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Regular physical activity eliminates the harmful association of television watching with multimorbidity. A cross-sectional study from the European Social Survey

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ABSTRACT

The aims of the study were to analyse the association of television viewing, physical activity (PA), and multimorbidity; and to understand if PA attenuates or eliminates the detrimental associations between television viewing and multimorbidity. This is a cross-sectional study based on data from the European Social Survey round 7, 2014. Participants were 32,931 adults (15,784 men), aged 18–114 years old, from 18 European countries. Self-reported information regarding chronic diseases (CD), PA and time watching television were collected through interview. Logistic regression analysis was conducted to analyse the association between watching television and PA with the presence of multimorbidity (≥1 CD). Men and women who watched television had increased odds of having multimorbidity. When considering PA it was observed that, independently of television viewing, compared to engaging in PA for ≤1 day/week, engaging in 2–4 days/week and in ≥5 days/week was inversely associated with multimorbidity. Increased odds of multimorbidity were observed for men spending > 3 h/day watching television in the 2–3 days/week and ≤1 day/week categories of PA. For women engaged in 30 min of physical activity 2–3 days/week, spending > 3 h/day watching television was associated with higher odds for multimorbidity. For adults who practiced physical activity on ≥ 5 days/week watching television was not associated with multimorbidity. Time spent watching television is associated with multimorbidity. However, physical activity participation can attenuate or even eliminate this association.

1. Introduction

The prevalence of sedentary behaviours has increased (Hansen et al., 2012; Kohl 3rd et al., 2012). In high-income countries most adults spend their awake time in sedentary behaviours (Dumith et al., 2011), being television viewing time reported as the most prevalent leisure-time sedentary behaviour (Clark et al., 2009; Harvey et al., 2013). Several studies have demonstrated that sedentary behaviours, and particularly the time spent watching television, is associated with increased risk for mortality and chronic diseases, such as obesity, diabetes, cardiovascular diseases, and some cancers (Ekelund et al., 2016; Keadle et al., 2015; Pinto Pereira et al., 2012).

The deleterious associations of television viewing with mortality and chronic diseases in adults have been investigated to be independent of physical activity (Wijndaele et al., 2011). Interestingly, although the detrimental impact of time watching television has been also observed in active people (Healy et al., 2008), higher levels of physical activity may attenuate or even eliminate the increased risk associated with sedentary behaviours (Ekelund et al., 2016; Rao et al., 2016).

Several studies have addressed the association of television viewing and physical activity with specific chronic diseases (Ekelund et al., 2016; Keadle et al., 2015; Pinto Pereira et al., 2012) but few studies have investigated this issue with the presence of multimorbidity. The World Health Organization defines multimorbidity as the coexistence of two or more chronic conditions (WHO, 2016). The prevalence of multimorbidity is considering high (Barnett et al., 2012; Prazeres and Santiago, 2015; Puth et al., 2017), and evidence suggests that the most patients with chronic health conditions do not have a single diagnosis, but various diagnoses coexist within one person (Violan et al., 2014). Furthermore, multimorbidity becomes increasingly more common with age (Barnett et al., 2012; Prazeres and Santiago, 2015; Puth et al., 2017), is linked with high disability and mortality (Barnett et al., 2012),

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increased hospital admissions, use of inpatient and ambulatory health care (Salisbury et al., 2011), and reduced functional status (Fortin et al., 2014). Due to the high prevalence of sedentary behaviours (Hansen et al., 2012; Kohl 3rd et al., 2012), particularly the time watching television (Clark et al., 2009; Harvey et al., 2013), ageing population, and a high proportion of inactive adults (Loyen et al., 2017; Marques et al., 2015), the prevalence of multimorbidity has been rising (Pefoyo et al., 2015; Prazeres and Santiago, 2015; WHO, 2016). Therefore, the aim of this study was twofold: a) to analyse the association of television viewing, physical activity, and multimorbidity; and b) to understand if physical activity attenuates or eliminates the detrimental association between television viewing and multimorbidity.

2. Methods

2.1. Study design and participants

This is a cross-sectional study based on data from the European Social Survey round 7, 2014, including 20 European countries (Austria, Belgium, Switzerland, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Sweden, Slovenia, United Kingdom) and Israel. The European Social Survey is an academically driven survey that has been conducted every two years across Europe since 2001. The survey measures the attitudes, beliefs, and behaviours of European adults. The European Social Survey uses national representative samples among countries. Participants are sampled by means of postal code address files, population registers, social security register data, or telephone books. In each country, the information was collected using a questionnaire filled-in through an hour-long face-to-face interview that included questions on the use of medicine, immigration, citizenship, socio-demographic and socioeconomic issues, health status, and physical activity. The questionnaire was translated into the language of each of the participating countries by language experts. Further details about European Social Survey are available elsewhere (Schnaudt et al., 2014). The study protocol of the European Social Survey subscribes the Declaration on Professional Ethics of the International Statistical Institute (http://www.europeansocialsurvey.org/about/ethics.html).

