Original Article

Excessive screen viewing time by adolescents and body fatness in a developing country: Vietnam

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Background and Objectives: Screen time among youth has been increasingly recognized as a public health problem because of its link with obesity. This has been demonstrated in many studies conducted in developed countries but few studies have addressed the problem in developing countries, despite an increase literature about the emergence of obesity and a greater access to screen devices in a country like Vietnam. Our study aimed at assessing screen time and its relationship with BMI in adolescents of Ho Chi Minh City (HCMC), Vietnam. **Methods and Study Design:** In a cross-sectional study of 2024 junior high school students aged 11-14 of HCMC, students were measured for BMI and questioned on time spent watching television/Video/DVD or using computer for fun. High users were defined as time ≥2 h/d. International Obesity Task Force BMI cutoffs were used to define overweight and obesity. **Results:** Adolescents spent 2.2 h/d in screen time, with higher values for boys than girls (p<0.001). 53.8% of the respondents were high users. Time spent using computers for fun increased with age, and with the household wealthy index. The overall prevalence of overweight and obesity was 21.1%. Using multiple logistic regression, overweight and obesity was higher in boys (adjusted OR=2.66, 95% CI: [2.06; 3.44], p<0.001) and in children aged 11-12 who had a screen time ≥2 h/d (adjusted OR=1.48, 95% CI: [1.09; 1.99], p<0.02). **Conclusions:** In HCMC, a majority of adolescents spent ≥2 h/d on screen time. High screen time is associated with an increased prevalence of overweight and obesity in young adolescents. Public health intervention programs are needed to reduce screen time among youth.

Key Words: adolescents, screen time, Ho Chi Minh City, obesity, Vietnam

INTRODUCTION

For some years, Vietnam is undergoing a socio-economic transition but also a nutrition transition, especially in large cities. Ho Chi Minh City (HCMC), the largest city and the most economically dynamic area of Vietnam, has to face with an increase in sedentary lifestyles, coupled with a change in diets that are more and more energy dense. This nutrition transition has been associated with a threefold increase in prevalence of overweight and obesity (OO) over the past decade among adolescents in HCMC.[1,2]

Obesity in adolescence substantially increases the risk of cardiovascular diseases and their associated health deficiencies in adulthood; obesity in adulthood is now recognized as a high risk factor for chronic diseases, such as hyperlipidemia, hyperinsulinemia, hypertension, and early atherosclerosis.[3,4]

By contributing to the energy imbalance, sedentary behavior is considered as an important determinant of obesity.[5-7] Screen-based activities, such as watching television (TV), videos, DVDs, and using computers for fun have become common sedentary behaviors among young people.[8] There is evidence in the literature that screen time (ST) over 2 hours per day is linked with OO, with elevated blood pressure, and with elevated serum cholesterol established in adolescence has been shown to track into adulthood.[12] In scientific literature, data on ST are more and more available for developed countries but they are limited for developing countries, such as Vietnam. However, epidemiological data on the association between excessive ST and the prevalence of OO among non-Western youth may differ from those among Western youth. In HCMC, the rapid globalization and urbanization have created a greater accessibility to screen devices, including TV, computers, and video game consoles among adolescents.[13]

A recent study conducted in HCMC have addressed the sedentary lifestyle of adolescents, showing its relationship with age, gender, and socio-economic status, but this study failed to report on ST which is known to be the most popular sedentary leisure activity in adolescents.[14] Thus, studying the ST of adolescents in HCMC and its

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relationship with obesity is of public health concern. Moreover, focusing on adolescents aged 11-14 is relevant because 11 to 14 years of age correspond to the early stage of adolescence, offering therefore an important window of opportunity to prevent risk factors for diet-related chronic diseases.[15]

Because prevalence of OO among adolescents of HCMC was found to be higher in boys, in younger age, in those attending schools from districts classified as wealthy districts by the Vietnamese government, and in children living in families with a higher socioeconomic status, there is a need for taking these factors into account in the analysis of ST data in this population.[16]

This article aims to describe ST across gender, age, school location, and household wealth index and its relationship with body mass index (BMI) in adolescents aged 11-14, attending schools in HCMC, Vietnam.

