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TV viewing time is associated with increased all-cause mortality in Brazilian adults independent of physical activity

Television viewing and all-cause mortality

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Abstract

The purpose of this study was to investigate the association between television (TV) viewing and all-cause mortality among Brazilian adults after six years of follow-up. This longitudinal study started in 2010 in the city of Bauru, SP, Brazil, and involved 970 adults aged ≥ 50 years. Mortality was reported by relatives and confirmed in medical records of the Brazilian National Health System. Physical activity (PA) and TV viewing were assessed by the Baecke questionnaire. Health status, sociodemographic and behavioural covariates were considered as potential confounders. After six years of follow-up, 89 deaths were registered (9.2% [95%CI= 7.4% to 11%]). Type 2 diabetes mellitus was associated with higher risk of mortality (p-value= 0.012). Deaths correlated significantly with age (rho= 0.188; p-value= 0.001), overall PA score (rho= -0.128; p-value= 0.001) and TV viewing (rho= 0.086; p-value= 0.007). Lower percentage of participants reported TV viewing time as often (16%) and very often (5.7%), but there was an association between higher TV viewing time ("often" and "very often" grouped together) and increased mortality after six years of follow-up (p-value= 0.006). The higher TV viewing time was associated with a 44.7% increase in all-cause mortality (HR= 1.447 [1.019 to 2.055]), independently of other potential confounders. In conclusion, the findings from this cohort study identified increased risk of mortality among adults with higher TV viewing time, independently of physical activity and other variables.

Keywords: Sedentary behaviour; Television; Mortality; Public health; Epidemiology; Brazil.

Introduction

Projections for the year 2050 estimate that the number of elderly adults will increase to nearly 2.1 billion, and the largest growth will be in Latin America, with a projected 71% increase in the population aged 60 years or older (United Nations, 2015). Considering that individuals who reach the age of 60 are expected to live an additional 20.2 years on average (United Nations, 2015), being physically active becomes a key component of healthy aging, and changes in physical activity (PA) levels even later in life can improve health and longevity (Paffenbarger et al., 1993; Pahor et al., 2014).

However, older adults spend a considerable amount of their awake time in sedentary activities [which involve energy expenditure ≤1.5 metabolic equivalents (METs), in a sitting or reclining posture (Sedentary Behaviour Research, 2012)], creating a new public health challenge. Even with other types of technology available, television (TV) viewing is still the most common manifestation of sedentary behaviour in modern society (Keadle et al., 2015; Sun et al., 2015). Compelling evidence suggests that engagement in sedentary activities or PA affects the occurrence of a large variety of diseases and mortality in different ways (Edwardson et al., 2012; Ekelund et al., 2016; Gerage et al., 2015; Keadle, 2015; Lynch, 2010; Meneguci et al., 2015).

In 2008, low levels of PA were responsible for 9% of premature mortality worldwide (5.3 million deaths) (Lee et al., 2012), while recent meta-analysis identified that higher TV viewing increased the risk of premature mortality in adults by 33% (Sun et al., 2015). Moreover, even if sharing similar aspects to sedentary behaviour, TV viewing and sitting time may have different burden on mortality rates, with TV viewing producing higher risk which is less attenuated by PA (Ekelund et al., 2016).

The absence of scientific data from developing countries can be considered an important gap, as the majority of longitudinal studies assessing the impact of sitting time and TV viewing on mortality involved adults living in the USA, some European nations, Australia, and Japan (Ekelund et al., 2016). Ethnicity, race, and economic status are variables which differ greatly between developed and developing nations, affecting engagement in PA and sedentary activities (Ford, 2012). Thus, it is not clear how transferable findings are from developed nations to adults living in emerging countries. As far as we know, there is no

prospective study investigating the burden of TV viewing on mortality in developing nations and whether PA reduces that risk of mortality attributed to TV viewing.

Therefore, the aim of the present study was to investigate the association between TV viewing and all-cause mortality among Brazilian adults after six years of follow-up.

