

ORIGINAL PAPER

SELECTED DAILY REGIME ACTIVITIES AMONG ADOLESCENT GIRLS – TROJAN HORSE OF GESTATIONAL OBESITY?

Martina Bašková¹, Jaroslava Kopčáková², Tibor Baška³¹Department of Midwifery, Jessenius Faculty of Medicine in Martin, Comenius University in Bratislava, Slovakia²Department of Health Psychology, Faculty of Medicine, P.J. Šafárik University in Košice, Košice, Slovakia³Department of Public Health, Jessenius Faculty of Medicine in Martin, Comenius University in Bratislava, Slovakia

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Abstract

Aim: The article analyzes breakfast-skipping, excessive screen-based activities (two or more hours a day), and insufficient physical activity in relation to body mass index and family affluence in 13–15 year-old girls in Slovakia. *Design:* Cross-sectional study. *Methods:* Health Behavior in School Aged Children (HBSC), an internationally standardized cross-sectional questionnaire study was conducted in 2014, in Slovakia. The representative sample consisted of 3,077 adolescent girls aged 13–15 years. *Results:* Overweight and obesity was found in 6.2%, and 4.0% of respondents, respectively. The majority (55.0%) of girls admitted skipping breakfast, and 83.6% reported excessive screen-based activities regardless of family affluence. Daily physical activities were two times more common in girls with normal weight compared with those who were obese (18.6% vs. 9.1%). *Conclusion:* Insufficient physical activity and excessive screen-based activities are common in adolescent girls, and are, therefore, crucial factors to focus on in the prevention of obesity, especially after pregnancy.

Keywords: adolescent girls, daily regime, obesity.

Introduction

Obesity currently ranks among the most important and prevalent public health issues worldwide. As a risk factor in numerous chronic diseases, obesity contributes significantly to premature mortality and morbidity across the World. According to official data from the World Health Organization, the prevalence of obesity has doubled globally since 1980, reaching 10.7% in males, and 15.2% in females in 2014. The prevalence in Europe is approximately two times higher (21.5% in males, and 24.5% in females). In Slovakia, approximately one quarter of the adult population is obese (24.6% in males, and 26.7% in females), i.e., the prevalence slightly exceeds the European average (World Health Organization, 2016).

In addition to other health consequences, obesity represents an important issue for midwifery due to its contribution to such conditions as increased risk of polycystic ovaria, anovulation cycle, irregular menstruation, and even amenorrhea. Obesity during pregnancy affects child development, as well as the

health of pregnant women (clinical manifestation of gestational hypertension, preeclampsia, gestational diabetes etc.) (Downs, 2016).

However, the development of obesity originates as early as childhood and adolescence (Samura et al., 2016). In addition to inherent predispositions, lifestyle factors play a crucial role in this process. Dietary habits in particular, i.e., the quantitative and qualitative composition of diet, contribute significantly to its aetiology. However, besides dietary composition itself, several aspects of daily regime also make a significant contribution. Regularity of daily meals, especially breakfast, and physical activity can be considered particularly important in this context. The association between skipping breakfast and obesity has been well documented by several studies (Haug et al., 2009; Deshmukh-Taskar et al., 2010; Zakrzewski et al., 2015). Adequate daily physical exercise, particularly sports activities, are important for the healthy mental and physical development of children and adolescents (Janssen, LeBlanc, 2010). Excessive screen-based activities (i.e., the watching of TV, and computer use, especially gaming and internet activities) not only occupy a significant part of leisure time, but are also associated with increased energy intake, namely due to foods high in fat and

Corresponding author: Martina Bašková, Department of Midwifery, Jessenius Faculty of Medicine in Martin, Comenius University in Bratislava, Malá Hora 5, Martin, Slovakia; e-mail: Martina.Baskova@jfmed.uniba.sk

sugar (Lissner et al., 2013; Marsh, Nefdt, Hazel, 2014). Moreover, the effects of the determinants of obesity do not usually become apparent immediately, causing increases in body weight in later years. In females, pregnancy is a one of the most critical periods for weight gain (Downs, 2016).

