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PROBLEM BEHAVIOUR IN OVERWEIGHT PREADOLESCENTS

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Abstract: *Personality and psychological profile of groups of normal and overweight children from age 11 to 14 were compared. Weight groups were formed on the basis of the Body Mass Index, that had been assessed in subjects at birth and age 10. 4412 parents completed the Achenbach `s Child Behavior Checklist from which emotional and problem behavior could be derived. Social Withdrawal, Somatic Complaints and Social Problems were associated with overweight as measured by the Body Mass Index at age 10. Our results indicate that the socioeconomic variables such as education level of parents, family income, and dwelling place do not affect the overweight in children except for the number of siblings. Teasing from peers is more relevant for overweight boys, and not for girls according to the mothers ˇ report. Weight status at birth is only little associated with the weight status at age 10. This research is based on a Longitudinal Growth Study whose purpose is to examine perinatal, anthropometric, and demographic variables in a representative sample of Hungarian children.*
Keywords: *Overweight children; BMI; Child Behavior Checklist; Longitudinal Growth Study.*

Introduction

The great amount of research reported in the literature on overweight testifies to the relevance of the phenomenon. Obesity and overweight in adulthood are associated with increased mortality, hypertension, hypercholesterolemia, diabetes mellitus and coronary heart disease (Bray 1985, Garrison and Castelli 1985, Pi-Sunyer 1991). Overweight in childhood is a prevalent condition that increases risk of adult obesity (Abraham et al. 1971, Gortmaker et al. 1987, Mossberg 1989, Serdula et al. 1993, Guo et al. 1994). Obesity as an eating disorders is not classified by the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R; American Psychiatric Association, 1980) because it "is not generally associated with any distinctly psychological or behavioral syndrome". Among others it has been found that obese children may exhibit socioemotional problems such as low self-esteem, low social competence, and moodiness. Child obesity has been found to be associated with behavioral problems such as conduct disorders, social withdrawal and peer rejection (Lerner and Schroeder 1971, Held and Snow 1972, Stein et al. 1987, Li 1995). However, this has not been supported by results given by research on general population. On the other hand, obese children do not differ from non-obese children on measures of psychological disturbance, levels of self-esteem, and psychological adjustment (Wadden and Stunkard 1985, Sallade 1973).

The study reported here focuses on the personality and psychological profile of normal and overweight children and also attempts to reveal some properties of parental evaluation of their child's weight when compared with an objective measure calculated from the children's height and weight (body mass index; BMI).

Subjects and Methods

Subjects: Being a part of the National Longitudinal Growth Study[1] whose purpose is to examine perinatal, anthropometric, and demographic variables in a representative sample of Hungarian children. In the present study 4412 parents described their 11-14 years old children's emotional and behavioral problems by the Achenbach's Child Behavior Checklist (CBCL; Achenbach 1991). Age of the children was from 11 to 14. (Mean=12.74; SD=0.93), 2131 were girls and 2281 were boys.

Measures: The children's emotional and behavioral problems were measured by the hungarian version of the widely used Child Behavior Checklist developed by Achenbach (Achenbach 1991, Gádoros 1996). The standardized rating scale of 114 items designed to obtain parents` reports of their child dealt with a wide range of problem behaviors such as Withdrawal, Anxiety/Depression, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Delinquency, Aggression beside which twenty competence items cover the child`s activities, social relations, involvement in social organizations, school performance, and social competence. Total competence score is derived from the sum of Activity, Social and School scales. Problem items are scored by parents on a 3-point scale (a 0 if the problem item does not hold for the child, a 1 if the item is somwhat true or sometimes true, and a 2 if it has been very true or often true the preceding 6 months). Two broad-band groups of syndromes derivated from the problem scales, were designated as "externalizing" and "internalizing". Externalizing problems reflect conflicts with other people and is mainly composed of aggressive and delinquent behavior syndromes. Internalizing problems consist of the withdrawal, anxiety/depression and somatic complaints syndromes.

Children's weight and height at birth and at age of 10 are used to calculate a body mass index (BMI), which is defined as subject`s weight in kilograms divided by height squered in meters, which is also an anthropometric measure of obesity. BMI has been used widely in adults as a measure of overweight. However, several studies indicate BMI is not a reliable measure of fatness for children since BMI changes substantially with age, rising steeply in infancy, falling during the preschool years, and then rising again into adulthood (Rolland-Cachera et al. 1987, Siervogel et al. 1991, Bodzsár 1991, Kuczmarski 1993). In our sample the mean of BMI at birth was 12.76 (SD=1.19, N=5816) while the mean of BMI at age 10 was 17.35 (SD=2.92, N=4343). For the above reason, child BMI needs to be assessed using age related reference curves (Joubert et al. 1992, Cole et al. 1990).

