (18.8%). Of the total sample, the prevalences of diabetes, hypertension, and obesity were, respectively, 7.5%, 24.6%, and 20.2%. More details regarding the characteristics of the sample may be found in TABLE 1.

TABLE 1 - Sociodemographic and lifestyle factors, health conditions, and self-perceived health levels of residents of the 26 state capitals and Federal District of Brazil (n = 52,443), 2019.

Variables	n	%[d]	95% CI
Sex			
Male	18,354	46.0	45.0 to 46.9
Female	34,089	54.0	53.1 to 55.0
Age (years)			
18 to 39	12,258	47.1	46.2 to 48.1
40 to 59	16,858	34.6	33.7 to 35.4
≥ 60	23,327	18.3	17.8 to 18.8
Marital status			
Without a partner	26,758	53.6	52.6 to 54.5
With a partner	25,499	46.4	45.5 to 47.4
Skin color			
White	22,598	41.2	40.3 to 42.2
Black	4,106	10.7	10.1 to 11.3
Brown	20,217	40.2	39.2 to 41.1
Others	5,076	7.9	7.4 to 8.4
Regions of Brazil			
North	11,210	10.4	10.0 to 10.7
Northeast	18,557	25.2	24.6 to 25.9
Central-West	8,254	11.7	11.3 to 12.3
Southeast	8,226	44.6	43.6 to 45.6
South	6,196	8.1	7.7 to 8.4
Education (years of study)			
≤ 4	8,325	12.8	12.2 to 13.4
5 to 8	7,014	16.0	15.3 to 16.8
9 to 11	17,688	38.4	37.5 to 39.3
≥ 12	19,416	32.8	31.9 to 33.7
Smoking status			
Non-smoker	35,983	70.5	69.5 to 71.3
Former smoker	12,867	19.7	19.0 to 20.5
Current smoker	3,593	9.8	9.2 to 10.5
Alcohol consumption[a]			
No excessive drinking	45,731	81.2	80.4 to 82.0
Excessive drinking	6,709	18.8	18.0 to 19.6
Processed foods[b]			
< 4 processed foods	46,395	81.8	81.0 to 82.6
≥ 5 processed foods	6,048	18.2	17.4 to 19.0
Leisure time PA			
Yes	27,809	52.4	51.5 to 53.4
No	24,634	47.6	46.6 to 48.5
PA recommendations[c]			
Yes	25,155	55.2	54.3 to 56.1
No	27,288	44.8	43.9 to 45.7

PA: physical activity;
a: alcohol abuse, considering ≥ 5 drinks for males and ≥ 4 drinks for females;
b: consumption of ≥ 5 processed foods the day before the survey;
c: the meeting of PA recommendations considers ≥ 150 min per week of moderate PA, ≥ 75 min per week of vigorous PA, or an equivalent combination of moderate- and vigorous-intensity physical activity;
d: weighted percentage of the sample;
95% IC: 95% confidence interval;
The "obesity" variable had the highest number of ignored information (5,324 missing values in total).

Continue

Continuation

TABLE 1 - Sociodemographic and lifestyle factors, health conditions, and self-perceived health levels of residents of the 26 state capitals and Federal District of Brazil (n = 52,443), 2019.

Variables	n	%[d]	95% CI
Obesity			
No	37,558	79.8	79.0 to 80.6
Yes	9,561	20.2	19.4 to 21.0
Diabetes			
No	46,134	92.5	92.1 to 93.0
Yes	6,251	7.5	7.1 to 7.9
Arterial hypertension			
No	33,123	75.4	74.7 to 76.2
Yes	19,276	24.6	23.8 to 25.3
Self perceived health			
Very good / Good	33,073	66.0	65.1 to 66.9
Regular	16,089	29.2	28.8 to 30.1
Bad / Very bad	2,719	4.8	4.5 to 5.3

PA: physical activity;
a: alcohol abuse, considering ≥ 5 drinks for males and ≥ 4 drinks for females;
b: consumption of ≥ 5 processed foods the day before the survey;
c: the meeting of PA recommendations considers ≥ 150 min per week of moderate PA, ≥ 75 min per week of vigorous PA, or an equivalent combination of moderate- and vigorous-intensity physical activity;
d: weighted percentage of the sample;
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The "obesity" variable had the highest number of ignored information (5,324 missing values in total).