Probability sampling from residents aged 15 years and older was applied in all countries (excluding only the homeless and the institutionalized population), comprising 40,185 participants. For the present study participants under 18 years old were excluded from the analyses (n = 1215), because the focus was on the adult population. Participants from Czech Republic and Estonia did not report information on chronic diseases and were therefore excluded (n = 3943). Respondents without information in more than two socio-demographic variables were also excluded (n = 2096). These restrictions resulted in a total sample size of 32,931 participants (15,784 men, 17,147 women), aged 18–114 years old.

2.2. Measures

2.2.1. Chronic diseases

Chronic diseases (heart or circulation problems, high blood pressure, breathing problems, allergies, diabetes, and cancer) were assessed by asking participants to indicate whether they currently have, or had chronic diseases (yes/no) in the last 12 months. For obesity, body mass index (BMI) was calculated from self-reported height and weight (kg/m^2). Body mass index categories were calculated in accordance with the WHO guidelines (WHO, 2000) and dichotomized into non-obese ($< 30.0\ kg/m^2$) and obese ($\geq 30\ kg/m^2$). Multimorbidity was defined as the co-occurrence of two or more of these conditions.

2.2.2. Physical activity

Information on physical activity was assessed with a single item asking, “On how many of the last 7 days did you walk quickly, do sports, or other physical activity for 30 minutes or longer?”. Using the reported information on physical activity, a new variable was computed to classify participants into three groups: 1) practice of physical activity ≤ 1 day/week; 2) practice of physical activity 2–4 days/week; and 3) practice of physical activity ≥ 5 days/week. Although physical activity was assessed with a single item, there is evidence in previous studies that a single question is an acceptable alternative (Wanner et al., 2014). The American College of Sports Medicine highlights that, although health and fitness benefits may occur exercising only once per week, this is not recommended due to an increased risk in musculoskeletal injury and adverse cardiovascular events (ACSM, 2014). Accordingly, in this study, performing 0 and 1 days per week were grouped in the same category.

2.2.3. Time watching television

Participants were asked to report how much time, in total, they spend watching television on an average day. Responses were from no time to > 3 h, using intervals of 30 min. Based on previous recodification (Keadle et al., 2015), responses were recoded to “no time at all”, “ < 1-h/day”, “2–3 h/day”, and “ > 3 h/day”.

2.2.4. Covariates

Participants reported their sex and age. The European Social Survey data provides two variables of education attainment: a recoded variable that focuses on achieved levels of education (primary, lower secondary, upper secondary, post-secondary, and tertiary education), according to the International Standard Classification of Education (UNESCO, 2012), and years of full-time education. Participants were asked to describe whether they lived with or without a husband/wife/partner, and their correspondent legal status (e.g. married, civil union, illegally recognized). Response options were dichotomized into live with or without a partner. To determine the living place, participants were asked to report whether they lived in a big city, suburbs or outskirts of a big city, town or small city, country village, or home in countryside. Those who indicated that they lived in a big city, or suburbs, or outskirts of a big city were grouped into a new category named urban areas; those who responded that they lived in country village or home in countryside were grouped into rural areas. Household income was determined based on decile. Using this data, 1st to 3rd, 4th to 7th, and 8th to 10th decile were grouped to create three groups: low, middle and high, respectively.

Participants were asked about their smoking behaviours. Response options ranged from “I have never smoked” to “I smoke every day”. Because there is no threshold of safety for smoking cigarettes, responses were recoded into current smoker, former smoker, and never smoke. Participants were also asked how often they drink alcohol. Responses were recoded into less than once a month, 2–3 times a month, once a week, several times a week, and every day.

These socio-demographic variables were selected as covariates because they are determinant factors of physical activity and sedentary behaviours (Marques et al., 2016). Age, education, socioeconomic status (Barnett et al., 2012; Prazeres and Santiago, 2015; Puth et al., 2017), employment status and family structured (Agborsangaya et al., 2012; Chung et al., 2015) are also related with multimorbidity. Smoking cigarettes was also selected due to its associations to the development of several chronic diseases and mortality (Dhalwani et al., 2017; Loef and Walach, 2012).

2.3. Statistical analysis

Descriptive statistics were calculated (means, standard deviation, and percentages) for the entire sample, and stratified by sex. Chi-square and Student's *t*-test were used to compare men and women according to socio-demographic characteristics, the presence of chronic diseases in the last 12 months, multimorbidity, time spent watching television, and