Defining obesity or overweight for children is difficult, and there is no generally accepted definition of obesity or overweight for youth in the literature (Obarzanek 1993). Usually two percentile cutoff definitions were used to estimate overweight prevalence: 85th and 95th percentile. The 95th percentile of BMI clearly represents overweight and it is likely to have high specificity for excess body fat. The 85th percentile of BMI is more inclusive and has been used to set public health objectives for overweight prevalance among adolescents and is a widely used criterion of overweight for adults (Troiano et al. 1995, Kuczmarski 1994). We defined as overweight all children whose BMI was at the 85th percentile or greater in the recent study. We separated two BMI groups for statistical analysis: *normal-weight group* between the 15th percentile and 85 percentile (BMI at birth: N= 2580, 1203 girls, 1377 boys; BMI at age 10: N=2574, 1221 girls and 1353 boys), and *overweight group* (BMI at birth: N=566, 269 girls, 297 boys, BMI at age of 10: N=544, 259 girls, 285 boys) 85 percentile or greater than 85th percentile.

After obtaining various demographic data we restricted ourselves to using the following sorts of information: educational level of parents, mumber of siblings, family income and dwelling place.

Results

For both sexes, children who where classified as obese at age 11-14 years had had higher birth weights ($F(1, 3053) = 4.87$; $p<0.027$) than did the normal-weight group. Pearson correlation coefficient between BMI at birth and age 10 was $r = 0.12$ ($p< 0.000$, $N=4228$). Table 1 showes the frequency of cells in the crosstabulations of BMI at birth by BMI at age 10. Children who had been underweight at birth were near twice (1.7) as likely to become classified overweight at age 10 than not underweight children. In case of overweight newborn this risk ratio is poorer: 1.2. The sex separate analysis confirmed that the value of risk ratio is similar in both sexes.

Table 1: Crosstabulation of BMI at birth by BMI at age 10

		BMI at age 10			
		Underweight	**Normal-weight**	**Overweight**	**Row total**
BMI at birth	Underweight	143	399	78	620
	Normal-weight	359	1700	350	2409
	Overweight	46	384	96	526
	Column total	548	2438	524	3555

$\chi^2 = 49.16$, df=4, $p<0.0000$

As regards the socioeconomical variables these did not show significant effects for the weight of children except for the number of siblings ($F(1,3107) = 16.01$; $p<0.0001$). Obese children had significantly less siblings than the normal weight children.

Two-way analysis of variance (ANOVAs; 2(Sex: girls/boys) X 2(normal/overweight group) were conducted on the total score of problem and competence scales as dependent variables. Table 2. shows means and standard deviations for the different scales, and the various BMI groups (normal and oveweight).

Higher scores on Competence scales (Activity, Social Activity, School) indicate better adaptive functioning, while higher scores on the Problem Scales (Withdrawal, Anxiety/Depression, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Delinquency, Aggression) and the three calculated scores (Internalizing, Externalizing, and Total Problem) show maladaptive behavior/emotional problems. The results show significant effects for the separate sex groups in Activity, School, Attention Problem, Delinquent Behavior, Aggression, Externalization and Total Problem scales. Boys were rated as more active ($F(1, 3112) = 3.40$; $p<0.033$), inattentive ($F(1, 3113) = 65.88$; $p<0.000$), deviant ($F(1, 3114) = 48.49$; $p<0.000$) and aggressive ($F(1, 3110) = 34.46$; $p<0.000$) than girls. The boys were rated significantly higher in the Externalization ($F(1, 3110) = 62.10$; $p<0.000$) and Total Problem scores ($F(1, 3094) = 17.47$; $p<0.000$). Parent rated their daughter higher in the School achievment scale than their son ($F(1, 3110) = 60.96$; $p<0.000$).

Table 2: Means (M) and standard deviation (SD) of the different Competence and Problem scales

