Polish Annals of Medicine

Journal homepage: https://www.paom.pl

Research paper

Parents' perception of physical activity and body mass in their children compared to BMI and physical fitness test results – examination of 8369 children

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Article info

Article history
Received 14 May 2021
Accepted 15 July 2021
Available online 10 September 2021

Keywords
Health
Fitness test
Children
Physical activity
Body mass index

Doi
https://doi.org/10.29089/2020.20.00178

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Abstract

Introduction: The level of parents' knowledge and ability to evaluate a child's health condition is crucial when making decisions concerning physical activity levels and dietary patterns.

Aim: This study assessed parents' views versus the actual health status of their children using anthropometric examinations and performance test results.

Material and methods: The research involved an examination of 8369 children aged 6–7 years and an analysis of responses provided by parents to a questionnaire of the general health status of children, their physical activity, and estimated average time spent passively. Responses were compared to the results of a performance test and anthropometric measurements, classified according to centile grids for a given age and sex.

Results and discussion: In total, 85% of guardians did not notice obesity in a child whose BMI was in the 95th percentile or above. Guardians of children with very bad physical performance evaluated their general health condition as very good (42%) or good (50%), which means that 92% of guardians were not aware of their child's very low exercise capacity. In total, 75% of guardians of children with very poor fitness believed that their child had a sufficient amount of physical activity during the day.

Conclusions: Parents or guardians of children with excessive body weight have a low level of awareness of obesity and have no awareness of their children's very low physical performance. We conclude that there is a great need for comprehensive education of societies regarding the importance of physical activity and nutrition for the health of children and youth.

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1. INTRODUCTION

A high number of obese and overweight children, prevailing for decades, involves a risk for the development of future generations.[1] At the same time, a sedentary lifestyle becomes common, also among children and adolescents.[2] The effect of a low level of physical activity and obesity, e.g. on the development of circulatory system diseases, metabolic diseases, and some cancers, has been documented.[3,4] School-age is the time of building your own self-esteem but obese children have problems with acceptance by their colleagues and can encounter weight-based stigma.[5] The price for excess weight and low cardiovascular fitness is high and is paid not only by the patient but also by the whole society. Children and youths are more susceptible to the impact of advertising, hence high awareness of the choices made when buying food is very important.[6] The analysis of behavioral factors influencing childhood obesity states that watching TV for more than 2 h per day can increase the risk of childhood obesity by 42% and sufficient physical activity can reduce this risk by 30%.[7] Efforts are being made to prevent the trend toward poor dietary habits and insufficient physical activity by increasing public awareness programs.[8] Education can change a lot but designing effective prevention programs requires knowledge of who they should be addressed and which risk factors they need to change. Lifestyle and physical activity of children depend, first of all, on their parents.[8,9] The level of knowledge and ability to evaluate the health status of children by their parents is crucial for making lifestyle changes.

2. AIM

This study assessed parents' views versus the actual health status of their children using anthropometric examinations and performance test results.

3. MATERIAL AND METHODS

3.1. Study design and population

The study participants were 8369 children aged 6–7, including 4041 girls and 4328 boys. The children were examined under the 'Healthy Life of Your Child' diagnostic-education programme from September 2012 to December 2015, by an interdisciplinary team of specialists from the Centre for Promoting Child Health and Fitness in Gdańsk. Children's parents/guardians participated in the survey study. All parents expressed consent to the examination of their children and the survey of their children's health status and physical activity. Before the tests, parents completed questionnaires on their children's lifestyles.

3.2. Questionnaire

The survey was created for the purposes of the study. It consists of two parts. The first part concerned anthropometric data (body weight, height, age), parents' education and general health of the child. The second part consisted of basic questions about the child's physical activity and nutrition. Answers to the following questions were used for statistical analysis:

(1) How do you evaluate the general health condition of your child?
(2) In your opinion, does your child have enough physical activity during the day?
(3) How many hours a day does your child spend in front of a computer or TV screen?
(4) How many hours a week does your child spend on active playing or practicing sports (outside school)?

The parent/guardian chose one answer (out of four), which in his/her opinion was the closest to the truth.

3.3. Child examination

The clinical examination included anthropometric measurements and an exercise test.