Methods

Sample and sampling

The present study is part of an ongoing cohort study entitled "The impact of physical activity level on health care costs related to ambulatory treatment", which is being carried out with adults who used the Brazilian National Health System (BNHS). The cohort study started in 2010 in the city of Bauru, a middle-sized Brazilian city (366,992 inhabitants and human development index of 0.801) located in the central region of São Paulo State, the most industrialized state in Brazil. The Department of Health of Bauru (subordinated to the BNHS) administrates primary care services in the city, which is composed of 17 basic health care units (BHU). BHUs are small primary health care centres, in which a wide variety of health professionals (e.g., general practitioners, gynaecologists, obstetricians, psychiatrists, dentists, and nurses) offer health services of low complexity (e.g., medical consultations, medicine prescription, vaccinations) to the population of a specific region of the city. All services are free of charge, characterized as primary health care (more complex cases [emergencies, surgeries and complex examinations] are directed to hospitals linked to the BNHS).

Each BHU keeps records of all people who were attended throughout the years and, based on these records, the researchers randomly selected 970 adults in five BHUs at baseline (2010) ([194 in each BHU; the biggest BHU in each geographical region of the city (north, south, west, east, and downtown]). Researchers contacted these adults by telephone to verify inclusion criteria: i) age >50 years; ii) registered for at least one year at the BHU; and iii) active health care service registration (at least one medical visit in the previous six months). Upon telephone contact, trained staff interviewed participants every two years (2010 [baseline], 2012, 2014, and 2016). In this dataset, there were no missing data and all participants signed a consent form prior to participation in the survey.

Prior to implementation, the Ethics Board Committee of Sao Paulo State University (UNESP) Bauru campus reviewed and approved the study protocol (http://aplicacao.saude.gov.br/plataformabrasil/login.jsf; protocol number 210.363) and all participants included in the study signed a consent form.

Mortality surveillance

Trained researchers contacted all participants by phone, registering the occurrence and date of deaths during the follow-up period. Relatives reported deaths during telephone contact and the researchers ascertained the information in the records of the BNHS (with previous authorization from the Bauru Department of Health). At the final follow-up in April 2016, the number of all-cause mortality cases was 89. The causes of deaths were coded according to the International Classification of Diseases (WHO, 2010). The four most prevalent causes of death were cardiovascular (n= 31; 34.8%), neoplasms (n= 12; 13.5%), respiratory (n= 6; 6.7%), and gastrointestinal (n= 6; 6.7%).

Physical activity and TV viewing assessment

At baseline, through face-to-face interview, information regarding PA and TV viewing were assessed by the Baecke questionnaire (Baecke et al., 1982), which comprises 16 questions scored on a 5-point Likert scale, ranging from never to always/very often, and addresses three domains of PA: occupational, sports participation, and leisure-time. Overall PA score was calculated following the questionnaire instructions and taking into account the three domains.

The researchers assessed TV viewing time using one question in the leisure-time section of the questionnaire (Baecke et al., 1982): “During leisure time I watch television”, with the following possibilities of answer: “never”, “seldom”, “sometimes”, “often”, or “very often”. For statistical analyses, three TV viewing time categories were created: “never and seldom” (low TV viewing), “sometimes”, and “often and very often” (high TV viewing). Additionally, in 2014 the researchers thought it would be important to know how many hours per day the participants spent watching TV and included a question regarding this issue (724

adults were interviewed). There was a correlation between TV viewing time reported in 2010 and TV viewing time in 2014 (n= 724 [rho= 0.254; p-values= 0.001]).

