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## HOW WELL DO POLISH TEENAGERS MEET HEALTH BEHAVIOUR GUIDELINES?

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### ABSTRACT

**OBJECTIVE.** To estimate the prevalence of meeting health behaviour guidelines regarding eating breakfast, fruit and vegetable consumption and physical activity and to identify adolescents who accumulate the unhealthy behaviours.

**SUBJECT AND METHODS.** Cross-sectional study was conducted in 2008 in adolescents aged 13-year-old (N=574). They self-reported their physical activity (MVPA - *Moderate-to-Vigorous Physical Activity*), regularity of breakfast eating and fruit and vegetable consumption. The adherence to physical activity and nutritional guidelines were described. Relationships between dependant variables and sex and place of residence were examined. Cluster analysis was used to identify subgroups of youths whose accumulate the unhealthy behaviours.

**RESULTS.** The proportion of adolescents who met each health recommendation varied: 69% ate breakfast on 5 school days, 46,9% consumed at least once a day fruit and vegetable and 27,5% performed recommended daily physical activity. Boys were significantly more active ( $p<0,001$ ) and ate breakfast more frequently than girls ( $p<0,04$ ). A gender difference in fruit and vegetable intake was not statistically significant. Only 11,5% of adolescents fulfilled all three recommendations, more often boys than girls ( $p=0,020$ ). Almost 54% of adolescents had multiple unfavorable health behaviours, and 14,1% all three of them – significantly more often girls than boys ( $p=0,011$ ). For adolescents with two risk behaviours, the most prevalent cluster was formed by not meeting the physical activity and fruit and vegetable recommendations.

**CONCLUSIONS.** The unhealthy behaviours tend to accumulate among teenagers - more often in girls than in boys, becoming the risk factors for different chronic diseases. Widespread dissemination of healthy lifestyle guidelines among adolescents, their parents and teachers, and undertake interventions aimed to reduce unhealthy behaviours could bring health benefits in the future.

**Key words:** *physical activity, breakfast eating, fruit and vegetable consumption, guidelines, adolescents*

### INTRODUCTION

There is good scientific evidence which shows that physical activity and healthful dieting habits promote optimal child health, physical and mental growth, physical fitness, in children and adolescents (1,2). Poor eating habits and insufficient physical activity are established risk factors for chronic diseases: obesity, hypertension, type 2 diabetes, cardiovascular diseases and some types of cancer (3).

Physical activity (PA) plays a crucial role not only in stimulating and supporting physical development and motor skills in children and adolescents. PA has positive effects on social and emotional well-being, and

quality of life. Regular physical exercise at a moderate or vigorous effort improves physical performance and helps to maintain a proper weight (2).

Healthy nutrition in childhood and adolescence is not only a determinant of proper growth up and good health, but influences school performances (2). In particular, breakfast consumption is important for school performance. Eating breakfast improves short-term memory as well improving performance on cognitive function tests (4). It has shown that adolescents who skip breakfast are more likely to be obese than who eat breakfast regularly (5).

Fruit and vegetables are important component of healthy diet. There is evidence that regular and adequate

fruit and vegetable consumption contribute to the prevention of cardiovascular disease and some types of cancers and help to weight management (6).

Exceptional importance of these behaviours was the reason for developing by experts evidence-based guidelines. According to these recommendations, children and adolescents should eat breakfast everyday (7). Vegetable and fruits should be consumed few times per day during main meals and snacking (at least 5 portion per day) (7). Children and youth aged 5-17 should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily (8).

There have been many articles on these behaviours in children and adults, also in Poland. Most of them, in respect to dietary habits and physical activity in youth, have presented a single health behaviour (each separate behaviour) (9-12). To our knowledge there is currently the first attempt that shows co-occurrence of these health behaviours among adolescents in Poland.

The purpose of this study was to estimate the proportion of the adolescents meeting recommendations for the physical activity, fruit and vegetable intake, and breakfast consumption, and to identify of 13-year-olds who cumulate the unhealthy behaviours.