METHODS

Study design

The design of the present study has been described in detail in a recently published paper.[2] Briefly, a cross-sectional survey was conducted among children aged 11-14 in junior high schools of HCMC in 2010. HCMC has about 92% of adolescents attending secondary high schools. This study was conducted in all the 14 urban districts of HCMC that are classified as either wealthy districts (n=4) and less wealthy districts (n=10). Districts were classified as wealthy or not using the official definition of the Vietnamese government that is based on infrastructures and housing costs in each district. 15 schools were randomly selected in wealthy districts, and 8 schools in less wealthy districts, using a probability proportional to the population size. In each selected school, we prepared two lists of classes by grade (grade 6-7 and grade 8-9), and one class was chosen at random from each list. All students from the selected classes were invited to participate. In total, 23 schools out of the 144 were selected to reach a target size of 2024 students for the study, out of a total population of 193,094 adolescents from urban districts of HCMC. All students from each randomly selected class were invited to participate to the study. No one refused. Students who were absent the day of the first visit were invited at the time of the second visit, and their anthropometry measurements were collected together with interview data at this second visit.

Measures

Anthropometric measures

Weight was measured in light clothes without shoes to the nearest 0.1 kg using a Tanita electronic scale (Tanita BF 571, Tanita Corporation, Japan). Height was measured to the nearest 0.1 cm using a suspended Microtoise tape with standard methodology. Measurements were taken once and recorded by one trained worker. BMI was calculated as weight in kilogram divided by height in meters squared. The International Obesity Task Force (IOTF), BMI cutoff values were used to define underweight and combined OO with predicted BMIs of less than 18.5 and more than 25 at 18 years of age, respectively.[17,18]

Screen time

ST was defined as time spent on a set of activities like watching TV/Video/DVD and using computers for fun (including e-communication, e-games, and surfing on the net). Total ST was defined as the sum of time spent watching TV/Video/DVD and time spent using computers for fun. Time estimates were based on a self-administrated questionnaire. This questionnaire was based on the Adolescent Sedentary Activity Questionnaire,[19] adapted to Vietnamese adolescents.[16] The Adolescent Sedentary Activity Questionnaire (ASAQ) invites students to think about a normal week and to report for each day of the week a quantitative evaluation of time spent outside of school hours in 12 pre-specified sets of sedentary activities. Daily time spent on sedentary activities was computed as the total of all recorded times, categorized by sedentary domains: ST, time for education, time for other leisure, and time for passive commuting to school.

The validity of ASAQ against accelerometer was low to fair reliability and validity for the all sedentary activities. The reliability showed a Spearman correlation of 0.28 and 0.23 for the assessment of ST among males and females. Two week test-retest showed that the weighted Kappa was 0.37 for the whole group, and was higher for boys than girls. Questionnaires were administered in class at a fixed date by the school supervisors, and took approximately 15 minutes for answering.

Participants were also categorized as high (≥2 hour/day (h/d)) or low (<2 h/d) users of watching TV/Video/DVD, using computers for fun or in total ST.[20,21]

Household wealthy index

A household wealthy index was used to estimate socioeconomic status. This index was calculated as the first principal component of the variance-covariance matrix of 14 dummy variables for ownership of 14 assets. These 14 assets included bicycle, motorbike, TV, radio, video, cassette player, computer, gas stove, CD player, car, microwave oven, refrigerator, telephone, and air-conditioners. The assets were collected based on the Family Questionnaire for parents. This questionnaire included socio-demographic data and household information including family size, education and occupation, and the ownership of domestic assets. The index was divided into three categories based on tertiles to define three subgroups corresponding to poorest, middle and richest.