Covariates

In the present study, health status, and sociodemographic and behavioural covariates were considered potential confounders (used to adjust the multivariate model). Sociodemographic variables were sex (male or female), chronological age (<65 years old and ≥65 years old), and economic status (low and high) (ABEP, 2010). Health status variables were composed of waist circumference and a previous diagnosis of arterial hypertension, type 2 diabetes mellitus, or dyslipidaemia. Diagnoses of the diseases were identified through medical records of the participants (the Department of Health was granted access to the medical records of these patients from 2010) while waist circumference (in centimetres) was used as a proxy of abdominal obesity (waist circumference was measured by the researchers during the interview in 2010). Behavioural variables were smoking status (categorized as "yes" [current smokers independent of number of cigarettes per day] and "no" (former smokers or never smoked]) and medicine use ("yes" [medicines acquired outside BNHS with their own budget] or "no"). Medicines delivered by the BNHS were not considered in this study because their release to the patient is linked to a previous medical disease diagnoses, which were also controlled for.

Statistical analyses

Mean values and 95% confidence intervals (95%CI) summarized the numerical variables. ANOVA one-way (Tukey's post-hoc used when necessary) was used for the comparisons between groups of TV viewing time at baseline. Categorical variables were expressed as rates and 95%CI. These variables were also compared using the chi-square test (Yates's correction was applied in 2x2 contingency tables). Kaplan Meier survival analysis was performed, using a log-rank p-value to compare the curves. The mortality risk after six years of follow-up attributed to TV viewing was estimated by Cox regressions in terms of hazard ratios (HR) and its 95%CI. In the multivariate models, potential confounders were inserted simultaneously and adjusted values of HR generated. All statistical analyses were performed with the software BioEstat (release 5.0) and statistical significance (p-value) was set at 0.05.

Results

At baseline, a group of 970 randomly selected adults (709 women and 261 men) aged >= 50 years were recruited. The age ranged from 50.0 to 96.1 years, and the number of medicines bought by the participants ranged from zero to eight units. Lower TV viewing time ("never" and "seldom" grouped together) was related to lower age (*p*-value= 0.025), weight (*p*-value= 0.029), waist circumference (*p*-value= 0.013), economic status (*p*-value= 0.003), and higher PA scores (*p*-value= 0.001). For categorical variables, an association of male sex (*p*= 0.017), occurrence of arterial hypertension (*p*-value= 0.001), and higher economic status (*p*-value= 0.018) with high TV viewing time ("often and very often" grouped together) was observed (**Table 1**).

Spearman correlation identified that TV viewing time correlated with overall PA score (rho= -0.231; *p*-value= 0.001), chronological age (rho= 0.096; *p*-value= 0.003), waist circumference (rho= 0.069; *p*-value= 0.033), and economic status (rho= 0.107; *p*-value= 0.001). TV viewing time did not correlate with number of medicines purchased (*p*-value= 0.784) or smoking habit (*p*-value= 0.683). On the other hand, the overall PA score correlated with age (rho= -0.269; *p*-value= 0.001), waist circumference (rho= -0.131; *p*-value= 0.001), use of medicine (rho= -0.079; *p*-value= 0.014), and smoking (rho= -0,078; *p*-value= 0.015).

After six years of follow-up, 89 deaths were registered (9.2% [95%CI= 7.4% to 11%]). Type 2 diabetes mellitus was the only disease associated with a higher risk of mortality (*p*-value= 0.012) (**Table 2**). Deaths correlated significantly with age (rho= 0.188; *p*-value= 0.001), overall PA score (rho= -0.128; *p*-value= 0.001), and TV viewing (rho= 0.086; *p*-value= 0.007).

A total of 16% of the participants reported their TV viewing time in 2010 as often and 5.7% as very often (**Figure 1**). High TV viewing ("often" and "very often" combined) was associated with an increased risk of all-cause mortality (HR= 1.447 [1.019 to 2.055]) (**Figure 2**), independent of potential confounders.

Discussion

This 6-year longitudinal study aimed to investigate the possible association between TV viewing time and all-cause mortality among Brazilian adults. We found that the risk of mortality was 44.7% higher among participants who reported high TV viewing time ("often" and "very often" grouped together), independent of PA levels and other relevant covariates. To our knowledge, this is the first prospective study analysing all-cause mortality and TV viewing in a developing nation.

