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Original Article

Quality of Life, Motor Ability, and Weight Status among School-aged Children of Tehran

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Abstract

Background: This study aimed to investigate the relationship between health Related quality of life (HRQOL), motor ability and weight status in children.

Methods: Two hundred forty children ages 9-11 yr who were selected via multi stage cluster sampling design from primary schools in the Shahre Qods at Tehran, Iran in 2007. HRQOL was assessed by the pediatric quality of life inventory (PedsQL). Motor abilities were determined by a Basic Motor Ability Test (BMAT). Body mass index was calculated to determine weight status.

Results: Psychosocial, physical, and total health related qualities of life (all $P< 0.05$) were significantly lowered for obese when compared to normal weight participants. In contrast, the mean scores for each HRQOL domain in motor ability category were not significant. No significant interaction was apparent when examining HRQOL scores, BMAT variables and weight status.

Conclusion: Regardless of motor ability levels, reducing body weight among children is a potential avenue for promoting improved HRQOL. Over weight boys reported significantly worse school performance than over weight girls, suggesting the importance in considering such dimensions in programs aimed at further understanding obesity in children.

Keywords: Body mass index, Children, Motor ability, Quality of life, Iran

Introduction

Few problems in childhood are so obvious to others, so difficult to treat and have such long-term effects on health as obesity (1). Childhood obesity is now one of the most significant public health challenges internationally (2, 3) with prevalence rates doubling or tripling over the past 15 years (3). Limited studies in Iran have reported this trend as 13.3%-24.8% over weight and 7.7%-8% obese children (4, 5). The development of overweight in childhood is related to subsequent overweight/obesity in adulthood (6, 7), where it is associated with an increased risk of morbidity and mortality (8). When discussing the health related sequel of obesity, two prominent domains of health emerge the psychosocial and the medical (9). Contributing to the burden of overweight in children are the psychosocial aspects associated with overweight such as self-esteem, peer interactions, social interactions, depression, shame, and decreased self-confidence (10). Being overweight increases a child's risk of developing type 2 diabetes, hyper lipidemia, elevated blood pressure, sleep apnea, and asthma (11). Childhood obesity does not singularly affect the overweight child; its impacts are globally seen in the social, economic, and psychological environment surrounding the

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child (10, 12).

An important aspect of childhood that may be greatly affected by the state and outcomes of being overweight is a child's quality of life (13). Health Related Quality of life (HRQOL) can be defined as a multidimensional construct that reflects one's self-perceptions of enjoyment and satisfaction with life (14). Assessing childhood HRQOL can provide insights into a child's self-rating of physical, psychosocial, and overall functioning (15, 16).

Movement abilities are an integral part of a primary schools curriculum for personal development, health, and physical education. Their positions is based on the importance of motor development to children's physical, cognitive, and social growth and development (17) and are the foundations of physically active lifestyle (18). These also seem to be related to young people's health. For example, children and adolescents whit greater movement ability tend to be more physically active (19-21), have higher levels of aerobic fitness (22) and self esteem (21), and are less likely to be overweight (23).

Several studies have shown that overweight children report significantly lower quality of life than their healthy-weight counterparts do. For example, Friedlander et al. (24) found that overweight children had significantly lower scores on psychosocial, physical functioning, and global health-related quality of life with compared to healthy-weight children. Overweight children were over five times more likely to report poor quality of life scores compared to healthy-weight children (15). Finally, a recent study of severely overweight children demonstrated that significantly lower quality of life related to physical functioning and social domains (25). Several studies have described the association between movement ability and adiposity. Graf et al. (26) reported an inverse correlation between motor ability and body mass index in 668 children. The letter study also reported the overweight and obese children had poorer result for motor abilities (27). Interestingly, in obese children weight bearing activities were below average but not all motor ability (28).

While there has been a consistent relationship between being an obese child and lower perceptions of health related quality of life, is unknown whether reduction in motor abilities among children whit higher adiposity is associated with lower levels of HRQOL. In addition, there is a paucity of researches that examine the extent of overweight/obesity its relationship with QOL, and motor ability. Therefore, the current study aimed to describe the relationship among HRQOL, motor ability and weight status.

