



## Teenagers' attitude towards obesity and obese peer

### Stosunek nastolatków do problemu otyłości oraz do otyłych rówieśników

Aleksandra Radosz , Anna Obuchowicz 

Department of Paediatrics, Faculty of Health Sciences in Katowice, Medical University of Silesia, Katowice, Poland

#### ABSTRACT

**INTRODUCTION:** We present the results of a survey conducted from May to November 2020 among teenagers in the Silesian Province, Poland. The aim of the study was to evaluate the approach of teenagers to their physical activity and the problem of obesity.

**MATERIAL AND METHODS:** The survey was conducted in randomly selected schools and among patients of selected medical facilities using electronic and paper versions of the questionnaire. The study included 527 respondents: 261 aged 11–14 (49.5%) and 266 aged 15–18 (50.5%).

**RESULTS:** The recommended amount of physical activity was reported by 31.8% of children aged 11–14 and by 15.4% of children aged 15–18. Among the respondents 20% admitted to remaining indifferent to others being bullied for excess body weight. Among teenagers aged 11–18, 53% were not able to provide a definition of obesity and 36.6% could not name any complications of the condition. 14% of the respondents expressed negative associations with obese individuals. In the study group, 26.2% of individuals showed no interest in the problem of obesity.

**CONCLUSIONS:** There is an urgent need to promote among teenagers: knowledge on the determinants and consequences of obesity, respect towards everybody regardless of their weight, physical activity as the fundamental method of fighting obesity.

#### KEY WORDS

teenager, obesity, perception of obesity, physical activity, attitude towards obese peers

Received: 13.01.2022

Revised: 19.01.2022

Accepted: 11.04.2022

Published online: 08.06.2022

**Address for correspondence:** lek. Aleksandra Radosz, Oddział Kliniczny Pediatrii, Wydział Nauk o Zdrowiu w Katowicach, Śląski Uniwersytet Medyczny w Katowicach, ul. Stefana Batorego 15, 41-902 Bytom, tel. +48 32 786 14 98, e-mail: aradosz@sum.edu.pl



This is an open access article made available under the terms of the Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) license, which defines the rules for its use. It is allowed to copy, alter, distribute and present the work for any purpose, even commercially, provided that appropriate credit is given to the author and that the user indicates whether the publication has been modified, and when processing or creating based on the work, you must share your work under the same license as the original. The full terms of this license are available at <https://creativecommons.org/licenses/by-sa/4.0/legalcode>.

Publisher: Medical University of Silesia, Katowice, Poland



## STRESZCZENIE

**WSTĘP:** W pracy przedstawiono wyniki badania ankietowego prowadzonego od maja do listopada 2020 r. wśród nastolatków zamieszkujących województwo śląskie. Celem badania była ocena stosunku młodzieży do problemu otyłości oraz aktywności fizycznej.

**MATERIAŁ I METODY:** Ankietę – w wersjach elektronicznej oraz papierowej – przeprowadzono w losowo wybranych szkołach oraz wśród pacjentów wybranych placówek medycznych. W badaniu uczestniczyło 527 respondentów, w tym 261 w wieku 11–14 lat (49,5%) i 266 w wieku 15–18 lat (50,5%).

**WYNIKI:** 31,8% dzieci w wieku 11–14 lat oraz 15,4% w wieku 15–18 lat relacjonowało należną aktywność fizyczną. 20% respondentów przyznawało się do pozostawania obojętnymi wobec dokuczania innym z powodu nadmiernej masy ciała. 53% nastolatków w wieku 11–18 lat nie potrafiło podać definicji otyłości, a 36,6% nie potrafiło wymienić powikłań otyłości. 14% respondentów miało negatywne skojarzenia związane z osobami otyłymi. 26,2% wykazało brak zainteresowania problemem otyłości.