TV viewing in this population was inversely associated with overall PA, and directly associated with age, weight, waist circumference, economic status, male sex, and occurrence of arterial hypertension. The correlates for TV viewing found in our survey corroborate with the findings of a recently published systematic review (O'Donoghue et al., 2016). The age range of our sample (from 50 to 96 years old) explains, at least in part, this similarity, since a significant proportion of our participants were retired. According to previous evidence, time spent watching TV and in other sedentary behaviours increases significantly in retirees (Touvier et al., 2010), male sex (Uijtdewilligen et al., 2015), and in people with higher socio-economic status (Shuval et al., 2013). Moreover, TV viewing has been related to decreased amounts of time spent in PA (Touvieret al., 2010), and increased body weight, waist circumference (Menai et al., 2016; Shuval et al., 2013), and likelihood of hypertension (Thorp et al., 2013).

Overall, our mortality rate of 9.2% was slightly higher than the 8.4% observed in studies carried out in developed nations assessing the impact of TV viewing on all-cause mortality (Ekelund et al., 2016). Regarding mortality risk and TV viewing, we found that participants reporting high levels of TV time ("often" and "very often" grouped together) presented a 44.7% higher risk of death than those who reported lower time in this habit. A large number of studies have reported that prolonged sedentary behaviour is positively associated with higher mortality [34% (Chau et al., 2013), 28% (Keadle et al., 2015), and 49% (Wilmot et al., 2012)], even after adjustments. In addition, evidence shows that reducing TV viewing from 5 or more hours to 3-4 hours per day over a 6.6-year period decreases the mortality risk by about 15% when compared to those who maintained 5+ hours of TV viewing per day (Keadle et al., 2015).

There is more than one way linking TV viewing to mortality, making the phenomenon hugely complex. Food consumption during this sedentary habit, due to food advertisement during TV viewing may trigger food craving independent of hunger especially in children and adults (Ekelund et al., 2016; Harris et al., 2009). The increased consumption of food and in addition low energy consumption during TV viewing increases body weight, leading to the development of obesity (Sun et al., 2015). Moreover, evidence shows that exposition to higher TV viewing precedes changes in markers of general abdominal obesity (Helajärvi et al., 2014), with a potential effect of causing obesity-related diseases and mortality (Veerman et al., 2012; Shiyovich et al., 2013).

In terms of obesity comorbidities, type 2 diabetes mellitus seems to be one of the most relevant diseases linking TV viewing and mortality (Wilmot et al., 2012). A recent meta-analysis (16 studies and a sample of over one million adults) by Ekelund et al. (2016) suggested that one of the possible pathways linking TV viewing and mortality is based on its detrimental effects on the glucose metabolism, mainly due to prolonged postprandial sitting time after meals, such as dinner. The hypothesis presented by Ekelund et al. (2016) is supported by previous data reporting that the risk of mortality related to TV viewing decreased from 39% to 27% when diabetes mellitus was considered as a confounder (Sun et al., 2015). Our findings point to the same direction, showing the relevant burden of diabetes mellitus on all-cause mortality rates. On the other hand, it is important to take into account that diabetes mellitus and sedentary behaviours affect the development of other diseases (e.g., cardiovascular, fatty liver disease, and cancer) (Same et al., 2016; Wei et al., 2016; Zhou et al., 2015; Lynch, 2015), which were not controlled for in our cohort. Therefore, the burden of diabetes mellitus could be overestimated in our models. For this reason, we intend to assess these diseases in the next waves of our cohort study.

Another important factor when considering the impact of TV viewing on mortality is diet (Kurotani et al., 2016). In fact, diets with higher quality scores have been consistently associated with lower mortality risk (Atkins et al., 2014; Harmon et al., 2015; Akbaraly et al., 2011; Kant et al., 2000), and the risk of mortality can decrease by up to 42% (Kurotani et al., 2016). In adolescents and adults, higher TV viewing time generates increased consumption of snacks and foods rich in saturated fat (Fernandes et al. 2011; Hartmann et al. 2013). Moreover, skipping breakfast is harmful to the glucose and lipid metabolisms (Cahill et al., 2013; Cayres et al., 2016) and this habit seems to be related to TV viewing (Cahill et al., 2013). The absence of data related to diet is a relevant limitation and during the next follow-up dietary habits will be assessed.

