

« **BEHAVIORAL RISK FACTORS IN ADOLESCENTS** »

Editorial

Adolescence is a critical time for growth and development. Historically, adolescents generally have very poor diets and low levels of physical activity, which have been associated with increased risk of overweight/obesity and other health problems during adolescence and through adulthood. Healthy behaviors during adolescence can set the stage for positive life-long behaviors and the prevention of chronic disease.

The articles included provide important insights on the current state of health behaviors among youth in Europe and Brazil. Articles by Filho et al. and Santaliestra-Pasias et al. showed a clustering of unhealthy behaviors: those youth with high levels of sedentary behaviors also reported low levels of fruit and vegetable consumption. At the same time, Filho et al. reported better-than-expected consumption of fruit and vegetables and Levin et al. indicated that the prevalence of health behaviors among some youth may actually be improving.

However, there is still an ongoing need to support healthy behaviors at this critical life stage; health disparities for these behaviors are persistent as shown by Levin et al. The highest socio-economic youth in this study tended to report the healthiest behaviors over time. Authors argued that interventions targeting the vulnerable youth are necessary. Public health approaches are needed to create environments where the healthy choice is the easy choice; if possible, programs should address eating and physical activity together.

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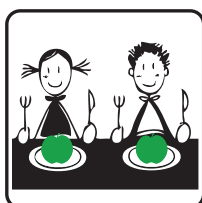
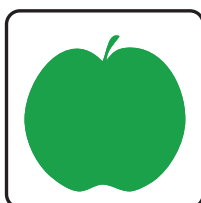
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# Insufficient F&V consumption and other behavioral risk factors: How are adolescents doing in Brazil?

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Adolescents are highly susceptible to environmental factors (e.g., the media, family and friends) which may have negative effects on their choices of health-related behaviors. Considering that many behaviors are established during adolescence and continue into adulthood, the study of behavioral risk factors (BRFs) among adolescents is a very relevant topic for public health interventions. We performed a survey that aimed to identify the prevalence of BRFs (insufficiently active, excessive TV watching, alcohol and tobacco use, daily soft drinks consumption and insufficient fruit and vegetable [F&V] consumption) among adolescents from a municipality in southern Brazil. In this paper, we have highlighted the results related to F&V consumption.

## A survey conducted in elementary and secondary schools in southern Brazil

We performed a cross-sectional study with 1,628 adolescents (aged 11-17.9 years, 52.5% males) who were randomly selected from 44 public schools (classes from the 6th grade of elementary school to the 2nd year of secondary school) in Curitiba, southern Brazil. Self-report instruments were used to assess the BRFs. A food frequency questionnaire validated for the Brazilian population was used to estimate eating behaviors outcomes. Six BRFs were analyzed:

- daily soft drinks consumption
- insufficient F&V consumption (< 5 F&V portions per day)
- insufficiently active (< 420 minutes of moderate-to-vigorous physical activity per week)
- excessive TV watching (> 3 hours of TV watching every day)
- current alcohol and tobacco use (the use of these substances in the month preceding the survey).

Adjusted prevalence ratios (Poisson regression) were used as an association measure.

## How are adolescents doing in southern Brazil?

The highest prevalence rates were observed in the following BRFs: being insufficiently active (50.5%) and daily soft drinks consumption (47.6%). Insufficient F&V consumption was the third BRF with the highest rate of prevalence among Brazilian adolescents, involving an estimated 35.5% of adolescents. The prevalence rates obtained from current alcohol use (32.4%), excessive time watching TV (28.8%) and current tobacco use

(7.9%) were lower than the prevalence of insufficient F&V consumption. Only 8.4% of the adolescents did not show any BRFs.

The estimates of insufficient F&V consumption ( $\leq 5$  portions per day) were below those found in previous studies<sup>1,2</sup>. These previous studies also used food frequency questionnaires to estimate people's intake of fruit and vegetables. Our results showed that the habit of insufficient F&V consumption was estimated as being lower among Brazilian adolescents when compared to their counterparts from other countries. Some environmental and demographic factors (e.g., the availability of F&V throughout the year, the encouragement from parental patterns of consumption and seasonal reductions in the price of F&V) may explain the adoption of this healthy habit among Brazilian adolescents. However, 35% of adolescents ate less than five F&V portions per day, which was the third BRF with the highest prevalence rates. Thus, the development of actions to promote healthy eating among young people from Brazil should be considered.