Data analysis

Analyses were conducted using STATA V.11 (STATA Corporation, 2009) and data were weighted to account for the multi-stage cluster sampling design. When combining data from wealthy districts with those from non wealthy districts, weights of 0.17 and 0.83 were used to correct for the lower proportion of students in wealthy districts (28%) than in non wealthy districts (72%). Age was classified into two groups of 11-12 years and of 13-14 years that roughly correspond to children in grades 6-7 and 8-9, respectively. These two age groups have different schedules at school, different study load, and different homework charges after school. Descriptive statistics are presented as median and 25th, 75th percentile (P_{25}, P_{75}) or

proportions. Since time data were not normally distributed, time spent watching TV, using computers for fun, or both (total ST) was compared between two groups (boys vs girls, school located in wealthy districts vs school located in less wealthy districts) using Mann-Whitney rank sum test. Pearson chi-square test was used to compare proportions of high users in watching TV/Video/DVD, in using computer for fun, and in total ST between two groups. Across ordered categories, trends of median ST were assessed using Kruskal-Wallis test, and trends of proportion of high users were assessed using Cochran chi-square test. Odds ratio (OR) and 95% confidence interval (95% CI) were used as association indices. Multiple logistic regressions with interactions were used to assess the predictive value of high users on prevalence of OO, and results are reported as OR with 95% confidence intervals. High use in total ST (coded 1/0), male gender (coded 1/0), younger age (11-12 years, coded 1/0), and interactions between high use in total ST and male gender and between high use in total ST and younger age were submitted to a stepwise backward elimination procedure using maximum likelihood chi-square statistics to remove variables, but keeping a hierarchical model. The statistical significance level was set to 0.05.

Ethical considerations

Standards of ethics in studies conducted in Vietnam were respected. The study protocol was ethically approved by the Health Service of HCMC and the Department of Education and Training of HCMC. The study was a collaboration between the University of Medicine Pham Ngoc Thach and the Université catholique de Louvain (Brussels, Belgium). The protocol was also approved by the Ethical Review Committee of both universities. Informed consent was obtained from parents, students and school principals with standard assurances of confidentiality. Participants were informed that answering the anonymous questionnaire was voluntary.

RESULTS

In the 46 selected classes, there were 2051 students who were invited to participate in the study. Anthropometric measurements were gathered from 2,050 students. The-family form was missing in 60 cases, resulting in 1,989 cases available for analysis. Students spent a median of 129 minutes/day (min/d) (P_{25}, P_{75}: [73, 210]) or 2.2 h/d in total ST. The total proportion of children watching TV/Video/DVD, using computers for fun, and reporting a total ST ≥2 h/d was 29.6%, 16.9%, and 53.8%, respectively.

For each age and gender stratum, the median daily time spent in ST and prevalence of ST ≥2 h/d are presented in Table 1. Boys spent significantly more time in screen-based activities than girls. Both time spent watching TV/Video/DVD and time spent using computers for fun increased with age in boys as well as in girls.

The proportion reporting ≥2 h/d using computers for fun was almost twice as high in youths aged 13-14 compared to youths aged 11-12 (31.5% vs 16.4% in boys and 12.7% vs 6.5% in girls).

Table 2 provides stratification by age and socio-economic status of time (min/d) spent watching TV, using computers for fun, and total ST, along with the prevalence of ST ≥2 h/d. Students studying at schools located in wealthy districts spent more time viewing TV andusing computers for fun than students studying in schools located in less wealthy districts, with highly significant differences in time using computers for fun in youths aged 13-14.

An increase in time spent using computers for fun was also observed with an increasing household wealthy index in children aged 11-12 (from 17 to 39 min/d, $p<0.001$). In youths aged 13-14 , the median time increased with the household index for both activities (watching TV/Video/DVD and using computers for fun), leading to an increase in total ST from 136 min/d in the poorest to 154 min/d in the richest families, with a proportion of high users that increased from 56% to 64% ($p<0.04$).

