

Effects of lifestyle intervention on psychosocial adjustment in obese children

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Objective

The aim of this study was to evaluate the relationship between changes in physical activity (PA), sedentary behavior, and physical self-perceptions and body image in 104 overweight and obese children. The age of the children ranged from 9 to 11 years.

Participants and methods

A trial was designed to increase PA and reduce sedentary behavior. PA was reported by screen time more than 3 h/day for 8 weeks. Sedentary behavior was defined as minutes per day spent in television (TV) viewing, video game, and mobile phone.

Results

Increases in PA were associated with increases in body image ($P < 0.00$) and body satisfaction ($P < 0.003$). Reduction in TV viewing was also related to increased physical self-worth.

Conclusion

Increases in PA are associated with improvements in physical self-perceptions, whereas reductions in TV viewing are associated with increased physical self-worth, and these psychosocial benefits appear to be independent of change in adiposity.

Keywords:

children, obesity, physical activity, screen time, self-perceptions, television

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Introduction

The childhood obesity epidemic has not plateaued and nearly half of all children are now overweight or obese [1]. Obesity represents a serious public health concern, given its associated health complications [2]. In addition to adverse medical effects, there is a growing body of evidence indicating deleterious psychosocial sequelae of obesity in youth. This includes, but is not limited to depression, social isolation, and discrimination, all of which have been shown to have negative effects on self-esteem [3]. Physical self-perceptions have also been shown to be important indicators of the motivation to be physically active. One of the most reliable psychological correlates relating to physical self-perceptions in obese children is body dissatisfaction or physical appearance esteem [4]. Thus, lifestyle interventions that enhance body image and other physical self-perceptions should not only provide psychological benefits [5], but these benefits may translate into more sustained physical activity (PA) and improved eating behavior needed to induce negative energy balance and weight loss [6]. Increasing PA and reduction sedentary behavior in obese youth may be one method of achieving this aim [7]. In addition, television (TV) watching is a sedentary behavior that forms a large proportion of children's leisure time.

Participants and methods

Written consent was obtained from children's parents; medical history was obtained from each child and their parents before entry into the study and the exclusion criterion were chronic illness. School-age children 9–11 years of age of both sexes were included in this study; there were 54 obese children (BMI >95), 51 overweight children (BMI >85), and 50 nonobese children (BMI <85).

Anthropometric measurements were performed to the nearest 0.01 kg and 0.1 cm, respectively, and BMI (kg/m^2) was calculated as body weight (kg) divided by height (m^2). The waist and hip circumference measurements were obtained with the child in the standing position.

A trial was designed to increase physical activity and reduce sedentary behaviors e.g TV viewing, computer and mobile games. The Shoukier assessment scale was used to evaluate teasing behavior prevalent within the family and by peers [8].

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Statistical analysis

Data were coded entered and analyzed by a personal computer with SPSS for windows (version 9.5), Chicago, Illinois, USA, for microsoft windows; properties were used to describe the distribution of categorical variables among children. Univariate statistics for data description were used. Bivariate statistics using the χ^2 -test and Pearson's correlation were used to assess the strength of the relation. The confidence level was the *P* value (1- α) associated with a confidence interval.

Results

Table 1 shows a comparison between obese, overweight, and no obese children in terms of anthropometric parameters. The waist/hip ratio for obese children was 0.92, whereas it was 0.85 for overweight children; the waist to hip ratio was 0.79 in nonobese children and the difference was statistically significant (*P*=0.000). There was also a statistically significant difference in the waist/height ratio (*P*=0.001) and the mean weight for age *Z* score between the three groups (*P*=0.01)

Table 2 shows the relation between childhood obesity and health risk behavior in terms of PA patterns. Obese

children participated in PAs such as walking and cycling ($\chi^2=8.9$; *P*=0.003); the *P* value was highly significant.

Table 3 shows the psychological evaluation of obese-overweight and nonobese children in the Body Image Test using three different silhouettes. Comparison between the two groups using the Body Image Test was significant ($\chi^2=36.0$; *P*=0.00).

Table 4 shows the relation between childhood obesity-overweight on health risk behavior in terms of teasing, physical abuse, and serious injuries. Teasing by peers was reported by 84.6% of obese children and by 18% of normal-weight children (*P*=0.000).

Discussion

Childhood obesity is increasingly being recognized as a global epidemic [9]. The notion that BMI is inversely related to self-esteem in youth has been reported in many studies [10-12]. However, the relationship appears to be much stronger when obese and nonobese children are compared on self-esteem related to physical self-perceptions and physical quality of life [13]. Perceived deficits in physical self-perceptions are often associated with real deficit, both of which may act as barriers to participating in physically active games or sports. Thus, it is not surprising that low scores on perceived physical competence are constantly associated with reduced PA and high scores on perceived physical competence are predictive of more regular and frequent PA in children. These physical self-perceptions have also been shown to be important indicators of motivation to be physically active. One of the most reliable psychological correlates relating to physical self-perception in obese children is body

Table 1 Comparison between obese, overweight, and nonobese children in terms of anthropometric parameters

	Obese (N=54)	Overweight (N=50)	Normal (N=50)	<i>P</i>
WAZ	2.7±0.61	2.1±0.19	0.29±0.06	0.01
HAZ	0.26±0.12	0.1±0.13	0.09±0.17	NS
Waist/height ratio	0.62±0.02	0.56±0.09	0.41±0.03	0.001
Waist/hip ratio	0.91±0.005	0.85±0.01	0.79±0.03	0.000

Values are mean±SD. HAZ, height for age *Z* score; WAZ, weight for age *Z* score. *P*≤0.05, level of significance.