## Active lifestyle may prevent insufficient F&V consumption and promote healthy eating

Adolescents who did not participate in organized physical activity had a higher prevalence of insufficient F&V consumption. Additionally, adolescents who used computer/video games daily were the high-risk subgroups for daily soft drinks consumption. The association between active lifestyle and BRFs has been highlighted previously<sup>3</sup>. The encouragement of physical activity inside and outside of the school can also play an important role, not only in protecting against cardiovascular health problems, but also in encouraging a healthy lifestyle based on different behaviors. The association between sedentary behavior and inappropriate eating habits was also highlighted in a systematic review<sup>4</sup> and may be related to the consumption of these foods during sedentary activities. Thus, interventions to promote healthy eating in Brazilian adolescents can be focused from the perspective of an active lifestyle. Public policies on physical activity-related behaviors can contribute to the reduction of other behaviors that are associated with the development of cardiovascular problems, including eating behaviors such as the insufficient consumption of F&V and excessive soft drinks consumption.

**BASED ON:** Barbosa Filho VC, Campos W, Bozza R, Lopes AS. The prevalence and correlates of behavioral risk factors for cardiovascular health among Southern Brazil adolescents: a cross sectional study. *BMC Pediatr.* 2012;12:130.



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# Adolescents who spent more time in sedentary activities had a lower consumption of F&V. The HELENA study

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Increasing levels of physical inactivity and sedentarism in young population groups have been observed<sup>1</sup>. Sedentary time is often defined as the time spent on specific sedentary behaviours such as television (TV) viewing, computer or internet use. The American Academy of Paediatrics (AAP) recommends parents to limit total media time exposure to no more than 1-2 hours/day<sup>2</sup>. Moreover, sedentary behaviors can influence dietary intake depending on the type of activity. For example, increased TV viewing has been associated with unhealthy eating patterns, like higher consumption of sweets, savory snacks or soft drinks, and less F&V.

There are a lack of studies examining the relationship between a comprehensive list of screen time behaviors and the consumption of F&V. Therefore, we aimed to examine the association between time spent on different sedentary behaviors and consumption of specified food and beverages among European adolescents.

## European adolescents aged 12.5 to 17.5 years

The HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) Cross Sectional Study (CSS) is a European Union funded project on lifestyle and nutrition. The sample included 2,202 adolescents (45.5% males) between 12.5 to 17.5 years old, from 10 European cities (Athens, Heraklion, Dortmund, Ghent, Lille, Pecs, Rome, Stockholm, Vienna, and Zaragoza). Adolescents self-reported the frequency of specified sedentary behaviors for weekdays and weekends. Behaviors assessed included: TV viewing, playing computer games and video games, internet surfing for recreational reasons and for study purposes, and studying (non-school time). Dietary consumption was

assessed using the self-administered, computerized 24 Hour recalls and the adolescents completed the 24HRR twice during school time. F&V consumption were selected, out of the total 43 food groups.

Differences in food consumption according to time spent in each sedentary behavior were analyzed, and logistic regression analyses were performed to obtain ratios of food group consumption by specified sedentary behaviors.

## Adolescents who spent more time in sedentary activities had a lower consumption of F&V

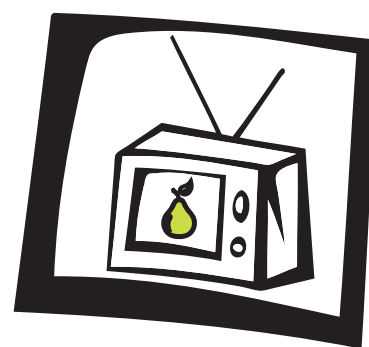
Adolescents' F&V consumption not differed by gender. In general, girls had higher F&V consumption than boys. Adolescents (boys and girls) spending more time > 4 hours/day watching TV during weekdays and weekends, and playing computer games or using the internet for recreational reasons during weekdays, were less likely to consume fruit than those who spent < 2 hours/day. The frequency of consuming fruit decreased with increased time watching TV, playing computer or video games or using the internet for recreational reasons. Also, the frequency of consuming fruit increased with increasing study time during weekdays in both sexes.

Overall, we found that those adolescents who spent more time in sedentary activities, mainly TV viewing, playing computer games and using the internet for leisure time, had a lower consumption of fruit, and were less likely to consume them. Analyses conducted for boys and girls separately showed that the associations were consistent between sexes. These trends could possibly be due to the displacement of fruit by other frequently advertised foods. Screen

viewing time activities, in particular TV viewing, have been associated with unhealthy eating practices<sup>3</sup> and may partly explain the relationship between sedentary behaviors and obesity<sup>4</sup>. It is possible that low levels of physical activity, combined with parental attitudes towards TV viewing, playing computer or video games, use of the internet for studying and the availability of internet in the home might have an influence on the amount of time adolescents spend in each sedentary behavior, and their food consumption.