Moreover, the impact of TV viewing on a reduction in PA seems potentially harmful to human health, mainly in older people affected by significant increases in body fatness related to aging (Rillamas-Sun et al., 2014). Higher PA eliminates the impact of sitting time on mortality, denoting the relevance of being physically active, especially when large amount of sedentary behaviour is not optional (e.g., at work or transportation) (Ekelund et al., 2016). On the other hand, higher PA only attenuates the impact of TV viewing on mortality (Ekelund et al., 2016). It is important to highlight that our mortality risk after six years (adjusted for PA) was similar to data from 1,005,791 adults over 45 years living in developed nations who watched TV $\geq$ 5h/day and engaged in $\leq$ 2.5 MET-h per week (1.44 [95%CI: 1.34 to 1.56]) (Ekelund et al., 2016). Time spent in sedentary behaviours and time spent in PA have been pointed out as two independent variables affecting mortality risk (Taveras et al., 2007). Also in our study TV viewing was associated with a higher risk of mortality independent of PA. Campaigns promoting health in adults should take into account specific actions to both increase physically active behaviours and mitigate time spent in TV viewing and other sedentary behaviours.

As limitations, we recognize the self-reporting of TV viewing time. Hence, objective measures of sedentary behaviour (accelerometers), should be considered in future studies. Although TV viewing is not the only type of sedentary behaviour, we specifically focused on this one as it is the predominant source of sedentary behaviour among the population in Brazil (Mielke et al., 2014) and a strong source of sedentary behaviour in leisure-time (Sugiyama et al., 2008). Another limitation regards a possible cause-effect relationship involving pre-existent conditions, such as debilitating diseases, which would cause high sitting time. This cause-effect relationship is still unclear, i.e., there is not enough evidence stating that high sitting time leads to debilitating disease, or that the presence of such diseases causes more sitting time. It is known that both situations are likely to exist, but which one is dominant remains unknown (Helajärvi et al., 2014). The lack of information about these conditions in our sample constitutes a limitation. Additionally, the relatively short follow-up and lack of information about diet are relevant limitations. Finally, cardiac diseases were not specified in the causes of death. As this is the first paper of the cohort study focusing on hazardous health outcomes related to sedentary behaviour, we are planning to analyse further health outcomes in the near future.

In conclusion, the findings from this cohort study identify an increased risk of mortality among adults with higher TV viewing time, independent of physical activity and other variables. TV viewing is an activity that can potentially be reduced more easily than other types of sedentary behaviours, such as occupational sitting. Hence, reducing TV time is a potential target for interventions and policy actions in developing nations.

Perspectives

The present findings do not only provide valuable information on the association between TV viewing and all-cause mortality among Brazilian adults but this is also the first prospective study analysing this issue in Brazil. Given the high prevalence of excessive TV watching and the increased risk of mortality related to this behaviour (44.7%), independent of PA and other potential confounders, these results indicate the importance of public health recommendations aimed at decreasing TV time and possibly overall sedentary behaviour.

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TABLES

Table 1. Summary of the general characteristics of the sample at baseline in 2010 (n= 970; Bauru, Sao Paulo State, Brazil).