Using the IOTF definition, 12.6% of adolescents were underweight and 21.1% were overweight or obese. Prevalence of underweight was comparable in boys (12.3%) and girls (13.0%) but OO prevalence was much higher in boys (28.3%) than girls (14.5%). Relationships between BMI categories and time spent watching TV/Video/DVD, using computers for fun, or in both activities are illustrated in Figure 1. There was an increase in time spent watching TV/Video/DVD across BMI status in boys and in girls aged 11-12 (Figure 1A), while in children aged

Table 1. Screen time (min/d) according to gender and age

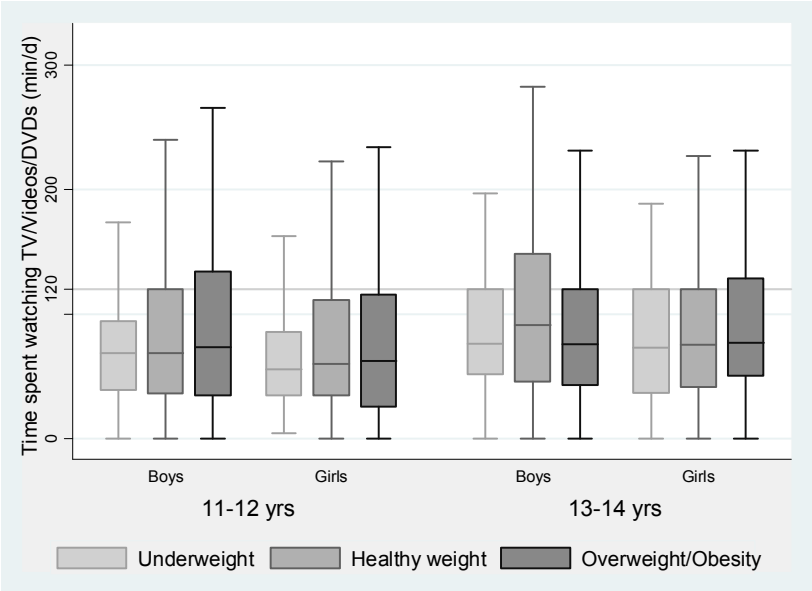
	11-12 years			13-14 years			Total
	Boys	Girls	*p* value	Boys	Girls	*p* value	
n	420	491		527	551		
Viewing TV/Video/DVD							
Median (min/d)[§]	73 (35, 129)	62 (34, 111)	0.06	86 (47, 141)	77 (43, 129)	0.04	77 (39, 129)
≥2 h/d (%)	28.8	24.2	0.12	34.2	30.5	0.20	29.6
Using computers for fun[†]							
Median (min/d)[§]	43 (17, 86)	21 (2, 51)	0.001	69 (26, 133)	34 (9, 77)	0.001	39 (13, 86)
≥2 h/d (%)	16.4	6.5	0.001	31.5	12.7	0.001	16.9
Total screen time[‡]							
Median (min/d)[§]	133 (69, 211)	94 (51, 159)	0.001	167 (99, 257)	124 (73, 197)	0.001	129 (73, 210)
≥2 h/d (%)	54.3	38.7	0.001	69.1	52.1	0.001	53.8

[†]Using computers for fun includes e-communications, e-games, surfing the net.
[‡]Total screen time: time watching TV/Video/DVD or using computers for fun.
[§]Median (P_{25}, P_{75}).

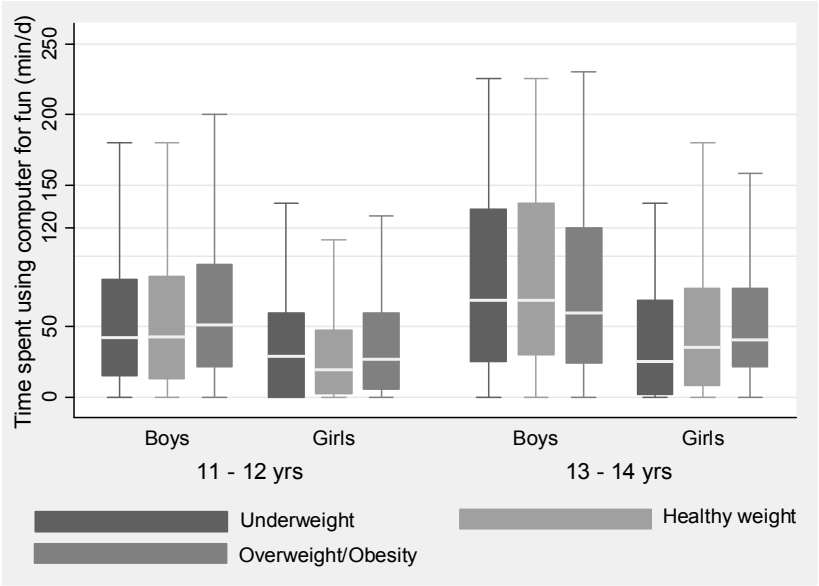
Table 2. Screen time (min/d) according to school location and household wealthy index

