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ABSTRACT

Overweight in childhood and adolescence is a major public health problem due to its medical and psychosocial consequences. The aim of this study was to investigate overweight and life style factors in children aged 10. The sample consisted of 138 children 10 years of age from three public primary schools in southern Sweden from whom data on height, weight, Body Mass Index (BMI) and life style were obtained during 2003–2004. Differences in life style factors between the overweight and the non-overweight children were investigated using the chi-square test and Fisher exact test. The association between life style factors and overweight was studied using multivariate logistic regression analysis. Omitting lunch at school and feeling tired at school were found to be associated with overweight. Headache and the experience of being bullied were significantly more common among the overweight children. Overweight was found in 24% of the children, a fourth of whom (6%) were obese. This is important problems that school nurses need to confront. A new and interesting finding obtained was that omitting lunch at school was associated with overweight. Additional longitudinal studies of the impact of life style factors on paediatric overweight are needed to assess school-based preventive programmes.

KEY WORDS: Overweight, Life Style, Children

Background

The prevalence of overweight in children and adults is rising. In Sweden the prevalence of paediatric overweight has doubled over the past 15 years and obesity has increased even more (1). Overweight in childhood and adolescence is a major public health problem because of its medical and psychosocial consequences and the fact that young people who are overweight are more likely to become obese adults (2). Children with severe obesity tend to have biomarkers of increased risk of adverse cardiovascular outcomes (3–5). Their quality of life can also be negatively affected (6–9). Although preventing overweight and obesity is highly important, few projects aimed at this have turned out to be very effective (10), although reducing the consumption of carbonated drinks (11–12), reducing the extent of sedentary activities and increasing physical activity (13–15) may partly prevent childhood obesity. It is possible to prevent obesity in children through limited, school-based programs that combine the promotion of healthy dietary habits with physical activity (16).

According to Swedish school laws, school health care should promote pupils' adopting a healthy life style (17). In the guidelines of The National Board for Health and Welfare the focus of school health care is on preventive measures for furthering health. Reducing health risks connected with life style is given high priority (18). In order to develop effective school-based programmes for promoting health, it is important that the impact that life style factors have on overweight be further explored. The present study investigates overweight and its relation to life style factors in 10-year old children in three public primary schools in southern Sweden.

Methods

Sample

The potential sample consisted of all children 9½–10½ years of age from three public primary schools attending grade 4 during 2003–2004 (n=146), except for those children scheduled for relocation or absent at the time of the examination (n=7). A letter providing information about the study was sent to the parents of each of the children. The parents were asked if they not did wish their children to participate, to indicate this. Both the children and their parents gave their informed consent to relations between height and weight measurements and results of a life style questionnaire being studied. In all but one case, the parents gave their informed consent to their child's participation, the final number of participants thus being 138. The study was conducted in a municipality in southern Sweden of about 100,000 inhabitants. The sample consisted of 64 girls (46%) and 74 boys (54%). The schools were located in two city districts, termed here 1 and 2. There were 83 pupils (60%) from district 1 and 55 pupils (40%) from district 2 who took part. District 1, in which there were two schools was located in the centre of the city, whereas district 2, which had one school, was at the outskirts of the city. The

Table I: Overweight in relation to life style factors in ten-year-old children (n=138). Bivariate comparisons by chi-square test.

	Overweight (n=33)	Non-overweight (n=105)	Total (n=138)	chi-square value	p-value
Breakfast daily	27 (82%)	88 (84%)	115 (83%)	.072	ns
Lunch daily	15 (46%)	84 (80%)	99 (72%)	14.780	< .001
Vegetables daily	10 (30%)	51 (49%)	61 (44%)	3.398	ns
Fruit daily	10 (30%)	40 (38%)	50 (36%)	.660	ns
Sports often	24 (73%)	88 (84%)	112 (81%)	2.017	ns
Outsides during school breaks daily	24 (73%)	85 (81%)	109 (79%)	.759	ns
Often tired at school	15 (45%)	16 (15%)	31 (23%)	13.162	< .001
Often having stomach-ache	3 (9%)	8 (8%)	11(8%)	.074	ns
Often having headache	9 (27%)	10(9%)	19 (14%)	6.662	.010
Often having sleeping difficulties	7 (21%)	14 (13%)	21 (15%)	1.208	ns
Often feeling anxious or sad	3 (9%)	7 (7%)	10 (7%)	.220	ns
Sometimes teased or bullied	14 (42%)	24 (23%)	38 (28%)	4.818	.028
Like school rather well or very much	30 (91%)	102 (97%)	132 (96%)	2.346	ns