The anthropometric measurements were taken by a physician during morning hours, with the children barefoot and dressed in their sports outfits. The height measurements were taken with the children in a standing position using the SECA 217 stadiometer. The body weight was measured using the TANITA MC-780 MA (BIA). BMI was estimated after taking the body height and weight measurements. BMI categories for sex and age were determined according to international obesity task force (IOTF).[10,11] The participants were then subjected to a 3-minutes Kasch Pulse Recovery (KPR) test and the test results were classified into centile groups.[12,13] For statistical analysis, subjects were divided into groups based on their exercise test results:

(1) less than 5 percentile (excellent fitness);
(2) 5–25 percentile (very good fitness);
(3) 25–50 percentile (good fitness);
(4) 50–75 percentile (sufficient fitness);
(5) 75–95 percentile (poor fitness);
(6) more than 95 percentile (very poor fitness).

The physical examination results were then compared to the survey responses. Parameters in given groups were described by determining the number of individuals in groups and subgroups, which were then divided into the categories of the responses provided.

3.4. Statistical analysis

The analyzes were made using Pearson's χ^2 test. In all cases, it was evaluated that there were statistically significant differences between the groups.

4. RESULTS

Higher education background was declared by 51.9% of respondents, secondary education by 32.5% and primary/vocational education by 15.6%.

The general health condition of children with poor fitness was evaluated by their guardians as very good (48.03%) or good (46.64%) and with very poor fitness – as very good

(41.67%) and good (50.69%), respectively (Table 1). This means that 92.36% of guardians of children with a very low level of cardio-respiratory fitness are not aware of their child's actual physical fitness level.

The general health condition of overweight children was evaluated by their guardians as very good (47.29%) or good (46.78%) and of obese children – as very good (33.72%) and good (57.85%), respectively (Table 2). This means that 94.07% of parents of overweight children and 91.57% of parents of obese children do not notice excessive body weight of their children or do not consider it a health problem.

Regarding physical activity, 81.37% of guardians of children with poor physical fitness and 79.86% of guardians of children with very poor fitness stated that their child had a satisfactory amount of daily exercise – answer: yes (Table 3).

Regarding the level of physical activity, 74.71% of guardians of overweight children and 70.66% of guardians of

Table 1. The children's exercise test results compared to their general health condition as evaluated by their parents (Question 1).

Children's health condition	Exercise test results					
	excellent	very good	good	sufficient	poor	very poor
Very good	158(57.45)	947(57.60)	1171(53.45)	781(50.10)	415(48.03)	60 (41.67)
Good	106(38.55)	640(38.93)	921(42.04)	702(45.03)	403 (46.64)	73 (50.69)
Good enough	11(4)	48(2.92)	89(4.06)	65(4.17)	41 (4.75)	10 (6.94)
Bad	0	1(0.06)	6(0.27)	2(0.13)	0	0
Hard to say	0	8(0.49)	4(0.18)	9(0.58)	5 (0.58)	1 (0.69)
Total	275(100)	1644(100)	2191(100)	1559(100)	864(100)	144(100)

Comments: All nubers are given as n(%); $P = 0.000$ (χ^2 Person's test).

Table 2. BMI compared to the children's general health condition as evaluated by their parents (Question 1).

Children's general health condition	BMI results					
	significant underweight	underweight	thin	normal	overweight	obesity
Very good	11(32.35)	50(32.89)	511(48.07)	3134(51.86)	367(47.29)	88(33.72)
Good	16(47.06)	91(59.87)	472(44.40)	2587(42.81)	363(46.78)	151(57.85)
Good enough	6(17.65)	9(5.92)	66(6.21)	279(4.62)	45(5.80)	19(7.28)
Bad	0(0)	1(0.66)	4(0.38)	9(0.15)	1(0.13)	0(0)
Hard to say	1(2.94)	1(0.66)	10(0.94)	34(0.56)	0(0)	3(1.15)
Total	34(100)	152(100)	1063(100)	6043(100)	776(100)	261(100)

Comments: All nubers are given as n(%); $P = 0.000$ (χ^2 Person's test).

Table 3. The children's exercise test results compared to their daily, sufficient physical activity as evaluated by their parents (Question 2).

Children's physical activity as evaluated by their parents	Children's exercise test results					
	excellent	very good	good	sufficient	poor	very poor
Yes	258(94.51)	1467(89.29)	1909(87.17)	1314(84.56)	699(81.37)	115(79.86)
No	12(4.40)	129(7.85)	181(8.26)	161(10.36)	107(12.46)	18(12.50)
Hard to say	3(1.10)	45(2.74)	100(4.57)	79(5.08)	53(6.17)	11(7.64)
Total	273(100)	1643(100)	2190(100)	1554(100)	859(100)	144(100)

Comments: All nubers are given as n(%); $P = 0.000$ (χ^2 Person's test).