Table 2 Relation between childhood obesity and health risk behavior in terms of physical activity patterns

Tests	<i>N</i>	Obese-overweight (N=104) [n (%)]	Normal (N=50) [n (%)]	χ^2	<i>P</i>	Odds ratio	95% CI
Watching TV and computer							
1-2 h	56	38 (36.5)	18 (36.5)	0.004	1.00	1.02	0.51-2.15
3 h	98	66 (63.5)	32 (64.5)				
Riding bicycle or walking							
0 day	119	83 (79.8)	36 (72)	1.2	0.31	1.54	0.7-3.3
≥1 day	35	21 (20.2)	14 (28)				
Going to and from school							
Walking	66	36 (34.6)	30 (60)	8.9	0.003	0.35	0.18-0.7
Vehicle	88	68 (65.4)	20 (40)				
Physical activity for 1 h							
0	95	69 (66.4)	26 (52)	2.9	0.11	1.8	0.9-3.6
≥1	59	35 (33.6)	24 (48)				

CI, confidence interval; TV, television.

Table 3 Evaluation of obese–overweight and normal children in terms of body image after increases in physical activity for 8 weeks

Body image	N	Obese–overweight (N=104) [n (%)]	Normal (N=50) [n (%)]	χ^2	P	Odds ratio	95% CI
Normal	47	4 (3.85)	43 (86.00)	36.000	0.000	0.50	0.4–0.6
Overweight	55	50 (48.08)	5 (10.00)				
Obese	52	50 (48.08)	2 (4.00)				

CI, confidence interval.

Table 4 Relation between childhood obesity–overweight and health risk behavior in terms of teasing, physical abuse, and serious injuries

Tests	N	Obese–overweight (N=104) [n (%)]	Normal (N=50) [n (%)]	χ^2	P	Odds ratio	95% CI
Teased or not by adults in the last year							
Less than five times	82	40 (38.5)	8 (16)	28.1	0.000	8.4	3.6–19.7
More than five times	72	64 (61.5)	42 (84)				
Physical abuse in the last year by an adult							
Less than five times	78	51 (49.0)	27 (54.0)	0.33	0.6	0.8	0.4–1.6
More than five times	76	53 (50.9)	23 (46.0)				
Serious injuries in the past year							
No injuries	134	87 (83.6)	47 (94)	3.2	0.1	0.3	0.1–1.2
Injuries once or more times	20	17 (16.3)	3 (6.0)				
Teased or not by peers in the last month							
Not teased by peers	57	16 (15.4)	41 (82)	64.3	0.000	0.04	0.2–0.09
Teased by peers	97	88 (84.6)	9 (18.0)				

CI, confidence interval.

satisfaction [13]. In this study, increases in PA and decreases in TV viewing in overweight and obese children for 8 weeks resulted in increased body satisfaction ($P<0.000$). This is clinically significant because body dissatisfaction is not only a consequence of obesity but is directly related to unhealthy dieting behaviors that are cross-sectionally and prospectively related to weight gain in youth. Thus, lifestyle interventions that enhance body image and other physical self-perceptions should not only provide psychological benefits, but these benefits may translate into more sustained PA and improved eating behavior in obese children to achieve energy balance. Obese children represent a group who may benefit from increased energy expenditure from PA, given that they are less physically active and less fit. In another study, TV watching was reported to be a sedentary behavior that forms a large proportion of children's leisure time and is prospectively related to the development of obesity in children [14]. Moreover, physically active children report greater body satisfaction, self-esteem, and self-perceptions than their sedentary peers. There is evidence that the psychological benefits of increased PA in youth are often independent of changes in body mass, but this needs to be studied further.

Using sedentary behavior to enforce PA, a behavior-modification technique known as the Premack

principle [15], increases PA and reduces sedentary behavior in normal-weight and obese children. Very few clinical trials have examined the effects of modifying PA and sedentary behavior on psychological well-being in obese children. Despite the study intervention not resulting in visible changes in BMI, there remains a relationship between increased PA and improved body self-esteem. This finding was reported previously in youth [16]. Many overweight children experience weight-based teasing, which likely serves to exacerbate body dissatisfaction. In this study, obese children were teased by adults and also by their peers ($P=0.00$ and 0.04). Many obese children presenting for treatment have difficulty losing weight and maintaining the losses; it is encouraging to note that body image and physical self-worth can be enhanced independent of weight loss simply by encouraging overweight children to become more physically active. Overweight and obese children must be encouraged to participate in higher volume, lighter intensity PA to achieve psychosocial health benefits.

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Conflicts of interest

There are no conflicts of interest.

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