**WNIOSKI:** Istnieje pilna potrzeba upowszechniania wśród nastolatków: wiedzy na temat uwarunkowań i następstw otyłości, postawy szacunku względem wszystkich osób – niezależnie od ich masy ciała, aktywności fizycznej jako podstawowej metody walki z otyłością.

### KEY WORDS

nastolatek, otyłość, postrzeganie otyłości, aktywność fizyczna, stosunek do otyłych rówieśników

## INTRODUCTION

A rising frequency of obesity at increasingly younger ages is a reason to investigate the extent of teenagers' attitudes towards obesity and the way overweight individuals are perceived by young people.

The aim of the study was to investigate whether children and adolescents pay attention to the problem of obesity and realise its existence. The study was also intended to determine the perception of obese individuals among teenagers.

## MATERIAL AND METHODS

An original anonymous questionnaire was developed that was directed at children aged 11–18. It included 22 closed-ended single- and multiple-choice questions (14 and 2, respectively), and 6 open-ended questions. The questions were intended to establish:

- how the respondents perceived their own body weight and how they self-rated their physical activity,
- whether there were any overweight individuals in the respondents' families and among their peers,
- how the study participants defined obesity,
- what the respondents' attitude towards obese peers was,
- the degree to which the study participants were interested in the problem of obesity and what sources of knowledge on excess body weight they had available.

The questions were adjusted to the respondents' age. A pilot study was conducted on the youngest group of study participants.

The survey was carried out from May to November 2020 online and on paper (19.9% of the questionnaires). The online surveys were administered upon the

approval of the headteachers of randomly selected schools in cities located in the Silesian Province of Poland. Invitations to take part in the survey were sent to the headteachers by e-mail. Following approval, a link to the questionnaire, which was uploaded to Google Drive, was provided to the students during their weekly meetings with their form teacher, which were held online due to the SARS-CoV-2 pandemic. The following schools agreed to take part in the study: Primary School No. 3 in the city of Będzin, a hospitality and catering secondary school complex in the city of Bytom and preschool and primary school No. 2 in the city of Piekary Śląskie. Paper questionnaires were distributed among patients who reported to the "Family" outpatient clinic in Piekary Śląskie and to the Department of Paediatrics of the Specialist Hospital No. 2 in Bytom and Department of Gastroenterology of the Upper Silesian Child Health Centre in Katowice. The results of the survey were entered into a Google Drive spreadsheet.

Before answering the questions, the respondents provided their own body weight and height values. Based on that, percentile positions of these somatic features were determined, and the body mass index (BMI) was calculated and compared with relevant growth charts (Percentile charts for growth and nutritional status assessment in Polish children and adolescents from birth to 18 years of age) [1].

The Fisher's exact test was used for statistical analysis, with a significance level of  $p < 0.05$ .

### Characteristics of study groups

The study included 527 respondents. There were 261 younger subjects (aged 11–14; 49.5%) and 266 older participants (aged 15–18; 50.5%). The distribution of age, sex and declared nutritional status is presented in Table 1. Among the participants, 82.9% lived in a city. 81.7% of the respondents have siblings; of them, 28.7% came from large families (three or more children in the



family). Among the respondents, 11.8% suffered from chronic diseases (bronchial asthma, allergic rhinitis, atopic dermatitis). One person considered themselves

to be obese; however, based on the self-reported body weight and height values, obesity was found in a much higher number of subjects (Table I).