Table 4. BMI compared to the children's daily physical activity level (Question 2).

Children's daily physical activity level	BMI					
	significant underweight	underweight	thin	normal	overweight	obesity
Yes	31(93.94)	140(90.91)	945(89.15)	5274(87.38)	576(74.71)	183(70.66)
No	1(3.03)	9(5.84)	71(6.70)	500(8.28)	149(19.33)	52(20.08)
Hard to say	1(3.03)	5(3.25)	44(4.15)	260(4.31)	46(5.97)	24(9.27)
Total	33(100)	154(100)	1060(100)	6036(100)	771(100)	259(100)

Comments: All nubers are given as n(%); $P = 0.000$ (χ^2 Person's test).

Table 5. The children's exercise test results compared to time spent in front of a computer or TV screen (Question 3).

Time spent in front of TV/ HR, h	Children's exercise test results					
	excellent	very good	good	sufficient	poor	very poor
>3	53(19.70)	325(19.76)	485(22.07)	329(21.01)	204(23.53)	36(24.83)
1–3	152(56.51)	915(55.62)	1246(56.69)	919(58.68)	510(58.82)	92(63.45)
0–1	64(23.79)	401(24.38)	466(21.20)	317(20.24)	153(17.65)	17(11.72)
Total	269(100)	1641(100)	2197(100)	1565(100)	867(100)	145(100)

Comments: All nubers are given as n(%); $P = 0.000$ (χ^2 Person's test).

Table 6. Children's BMI compared to time spent in front of a computer or TV screen (Question 3).

Time spent in front of TV screen, h	significant underweight	underweight	thin	normal	overweight	obesity
>3	9(26.47)	39(25.16)	246(23.06)	1266(20.93)	186(24.00)	76(28.68)
1–3	19(55.88)	80(51.61)	571(53.51)	3512(58.05)	460(59.35)	162(61.13)
0–1	6(17.65)	35(22.58)	250(23.43)	1267(20.94)	127(16.39)	27(10.19)
Total	34(100)	154(100)	1067(100)	6042(100)	773(100)	265(100)

Comments: All nubers are given as n(%); $P = 0.000$ (χ^2 Person's test).

obese children believed that their child had a satisfactory level of daily physical activity (Table 4).

It is reported that 23.53% of children with poor physical fitness spend more than three hours a day in front of a computer or TV screen, and 58.82% of those children spend 1–3 h a day in front of a computer or TV screen. The study found that 24.83% of children with very poor fitness spend more than 3 h a day in front of a computer or TV screen, and 63.45% of those children spend 1–3 h a day (Table 5).

According to the parents, 24.00 % of overweight children spend more than 3 h in front of a computer or TV screen and 59.35% of those children spend 1–3 h a day in a similar way. The percentage of obese children that spend more than 3 h a day in front of a computer or TV screen is 28.68% (Table 6).