	Watching TV/Video/DVD				Using computers for fun[†]				Total screen time[‡]			
	Median (min/d)[§]	*p*-value	≥2 h/d (%)	*p*-value	Median (min/d)[§]	*p*-value	≥2 h/d (%)	*p*-value	Median (min/d)[§]	*p*-value	≥2 h/d (%)	*p*-value
Age 11-12 years												
School location		0.57		0.04		0.02		0.41		0.15		0.22
Less wealthy districts	64 (36, 111)		22.4		26 (6, 60)		9.9		99 (58, 171)		43.2	
Wealthy districts	69 (34, 128)		28.5		34 (9, 73)		11.7		111 (56, 189)		47.4	
Household wealthy index		0.64		0.64		0.001		0.91		0.06		0.12
Poorest	69 (34, 120)		25.7		17 (0, 56)		11.3		99 (51, 171)		42.6	
Middle	72 (39, 120)		25.9		34 (9, 69)		11.0		112 (64, 176)		46.4	
Richest	64 (34, 124)		27.4		39 (16, 81)		11.0		116 (61, 193)		48.7	
Age 13-14 years												
School location		0.16		0.04		0.001		0.002		0.001		0.006
Less wealthy districts	76 (43, 129)		28.4		39 (15, 86)		16.8		132 (77, 208)		54.9	
Wealthy districts	86 (47, 137)		34.5		51 (17, 116)		24.8		150 (87, 240)		63.5	
Household wealthy index		0.64		0.72		0.001		0.001		0.004		0.04
Poorest	77 (43, 137)		33.1		34 (9, 77)		14.6		137 (75, 204)		56.3	
Middle	81 (46, 137)		31.9		51 (17, 111)		24.0		146 (81, 236)		60.8	
Richest	86 (47, 137)		31.9		60 (26, 120)		27.0		154 (94, 249)		64.1	

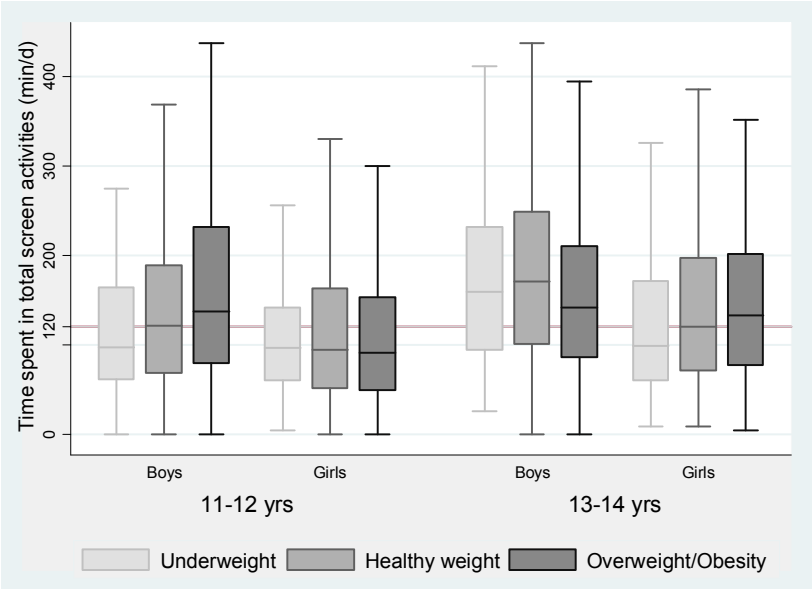
[†]Using computer for fun includes e-communications, e-games, surfing the net.
[‡]Screen time: time watching TV/Video/DVD or using computer for fun.
[§]Median (P_{25}, P_{75}).
p-value: Kruskal-Wallis test or Cochran trend test.