**Table I.** Subjects' sex, age and declared nutritional status (BMI)

**Tabela I.** Płeć, wiek i deklarowany stan odżywienia (BMI) badanych

Sex	Age group (years)	Number of subjects	BMI (centile)*				
			< 3	3–85	≥ 85–95	> 95	no information
Boys	11–14	n = 112	5.4%	64.3%	14.3%	8.9%	7.1%
	15–18	n = 71	4.2%	63.4%	15.5%	15.5%	1.4%
Girls	11–14	n = 149	11.4%	67.1%	9.0%	2.0%	4.7%
	15–18	n = 195	5.6%	72.8%	14.4%	6.15%	1%

\* Body mass index (BMI) calculated based on self-reported body weight and height values with reference to growth charts [1]

## RESULTS

### Self-rated nutritional status of respondents

The survey participants were asked to rate their body mass. Among the children, 56.4% rated their body weight as normal. In the group of subjects who considered their body weight to be abnormal (43.6%), the majority of children stated that they weighed too much. The body weight self-rating was compared to the actual state. In the group of children with a normal BMI, 64.4% stated that their weight was normal. The remaining 35.6% of children believed their weight to be too high or too low. Among the children with a BMI  $\geq 85^{\text{th}}$  percentile, 16.1% considered their weight to be normal and 83.9% rated their weight as too high.

### Respondents' evaluation of nutritional status of family members and peers

One's attitude towards obese people may be affected by the presence of such individuals in the immediate family. Among the subjects with a BMI  $\geq 85^{\text{th}}$  percentile, 52.7% admitted that there were overweight individuals in their family, with 27.4% indicating that such individuals came from more than one generation. Among children with a normal body weight, there were 43.9% who had overweight immediate family members.

Among the subjects, 50% considered one of their peers to be overweight.

### Subjects' self-reported physical activity

The chief method of obesity prevention is having the right amount of physical activity. For this reason, the questionnaire included three questions that were meant to determine what percentage of the subjects exercised

for the currently recommended amount of time for obesity prevention (at least 30 minutes daily). The respondents were also asked whether they considered their own physical activity levels as adequate. Such a rating was provided by 59.3% of the subjects. In terms of age group differences, 44.7% of the older pupils rated their own physical activity as sufficient, while in the younger group, 70.1% of children concluded that they had sufficient exercise.

An attempt was made to obtain more objective data by asking the participants about the number of physical education (PE) classes per week and the number of days with more than 30 minutes of physical activity per week. Based on the subjects' responses, it was concluded that in the younger group, 31.8% of the individuals had a good amount of exercise (physical activity performed every day or more than once a day), while 38.3% had a quite good amount of exercise (less frequent physical activity than once a day, but more frequent than PE classes). In the older group, the respective figures were 15.4% and 50.4%. There was a significant difference ( $p < 0.001$ ) between the groups in terms of a good amount of exercise with the younger group scoring higher. Students that were exempt from PE classes accounted for 2.7% of the younger group and 7.1% of the older group (Table II).

The self-reported physical activity of overweight children and of children with a normal body weight divided into age groups was compared. The data are presented in Table III.

All the percentages indicate that the overweight respondents from both the younger and older groups undertake physical activity less frequently. A statistically significant difference ( $p < 0.005$ ) was demonstrated in this respect only for 'good' and 'quite good' physical activity performed by the respondents aged more than 15.

**Table II.** Self-reported physical activity in two age groups of respondents

**Tabela II.** Samoocena aktywności fizycznej w dwóch grupach wiekowych respondentów

Age group (years)	Physical activity reported by respondents				
	every day or more than once a day (good)	more frequently than PE, but not every day (relatively good)	limited to PE classes (insufficient)	less frequent than PE, but present (insufficient)	no physical activity, including students exempt from PE
11–14	31.8%	38.3%	25.3%	1.9%	2.7%
15–18	15.4%	50.4%	24.8%	2.3%	7.1%

\* Fisher's exact test; PE – physical education



**Table III.** Self-reported physical activity of subjects with normal body weight and BMI  $\geq 85^{\text{th}}$  percentile  
**Tabela III.** Samoocena aktywności fizycznej respondentów z prawidłową masą ciała i z BMI  $\geq 85$  centyla