Variables	Overall sample	TV viewing time			*p*-value[§]
		Never/Seldom	Sometimes	Often/Very often	
Numerical	Mean (95%CI)	Mean (95%CI)	Mean (95%CI)	Mean (95%CI)	
Age (years)	64.7 (64.1 to 65.2)	63.2 (61.7 to 64.8)	64.6 (63.9 to 65.3)	66.1 (64.8 to 67.3)[a]	**0.025**
Weight (kg)	72.5 (71.9 to 73.8)	70.4 (67.9 to 72.9)	73.2 (72.0 to 74.4)[a]	73.7 (71.5 to 75.9)	**0.029**
Height (cm)	157.3 (156.8 to 157.8)	157.0 (155.7 to 158.4)	157.3 (156.6 to 157.9)	157.9 (156.7 to 159.0)	0.086
BMI (kg/m^2)	29.4 (29.1 to 29.8)	28.8 (27.6 to 29.5)	29.6 (29.1 to 30.1)	29.5 (28.8 to 30.3)	0.147
WC (cm)	99.1 (98.2 to 100.1)	96.3 (93.7 to 98.8)	99.6 (98.6 to 100.6)[a]	99.6 (97.7 to 101.6)	**0.013**
ES (score)	17.7 (17.4 to 18.1)	16.6 (15.7 to 17.6)	17.8 (17.4 to 18.2)[a]	18.6 (17.9 to 19.4)[b]	**0.003**
PA (Score)	7.1 (6.9 to 7.2)	7.5 (7.2 to 7.8)	7.2 (7.1 to 7.3)	6.4 (6.2 to 6.6)[a,b]	**0.001**
Number of medicines	0.6 (0.53 to 0.66)	0.7 (0.5 to 0.9)	0.5 (0.5 to 0.6)	0.7 (0.5 to 0.9)	0.770*
Categorical	% (95%CI)	% (95%CI)	% (95%CI)	% (95%CI)	*p*-value[#]
Sex (female)	73.1 (70.3 to 75.8)	76.8 (69.8 to 83.7)	74.6 (71.2 to 78.0)	66.2 (59.8 to 72.6)	**0.017**
Medicine use (yes)	40.6 (37.5 to 43.7)	42.3 (34.1 to 50.4)	39.2 (35.3 to 43.0)	43.8 (37.1 to 50.5)	0.632

Hypertension (yes)	77.1 (74.3 to 79.6)	69.0 (61.4 to 76.6)	76.1 (72.7 to 79.4)	85.2 (80.4 to 90.0)	**0.001**
Diabetes mellitus (yes)	28.5 (25.6 to 31.2)	26.1 (18.8 to 33.3)	28.6 (25.1 to 32.2)	29.5 (23.4 to 35.7)	0.502
Dyslipidaemia (yes)	32.4 (29.4 to 35.3)	33.1 (25.4 to 40.8)	30.1 (26.5 to 33.7)	38.6 (32.0 to 45.2)	0.169
Smoking (current/former)	47.3 (44.1 to 50.4)	50.0 (41.8 to 58.2)	45.0 (41.1 to 48.9)	52.4 (45.6 to 59.1)	0.464
Overweight/Obesity (yes)	80.2 (77.8 to 82.8)	75.0 (66.7 to 81.2)	81.9 (78.8 to 84.9)	78.9 (73.o to 84.1)	0.531
Economic status (low)	81.2 (78.7 to 83.7)	85.2 (79.4 to 91.1)	82.2 (79.2 to 85.2)	75.7 (69.9 to 81.5)	**0.018**

Notes: BMI: body mass index; WC: waist circumference; ES: economic status; PA: physical activity; 95%CI: 95% confidence interval; [§] ANOVA one-way; *Wilcoxon test; [#]chi-square test; [a] different than group "never/seldom"; [b] different than group "sometimes"; bold mean statistical significance.

Table 2. Correlates of all-cause mortality from 2010 to 2016 in Brazilian adults (n= 970; Bauru, Sao Paulo State, Brazil).