A. Watching TV/Videos/DVDs and BMI



B. Using computer for fun and BMI



C. Total screen activities and BMI

Figure 1. Relationship between BMI categories and screen time by age and gender.

Table 3. Association between screen time and overweight or obesity using multiple logistic regression

	Overweight and obesity		
	Odd ratio	95% confidence interval	*p*-value
1. Boys	2.66	2.06; 3.44	<0.001
2. Age ≤12 years	1.26	0.96; 1.64	0.09
3. High users (screen time ≥2 h/d)	0.74	0.51; 1.07	0.11
Interaction (2) and (3)	1.59	1.06 ; 2.38	0.02

13-14, no trend was observed. Figure 1B also shows that time spent using computers for fun tended to increase across BMI categories, but it was only significant among girls aged 13-14 ($p<0.042$). As shown in Figure 1B, overweight and obese boys spent more time using computers for fun than overweight and obese girls of the same age (youths aged 11-12: 51 vs 27 min/d, $p<0.001$; youths aged 13-14: 60 vs 41 min/d, $p<0.02$).

Figure 1C also shows that in girls aged 13-14, there was a significant increase in total ST as their BMI category increased ($p<0.047$). This increasing trend was also observed in boys aged 11-12 but did not reach statistical significance in univariate analysis. It should be underlined that ST in overweight and obese boys aged 11-12 (Median: 149 min/d, P_{25}, P_{75}: [81, 249]) was as much as in overweight and obese girls aged 13-14 (Median: 139 min/d, P_{25}, P_{75}: [77, 223]).

Among adolescents aged 11-12, the prevalence of OO was higher in children with ST ≥2 h/d than in children with ST <2 h/d (OR=1.34, 95% CI: [0.99; 1.81], $p>0.062$). Interaction between high users and boys was not significantly associated with the prevalence of OO ($p>0.89$) and this interaction was therefore removed from the multiple logistic regression model. Interaction between high users (ST ≥2 h/d) and younger age (Table 3) in adolescents aged 11-12, children with ST ≥2 h/d had an increased odds of OO (adjusted OR=1.59 x 1.26 x 0.74=1.48, 95% CI: [1.09; 1.99], $p<0.02$).

DISCUSSION

We found that the majority (53.8%) of Vietnamese adolescents exceeded the recommended maximum screen time of 2 h/d,[21] with 2.2 h/d as median screen time. Boys reported higher ST than girls, and a higher proportion of them exceeded the recommended daily ST. Older children spent more time in ST than younger ones. Student in wealthier families spend significantly more time using computers for fun, and had higher ST at all ages. The association between weight status and TV/Video/DVD viewing was not significant for all age groups while using computer for fun was associated with weight status in girls aged 13-14. Using multiple logistic regression, we found that children aged 11-12 who had ST ≥2 h/d had a higher odds of OO.

Differences in the methods and questions used to assess ST make it difficult to directly compare our findings to those reported in other studies. Compared to a Chinese study conducted in 2006, children aged 13-18 reported a lower median ST (1.4 h/d) with 44.3% of boys and 34.7% of girls surpassing ST guidelines.[22] Another report in Australia in 2004, which used the same questionnaire as in our study, showed a higher duration of ST (3.1 h/d), in which 62% of children aged 11-15 spent at least two hours per day in screen activities.[23] It is said that our findings highlighted the emerging problem of increasing ST among Vietnamese adolescents.