Age group (years)	BMI centile	Physical activity reported by respondents			
		more frequently than PE (good or relatively good)	limited to PE classes (insufficient)	less frequent than PE (insufficient)	no physical activity, including students exempt from PE
11-14	< 85	69.9%	15.8%	12.2%	2.0%
15-18		63.7%*	19.4%	16.9%	3.0%
11-14	$\geq 85$	56.0%	22.0%	22.0%	4.0%
15-18		48.4%*	32.3%	19.4%	8.1%

\*  $p < 0.005$  Fisher's exact test; BMI – body mass index; PE – physical education

**Negative reactions of others to respondents' nutritional status and respondents' reactions to their peers' excess body weight**

Among the respondents, 24.7% were bullied for their weight and 58.1% admitted to having witnessed such incidents. As far as the two age groups are concerned, 12.7% of the younger subjects and 35.7% of the older subjects were ridiculed for being overweight. In addition, 43.3% of the younger and 56.7% of the older respondents witnessed peers being bullied for their excess body weight. It is worth taking note of the fact that 11.9% of children from the younger group and 14.3% of individuals from the older group did not provide any answer to this question (Table IV).

It was also determined how many students were subjected to ridicule depending on their self-reported body weight (Table V). In the younger group, among those with a BMI  $< 85^{\text{th}}$  percentile, 9.5% of the children

reported hearing nasty comments concerning their weight. Among the overweight and obese children, the figure was 28%. In the older group, among children with a BMI  $< 85^{\text{th}}$  percentile, 26.6% experienced ridicule for their weight; as for the teenagers with excess body weight, 66.1% had such experiences. These differences are highly statistically significant (Table V).

One of the questions in the survey concerned the way the subjects responded to others being ridiculed and bullied for their excess weight. The answers to this question broken down by age group are summarised in Table VI.

A small number of children put forward their own proposals for responding to overweight individuals being ridiculed (more frequently in the older group: 5% vs 2% in the younger group). They usually suggested comforting the obese person or turning the situation into a joke.

**Table IV.** Prevalence of bullying associated with body weight among respondents' peers  
**Tabela IV.** Zjawisko dokuczania związanego z masą ciała w środowisku rówieśniczym respondentów

Age group (years)	Percentage of respondents who experienced bullying for their weight	Percentage of respondents who witnessed others being bullied for their excess body weight	No answer (%)
11-14	12.7	43.3	11.9
15-18	35.7	56.7	14.3

\* Fisher's exact test

**Table V.** Respondents' experience of bullying for body weight taking into consideration age groups and BMI percentile  
**Tabela V.** Doświadczenia respondentów związane ze zjawiskiem dokuczania z powodu masy ciała z uwzględnieniem grup wiekowych i centyla BMI

Age group (years)	BMI percentile	Students who were subjected to ridicule for their weight	Statistical significance*
11-14	< 85	9.5%	$p < 0.001$
15-18		26.6%	
11-14	$\geq 85$	28.0%	$p < 0.001$
15-18		66.1%	

\* Fisher's exact test; BMI – body mass index



**Table VI.** Respondents' reactions to peers being bullied for their excess weight  
**Tabela VI.** Sposób reagowania respondentów na zjawisko dokuczania rówieśnikom z nadmierną masą ciała

Age group (years)	Respondents' reactions to peers being bullied for their excess weight						Statistical significance*
	defence	no reaction	acceptance of ridicule in order to be motivated to fight obesity	own proposal	ridicule	no answer	
11–14	37.8%	20.3%	3.8%	2%	0	36.1%	p < 0.05
15–18	35.7%	26.7%	7.14%	5%	1.3%	24.16%	

\* Fisher's exact test

### Respondents' definitions of obesity

The subjects were asked to provide their own definition of obesity. In the younger group, 38.3% of children and in the older group 21.1% of individuals concluded that "obese" meant the same as "fat". In 13.85% of

cases, the respondents associated obesity with appearance. In total, 14.04% of the respondents expressed negative associations with obese individuals when providing their own definition of obesity. The definitions provided by the respondents are summarised in Table VII.