## SUBJECTS AND METHODS

Cross-sectional study was conducted in 2008 in adolescents aged 13-year-old ( $n=605$ ; 305 girls and 300 boys; 48% lived in town and 52% in countryside). The study sample was a Polish subset of a prospective birth cohort of child/mother dyads included for observation after delivery in hospital (stage I), followed at the age of three years (stage II) and then at the age of 13 years (stage III). The study in all three stages was conducted by the questionnaire survey method. In stage I (1995), the questionnaires were completed by the hospital medical staff for all neonates born in Polish hospitals between 1 and 10 January, and included detailed information on newborns' feeding during the postpartum hospital stay. A set of 11,937 questionnaires were collected. In stage II (1998), a selection of full-term neonates out of the initial group, with weight  $\geq 2500$  g, who were breastfed (at least in hospital), with no chronic diseases ( $n=9612$ ), was made and a random 20% sample was selected for follow-up ( $n=1923$ ). Mothers of children aged three were mailed a questionnaire enquiring about exclusive and overall breastfeeding duration and basic information about family; 1250 questionnaires were suitable for evaluation (respond rate 65%). In stage III (2008), up-to-date addresses were identified for 1177 families of 13 year-old subjects and sets of questionnaires were mailed to parents/caregivers and children. Questionnaires for the children and parents contained questions

about lifestyle. In total, 638 family sets of questionnaires were returned; 33 were excluded because of significant incompleteness, so 605 families (51.4% families to whom questionnaires were mailed) were accepted for further analysis.

To examine, if the final cohort is representative to the cohorts from I and II stage, we compared socio-demographic variables from I and II stages. We found no statistically significant differences in frequency of compared variables.

Approval of the Ethics Committee of the Institute of Mother and Child was obtained.

For this paper the dataset was created from 574 adolescents (290 girls and 284 boys). 31 participants were excluded with incomplete information. In this paper the answers of questions regarding to physical activity, breakfast eating, fruit and vegetables consumption were used.

### *Outcome variables and their measures*

- **Physical activity** – number of days per week in moderate- to vigorous- intensity at least 60 minutes. Answer could range from 0 do 7 day. Number of these days per week is an indicator for physical activity - MVPA (*Moderate-to-Vigorous Physical Activity*) (13). In the present paper, time spent in MVPA was dichotomized as: MVPA=7 days/week (recommended), or MVPA<7 day/week (below recommended level).
- **Breakfast consumption** was measured with a question: “*Of the 5 school days in a week, how many days do you eat breakfast (something more than glass of milk, tea or something else)?*”. Answer could range from 0 to 5 days. For the purpose of this study, breakfast consumption was dichotomized: recommended - breakfast eaters =5 school days, or breakfast skippers <5 days.
- **Fruit and vegetable consumption.** Fruit and vegetable consumption was measured in two questions. 1. “*How many times per week do you usually eat fruits?*”. 2. “*How many times per week do you usually eat vegetables?*”. Response options were: never, less than one time per week, one time per week, 2-4 times per week, 5-6 times per week, every day, every day more that 1 time per day. On the basis of the answers of two questions the total summary indicator for fruit and vegetables consumption was calculated. In present paper, fruit and vegetable consumption was dichotomized: at least once time per day (recommended consumption) or less than once per day.
- **Demographic variables:** gender and place of residence.

### Statistical analyses

SPSS v. 14 was used for analyses. Using descriptive statistics the proportion (percent) of youth meeting health behaviors recommendations in regards to physical activity, breakfast eating, vegetable and fruit consumption were presented. A chi<sup>2</sup> test was used to investigate differences between outcome variables and gender and place of residence.

Cluster analysis was used to identify homogenous subgroups of adolescents for co-occurrence of these behaviours. The analysis, conducted using a two-step cluster method, identified 8 distinct groups with cumulating unhealthy behaviours. This subgroups were agglomerated in four, originally defined groups because of number of unfavorable health behaviours. To examine sex differences between identified clusters chi-square tests were executed. Significance level was set at  $p < 0,05$ .