When considering computer, tablet, or cell phone use, 13.4% (95%CI: 12.7 to 14.1) of the participants reported spending at least four hours per day on these devices. In TABLE 2, the factors associated with excessive computer, tablet, or cell phone use may be analyzed. It was found that individuals who lived without a partner (OR: 2.54; 95%CI: 2.20 to 2.93), had black skin (OR: 1.25; 95%CI: 1.01 to 1.55), had more years of education ($OR_{5 \text{ to } 8 \text{ years}}$: 2.14; 95%CI: 1.38 to 3.34; $OR_{9 \text{ to } 11 \text{ years}}$: 3.64; 95%CI: 2.46 to 5.38; $OR_{\geq 12 \text{ years}}$: 2.88; 95%CI: 1.94 to 4.29), excessively consumed alcohol (OR: 1.47; 95%CI: 1.25 to 1.74) or processed foods (OR: 1.50; 95%CI: 1.29 to 1.76), and had worse self-perceived health ($OR_{regular}$: 1.36; 95%CI: 1.18 to 1.58; $OR_{bad/very\ bad}$: 1.50; 95%CI: 1.23 to 1.99) had higher chances of the investigated outcome compared to their peers. In contrast, those who were younger ($OR_{18 \text{ to } 39 \text{ years}}$: 11.08; 95%CI: 9.02 to 13.61; $OR_{40 \text{ to } 59 \text{ years}}$: 2.98; 95%CI: 2.37 to 3.74) and lived in the south of Brazil (OR: 0.71; 95%CI: 0.58 to 0.88) had a lower chance of excessive use of computers, tablets, or cell phones compared to older people and those from the north region, respectively.

TABLE 2 - Sociodemographic and lifestyle factors, health conditions, and self-perceived health levels associated with computer, tablet, or cell phone time (at least four hours per day) for residents of the 26 capitals and Federal District of Brazil, 2019.

Variables	%[d]	Crude analysis			Adjusted analysis		
		OR	95% CI	p-value	OR	95% CI	p-value
Sex				0.006[e]			0.804[e]
Male	14.5	1.00			1.00		
Female	12.5	0.84	0.74 to 0.95		0.98	0.86 to 1.12	
Age (years)				≤ 0.001[f]			≤ 0.001[f]
18 to 39	23.3	14.32	11.74 to 17.47		11.08	9.02 to 13.61	
40 to 59	5.8	2.91	2.33 to 3.63		2.98	2.37 to 3.74	
≥ 60	2.1	1.00			1.00		
Marital status				≤ 0.001[e]			≤ 0.001[e]
Without a partner	0.6	1.00			1.00		
With a partner	19.9	3.88	3.38 to 4.45		2.54	2.20 to 2.93	
Skin color				≤ 0.001[e]			0.041[e]
White	12.4	1.00			1.00		
Black	18.3	1.59	1.30 to 1.94		1.25	1.01 to 1.55	
Brown	14.3	1.18	1.03 to 1.36		1.02	0.87 to 1.19	
Others	7.8	0.60	0.45 to 0.80		0.78	0.58 to 1.06	
Regions of Brazil				≤ 0.001[e]			0.003[e]
North	15.2	1.00			1.00		
Northeast	14.0	0.91	0.80 to 1.03		0.94	0.82 to 1.08	
Central-West	12.2	0.77	0.66 to 0.91		0.85	0.72 to 1.01	
Southeast	13.6	0.87	0.75 to 1.02		1.05	0.88 to 1.25	
South	9.9	0.61	0.51 to 0.73		0.71	0.58 to 0.88	
Education (years of study)				≤ 0.001[f]			≤ 0.001[f]
≤ 4	2.2	1.00			1.00		
5 to 8	6.5	3.14	2.06 to 4.78		2.14	1.38 to 3.34	
9 to 11	17.8	9.80	6.84 to 14.05		3.64	2.46 to 5.38	
≥ 12	16.0	8.61	5.98 to 12.38		2.88	1.94 to 4.29	
Smoking status				≤ 0.001[e]			0.1334[e]
Non-smoker	14.0	1.00			1.00		
Former smoker	9.8	0.67	0.56 to 0.80		1.13	0.93 to 1.37	
Smoker	16.1	1.18	0.95 to 1.47		1.26	0.98 to 1.61	
Alcohol consumption[a]				≤ 0.001[e]			≤ 0.001[e]
No excessive drinking	11.3	1.00			1.00		
Excessive drinking	22.4	2.26	1.96 to 2.61		1.47	1.25 to 1.74	
Processed foods[b]				≤ 0.001[e]			≤ 0.001[e]
< 4 processed foods	11.6	1.00			1.00		
≥ 5 processed foods	21.4	2.07	1.79 to 2.39		1.50	1.29 to 1.76	