**Table VII.** Definitions of obesity provided by respondents  
**Tabela VII.** Definicje otyłości podawane przez respondentów

Definitions of obesity	Percentage of respondents
Excess body weight BMI, overdeveloped body fat	28.5%
Association with individual appearance: someone "is too big" "takes up too much space" "looks bad due to their large weight" "has to wear loose clothes"	13.9%
Result of eating too much	6.8%
Excessive body weight that causes problems with moving around	3.8%
Excessive body weight that is life threatening	3.2%
Excessive body weight that is caused by an illness	4.17%
Result of laziness, negligence or even failure	2.5%
'I do not know'	17.3% (16.1% in younger group, 18.4% in older group)

An affirmative answer to the question whether they considered obesity as a disorder was given by 60.3% of students (31.4% in the younger group and 47.7% in the older group). There were 36.6% of children who did not know any complications of obesity. Among the subjects who did know some complications of obesity (63.4% of all respondents), the majority mentioned diabetes (63.5%), arterial hypertension (16.8%) and cardiovascular diseases (27.8%).

### Sources of knowledge on obesity

The last question in the survey concerned the sources of knowledge on obesity. More than one answer could be selected. The results are summarised in Table VIII.

**Table VIII.** Sources of knowledge on obesity indicated by respondents  
**Tabela VIII.** Źródła wiedzy na temat otyłości wskazane przez respondentów

Sources of knowledge on obesity	Percentage of respondents
Internet	45.9
Family	34.8
School	34.4
TV	27.9
Friends	6.3
Family doctor	9.8
Lack of interest in obesity	26.2

## DISCUSSION

The present study concerns an important problem of the social perception of a civilization disease, obesity, by a population of teenagers living in Upper Silesia, Poland. There is a positive sign of interest in the issue in that, as few as they are, 2.8% of the respondents provided voluntary statements of support for obesity research. Unfortunately, 26.2% of the pupils declared no interest in the problem of obesity, a large proportion of the participants could not define obesity correctly (53.3%) and many students did not know the complications of this disorder. There was a similarly insufficient level of knowledge among younger and older subjects. A positive observation is that only a small percentage of the older participants did not know their own body weight and height (1% of girls and 1.4% of boys). The results were poorer among the younger respondents (4.7% of girls and 7.14% of boys). Considering the possibility of obesity persisting, particularly from puberty to adulthood, the adolescents' ability to assess their own nutritional status may have a high preventative value [2]. Unfortunately, this assessment may be incorrect, such as in our study, in which 16.1% of teenagers with an increased BMI



considered their body weight to be normal. When drawing conclusions about the results, it should also be taken into account that, as stressed by Fonseca et Gaspar de Matos [3], a limitation to online research is the fact that obese teenagers may understate their weight. It seems, however, that the respondents in the present study provided their actual somatic measurements. A comparison of the nutritional status data obtained in the current study with those published in the literature may support this. In a study from 2008 [4], the prevalence of excess body weight was investigated among children aged 10–12 living in south eastern Poland. Excess body weight was found in 21% of girls (13.3% were overweight and 7.7% obese) and in 20.6% of boys (with 14.2% being overweight and 6.4% obese). In a study from 2018 [5], the prevalence of obesity among 18-year-old girls from Upper Silesia was 17.2%. Based on the data provided by the children in the present study, the total estimated prevalence of overweight and obesity in this population was 21.2%. There was a higher percentage of boys than girls among the individuals with an abnormal body weight.

A comparison of responses from the younger and older participants shows that in the older group body weight was more often associated with good appearance than health. More adolescents from the older group than the younger group expressed their negative attitude towards individuals with excess body weight; they were also more likely to perceive individuals with a normal BMI as overweight. This is supported by the fact that the problem of excess body weight among peers was recognised by 46.2% of the older students while based on the self-reported weight and height values, the prevalence of excess body weight was 23.7% in that group.