## Regular PA and healthy eating should be promoted among adolescents

Excessive TV viewing, computer and internet use (>2hours/day) during adolescence was associated with lower consumption of fruit. It can only be speculated that these adolescents could be at a greater risk of overweight and obesity and poorer nutritional status. From a public health perspective, efforts to promote healthy foods and to replace adolescents' sedentary time with alternative activities would appear to offer a way forward in the short term, including the role of the parents in creating healthy environments.



**BASED ON:** Barbosa Filho VC, Campos W, Bozza R, Lopes AS. The prevalence and correlates of behavioral risk factors for cardiovascular health among Southern Brazil adolescents: a cross sectional study. *BMC Pediatr.* 2012;12:130.

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# Trends in Scottish adolescents' fruit and vegetable consumption and school effects

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The UK is thought to have one of the highest rates of childhood obesity in the developed world and approximately a third of children in Scotland are overweight or obese<sup>1</sup>. Improving the diet of the Scottish child population is a priority for the Scottish government with national targets reflecting this<sup>2</sup>. Measuring trends in consumption of particular food types offer, an opportunity to monitor over time risk behaviours which directly affects weight. As health promotion generally is more effective in affluent groups, alongside trends in eating behaviour, changes in socioeconomic inequalities must also be monitored.



and vegetable consumption were observed. There was some modest correlation ( $r^2=0.48$ ) between fruit and vegetable consumption suggesting that children may cluster by 'healthy' eating and 'unhealthy' eating.

## The association between age, sex and family affluence and F&V

Fruit consumption was more frequent among girls and among younger children, while vegetable consumption was more frequent among girls but was not associated with age or grade. Fruit and vegetables were consumed by children with high

FAS more frequently than those with low FAS. When an interaction term was added between year and FAS this was not significant for either outcome, suggesting that while consumption frequency has increased, the relationship with family affluence has not changed for either fruit or vegetable consumption.

## Survey conducted in Scotland in 2002, 2006 and 2010

The Health Behaviour in School-aged Children study is a survey of 11, 13 and 15 year olds, carried out in schools across Scotland, selected randomly to be representative of the Scottish adolescent population in Primary 7, Secondary 2 and Secondary 4 grades respectively. The study sample included 4188, 5766 and 6414 students in each of 2002, 2006 and 2010 respectively. The participants answered questions about how many times a week they ate fruit and vegetables. The participants also answered questions relating to car ownership, computer ownership, bedroom occupancy and family holidays. These items combined make the Family Affluence Scale (FAS), a proxy measure for SES often used among adolescents<sup>3</sup>. Weekly consumption frequencies of each food type were modelled using multilevel linear modelling, adjusting for age, sex, school grade, school type and year. FAS was introduced to each of the models to measure the association with family affluence and an interaction term between FAS and year gave an indication of whether the association between FAS and consumption frequency changed over time.

## Fruit and vegetables consumption increased between 2002 and 2010

Overall, the number of days on which fruit was consumed increased between 2002 and 2010, by 0.25 days per week and the number of days on which vegetables were consumed increased between 2002 and 2010 by 0.28 days per week. However, between 2006 and 2010 slight decreases in both fruit

## School effects on fruit and vegetable consumption

Both fruit and vegetable consumption varied by school. The initiation of the Curriculum for Excellence<sup>4</sup>, which includes the promotion of healthy eating, fell within the period under study, as did the Schools (Nutrition and Health Promotion) Act of 2007<sup>5</sup>. This Act introduced statutory requirements for school meals for the first time in Scotland. It could be hypothesised that prior to 2007, differences between schools were likely to be greater. Accordingly, when a random school parameter was added to the year variable, the increase in fruit and vegetable consumption between 2002 and 2010 was shown to vary by school with those schools performing the worst in 2002, showing greater improvements in vegetable consumption over time. Nevertheless, variability between schools in adolescent consumption of fruit and vegetables remained significant in 2010.

## There is still room for improvement in Scotland

Adolescent fruit and vegetable consumption has improved over time in Scotland, across low, medium and high affluent children, with persistent socioeconomic inequalities. Although school initiatives do appear to be working, variability at the school level remains. This suggests that school initiatives and/or food provision within schools may be key in improving the eating behaviour of adolescents.

**BASED ON:** Levin KA, Kirby J, Currie C, Inchley J. Trends in adolescent eating behaviour: A multilevel cross-sectional study of 11- 15 year olds in Scotland, 2002-2010. *Journal of Public Health*, 34, 523-531.

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