PA: physical activity;
a: alcohol abuse, considering ≥ 5 drinks for males and ≥ 4 drinks for females;
b: consumption of ≥ 5 processed foods the day before the survey;
c: the meeting of PA recommendations considers ≥ 150 min per week of moderate PA, ≥ 75 min per week of vigorous PA, or an equivalent combination of moderate- and vigorous-intensity physical activity;
d: weighted percentage of the sample that spends at least four hours on computers, tablets, or cell phone;
OR: odds ratio; 95% CI: 95% confidence interval;
e: p-value from the Wald heterogeneity test;
f: p-value from the Wald test for linear trend;
adjusted analysis for sex, age, marital status, skin color, and region of Brazil (first level);
education level (second level);
smoking, alcohol consumption, processed foods, leisure-time PA, and PA recommendations (third level);
obesity, diabetes, and arterial hypertension (fourth level);
self-perceived health (fifth level).

Continue

Continuation

TABLE 2 - Sociodemographic and lifestyle factors, health conditions, and self-perceived health levels associated with computer, tablet, or cell phone time (at least four hours per day) for residents of the 26 capitals and Federal District of Brazil, 2019.

Variables	%[d]	Crude analysis			Adjusted analysis		
		OR	95% CI	p-value	OR	95% CI	p-value
Leisure time PA				0.121[e]			0.196[e]
Yes	13.9	1.00			1.00		
No	12.8	0.91	0.80 to 1.03		1.10	0.95 to 1.29	
PA recommendations[c]				0.044[e]			0.067[e]
Yes	14.0	1.00			1.00		
No	12.6	0.88	0.78 to 1.00		1.15	0.99 to 1.33	
Obesity				0.018[e]			0.812[e]
No	13.9	1.00			1.00		
Yes	11.7	0.82	0.70 to 0.97		0.98	0.82 to 1.17	
Diabetes				≤ 0.001[e]			0.263[e]
No	14.1	1.00			1.00		
Yes	4.4	0.28	0.21 to 0.38		0.83	0.60 to 1.15	
Arterial hypertension				≤ 0.001[e]			0.255[e]
No	15.4	1.00			1.00		
Yes	7.1	0.42	0.35 to 0.50		1.12	0.92 to 1.37	
Self perceived health				0.010[f]			≤ 0.001[f]
Very good / Good	12.8	1.00			1.00		
Regular	14.9	1.19	1.04 to 1.37		1.36	1.18 to 1.58	
Bad / Very bad	14.8	1.18	0.91 to 1.51		1.50	1.23 to 1.99	

PA: physical activity;
a: alcohol abuse, considering ≥ 5 drinks for males and ≥ 4 drinks for females;
b: consumption of ≥ 5 processed foods the day before the survey;
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OR: odds ratio; 95% CI: 95% confidence interval;
e: p-value from the Wald heterogeneity test;
f: p-value from the Wald test for linear trend;
adjusted analysis for sex, age, marital status, skin color, and region of Brazil (first level);
education level (second level);
smoking, alcohol consumption, processed foods, leisure-time PA, and PA recommendations (third level);
obesity, diabetes, and arterial hypertension (fourth level);
self-perceived health (fifth level).