It needs to be emphasised that the percentage of respondents expressing negative associations with obese individuals was relatively small: 14.04% (8.1% in the younger group and 6.5% in the older group). It is difficult to verify whether the acceptance of overweight individuals is currently as high as the respondents' answers suggest. One needs to bear in mind that despite anonymity a certain percentage of answers could have been wishful and not consistent with the respondents' beliefs. The results of the American EAT study [6] suggest that there is an increasing tendency towards a less judgemental attitude towards individuals with obesity. In recent years, a lower percentage of individuals have been observed to experience bullying for their excess body weight, with such behaviour being more common among younger children than older ones. The results of the present study indicate a more common experience of bullying and more frequent observation of other individuals being bullied for excess body weight among 15–18-year-old teenagers. The right amount of exercise is an important method of prevention and treatment of obesity. In both age

groups in the study, the percentage of children who limited their physical activity to PE classes only was nearly as high as 30%. The percentage of children who rated their physical activity as adequate was much higher than their reported duration of exercise suggested. The answers provided by the respondents show that teenagers are not aware of how much time they should devote to physical activity in order to maintain normal body weight. In both age groups, there was a notable difference in the reported frequency of exercise performed by respondents with excess and normal body weight. Lower values were observed for overweight individuals and those from the older group. Significant differences were found in the physical activity of obese and non-obese teenagers in Portugal [3], Lithuania [7] and China [8]. Particular efforts should be made to motivate teenagers to exercise daily. In this respect, it is important to continue health programmes in Poland such as "Prevention of overweight, obesity and chronic diseases through education of society on nutrition and physical activity" [9] and local government programmes such as the annual "Bicycle May", which promotes commuting to school by bicycle. In other European Union countries, programmes promoting physical activity have also been implemented, such as "Open Doors" and "Moonlight" in Hungary, which intended to increase the availability of sports facilities. In Slovenia, a national public health programme for health-enhancing physical activity (HEPA) was introduced, aiming to encourage people to undertake any form of regular physical activity for their whole life. In Britain, "Let's get moving" and "Sport Unlimited" programmes have been introduced [10].

The adolescents often stated that the family was their source of knowledge on normal body weight. The credibility of this knowledge is compromised by the fact that nearly one in three respondents grew up in a family with obese individuals both in their parents' and grandparents' generations. Social campaigns promoting the maintenance of a healthy body weight among adults have an impact on two generations since parents that are well-informed of the problem can pass on good nutritional habits to their well-informed children. The National Food and Nutrition Institute project mentioned above [9], which ended in 2017, was introduced in response to the need for education on the issue.

The peer environment has a significant impact on the way teenagers perceive health problems [11]. Half of the subjects considered at least one of their peers to be overweight. This means that children pay attention to the problem of being overweight. The aspect of appearance raised more interest among the older adolescents than it did among the younger children. In the younger group, appearance was not the subject of very critical judgement from peers. In the older group,



the model of a person with a normal body weight promotes slimness and even those individuals who are not objectively overweight may be perceived as such. This is supported by the fact that some respondents with a BMI < 85<sup>th</sup> percentile were subjected to nasty comments from their peers about their weight. It cannot be excluded that pupils with a BMI in the recommended range who experienced bullying for their weight were in fact slim. The results obtained in the study confirm the negative phenomenon of ridiculing children with excessive body weight (BMI ≥ 85<sup>th</sup> percentile), which increased with age. It affected 28% of the younger respondents and as many as 66% of the older students. It is alarming that 25% of the respondents did not defend those ridiculed and 5.5% actually supported bullying. A significant prevalence (84.9%) of lack of acceptance of overweight individuals among peers was confirmed by Kryśka [12], who studied children aged 12–13 attending primary schools in Katowice, Poland. Similar to the studies conducted by other authors, the present authors' research shows that overweight children are being labelled as lazy, less intelligent, less healthy and less active [13]. The high significance of preventing obese child and adolescent stigmatisation for improved efficacy of their treatment is emphasised by Pont et al. [14]. They also indicate that stigmatisation may take place in various settings, including healthcare. Some authors believe that experiencing stigmatisation by obese individuals is too rarely taken into account when planning therapy [15]. Research on stigmatisation due to excess body weight of both children and adults confirms that stigmatisation compromises their self-esteem and reduces their

physical activity and motivation for dieting, thus increasing weight gain [14,16,17].