## RESULTS

### 1. Prevalence of favorable health behaviours in adolescents

Table I shows the prevalence of **favorable health behaviours** in adolescents, so the proportion of them who meet the physical activity, fruit and vegetable,

and breakfast consumption recommendations. 69% of adolescents reported regular breakfast eating. More than daily consumption of fruit and vegetables was reported by approximately half (46,9%) of adolescents, and 27,5% achieved minimum MVPA. Proportion of boys engaged in recommended physical activity was significantly higher than girls ( $p < 0,001$ ). Boys were more often breakfast eaters too ( $p = 0,040$ ). There was no gender difference in *meeting* the daily fruit and vegetable recommendations. There was no statistically significant differences according to place of residence (although the youth from rural area appear to be more likely physically active and breakfast eaters) (tab. I).

### 2. Co-occurrence of unhealthy behaviors

Table II displays the results of cluster analyses. Cluster analysis identified distinct groups with cumulating unhealthy behaviours. In this table they were agglomerated in four subgroups because of number of unfavorable health behaviours.

The subgroup 1 was comprised of adolescents who had all three unfavorable health behaviours. All individuals were breakfast skippers, ate less fruits and vegetables and had low level of physical activity. This group consisted of 14,1% adolescents, significantly more girls than boys ( $p < 0,011$ ).

Table I. Proportions of adolescents, who met health recommendations, total and by sex and place of residence

Recommendations and criteria	Total (n=574)	Sex		p	Place of residence		p
		Boys (n=284)	Girls (n=290)		Urban (n=275)	Rural (n=296)	
<b>Breakfast consumption</b> =5 school day	69,0	72,5	65,6	0,040	67,2	70,4	0,231
<b>Fruit and vegetable consumption</b> At least one time per day	46,9	46,2	47,7	0,394	46,7	47,7	0,437
<b>Physical activity</b> MVPA=7days/wk	27,5	34,8	20,5	<0,001	26,5	28,8	0,299

Table II. Frequency of multiple unhealthy behaviors in adolescents, total and by sex

Subgroups	Number and type of multiple unhealthy behaviors	Total (n=574)	Boys (n=284)	Girls (n=290)	p
	<b>3:</b>				
Subgroup 1	Low physical activity level, low fruit and vegetable consumption, breakfast skipping	14,1	10,6	17,6	0,011
	<b>2:</b>				
Subgroup 2	Low physical activity level, low fruit and vegetable consumption	27,2	28,2	26,2	0,496
	Low physical activity level, breakfast skipping	9,0	6,3	11,7	
	Low fruit and vegetable consumption, breakfast skipping	3,3	4,9	1,8	
	<b>1:</b>				
Subgroup 3	Low physical activity level	22,1	20,1	24,1	0,409
	Low fruit and vegetable consumption	8,4	9,9	6,9	
	Breakfast skipping	4,4	5,6	3,1	
	<b>0</b>				
Subgroup 4	Meeting all health behaviour guidelines	11,5	14,4	8,6	0,020

The subgroup 2 contained the largest number of study participants (39.5%) and included adolescents who reported two unfavorable behaviours. Three variants co-occurrence of behaviours were observed. The most prevalent variant (27.2%) was formed by not meeting the physical activity and fruit and vegetable recommendations. There were no significant sex difference in this variant ( $p=0,496$ ).

The subgroup 3 (34.9%) consisted of adolescents who had only one health-harming behaviour. There were no significant sex differences ( $p=0.409$ ) in this subgroup. The most prevalent variant (22.1%) was formed by not meeting physical activity recommendation.

The subgroup 4, the least prevalent (11.5%) (tab. II), included adolescents who met all three health recommendation. Boys were significantly more likely than girls to follow recommended guidelines ( $p=0.020$ ).

## DISCUSSION

Eating behaviors and physical activity, like other health behaviors are shaped from early childhood and tracking through adolescence to adulthood (14). It was shown that early adolescence period is especially important for modeling these behaviours. On account of this, present publication throws the light on health behaviors of current 13-olds on future and their potential risks factors of chronic diseases, which are consequence of unhealthy behaviors.

In the current paper we undertake the attempt the answer the question about proportion of 13-year-olds whose meet health behaviour guidelines with regards to breakfast eating, fruit and vegetable consumption and physical activity. We analysed not only single behaviour but we focused on co-occurrence of them among youth. We identified the group of adolescents whose cumulate (two or three) unhealthy behaviours.