5. DISCUSSION

Preventive activities through social education on health-promoting approaches, such as a proper, balanced diet and appropriate level of physical exercise, have been conducted for years in developed and developing countries.[10,11] Since our research concerned 6–7-year-old children, from the area of a large city, the capital of a Polish province, with no preliminary selection. Although the results of the research presented above may be surprising, they confirm the observations of other researchers. The results of a British study demonstrated that only about 25% of parents realistically evaluated the excessive body weight of their children.[14] About 33% of mothers and 57% of fathers evaluated their obese children as well-nourished. In extensive overview studies, parents who wrongly evaluated the body weight of their child were overweight themselves.[14,15] In a study by Harnack et al., almost 90% of obese pre-schoolers were classified by their parents as well-nourished.[16] Szanecka found that mothers of obese children aged 8–13 and 14–18, in both age groups, significantly underestimated the evaluation of the figure of their daughters compared to mothers of overweight children and children with appropriate body weight.[17] The analysis conducted in this study on a large group of subjects (8369 children), concerning the parents' evaluation of physical development (underweight, overweight, obesity) and cardio-respiratory fitness, demonstrated that 91.57% of the guardians of obese children do not perceive excessive body weight of the children as a health problem. The negative effect of obesity on the health of children and adolescents is very well-documented in the scientific literature. Most frequently, these problems concern metabolic disorders, such as elevated triglyceride and cholesterol levels, with early symptoms of atherosclerosis and hypertension.[3] Obesity is conducive to the development of insulin resistance and type-2 diabetes, leading to further pathological complications.[18,19] The results of obesity that are less often emphasized, but very significant for children and youth, are mental and emotional disorders. Already at the pre-school age, small children attribute negative features and stereotypes to peers with larger body size.[20] Obese children are stigmatized by their peers, which affects their low self-assessment and may cause depressive states.[21] Marginalization in the peer group causes emotional disorders and rejection.[22] The present study indicates that despite extensive informative activities and preventive programmes, social awareness of health risks remains low, which may be a factor in the increasing childhood obesity rate in Poland.[23,24] A physical performance test was carried out according to the assumed standards and the results were compared to centile grids for the given age and sex. A physical fitness test is an objective measurement of the body response to a required effort. Only a body subjected to systematic physical activity reveals proper responses to the strain. Satisfactory daily physical exercise of children with very poor results of the fitness test is declared by 79.86% of guardians, while only 11.72% stated that their child spent less than 1 h a day in front of a computer or TV screen. In the group of children with very low physical fitness, 92.36% of guardians were not aware of very poor performance of the child. Most parents of inactive children erroneously believe that their children are active enough.

In British studies, 80% of parents of inactive children wrongly estimated the physical activity level of their child as being satisfactory.[25] The fact that the children's guardians declare an adequate level of physical activity, while at the same time the child demonstrates low cardio-respiratory fitness may be related to a lack of parents' knowledge of the appropriate daily exercise of average and moderate intensity for a child. The WHO recommends that children and adolescents aged 5–18 should have an aerobic exercise of average or moderate intensity for about 1 h a day.[26] However, judging from the physiological response of the body, it is difficult to recognize body effort levels, since it requires skill in differentiating the exercise load. Is low level of physical activity the result of the unawareness or consciously-adopted lifestyle of the family? Further studies are required to answer this question to formulate effective intervention. The support of the environment and education (including e-education) has a very significant effect on maintaining health-promoting behaviour. For children and adolescents, their environment is formed by their family and school. When designing programmes concerning the promotion of healthy lifestyle and prevention of civilization diseases, information related to parents' beliefs, obtained in the form of surveys and interviews, should be very tentatively taken into account in behavioural interventions. It is necessary to compare the opinion of guardians with the objective results of tests and measurements. It is confusing that 19.70% of parents of children with excellent and 19.76% with very good exercise levels estimated that their children spent more than 3 h in front of a computer or TV screen daily. Since it is difficult to combine systematic physical activity (which is reflected in good exercise test results) with a long time spent in a sitting position, it should be assumed that not all answers provided by parents are precise and can be inaccurate.

Limitations and strengths

The research was conducted only on one age group of 6 and 7 years old. The study group is representative of the population of a large city. The strength of the study is the confrontation of the parents' opinion with the test and measurement results, with reference to norms provided in centile grids for the given age groups.

6. CONCLUSIONS

(1) Parents of obese children wrongly estimate the body weight of their child as appropriate, and their health condition as good or very good. The vast majority of parents of children with poor and very poor cardiorespiratory fitness do not recognise deficiencies in physical activity.
(2) Behavioural modification (lifestyle change) of children should account for the low awareness of parents of the health risks of excessive body weight and low exercise levels.
(3) Physical activity programs should include a health education component, which details the level and nature of appropriate physical exercise for children.

Conflict of interests

The authors have no conflict of interest to declare.

Funding

The research material was collected as part of statutory activities of the Center for Health Promotion and Child Physical Fitness in Gdańsk. The Center is a budgetary unit of the City of Gdańsk established to operate in 1992. Its statutory tasks are to create and implement comprehensive, interdisciplinary programs to promote a healthy lifestyle and early detection of risk factors for the development of civilization diseases in children of Gdańsk.

Acknowledgements

We thank the children and their parents for time and agreement to participate in the study.

Ethics

The Independent Bioethics Committee for Scientific Research of Medical University of Gdansk issued the ethical approval for this study (decision no. NKBBN/228/2012). Parents provided written informed consent for completing the questionnaire and examination of the child.

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