It is worth taking note of the reason why some (although few) respondents considered it justified to bully overweight peers. This was supposed to motivate the ridiculed teenager to tackle their health problem. Pont et al. [14] also emphasise the existence of a conviction in society that the sense of embarrassment stemming from being stigmatised will motivate obese individuals to lose weight. In this respect, it is a priority to provide children and adolescents with theoretical knowledge on obesity and its health consequences, as well as on practical prevention measures [18,19]. Child and adolescent education regarding the perception of obese individuals should present their image in a balanced way.

## CONCLUSIONS

1. There is an urgent need to promote knowledge on the determinants and consequences of obesity among teenagers, particularly those over 14 years of age.
2. Efforts should be undertaken to promote knowledge on the subject of obesity and shape an attitude of respect towards everybody, regardless of their weight, while stressing the need to maintain a healthy body weight and support obese individuals in their fight against the condition.
3. Physical activity as the fundamental method of fighting obesity should be widely promoted among adolescents. The time devoted to physical activity must be longer and the quality of exercise better, particularly among individuals aged 15–18.

### Author's contribution

Study design – A. Radosz (70%), A. Obuchowicz (30%)

Data collection – A. Radosz (100%)

Data interpretation – A. Radosz (50%), A. Obuchowicz (50%)

Statistical analysis – A. Radosz (80%), A. Obuchowicz (20%)

Manuscript preparation – A. Radosz (50%), A. Obuchowicz (50%)

Literature research – A. Radosz (50%), A. Obuchowicz (50%)

## REFERENCES

1. Rózdzyńska-Świątkowska A., Kułaga Z., Grajda A., Gurzowska B., Gózdź M., Wojtyło M. et al. Height, weight and body mass index references for growth and nutritional status assessment in children and adolescents 3–18 year of age [Article in Polish]. *Stand. Med. Pediatr.* 2013; 10(1): 11–21.
2. Gordon-Larsen P., The N.S., Adair L.S. Longitudinal trends in obesity in the United States from adolescence to the third decade of life. *Obesity* 2010; 18(9): 1801–1804, doi: 10.1038/oby.2009.451.
3. Fonseca H., Gaspar de Matos M. Perception of overweight and obesity among Portuguese adolescents: an overview of associated factors. *Eur. J. Public Health* 2005; 15(3): 323–328, doi: 10.1093/eurpub/cki071.
4. Mazur A., Klimek K., Telega G., Filip R., Małecka-Tendera E. Ten-year secular trend of overweight and obesity in school children in south-eastern Poland. *Ann. Agric. Environ. Med.* 2014; 21(3): 634–638, doi: 10.5604/12321966.1120616.
5. Pałasz W., Ziora-Jakutowicz K., Oświęcimka J., Gorczyca P., Ziora K. Trends of underweight and obesity prevalence among adolescent girls in the selected population of the Silesian Agglomeration. *Pediatr. Endocrinol. Diabetes Metab.* 2018; 24(1): 20–35, doi: 10.18544/PEDM-24.01.0099.
6. Haines J., Hannan P.J., van den Berg P., Eisenberg M.E., Neumark-Sztainer D. Weight-related teasing from adolescence to young adulthood: longitudinal and secular trends between 1999 and 2010. *Obesity* 2013; 21(9): E428–434, doi: 10.1002/oby.20092.
7. Raistenskis J., Sidlauskienė A., Strukcinskiene B., Uğur Baysal S., Buckus R. Physical activity and physical fitness in obese, overweight, and normal-weight children. *Turk. J. Med. Sci.* 2016; 46(2): 443–450, doi: 10.3906/sag-1411-119.
8. Zhang Y., Liu S., Li Y., Li X., Ren P., Luo F. The relationships between weight status and physical fitness among Chinese children and youth. *Res. Q. Exerc. Sport* 2019; 90(2): 113–122, doi: 10.1080/02701367.2019.1603768.
9. Projekt „Zapobieganie nadwadze i otyłości oraz chorobom przewlekłym poprzez edukację społeczeństwa w zakresie żywienia i aktywności fizycznej”