The gender differences in screen based activities in Vietnamese children are similar to those reported in other studies.[7,23,24] Such gender differences may be partly explained by a Vietnamese social fact: girls tend to do more household activities and they spend more time on homework than boys.[25,26] Moreover, boys are more attracted not only by computer games but also by the content in computer games such as sports, racing, fighting, and shooting than girls in Vietnam, as in other countries.[27]

Our findings are similar to those from other studies showing a positive association between ST and age.[28-30] Younger teenagers need to be supervised with more stringent rules on screen based activities. Moreover, demands to use computers for homework are more frequent with increasing age; as a result, older children tend to have a greater access to media sources than the younger ones.[28]

In developed countries, children from the richest families have the lowest screen time levels. We found the opposite pattern in Vietnamese children. With its developing level, Vietnam is still a transition country where the new rich families provide a "modern" lifestyle for their children including up-to-date recreational facilities such as computers and screen devices.

Previous findings in other studies pointed television viewing as a leading factor associated with adolescent obesity[20,22,31] while the present study found the opposite pattern. Findings remain however inconclusive because the relationship between television viewing and weight status is often small or inconsistent in literature.[32] A possible explanation might be that the recent considerable increase in computer activities has reduced the attractiveness of watching TV/Video/DVD among teenagers.

Our finding is consistent with other reports showing a positive association between overweight and using computers for fun.[13,23,31] In developing countries, screen use is usually related to economic prosperity.[22] In Vietnam, from 2004 to 2010, the percentage of households having a computer doubled (from 16.1% to 35.5%) in urban areas, and there were 46 computers per 100 urban households in 2010.[13] As a result, there was a high increase in the proportion of adolescents engaged in using computers for fun; TV time has been substituted by other multiple new entertainment options, like using computers for fun.[33] This highlights the need to implement programs that address the time spent using computers for fun and not just watching television among adolescents.

Using multiple logistic regression, we found that younger children with high use of screen devices had a higher odd of OO. Comparisons with other studies are limited because of differences in age groups, because of

the ST definition, because of different potential confounders introduced in models, and because of interactions not considered in the modeling. A survey conducted in 2002 on Japanese adolescents (12-13 years) showed that watching TV and playing video games for more than 2 h/d in girls were strongly associated with overweight.[2] In this study, logistic regression analyses were performed with adjustments for age, but separately for boys and girls, and without testing for interactions. The authors did not sum up the time spent on the two activities. In another study among Finnish children aged 14, 16 and 18[34] Kautiainen did not find an interaction between age and time spent on ST in a logistic regression model developed to evaluate the impact of time spent viewing television, playing games and using computers on overweight, with adjustments for biological maturation, intensity of weekly physical activity and guardian's education. Their findings showed that increased time spent on watching TV and using computers was associated with an increased prevalence of overweight (obesity inclusive) among girls. These findings are in line with ours. An explanation for the association between ST and OO in youth is that there is an increased caloric intake due to eating during viewing television that is coupled with reduced energy expenditure during ST. ST is usually associated with snacking and bad eating habits, which lead to an increased energy intake.[27,35] These may contribute to the link between higher ST and weight. An additional problem is that ST reduces time spent on physical activities.[36-38] However, this theory is still under discussion. Some studies have shown that ST and physical activity are independently associated with metabolic risk factors.[18,39] Maher et al indicated that ST interacts with weight status through pathways over and above displacement of physical activity.[36]

Our study has some limitations. The cross sectional nature of our study does not allow identifying causal relationships. The Adolescent Sedentary Activity Questionnaire is a self-reported questionnaire. This may result in errors such as under- or over-estimated ST, even if the questionnaire was validated for use on Vietnamese adolescents and showed good reliability and validity. We did not include time for playing video games in ST. Internet and computers are now available in most households of HCMC. Children aged 11-14 years usually prefer using computer for fun rather than playing with video games, but we can't avoid an underestimation of screen time because we didn't include time spent on video games in our study. In recent years, smart phone technologies have become increasingly multi-functional, and children now prefer using smart phone for social media/fun than using other devices. However, this shift has appeared after we conducted our study. Current total screen time can therefore be higher than the estimate we found, and effects on BMI are also expected to be higher than in our results.