	6-year all-cause mortality (n= 89 cases)		
	n (%)	(% 95%CI)	*p*-value
Sex			0.254
Male	29 (11.1%)	(7.3 to 14.9)	
Female	60 (8.5%)	(6.4 to 10.5)	
ES			0.362
High	13 (7.1%)	(3.4 to 10.8)	
Low	76 (9.6%)	(7.8 to 11.7)	
Smoking			0.719
No	49 (9.6%)	(7.1 to 12.1)	
Current/Former	40 (8.7%)	(6.1 to 11.2)	
Bought Medicine			0.325
No	48 (8.3%)	(6.1 to 10.6)	
Yes	41 (10.4%)	(7.4 to 13.4)	
Arterial hypertension			0.190
No	15 (6.7%)	(3.4 to 10.1)	
Yes	74 (9.9%)	(7.7 to 12.1)	
Diabetes mellitus			0.012
No	53 (7.6%)	(5.6 to 9.6)	
Yes	36 (13.1%)	(9.1 to 17.1)	
Dyslipidaemia			0.306
No	65 (9.9%)	(7.6 to 12.1)	
Yes	24 (7.6%)	(4.7 to 10.6)	

Notes: ES= economic status; 95%CI= 95% confidence interval.

FIGURES LEGENDS

Figure 1. Television viewing time and its association with 6-year all-cause mortality in adults (n= 970; Bauru, Sao Paulo State, Brazil).

Figure 2. Kaplan-Meier survival curves (Panel A) and measures of hazard ratio (HR) for the association between high TV viewing time ("often" and "very often" combined) and 6-year all-cause mortality in adults (Panel B) (n= 970; Bauru, Sao Paulo State, Brazil). **Note**: Panel A describes crude Kaplan-Meier survival curves, while in Panel B, the multivariate model describes the association between 6-year mortality (dependent variable) and high TV viewing (independent variable) simultaneously adjusted by all covariates (sex, economic status, smoking, medicine use, arterial hypertension, dyslipidemia, diabetes mellitus, physical activity, waist circumference and age).

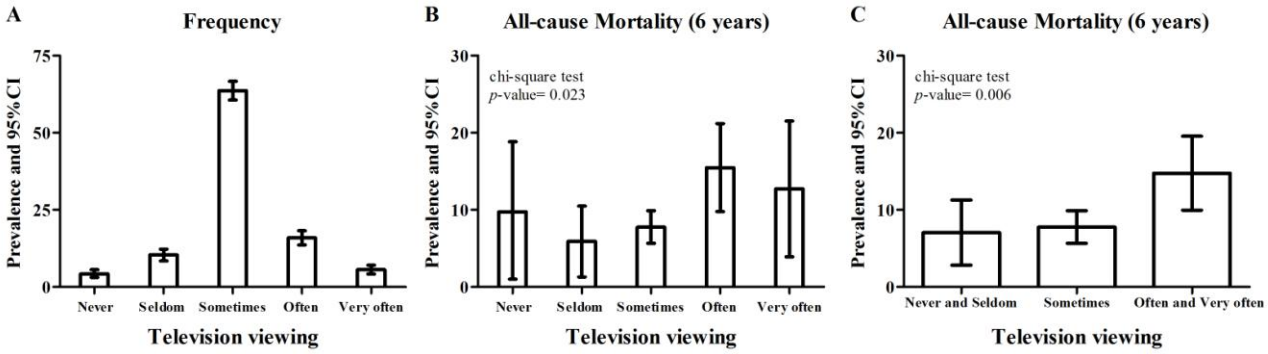

Figure 1. Television viewing frequency and its association with 6-year all-cause mortality in adults (n= 970; Bauru, Sao Paulo State, Brazil).