Discussion

This study aimed to verify the association of sociodemographic and lifestyle factors, health conditions (related to the presence of three chronic diseases), and self-perceived health levels with the time spent on computers, tablets, or cell phones during leisure time by adults from the Brazilian capitals and Federal District. Of the 52,443 participants, 13.4% reported spending at least four hours per day in front of such devices, with individuals who were younger, without a partner, and with higher education levels being more exposed to the investigated behavior.

Regarding the investigated sociodemographic factors, it was found that women were only less likely than men to use computers, tablets, or cell phones for at least four hours per day in the crude analysis. In this study, the variable age seems to have confounded the relationship between sex and the assessed sedentary behaviors. Systematic reviews that sought to identify correlates of sedentary behavior in adults showed a lack of consensus on this relationship, even when other more studied sedentary behaviors were evaluated, such as watching television and sitting time[21,22].

The inverse association between age and the outcome may be explained by the exponential technological advances, with younger individuals commonly finding it easier to use

technology while senior citizens chose other sedentary behaviors during their leisure time, such as watching television[23]. This scenario has been noticed for nearly two decades, as older adults do not interact with information technology in the same way as younger adults[24]. Thus, motor control barriers in relation to performing computer mouse tasks[25] or difficulties viewing relevant information or functionality due to certain aspects of mobile device design[26] are examples of constant situations experienced by older individuals, who are more familiar with trivial interfaces that are easy to understand and access[27].

Individuals who lived without partners were more likely to have prolonged use of computers, tablets, or cell phones than those with partners. The use of mobile devices has become quite frequent and is considered an omnipresent artifact nowadays, especially when connected to the Internet[28]. In 2018, a survey conducted by the Pew Research Center[29] in 27 countries identified that 83% of Brazilian adults had a cell phone, with the majority (60%) being smartphone models. A likely explanation for this result is linked to the fact that single, separated, and widowed individuals use these technologies as socialization tools. Social media contribute to identity formation, as well as to the process of reflection on how individuals see themselves and are seen by others[30], playing a relevant role in the formation of personal beliefs and perceived social norms[31] and enabling them to experience more desirable versions of themselves[32]. Thereby, through these resources, those without partners are able to interact more with friends and family and meet new people, given their greater need for socialization. Conversely, the family routine of those who live together may serve as a protective factor for sedentary behavior if combined with the presence of underage children at home[33].

Researchers have reported that skin color may also influence the adoption of sedentary behavior, suggesting that black people spend more time commuting, sitting in cars or buses, whereas white individuals are more likely to remain in sedentary behavior at work, using computers[34]. However, it is necessary to consider that social and economic factors are directly linked to sedentary activity levels[35]. Thus, a possible explanation for the results obtained in this study is that skin color alone may not be a determining factor to assess this type of behavior but rather an important reflection of the social and economic environment in which the individual is inserted.

Another point that deserves to be highlighted when investigating sedentary behavior concerns the perception of safety during leisure time. It is assumed that aspects related to violence in northern Brazil[36] contribute to people being afraid to leave their homes and, consequently, spending more time in front of devices such as computers, tablets, and cell phones. In contrast, a good perception of safety could provide greater comfort for individuals to perform outdoor activities in environments close to their homes, for example[37]. Likewise, cultural issues and more options for activities during leisure time may contribute to the reduction of sedentary behavior. The implementation of public policies that encourage the practice of physical activities, such as the Brazilian National Health Promotion Policy (PNPS), which includes "Academia da Saúde"[38] and other local programs[39,40] lead adults and senior citizens to have more active opportunities in their cities and replace the time spent on sedentary behaviors with healthier practices. However, some barriers to practicing active behaviors during leisure time may be perceived by the adult population, mainly the lack of motivation and time[41], thus leading to greater use of technology during this period.