P-values < .05 were considered statistically significant. ns=not significant.

population in district 1 had a higher mean yearly income (205 200 SEK) than that of district 2 (187 400 SEK). Unemployment was more common in district 2 (5,8%) than in district 1 (3,5%), there also being more families receiving social benefits in district 2 (6%) than in district 1 (2%). Some 12% of the population in district 1 was born abroad, vs. about 16% in district 2. The three schools involved in the study were the only public primary schools in the two districts.

Data collection

All the measurements were conducted by trained school nurses. Weight was measured in light clothing to the nearest 0.1kg on a standard digital scale. Height was measured without shoes to the nearest 0.1cm using a manual height board. BMI (body mass index, kg/m^2) was used as a measure of relative weight. Because of the variability of BMI levels with age among children, the international age- and gender-specific BMI cut-off points for children developed by Cole et al. (19) were used to define subjects' overweight. Children with BMI values above the percentile values corresponding to a BMI of 25 kg/m^2 in late adolescence were classified as overweight and those with a BMI corresponding to a BMI of 30 kg/m^2 in late adolescence as obese. Each child filled in a life style questionnaire (see Life Style Questionnaire) and afterwards discussed with the nurse the answers it had given. The life style questionnaire is one inspired by the general school health program described in the State of the Art document (20). It has been used for several years by school nurses in the district for the health examinations in grade 4.

Statistical Analyses

The chi-square test and Fisher exact test were used to investigate differences in life style factors between children with and without overweight. Multivariate logistic regression was used to analyse the association between life style factors and overweight. Variables found in the bivariate analysis to be associated with overweight at p-values <.20 were subjected to a multivariate logistic regression analysis (21). P-values <.05 were considered statistically significant. All statistical analyses were performed using SPSS, version 11.0.

Life Style Questionnaire

	Never	Seldom	Often	Every day
I eat breakfast				
I eat lunch at school				
I eat vegetables				
I eat fruit				
I take part in sports in my free time				
I'm outdoors during school breaks				
I feel tired when I'm at school				
I have stomach aches				
I have problems in sleeping				
I feel anxious or sad				
I'm bullied or teased				
	Very little	Not that well	Fairly well	Very much
I like school				

Result

Overweight was found in 24% of the children, one-fourth of these (6%) being obese. Overweight was more common in the girls (31%) than the boys (19%), although the difference was not significant (p=.094). The only significant gender difference in the life style factors was that the girls experienced themselves as being bullied or teased more often than the boys (p=.031). No significant differences in overweight between the children from the two districts were found.

Associations between the life style factors and overweight are presented in Table I. Although most of the children ate breakfast and lunch every day, it is notable that 17% did not eat breakfast daily, and that 28% did not eat lunch each day, despite free lunch being served in Swedish schools. Less than half of the children ate fruit and vegetables daily. A majority said that they were mostly outdoors during school breaks. Almost every fifth child never engaged in sports in their free time, or seldom did, and 23% reported feeling tired at school. Some children told of often having stomach problems (8%), headaches (14%) or sleeping difficulties (15%). A great majority of the children (96%) liked school rather well or very much. Some 7% of the children said they often felt anxious or sad, and 28% that they felt themselves teased or bullied at times.

Feeling tired, omitting lunch, having headaches and having the experience of being bullied were significantly more common among the overweight children. Forty-five per cent of the overweight children reported often feeling tired at school, as compared with 15% of the non-overweight children (p<.001). Some 56% of the overweight children but only 20% of the non-overweight children said they omitted lunch sometimes (p<.001). Having headaches was three times as common in the overweight (27%) than in the non-overweight children (9%) (p<.05). More of the overweight (42%) than the non-overweight children (23%) experienced themselves as being bullied or teased (p<.05). Several variables were tested in the multivariate logistic regression analysis (Table II), but only two of them showed a significant in relationship to the dependent variable overweight, which was found to be significantly related to not eating lunch at school (OR: 3.577; 95% CI: 1.480 – 8.665) and to being tired at school (3.242; 1.285 – 8.180). The children were asked whether they were tired never, seldom, often or every day while at school, the results indicating them to be tired at school either every day or several days of the week.