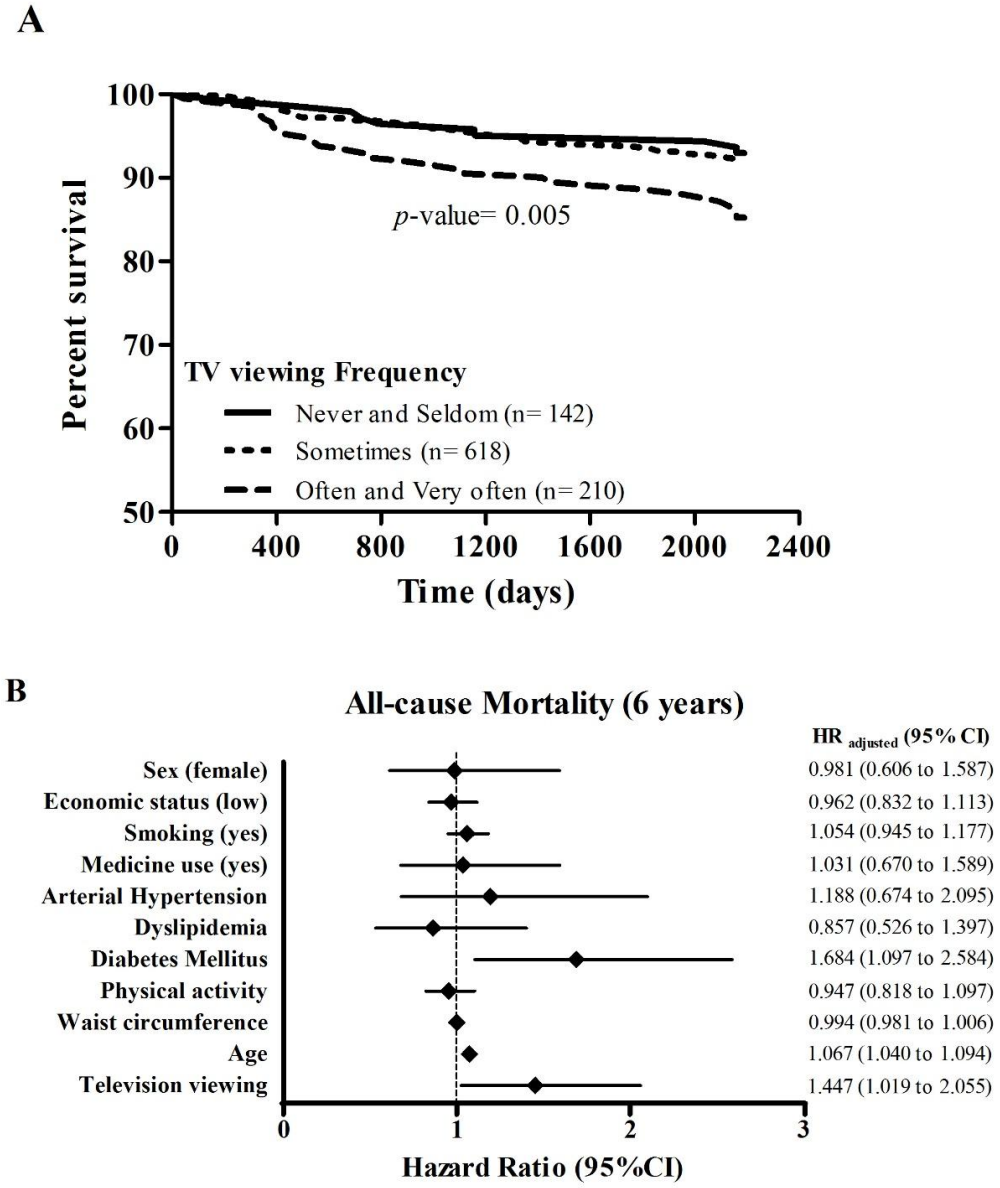

Figure 2. Kaplan-Meier survival curves (Panel A) and measures of hazard ratio (HR) for the association between high TV viewing time ("often" and "very often" combined) and 6-year all-cause mortality in adults (Panel B) (n= 970; Bauru, Sao Paulo State, Brazil). **Note**: Panel A describes crude Kaplan-Meier survival curves, while in Panel B, the multivariate model describes the association between 6-year mortality (dependent variable) and high TV viewing (independent variable) simultaneously adjusted by all covariates (sex, economic status, smoking, medicine use, arterial hypertension, dyslipidemia, diabetes mellitus, physical activity, waist circumference and age).