Health Behavior of School-aged Children (HBSC) is an international project of cross-sectional surveys monitoring health and health-related behavior in school children aged 11, 13, and 15 years. Currently, more than 40 countries are participating in this project, mostly from Europe. These studies analyze various aspects of health and health-related behavior in adolescents. The project is coordinated by the Child and Adolescent Health Research Unit (CAHRU) at the University of St Andrews, UK and the University of Bergen, Norway, together with the WHO Regional Office for Europe.

This article analyzes breakfast-skipping, excessive screen-based activities (two or more hours a day), and insufficient physical activity in relation to body mass index and family affluence in 13–15 year-old girls in Slovakia. The findings of this study can contribute to an understanding of the role of daily regime in adolescent girls/future mothers, which is a topic of special importance in midwifery.

Aim

The article analyzes breakfast-skipping, excessive screen-based activities (two or more hours a day), and insufficient physical activity in relation to body mass index and family affluence in 13–15 year-old girls in Slovakia.

Methods

Design

We used data from the HBSC study conducted in 2014, in Slovakia as a part of an international survey conducted in 43 countries in Europe and North America every four years. The HBSC study uses a school-based cross-sectional study design. The standardized protocol makes it possible to create harmonized datasets appropriate for cross-country comparisons, and for identifying changes over time. Uniform anonymous questionnaires are completed in classrooms, including mandatory modules of questions used in every participating country, and optional modules containing sets of questions based on the specific needs of individual countries. More detailed information about the HBSC methodology can be found in a study by Roberts et al. (2009).

Sample

To obtain a representative sample, we used two-step sampling. In the first step, 151 large and small elementary schools, located in rural and urban areas from all regions of Slovakia were asked to participate. These were randomly selected from a list of all eligible schools in Slovakia obtained from the Slovak Institute of Information and Prognosis for Education. Finally, 130 schools agreed to participate in the survey (response rate: 86.1%). In the second step, within these schools, data were collected in systematically selected classes from the 5th to the 9th grades. The whole sample included 10,179 adolescents (response rate: 78.8%). For our analysis, we used data only from girls aged 13 to 15 years old, and the final analyzed sample consisted of 3,077 respondents.

Data collection

Demographic data (*age, gender*) were collected by means of single questions taken from HBSC surveys (Currie et al., 2012; Inchley et al., 2016).

Body Mass Index was calculated from responses to the HBSC question: “How much do you weigh with no clothes on?” and “How tall are you with no clothes on?” (Currie et al., 2012; Inchley et al., 2016). The responses to these questions were categorised as normal weight, overweight and obese following BMI standards for Slovak adolescents (Ševčíková, Nováková, Hamade, 2004).

Family affluence was measured using the Family Affluence Scale III, which consists of six questions: “Does your family own a car, van or truck?” (No / Yes, One / Yes, two or more); “Do you have your own bedroom to yourself?” (No / Yes); “How many computers does your family own?” (None / One / Two / More than two); “How many bathrooms (room with a bath/shower, or both) are in your home?” (None / One / Two / More than two); “Does your family have a dishwasher at home?” (No / Yes); “How many times did you and your family travel out of Slovakia for a holiday/vacation last year?” (Not at all / Once / Twice / More than twice). We converted the FAS summary scores into a final score, which has a normal distribution and a range from 0 to 1. We then created tertile groups of low (0 to 0.333), medium (0.334 to 0.666) and high (0.667 to 1) socio-economic position (Elgar et al., 2015).

Breakfast consumption was measured by the item: “How often do you usually have breakfast (more than a glass of milk or fruit juice) during weekdays?” Responses were: “I never have breakfast during the week”, “One day”, “Two days”, “Three days”, “Four days”, and “Five days”. Having breakfast five days

a week was categorised as “regular breakfast on weekdays” (Hamřík et al., 2015).

Screen-based activities represented by watching TV, playing computer games, and working on a computer (during the week only), were computed using three separate items. Watching TV was measured by the question: “How many hours a day, in your free time, do you usually spend watching television, videos (including Youtube or similar services), DVDs, and other entertainment on a screen?” Computer gaming was measured by asking: “How many hours a day, in your free time, do you usually spend playing games on a computer, games console, tablet (e.g., an iPad), smartphone, or other electronic devices (not including moving or fitness games)?” Computer work was assessed by asking: “How many hours a day, in your free time, do you usually spend using electronic devices such as computers, tablets (e.g., an iPad), or smartphones for other purposes, for example, homework, emailing, tweeting, Facebook, chatting, or surfing the internet.” (Torsheim et al., 2010; Currie et al., 2012; Inchley et al., 2016) In our study we used these three separate items as a composite variable called “screen-based activities”. Following the recommendations of the American Academy of Pediatrics (AAP, 2001), time spent on at least one screen-based activity was dichotomised as either “excessive” (two and more hours/day), or “non-excessive” (less than two hours).