(Szwajcarsko-Polski Program Współpracy). Portal gov.pl [online], November 22, 2017. Available at: <<https://www.gov.pl/web/zdrowie/projekt-zapobieganie-nadwazce-i-otylosci-oraz-chorobom-przewleklym-poprzez-edukacje-spo-liczenstwa-w-zakresie-zywienia-i-aktywnosci-fizycznej-szwajcarsko-polski-program-wspolpracy>> [accessed on 01.06.2022].

10. EU Physical Activity Guidelines: Recommended Policy Actions in Support of Health-Enhancing Physical Activity [pdf]. Andersen L.B., Andersen S., Bachl N., Banzer W., Brage S., Brettschneider W.D. et al. [ed.]. Brussels 2008. Available at: <[https://ec.europa.eu/assets/eac/sport/library/policy\\_documents/eu-physical-activity-guidelines-2008\\_en.pdf](https://ec.europa.eu/assets/eac/sport/library/policy_documents/eu-physical-activity-guidelines-2008_en.pdf)> [accessed on 01.06.2022].

11. Amaya-Hernández A., Ortega-Luyando M., Bautista-Díaz M.L., Alvarez-Rayón G.L., Mancilla-Díaz J.M. Children with obesity: peer influence as a predictor of body dissatisfaction. *Eat Weight Disord.* 2019; 24(1): 121–127, doi: 10.1007/s40519-017-0374-0.

12. Kryśka S. Stygmatyzacja dzieci otyłych jako przykład braku akceptacji rówieśniczej. *Studia i Prace Pedagogiczne* 2014; 1: 193–201.

13. Latzer Y., Stein D. A review of the psychological and familial perspectives of childhood obesity. *J. Eat Disord.* 2013; 1: 7, doi: 10.1186/2050-2974-1-7.

14. Pont J.S., Puhl R., Cook S.R., Slusser W. Stigma experienced by children and adolescents with obesity. *Pediatrics* 2017; 140(6): e20173034, doi: 10.1542/peds.2017-3034.

15. Puhl R., Suh Y. Health consequences of weight stigma: implications for obesity prevention and treatment. *Curr. Obes. Rep.* 2015; 4(2): 182–190, doi: 10.1007/s13679-015-0153-z.

16. Nolan L.J., Eshleman A. Paved with good intentions: paradoxical eating responses to weight stigma. *Appetite* 2016; 102: 15–24, doi: 10.1016/j.appet.2016.01.027.

17. Vartanian L.R., Porter A.M. Weight stigma and eating behavior: a review of the literature. *Appetite* 2016; 102: 3–14, doi: 10.1016/j.appet.2016.01.034.

18. Antwi F., Fazylova N., Garçon M.C., Lopez L., Rubiano R., Slyer J.T. The effectiveness of web-based programs on the reduction of childhood obesity in school-aged children: a systematic review. *JBI Libr. Syst. Rev.* 2012; 10(42 Suppl): 1–14, doi: 10.11124/jbisrir-2012-248.

19. Golden N.H., Schneider M., Wood C. Preventing obesity and eating disorders in adolescents. *Pediatrics* 2016; 138(3): e20161649, doi: 10.1542/peds.2016-1649.