	normal-weight children		overweight children	
	M	SD	M	SD
Boys				
Activity	4.07	1.91	3.95	1.95
Social Activity	6.08	1.70	5.78	1.87
School	4.89	0.89	4.76	0.97
Total Competence Scores	15.24	3.25	14.67	3.71
Withdrawn	1.45	1.78	1.85	1.86
Anxious/Depression	1.93	2.39	2.19	2.46
Somatic Complaints	0.69	1.09	0.84	1.27
Social Problems	0.84	1.13	1.28	1.45
Thought Disorder	0.23	0.58	0.24	0.48
Attention Problems	2.29	2.36	2.36	2.21
Delinquent Behavior	1.10	1.46	1.13	1.59
Aggression	3.93	3.59	4.27	3.75
Externalization	6.03	5.44	6.61	5.87
Internalization	4.02	4.19	4.80	4.44
Total Problem Scores	14.01	11.07	16.97	11.99
Girls				
Activity	3.85	1.95	3.75	1.89
Social Activity	6.00	1.83	6.00	1.77
School	5.11	0.80	5.17	0.82
Total Competence Scores	15.14	3.44	15.14	3.25
Withdrawn	1.48	1.71	1.75	2.05
Anxious/Depression	2.09	2.33	2.11	2.95
Somatic Complaints	0.83	1.24	0.93	1.59
Social Problems	0.81	1.19	1.07	1.46
Thought Disorder	0.18	0.47	0.20	0.61
Attention Problems	1.58	1.85	1.45	1.86
Delinquent Behavior	0.67	1.06	0.71	1.03
Aggression	3.21	2.92	3.30	2.89
Externalization	4.50	4.15	4.49	4.01
Internalization	4.35	4.11	4.71	5.61
Total Problem Scores	12.63	9.74	14.12	11.46

As regards separate weight goups (normal and over), results show significant effects for Withdrawal, Somatic Complaints, Social Problems, Internalization, and Total Problem scores. The overweight group was rated as more withdrawn ($F(1, 3111)= 15.31$; $p<0.000$), and unsociable ($F(1, 3113)= 37.08$; $p<0.000$) then normal weight group. The overweight group was also rated much higher on the Somatic Complaints scale ($F(1, 3110)= 4.45$; $p<0.035$), Internalization ($F(1, 3107)= 7.86$; $p<0.005$), and Total Problem scores ($F(1, 3094,)= 19.34$; $p<0.000$). No significant Sex X BMI group interaction was found except for School achievement ($F(1,3110)= 5.40$, $p<0.020$).

It can be seen from the above results that the Withdrawal, and the Somatic Complaints, which constitute the Internalization scale indicating internal distress had significantly higher scores for the overweight group than for the normal-weight group for both sexes. As regards externalization, our results did not reveal significant difference between the two groups of children. Of the specific syndromes scales, the greatest difference between normal and overweight children was found for the Social Problems scale for both sexes. Our results confirm the well known fact about the sex differences: on the majority of CBCL scales boys scored higher than girls except for school performance.

Stigma and discrimination against obese children is evident. Our data suggest that obese boys are more likely to be teased than non-obese peers. However, this is not confirmed in the group of girls (Table 3.).

Table 3: Parent's answer to item 38 of CBCL (teased a lot) and defined weight groups by BMI at age 10

	Parent's answer to item 38 (teased a lot)							
	Boys				Girls			
BMI groups	**not true**	**somewhat true**	**very true**	**Row total**	**not true**	**somewhat true**	**very true**	**Row total**
Underweight	265	36	1	302	255	20	1	276
Normal-weight	1235	115	3	1353	1129	81	11	1221
Overweight	217	61	7	285	233	24	2	259
Column total	1217	212	11	1940	1617	125	14	1756

$\chi^2 = 63.39$, df=4, $p<0.0000$ $\chi^2 = 3.05$, df=4, $p<0.54$

We obtained further information about the child's weight status from the item No 55 of the Child Behavior Checklist (CBCL). The accuracy of the parents estimation was examined by comparing the child˜s appraised weight status with the normal-weight and overweight group definition based on the BMI. 89.6 % of the mothers had accurate estimations. Of those who were inaccurate, 66% underestimated their child`s weight status and 33.7 % of the mothers overestimated it. Mothers' accuracy in estimating child˜s weight status were near the same for both sexes. Mothers tended to underestimate more their daughter's weight status (70.8 %) than their son's (61 %). One-way ANOVAs were performed on mean of CBCL problem scales and competence scales, to determine mothers' estimation effects. We separated three groups of mothers according to the accuracy of their estimation. 3309 mothers' estimation can be considered accurate while 382 mothers judged unreliable (253 underestimate, 129 overestimate). For most of the CBCL scales and scores we found significant effects. Mothers who overestimated their children's weight also rated them significantly higher on problem scales, and lower on competence scales.

Discussion

This study indicates that emotional and social problems may be associated with children's obesity. Our data suggest that obese children are more likely to be inhibited, overcontrolled and they were rated higher on the Social Problems scale of CBCL than non-

obese peers. The obtained differences between normal and overweight children suggest that emotional and behavior disturbances are more likely to be emerge as the consequences of obesity. The social prejudice and discrimination against overweight children may account for these results. The overweight boys are teased more according the mothers' estimation than their normal-weight peers, which was not present among girls. It can be seen how important the influence of parental rating and expectation is on CBCL scales and because of a possible subjective bias that was for instance present in mothers' ratings who reported overweight for their children when this was not objectively true.

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