Materials and Methods

Population and samples

The study was started in 2007. Ten similar government primary schools were randomly selected from the schools in the Shahre Qods (Tehran, Iran). Among them, 240, three-five grades students age 9-11 years were randomly selected, and the children's parents provided informed consent for their participation.

Quality of life

The pediatric Quality of life Inventory 4.0 (PEDs QL), a 23-item questionnaire for children, was used to assess QOL. The PEDs QL measures health-related QOL with physical functioning (8 items), emotional functioning (5 items), social functioning (5items), and school functioning (5 items). In repeated reliability and validity tests, the PEDS QL has consistently had high reliability scores (α = 0.71 – 0.89) and has been able to distinguish between healthy children and those with chronic diseases (15). This measure was scored using a five-point scale (0 = never; 1 = almost never; 2 = sometimes; 3 =often; 4 = always). These items were then reverse scored on a scale of 1–100 (i.e., 0 = 100, 1 = 75, 2 = 50, 3 = 25, and4 = 0), so that higher scores indicate better health related QOL.A total scale score (derived by the mean of all 23 items) and psychosocial score (composed of the mean of items in the emotional, social, and school functioning subscales) are calculated to provide a summary of the child's QOL. The PEDs QL English version was forward translated into Persian by two independent translators and then discussed by a translation committee,

which combined the translations into one version. The forward translated version was then back translated into English, independently, by two other translators, and the Persian version with acceptable reliability score (α = 0.88) subsequently was approved for use.

Motor ability test

The Basic Motor Ability Test (BMAT) consists of a battery of nine tests designed to measure a variety of motor functions. These include eye-hand coordination, static balance, fine and gross motor control, agility and join flexibility. The BMAT is a standardized, product –oriented assessment commonly used in the assessment of motor abilities in children aged 4 to 12 years (18). In test- retest reliability, it results coefficient of 0.89 for total test. Motor ability scores were standardized into *z* Scores make up the motor quotient (MQ). The over MQ was categorized into the following 2 group; low level (MQ $\leq$ 50) and high level (MQ>50).

Weight status

A portable stadiumeter and digital scales were used to measure height (cm) and weight (kg) without shoes. The same person took the measurements using standardized procedures. From the row height and weight data, body mass index (BMI; kg/) was calculated. BMI percentiles for age and sex were categorized in to the following 4 group: (1) underweight (BMI < 5^{th} percentile), (2) normal weight ($5^{th} \leq$ BMI < 85^{th} percentile), (3) over weight ($85^{th} \leq$ BMI <95^{th} percentile), and (4) obese (BMI $\geq 95^{th}$ percentile), defined by the Centers for Disease Control and Prevention BMI for age and sex growth charts.

Statistical analyses

For the primary analyses, motor ability and weight status were used as independent variables while physical, psychosocial, and total HRQOL scores were used as dependent variables. Children were categorized as high or low level for motor ability based on motor quotient (i.e., >50 (mean value of motor ability) of high level).

Mean and Standard deviations (SD) of scores differences were calculated for BMI percentile ranking for age and gender, scores of motor ability, and HRQOL scores for physical functioning, psychosocial functioning, and total HRQOL scores. Two-way analysis of variance (ANOVA) was used to test for main and interactive effects of weight status and motor ability on HRQOL domains. Tukey multiple comparisons test was used for the evaluation of differences between groups. A significant probability of less than 0.05 was applied to all analyses. Data were analyzed using SPSS statistical software version 13.0

Results

Overall, the sample (50% boys) was approximately 10 years of age. Of 240 participants, 7.1% were classified as underweight, 64.6% normal weight, 13.8% overweight and 14.6% of obese. Table 1, includes descriptive statistics for study variables based on the entire sample and by categorizations of BMAT and weight status.