Our findings showed the large gap between health behaviours of 13-year-olds and relevant recommendations. The highest proportion of adolescents were meeting recommendation with regards to breakfast eating (69%). Almost half of youth declared at least once a day fruit and vegetable consumption and only 28% of them achieved minimal physical activity recommendation level. Our finding has shown a little better physical activity and dietary habits of 13-year-olds according breakfast eating and fruit and vegetable consumption compared with Polish results from HBSC study 2010 (11,12). These differences might be due to adolescents in our study were a little bit younger (in HBSC, 13-14-year-olds were combined analysed). It is well documented that the percentage of adolescents who meet recommendation of healthy eating and physical activity declines with age (2,11).

The results from the current study indicate that only every 9<sup>th</sup> teenager (11.5%) meets all three recommendations, so eats breakfast every day, consumes fruit and vegetable at least one a day, and achieves recommended levels of physical activity. Above half of them had two or three unhealthy behaviours. The most prevalent of the two- unhealthy behaviour subgroup included low physical activity and low fruit and vegetable consumption. It is worthy to note, that every 7<sup>th</sup> teenager (14.1%) had all three unhealthy behaviours. Our findings are concurrent with British researchers results (15). Their study included the same fields, conducted in adolescents aged 12-16, demonstrated that above half of them had at least two of unhealthy behaviours, and only 6% achieved the recommendations for all three of the health behaviours.

The results of our paper showed significant sex differences in these recommendations meeting. Boys were more likely to meet physical activity and breakfast consumption guidelines than girls. Proportion of boys meeting all these recommendation were also significantly higher. Similar findings received previously cited British researchers (15). A number of studies take into account gender differences in health behaviours, but their results are not unambiguous. Girls are usually perceived as those who are more likely engaged in healthy behaviors. It is concerning to behaviours in regard to safety (e.g. seatbelt fasten) (16) and some dietary behaviours. Girls more likely consume fruit and vegetable than boys and less likely eat sweets and drink soft drinks (11). Results of other researchers indicate that just boys had "healthier" dietary habits. A higher proportion of the boys compared with the girls regularly eat main meals including breakfast (17). In the study included about 5000 adolescents aged 11-18 years in US was found that higher percentages of the boys, compared with the girls were consuming the recommended amount of calcium (18). The girls, even normal-weight, were more likely than the boys engaged in different lost weight methods, including risky methods like starvation and laxative use (17). Our findings with regards to physical activity are consistent with other research which found that boys were more likely engaged in active lifestyle and more likely achieved recommended level of PA (10,12,19).

In the present study, no significant differences in meeting nutritional and PA recommendations were found in urban and rural adolescents. Similar results in regards to dietary behaviours received *Hoffman et al.* (20). Authors of this paper found that urban youth consumed fruit and vegetable more frequently than rural, but differences were not statistically significant. Other researches concluded, that fruit and vegetable consumption is associated with socioeconomic position. In families in better socioeconomic conditions, fruit and vegetable intake is higher than in low-income families with lower, regardless place of residence (21).

The Polish and worldwide literature regarding urban/rural differences in adolescents' physical activity are giving ambiguous answer. In the study of adolescents (15-17 years) from Wielkopolska (Poland) conducted in 2008 was shown that urban youth were significantly more physically active than rural counterparts (22). Similarly, findings from Canadian study has revealed higher rates of PA among youth in urban than in suburban or rural settings (23). Contrasting findings, in survey conducted in US among children aged 10-17 years, has shown that more rural children were physically active than urban ones (24).

We give into account, that our analyses regarding only three health behaviours: physical activity, breakfast eating and fruit and vegetable consumption in range of meeting of recommendation, does not give full picture of lifestyle of Polish teenagers. However, obtained findings, bring to three conclusions. Firstly, showed that less than 12% of adolescents achieved recommendations in regards to the three mentioned above behaviours. Secondly, unhealthy behaviours tend to accumulate in youth, more frequently in girls than in boys. Adolescents accumulating these unhealthy behaviours have risk factors for different chronic diseases. Thirdly, widespread dissemination of health behaviour guidelines among adolescents, their parents and teachers, and undertake interventions aimed to reduce unhealthy behaviours could bring health benefits in the future.

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