Physical activity was measured by an item asking adolescents about the number of days over the past week that they had been physically active for a total of at least 60 minutes per day. The question was preceded by an explanatory text that defined moderate-to-vigorous activity as “any activity that increases your heart rate and makes you get out of breath some of the time”, offering examples of such activities (running, inline skating, cycling, dancing, swimming, ice skating etc.) (Currie et al., 2012; Inchley et al., 2016). Responses could range from 0 to 7 days per week, and everyday (7 days per week) physical activity was classified as sufficient, based on the WHO recommendation (Currie et al., 2012; Inchley et al., 2016).

Questionnaires were administered by trained research assistants in the absence of a teacher during regular class time.

Data analysis

First, we described the sample using descriptive statistics. Next, Body Mass Index and Family affluence differences in the prevalence of breakfast consumption, screen-based activities and physical activity were explored using chi-square tests. Analyses were conducted with SPSS v 21.

Results

Table 1 presents the background characteristics of the sample. Almost 9 in 10 girls have normal body weight. Overweight and obesity were found in only a small fraction of the sample (6.2% and 4.0%, respectively). Less than half of the girls reported daily breakfast consumption, while the majority (55.0%) admitted skipping breakfast to a certain degree. The large majority (83.6%) reported spending two or more hours per day on screen-based activities, while less than one in five girls (17.8%) reported some form of physical activity on a daily basis.

Table 1 Descriptive characteristics of the sample

	n (%)
Gender	
girls	3,077 (100.0)
Age	
13 years old	1,019 (33.1)
14 years old	1,094 (35.6)
15 years old	964 (31.3)
Body Mass Index	
normal weight	2,481 (89.8)
overweight	172 (6.2)
obese	110 (4.0)
Family Affluence	
low	1,155 (42.6)
middle	736 (27.1)
high	822 (30.3)
Breakfast consumption	
every day	1,367 (45.0)
never–4 days	1,669 (55.0)
Screen-based activities	
two or more hours a day	2,315 (83.6)
less than two hours a day	453 (16.4)
Physical activity	
every day	530 (17.8)
0–6 days	2,443 (82.2)

The highest proportion of respondents were found to have low family affluence (42.6%), and the remainder reported medium or high family affluence (27.1% and 30.3%, respectively).

No statistically important association was found between breakfast-skipping and body mass index (Table 2). Similarly, intensive daily screen-based activities were not associated with body mass index. On the other hand, adolescent girls with normal weight were physically active more often than adolescent girls with overweight or obesity. Daily physical activity was two times more common in girls with normal weight compared to those who were obese (18.6% vs. 9.1%).

The family affluence scale showed no significant association with regularity of breakfast consumption or the intensity of screen-based activities (Table 3).

Table 2 Body Mass Index differences in the prevalence of breakfast consumption, screen-based activities and physical activity

		Body Mass Index			p-value
		Normal weight n (%)	Overweight n (%)	Obesity n (%)	
Breakfast consumption	every day	1,117 (45.4)	66 (38.6)	46 (42.6)	ns
	never–4 days	1,342 (54.6)	105 (61.4)	62 (57.4)	
Screen-based activities	2 or more hours/ day	1,927 (83.8)	133 (84.2)	83 (82.2)	ns
	less than 2 hours/ day	373 (16.2)	25 (15.8)	18 (17.8)	
Physical activity	every day	457 (18.6)	23 (13.4)	10 (9.1)	0.01**
	0–6 days	2,003 (81.4)	145 (86.3)	100 (90.9)	

** $p < 0.01$; ns – not significant**Table 3** Family affluence differences in the prevalence of breakfast consumption, screen-based activities and physical activity