While seeking to provide estimates of access to digital technology among young adults in the United States, Villanti et al.[32] found that individuals with at most a high school education had a significantly lower prevalence of access to devices such as smartphones, tablets, and desktop or laptop computers with Internet connections than those with at least some college education. Furthermore, access to Internet-enabled devices was lower among those with a lower subjective financial situation[32]. It is noticed that, in both more advanced and emerging economies, people with higher education and income levels are more likely to connect digitally[29]. In the scientific area, the education variable is able to adequately reflect the socioeconomic level, especially when collected in adulthood, due to its stability[42]. Thus, individuals with more years of education are also possibly those with greater purchasing

power and, consequently, have more access to these types of equipment and other resources that these devices offer.

As for the lifestyle variables, it was found that smoking was not associated with time spent on computers, tablets, or cell phones, unlike alcohol and processed food consumption, indicating that those who drank and consumed processed foods in excess were more likely to show the investigated sedentary behavior. A study developed with Dutch adults showed that smokers reported more time spent on television and not on computers compared to non-smokers and former smokers[16]. Possibly, occupying one hand to smoke becomes an obstacle for excessively using computers, tablets, or cell phones because both hands are needed for better using such devices (unlike with television).

From another perspective, it is possible that people who engage in risky health behaviors are more likely to acquire other risky behaviors[43]. For example, people who had consumed alcohol thirty days before a study reported greater access to smartphones, desktop or laptop computers with Internet access, and smart TVs or video game consoles with Internet access compared to those who did not describe the same alcohol consumption in the previous month[32]. Issues such as hormone release, which can affect the wellness perception of the individual, may also be related to the consumption of alcohol and/or processed foods and the increase in time spent in sedentary behavior and other metabolic outcomes unfavorable to health[21,44]. Precisely because it is a moment of leisure, when individuals are more relaxed and unworried, they tend to consume these products more. Additionally, the use of computers is no longer an activity only in the work context, being, in some cases, an additional tool for relaxation during leisure time. However, as this is a cross-sectional study, it is not possible to establish a cause-and-effect relationship. Thus, further research in this field is needed to confirm these findings.

For physical activity (whether performing it during leisure time or meeting recommendations in different domains), no significant results were found when investigating its relationship with leisure time spent on computers, tablets, or cell phones. First of all, it is important to enhance that spending much time on sedentary behaviors is distinct from having low physical activity levels[45], and these two types of behavior may coexist[46]. In this sense, the investigation of the interaction between physical inactivity and sedentary behavior is suggested in order to develop strategies that help promote healthier lifestyles[47], taking into account that these behaviors, when analyzed together, may contribute to the increase in cases of noncommunicable chronic diseases[47,48].

In this study, the presence of obesity, diabetes, and hypertension was not related to the outcome. Similarly, Nang et al.[14] indicated that time spent watching television was significantly associated with increased systolic blood pressure, total cholesterol, triglycerides, C-reactive protein levels, insulin resistance, and lower adiponectin. However, no association was observed between computer use and reading time with such biomarkers, which are directly related to the diagnosis of these chronic diseases. Hu et al.[43] reported that, among American women, time sitting at work and, especially, watching television was significantly associated with increased risk of obesity and type 2 diabetes. Nevertheless, the time spent sitting at home, during leisure time, used for reading and meals, among other activities, was not associated with obesity. One of the aspects that may help understand this relationship is the eating habits linked to these low-energy expenditure behaviors, as well as the current nutritional status, given that they are potential mediators that explain a large part of the associations between sedentary behaviors and chronic diseases[50,51]. Another possible explanation for our findings is that different "passive" sedentary behaviors in which cognitive demand is lower, such as listening to music and watching television, may be more harmful to health than those with more conscious mental activity, exemplified by the use of computers and cell phones for electronic games and reading books or newspapers[52]. Longer periods spent on passive sedentary behaviors were associated with a greater chance of being overweight and having a lower physical activity level[52]. Even so, more robust investigations are needed to clarify the interface between sedentary behaviors and chronic diseases.