Discussion

A significant association was found between not eating lunch at school and being overweight. All children in Sweden are served a cooked meal at school for lunch. It would be fruitful to investigate the reasons for failure to eat lunch at school, whether this could be due to disliking either the meals or the situation there. It would be of interest as well to know whether failure to take lunch at school was substituted by something else and whether not eating was an attempt to go down in weight. Significant rela-

Table II: Factors associated with overweight in ten-year-old children (n = 138). Multivariate logistic regression analysis with p-values and 95% confidence interval.

Variables	Odds ratio	95% CI for OR	p-values
Not eating lunch at school every day	3.577	1.480-8.665	0.005**
Feeling tired at school	3.242	1.285-8.180	0.013**

*Hosmer and Lemeshow goodness-of-fit test, **p=0.925. The variables not included in the equation were gender, physical activity, breakfast habits, headaches, feeling of well-being at school, experience of being teased at school, and sleeping difficulties.*

tionships were found between overweight and both feeling tired at school and having headaches. Tiredness and headaches may be due either to not eating lunch or to being overweight, or to both. When the National Food Administration in Sweden investigated the eating habits of 11-year-old children, they found that 89% ate breakfast every day and that 77% ate lunch each day (22). In our sample of 10-year-old children, the frequencies were slightly lower, only 83% eating breakfast and 72% lunch every day. According to the present results, the school nurse should encourage children to eat lunch at school and inform both teachers and parents of the importance that children eat lunch.

No parent wants its child to be too heavy, and no child wants to be overweight. Few other conditions are as closely linked with a sense of guilt and shame as overweight and obesity, and it is worthy of note that, although overweight is indeed associated with various life style factors, the hereditary taint is strong (23). Changing one's life style is extremely difficult. Attempts to treat overweight in children may result either in an increase in self-esteem (in the case of successful treatment) or a decrease in self-esteem (in the case of unsuccessful treatment) (10). Therefore, in meeting with families with overweight children, particular respect and understanding for their complex situation is needed. In the present sample, 24% of the children were overweight, one-fourth of these (6%) showing obesity. This finding could be compared with Swedish studies of ten-year old children generally, in which overweight (obesity included) varied between 21 and 29% and obesity varied between 3 and 4% (10).

A great majority of the children (96%) liked school rather well or very much. A clear need was seen of attending to and supporting those few children who appeared to not like school, particularly since in Sweden all children are obliged to attend nine years of school. Our findings show overweight children to experience themselves significantly more often than their peers as being bullied. This is an important problem that school personnel need to confront. During the school health care appointment, the school nurse discussed matters of mood and health with the pupils individually, providing them extra support when it appeared called for. At all three schools, written plans to counteract harassment had been drawn up.

No significant relationship between physical activities and weight level was found, although it has been reported in other studies (15). The age of the children and the small size of the sample may explain this. The life style questionnaire does not contain any questions on sedentary behaviours, which could have yielded valuable information. We found that 76% of the girls and 85% of the boys were engaged in sports outside of school, which is more than recent observations of sports habits in France (15) and in the US (24) have shown, where only 53–58% of the girls and 70–75% of the boys were found to participate in one or more sports outside of school.

It is possible to prevent obesity in children through limited, school-based programs that combine the promotion of healthy dietary habits with physical activity (16). The school nurse is the only professional at school who regularly meets each of the pupils individually, checking among other things their height and weight, and discussing their life style with them. This may encourage the children to either maintain a healthy life style, or to change one that is destructive. Parents are invited to participate in these discussions when it is considered desirable.

Conclusion

A new and interesting finding obtained was that omitting lunch at school was associated with overweight. According to the present results, the school nurse should encourage children to eat lunch at school and inform both teachers and parents of the importance that children eat lunch. Headaches and the experience of being bullied and of feeling tired were also found to be significantly more common in the overweight children. This is important problems that school nurses need to confront. No significant relationship between physical activities and weight level was found. Almost every fourth child in the study was overweight. Additional studies of a longitudinal character concerning life style factors that impact on paediatric overweight are needed, partly for assessing school-based prevention programmes.

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References

1. Petersen S, Brulin C, Bergström E. Increasing prevalence of overweight in young schoolchildren in Umeå, Sweden, from 1986–2001. Acta Paediatrica. 2003;92(7):848–53.

2. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. N Engl J Med. 1997;869–873.

3. Gidding SS, Nehgme R, Heise C, Muscar C, Linton A, Hassink S. Severe obesity associated with cardiovascular deconditioning, high prevalence of cardiovascular risk factors, diabetes mellitus/hyperinsulinemia, and respiratory compromise. Journal of Pediatrics. 2004;144(6):766–9.

4. Watts K, Beye P, Siafarikas A, O'Driscoll G, Jones TW, Davis, Green DJ. Effects of exercise training on vascular function in obese children. Journal of Pediatrics. 2004;144(5):620–5.

5. Weiss R, Dziura J, Burgert TS, Tamborlane WV, Taksali SE, Yeckel CW, Allen K, Lopes M, Savoye M, Morrison J, Sherwin RS, Caprio S. Obesity and the metabolic syndrome in children and adolescents. New England Journal of Medicine. 2004;350(23):2362–74.

6. Hughes AR, Farewell K, Harris D, Reilly JJ. Quality of life in a clinical sample of obese children. Int J Obes (Lond). 2006 May 30; [Epub ahead of print].

7. Arif AA, Rohrer JE. The relationship between obesity, hyperglycemia symptoms, and health-related quality of life among Hispanic and non-Hispanic white children and adolescents. BMC Fam Pract. 2006 Jan17;7:3[Epub].

8. Williams J, Wake M, Hesketh K, Maher E, Waters E. Health-related quality of life of overweight and obese children. JAMA. 2005;293(1):70–6.

9. Jansen I, Craig WM, Boyce WF, Pickett W. Associations between overweight and obesity with bullying behaviours in school-aged children. Pediatrics. 2004;113(5):1187–94.

10. SBU – report no.160 (173). Obesity – Problems and Interventions. A Systematic Review. The Swedish Council on Technology Assessment in Health Care: Stockholm, 2002 (update in Swedish 2005).

11. James J, Thomas P, Cavan D, Kerr D. Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. British Medical Journal. 2004;328:1237.

12. Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. Am J Clin Nutr. 2006;84(2):274–88.

13. Must A, Tybor DJ. Physical activity and sedentary behaviour: a review of longitudinal studies of weight and adiposity in youth. Int J Obes (Lond). 2005;29 Suppl 2:S84–96.

14. Goldfield GS, Mollory R, Parker T, Cunningham T, Legg C, Lumb A, Parker K, Prudhomme D, Gaboury I, Adamo KB. Effects of open-loop feedback on physical activity and television viewing in overweight and obese children: a randomized, controlled trial. Pediatrics. 2006;118(1):e157–66.

15. Klein-Platat C, Oujaa M, Wagner A, Haan MC, Arveiler D, Schlienger JL, Simon C. Physical activity is inversely related to waist circumference in 12-y-old French adolescents. International Journal of Obesity Related Metabolic Disorders. 2004 Jul 27 [Epub]

16. Flodmark CE, Marcus C, Britton M. Interventions to prevent obesity in children and adolescents: a systematic literature review. Int J Obes (Lond). 2006;30(4):579–89.

17. Skollag (1985:1110) 14 kap Skolhälsovård, 2 §. SFS nr 1985:1100.

18. Socialstyrelsens riktlinjer för skolhälsovården. Stockholm: Socialstyrelsen (The National Board for Health and Welfare); 2004.

19. Cole TJ, Bellizzi MC, Flegal KM, Dietz WH. Establishing a standard definition for child overweight and obesity world wide: international survey. BMJ. 2000;320:1240–1243.

20. Skolhälsovårdens generella insatser. State of the art. Stockholm: Svenska skolläkarföreningen och Riksföreningen för skolsköterskor; 2001.

21. Altman DG. Practical Statistics for Medical Research. London: Champan & Hall, 1991.

22. Larsson C. Ny nationell kostundersökning. Så äter barn (New national nutrition investigation. Meal habits in children). Uppsala: National Food Administration, 2004.

23. Stunkard AJ, Sörensen TIA, Hanis C, Teasdale TW, Chakraborty R, Schulli WJ. An adoption study of human obesity. N Engl J Med 1986;314:195–8.

24. Pate RR, Trost SG, Levin S, Dowda M. Sport participation and health-related behaviours among US youth. Arch Pediatr Adolesc Med 2000; 154: 904–911.