		Family Affluence			p-value
		Low n (%)	Middle n (%)	High n (%)	
Breakfast consumption	every day	482 (42.2)	320 (44.0)	387 (47.5)	ns
	never–4 days	660 (57.8)	408 (56.0)	428 (52.5)	
Screen-based activities	2 or more hours/ day	953 (83.7)	611 (84.4)	681 (84.5)	ns
	less than 2 hours/ day	185 (16.3)	113 (15.6)	125 (15.5)	
Physical activity	every day	174 (15.2)	129 (17.7)	179 (21.9)	0.001***
	0–6 days	971 (84.8)	598 (82.3)	637 (78.1)	

*** $p < 0.001$; ns – not significant

However, daily physical activity was most common in girls reporting high family affluence (15.2%, 17.7% and 21.9% in low, medium, and high family affluence, respectively).

Discussion

Our results revealed several important issues regarding the studied factors of obesity related to daily regime activities in adolescent girls. Of the studied factors, insufficient physical activity and excessive screen-based activities (involving more than 4 in 5 adolescents) are the most frequent. Results from Slovakia are consistent with most European countries (Inchley et al., 2016), indicating the international relevance of our results. However, excessive screen-based activities and breakfast-skipping do not affect body weight immediately. The effect of these factors becomes apparent only at later ages, following prolonged exposure (Herman et al., 2009). Nevertheless, life-style during childhood and adolescence determines risk of obesity in early adulthood (Kwon et al., 2015). This assumption is supported by official data on the prevalence of overweight and obesity in the general adult population of Slovakia (Global status report on non-communicable diseases, 2014), which is much higher (63.6% of males and 54.6% in females) than the prevalence found in our study in an adolescent population. The delayed effect of these risk factors leads to their underestimation, and a low level

of awareness in parents, which thus weakens efforts to achieve behavioral changes. With regard to girls, this issue has an added significance: the critical life period for excessive weight gain is during pregnancy and maternity (Samura et al., 2016). Therefore the roots of gestational obesity can be traced back as early as adolescence. Thus, the problem is no longer only a midwifery issue but also has relevance to nurses in general, namely community school nurses and paediatric nurses. The association found between physical activity and increased body mass index could be the result of low tolerance of physical exercise in obese children, who thus avoid participating in it.

Although obesity significantly contributes to socioeconomic differences in health (Mackenbach et al., 2008), recent studies have shown that there is a high degree of heterogeneity in this association (Lissner et al., 2013). Our results indicate the relatively weak influence of socioeconomic position on studied factors, with the exception of physical activity. While irregularities in eating habits occur across all social classes, and computers and TV are readily accessible, physical activity is connected with higher social groups. This could be caused by the financial demands of sports activities, such as expensive equipment, coaching etc., less affordable to lower income groups (Eime et al., 2013; Timperio et al., 2013).

With regard to the possible limitations of the study, we should bear in mind that the results are based on self-reports of respondents, thus the results of this study may, to some extent, vary from the actual situation. However, as standardized uniform methods were used, findings are comparable with those of other countries, and can be evaluated in the context of other available data. Moreover, the sampling method used (stratification by region and type of school, in addition to selection with probability proportional to size) provided representative data reflecting the actual epidemiological situation on a nationwide scale.

Conclusion

Our study indicates that insufficient physical activity, screen-based activities, and breakfast-skipping are widespread in adolescents in Slovakia. With the exception of physical activity, the factors occur independently of family affluence, representing a public health problem regardless of socioeconomic status. However, their effects are delayed, and are expected to induce obesity only at later ages, particularly during pregnancy and maternity. Ultimately, prevention of gestational obesity should begin as early as adolescence. The issue is important not only for midwives, but also for nurses, namely those dealing with children and adolescents.

Ethical aspects and conflict of interest

The study was approved by the Ethics Committee of the Faculty of Medicine, P.J. Šafárik University in Košice. Parents were informed about the study via the school administration and could opt out if they disagreed with their child's participation. Participation in the study was fully voluntary and anonymous, with no explicit incentives provided for participation.

The authors declare no potential conflict of interests.

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Author contribution

Concept and design (MB, TB), data collection (JK), analysis and interpretation of data (JK, TB), the drafting of the manuscript (MB), a critical revision

of the manuscript (MB), the final completion of the article (MB, TB).

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