A limitation of our ASAQ is that there was no distinction between week days and weekends, despite a study showing that screen time differs between week days and weekend days.[40] Such effect might have confounded our estimates. More and more studies noted that the association between ST and BMI depends upon moderate to vigorous physical activity in youth. However, our ASAQ did not contain enough details on physical activity to assess if the level was moderate to vigorous or not. We therefore couldn't adjust the relationship between BMI and screen time on time spent in moderate to vigorous physical activity in children to examine its confounding effect, and it is a limitation of our study. Another limitation is that we did not consider the diet-related variables in our study, though some studies have shown that eating pattern and snacking habits of children are associated with ST.[14,35] Additionally, inadequate sleep has shown to be associated with increased BMI and waist circumference.[41] However, we didn't assess the sleep pattern of the subjects; so, we don't know whether the adolescents who had more of screen time had inadequate sleep.

The use of BMI as a measure of overweight and obesity can also be discussed. Although BMI does not account for the heavier weight of muscle mass compared to fat, BMI provides the most useful, population-level measure of obesity, and it has good reliability and validity. It is also widely used for both clinical and public health applications.

Despite these limitations, our study is based on a random sample of students from all public schools in HCMC and it therefore allows inferring results at the city level. Our study also provides helpful information on ST among adolescents aged 11-14 for public health intervention programs in HCMC, because we conducted this study in an understudied population. Moreover, early adolescence (aged 11-14) is an interesting period because it deals with the transition between pre-adolescence and adolescence. It is a critical period for the development of overweight that may depend on the prevalence of many other risk factors of OO.

In conclusion, our study shows that a majority of adolescents aged 11-14 in HCMC exceeds the recommended daily limit of 2 h in ST. Boys and children living in richer families spend more time in screening activities. It was found that children aged 11-12 with ST $\geq$2 h/d had a higher prevalence of OO. The prevention of OO in youths should focus on children engaged in excessive ST, especially boys and children living in richer families. Adolescents should be encouraged to reduce ST during daytime. Future longitudinal research is needed to confirm a higher prevalence of OO in children aged 11-12 with ST $\geq$2 h/d.

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AUTHOR DISCLOSURES

None of the authors has declared any conflict of interest statement. All authors made substantive intellectual contribution to this manuscript and approved the submission. The corresponding author has full access to all aspects of the research, writing process, and takes final responsibility for the paper.

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sponding author has full access to all the data in the study and has final responsibility for the decision to submit for publication.

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Original Article

Excessive screen viewing time by adolescents and body fatness in a developing country: Vietnam

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發展中國家越南青少年過多的看螢幕時間與身體肥胖

背景與目的：青少年在螢幕前花費的時間因與肥胖有著密切的關係而引起社會的關注。多項研究只證明這個社會健康問題發生在發達國家。儘管肥胖的出現和大量觀看螢幕設備相關的文獻不少，但有關這個問題的研究在越南等發展中國家並不多。這項研究針對在越南胡志明市生活的青少年在螢幕前花費的時間和他們體質指數之間的關係。**方法與研究設計**：對2024名11-14歲的初中生進行橫斷面研究，測量學生的體質指數和詢問該名學生在螢幕前所花費的時間，包括看電視與打電子遊戲。每日花費兩小時或以上的學生被定義為頻繁使用者，並用國際肥胖工作組的臨界值定義超重和肥胖。**結果**：青少年每日在螢幕前花費2.2小時，其中53.8%是頻繁使用者，而男生花費的時間比女生多（p<0.001）。學生的年齡越大和家庭財富越多，花費在電子遊戲的時間也隨著增加。超重和肥胖總的流行率為21.1%。多元回歸結果發現，超重和肥胖的學生中男生較多（調整後的OR=2.66, 95% CI：[2.06；3.44]，p<0.001），而11-12歲的兒童每日則在螢幕前花費兩小時或以上（調整後的OR=1.48, 95% CI：[1.09；1.99]，p<0.02）。**結論**：在胡志明市，大部分青少年每日花費在螢幕前的時間為兩小時或以上。青少年在螢幕前花費時間長與超重和肥胖流行率增加有關。需要公共健康介入方案，以減少青少年在螢幕前花費的時間。

關鍵字：青少年、螢幕時間、胡志明市、肥胖、越南