Table1: Descriptive statistics for study variables across motor ability and weight status categories

	Total sample	Low level BMAT	High level BMAT	*P* value	Underweight	Normal Weight	Overweight	Obese	*P* value
N	240	120	120		17	155	33	35	
BMI (kg/m)	18.14(4.11)	19.08(4.61)	17.20(3.28)	<0.05	13.10(.94)	16.33(1.55)	21.24(1.19)	25.68(3.25)	<0.05
Psychosocial	84.11(14.32)	84.03(13.68)	84.19(15.00)	NS	79.51(19.17)	86.00(12.73)	83.64(16.90	78.43(14.37)	<0.05
Physical	80.52(13.62)	78.72(14.21)	82.31(12.82)	<0.05	74.26(16.37)	83.36(14.48)	76.32(16.07)	74.91(12.39)	<0.05
Total	83.47(13.06)	83.11(12.63)	83.83(13.52)	NS	78.20(17.49)	85.34(11.71)	81.81(15.31)	79.31(12.74)	<0.05

Values shown are mean (SD); NS= not significant

Table 2 shows the mean scores for each QOL domain in each weight and BMAT categorization. Children in the obese category had significantly lower psychosocial QOL than those in the normal weight category (F=3.85, P = .010).

Table 2: Mean scores of QOL by motor ability and weight status

HRQOL domain			
	Psychosocial	**Physical**	**Total**
High level BMAT Underweight	76.33(23.08)	71.87(16.20)	82.45(12.32)
Normal weight	85.77(13.33)	83.93(11.98)	85.39(11.20)
Overweight	87.67(8.25)	85.62(9.57)	79.48(17.30)
Obese	73.15(20.37)	73.96(13.26)	80.87(10.61)
Low level BMAT Underweight	84.05(11.86)	77.68(17.25)	75.22(20.45)
Normal weight	86.33(11.92)	82.57(13.22)	85.31(12.12)
Overweight	81.88(19.42)	72.28(15.35)	87.16(7.53)
Obese	80.26(11.60)	75.24(12.34)	74.79(17.54)

Value shown are mean (SD), P<0.05

Similarly, physical QOL was also lower for children in the obese, over weight and underweight category when compared to those in the normal category (F = 5.91, P =.001) .When total QOL was used as the dependent variable, the pattern of results was nearly identical to that found for psychosocial QOL. Children in the obese and underweight category had significantly lower total QOL than those in the normal weight category (F = 3.75, P = .012).There were no differences in the mean scores for each QOL domain in BMAT categorization (P>.05). There were no interactions between the relationships of weight and BMAT status with psychosocial, physical, and total QOL.

Discussion

This is the first study, to our knowledge, to evaluate the relationship between a multidimensional and validated conceptualization of QOL, weight status and motor ability tests.

The findings extend the previous literature examining QOL in over weight and obese children. Number of previous studies has documented lower QOL in overweight/obese children when compared to healthy weight children (15, 25). Our findings suggest that measurements of QOL are decreased in children at both ends of the spectrum; those who are obese and those who are under weight. Psychosocial QOL, however, remained consistent across weight categories, except for the obese children, suggesting that modest decreases in weight (i.e., shifting from obese to overweight) may improve psychosocial well being. We observed that physical QOL decreased significantly as weight increased. This finding elucidates the limitations associated with excess weight (e.g., difficulty running, doing chores) for both over weight and obese children. Regardless of weight status in a child, perceptions of psychosocial, physical, and total QOL were not different for children who were in high or low level BMAT. Previous research (26-28) suggested that BMI is inversely related to motor ability: however, when the interaction among motor ability levels and weight status was examined in this study these variables did not interact with QOL domains. From this result, it was confirmed that the excess body fat may have a greater influence on QOL than motor ability status. Further research is required to examine associations among QOL, motor ability and weight. There are a number of strengths and limitations of this study. The strengths include the use of motor test, a validated multidimensional assessment of QOL for children, and objectively assessed height and weight. As discussed previously, the cross- sectional design of this study meant the directions of the associations could not be determined. A larger sample size would also have enhanced the study, and it is

possible the small numbers will have accounted for the lack of significant findings in the interaction analyses. There are also a number of paths for future research in the area of motor ability, weight status, and QOL. Of primary interest is the causality of the relationships detected in this study. The examination of changes in weight and movement ability as predictors of changes in QOL would be a logical next step in this research. In conclusion, findings from this study suggest that regardless of motor ability levels, reducing body weight among children is a potential avenue for promoting improved QOL.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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