For the last variable of the analysis model, it was observed that, as the self-perceived

health levels of the participants worsened, the chances of spending at least four hours per day on a computer, tablet, or cell phone increased. A similar result was found in a study with older adults from six middle and low-income countries, in which a negative health perception was associated with a greater chance of sedentary behavior (in this case, at least four hours per day of sitting time)[53]. According to the authors, self-reported health may comprise aspects of health not identified through other questions asked in interviews, going beyond simply the diagnosis of noncommunicable chronic diseases[53], for example, and presenting a more holistic view in which the participant prioritizes and evaluates other important factors related to general health[54].

Based on that mentioned above, it is worth emphasizing that this study had strengths such as the size and representativeness of the sample. In addition, it is important to highlight the investigation of sedentary behavior indicators that have been gaining prominence in recent years, presenting a different panorama of the time spent watching television. However, this outcome was collected taking into account the combination of three different types of equipment (computers, tablets, and cell phones), and it was not possible to identify their particularities and purposes or even content accessed by the participants. Another aspect related to this variable is that it only counted the time using such devices for leisure, disregarding its totality in other domains, such as while at work, commuting, or at school/college. On the other hand, it is interesting to reiterate that investigations into sedentary behaviors are recurrent in the leisure context due to the risks caused by them, in addition to the possibility of interventions in this domain[55]. Operational and methodological criteria such as the different concepts (and indicators) of sedentary behavior and measurement forms also make it difficult to compare the results with other studies available in the literature. Finally, as this was a telephone survey, the measures were collected by self-reporting, which may cause errors in the estimates for the variables.

In conclusion, excessive time spent on computers, tablets, or cell phones was associated with age, marital status, skin color, region of Brazil, education level, lifestyle variables such as abusive consumption of alcohol and processed foods, and self-perceived health. The findings may contribute to the planning and implementation of programs that aim to raise awareness of the importance of healthier lifestyles and propose short and long-term changes in specific subgroups, in addition to identifying more vulnerable segments and characteristics of the population more exposed to sedentary behaviors. As strategies, more approaches to the different types of sedentary behavior and their repercussions on health are suggested, as well as ways to help reduce these indicators in a gradually and shrewdly, seeking alternative activities to replace them. For future research, the use of objective measures and longitudinal analysis is recommended in order to identify cause-and-effect relationships.

Resumo

Fatores associados ao comportamento sedentário baseado no uso de computador, tablet ou celular: dados de 52.443 adultos brasileiros.

Este estudo tem como objetivo verificar os fatores sociodemográficos e de estilo de vida, condições de saúde e autopercepção de saúde associados ao comportamento sedentário baseado no uso de computador, tablet ou celular no lazer em adultos das capitais brasileiras e do Distrito Federal. Trata-se de um estudo transversal derivado da pesquisa Vigitel, realizada em 2019 com indivíduos maiores de dezoito anos. O desfecho foi o tempo gasto em computadores, tablets ou celulares (pelo menos quatro horas por dia). As variáveis independentes do estudo foram sexo, idade, estado civil, cor da pele, região do Brasil, escolaridade, tabagismo, consumo excessivo de álcool e de alimentos industrializados, atividade física no lazer e recomendações de atividade física, presença de obesidade, diabetes e hipertensão e autopercepção de saúde, obtida por meio de questionário. A análise dos dados utilizou regressão logística binária, teste de heterogeneidade de Wald e teste de tendência linear. Entre os 52.443 participantes, indivíduos que viviam sem companheiro (p<0,001), que eram negros (p=0,041), tinham nível superior (p<0,001), consumiam álcool (p<0,001) e alimentos industrializados em excesso (p<0,001) e com pior autopercepção de saúde (p<0,001) foram mais propensos a usar computador, tablet ou celular para lazer em comparação com seus pares. Indivíduos mais velhos (p<0,001) e residentes na região sul do Brasil (p=0,003) tiveram menor chance de ter o desfecho investigado em relação aos participantes mais jovens e da região norte, respectivamente. Fatores como idade, estado civil e escolaridade estão mais fortemente associados ao uso prolongado de computador, tablet ou celular.

Palavras-chave: Tempo de tela; Atividades no lazer; Estudos transversais; Vigilância em saúde pública.

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