

IMPACT OF PEDIATRIC OBESITY ON QUALITY OF LIFE

By

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This document is dedicated to my parents, Bill and Linda Ingerski.

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TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGMENTS	iv
LIST OF TABLES	vii
ABSTRACT	viii
INTRODUCTION	1
Quality of Life	2
Child and Parent Report of Quality of Life	5
Determinants of Quality of Life	6
Social Support and Quality of Life.....	6
Race and Quality of Life	8
Current Study.....	9
METHOD	10
Participants	10
Measures	11
Anthropometrics	11
Demographic Questionnaire.....	11
Pediatric Quality of Life Inventory	12
Multidimensional Scale of Perceived Social Support	12
Procedure	13
Statistical Analyses	14
RESULTS	15
Relationship between Obesity and Quality of Life.....	15
Discrepancy between Child and Parent Report of Quality of Life	16
Differences in Quality of Life Between Caucasian and African American Children	16
DISCUSSION	22
Limitations.....	25
Future Directions	27

LIST OF REFERENCES	29
BIOGRAPHICAL SKETCH	32

LIST OF TABLES

<u>Table</u>	<u>page</u>
1 Demographic Data for Child and Parent	18
2 Summary Statistics and Correlations Among Variables	19
3 Regression Analysis Predicting Child Reported Quality of Life	19
4 Regression Analysis Predicting Parent Reported Quality of Life.....	20
5 Paired Sample T-Test of Discrepancy Between Parent and Child Reports of Quality of Life	20

Abstract of Thesis Presented to the Graduate School
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As rates of pediatric obesity continue to rise in the United States, researchers are increasingly focused on understanding the psychological impact that obesity has on the lives of children and adolescents. This study examined the relationship between body mass index (BMI) and quality of life in a sample of 79 clinically overweight children and adolescents, ages 8 to 17 years. Body mass index, social support, ethnicity, and informant were each examined as they relate to quality of life in obese pediatric populations. Results supported the relation between quality of life and body mass index, such that BMI significantly predicted quality of life. As per both child and parent-proxy report, child quality of life decreased with increasing BMI. Results also supported a discrepancy between child and parent-proxy report of quality of life; parents reported significantly worse quality of life than their children across all dimensions. No support was found for the moderating effect of social support between BMI and quality of life. Moreover, no significant differences were found between Caucasian and African American children on both parent and child reports of quality of life. These results

provide further understanding of the impact of obesity on quality of life in pediatric populations and support the use of quality of life measurement in future interventions in this population. Future studies should further explore other possible determinants of quality of life in overweight children and adolescents.

INTRODUCTION

Approximately 15 percent of all children and adolescents currently living in the United States are classified as overweight (Ogden, Flegal, Carroll, & Johnson, 2002). Given this high rate of obesity, investigation in pediatric populations is increasingly necessary as researchers determine topics to include in future treatment interventions aimed at overweight children and adolescents. Unfortunately, only a few researchers have studied the psychological consequences experienced by overweight children and adolescents, such as quality of life. For example, while researchers have conducted studies of quality of life for many years, the study of this topic in children and adolescents is limited. Moreover, even fewer researchers have studied the quality of life experienced by this growing population of overweight children and adolescents.

The rise in pediatric obesity is not only a medical concern; it is a topic that has inundated the media and become a leading public healthcare issue. As Western societies have increasingly moved toward sedentary lifestyles, the number of overweight individuals has risen substantially over the past several years (World Health Organization, 2003). Researchers estimate that there are currently more than 17 million overweight children in the world. In the United States, the number of overweight children has doubled and the number of overweight adolescents has tripled since 1980. The most recent National Health and Nutrition Examination Survey (NEHES) conducted in 1999-2002 classified 15.8 percent of children ages 6 to 11 and 16.1 percent of children ages 12 to 19 as overweight in the United States (Hedley et al., 2004).

A number of additional health concerns are associated with obesity in childhood and adolescence including respiratory and musculoskeletal problems, and diabetes. Infertility, cardiovascular disease, hypertension, stroke, and certain cancers constitute a few of the later concerns that overweight children may face as they progress through adulthood. Given the dramatic increase in rates of obesity, researchers estimate that the treatment of obesity for both children and adults accounts for two to six percent of total health care costs in developed countries (World Health Organization, 2003). Such data helps to illustrate the cause for alarm where obesity is concerned, specifically, the importance of investigating psychological aspects of obesity early in childhood and adolescence. For example, researchers found obesity in childhood and adolescence is associated with many negative consequences including stigmatization, behavior problems, low self-esteem, body dissatisfaction, and lower perceived physical and cognitive ability (Davison & Birch, 2001; Davison, Markey, & Birch, 2003; Latner & Stunkard, 2003; Stradmeijer, Bosch, Koops, & Seidell, 2000).

Quality of Life

Quality of life is a multidimensional concept that attempts to systematically evaluate an individual's health. Definitions of both health and quality of life vary widely; the World Health Organization (1997, p.1) offers two commonly accepted definitions of both concepts. They define health as "a state of complete physical, mental and social well-being not merely the absence of disease" and quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." Measures of quality of life typically include a variety of dimensions, such as physical, emotional, and social well being among others (Gerharz, Eiser, & Woohouse, 2003).

Although researchers have studied quality of life in adult populations for many years, the study of quality of life in child and adolescent populations is a comparatively recent development, emerging only in the past two decades. Despite its short history, pediatric quality of life research has quickly grown into a critical domain of research. As the focus of the medical field increasingly moves toward treating chronic conditions (Eiser & Morse, 2001), quality of life has developed into an important factor in determining treatment outcomes and evaluating a patient's unique perspective regarding their own health status (Crosby, Kolotkin, & Williams, 2003).

Currently, two types of quality of life measures exist: those intended to measure general health and those intended as disease-specific measures of well-being. Researchers have created disease-specific quality of life measures for a number of conditions (Eiser & Morse, 2001). These measures typically allow a more comprehensive examination of issues related to quality of life specific to the condition of interest; however, only one obesity-specific measure currently exists to study quality of life in overweight pediatric populations (Ravens-Sieberer, Redegeld, & Bullinger, 2001). A number of general or generic quality of life measures also exist. The Child Health Questionnaire (Landgraf, Abetz & Ware, 1991), Health Utilities Index (Feeny, Furlong, & Barr, 1998) and Pediatric Quality of Life Questionnaire–PedsQL (Varni, Seid, & Rode, 1999) are among a few of the most commonly used measures developed for child and adolescent populations. Pediatric researchers have used these measures extensively and documented their validity and reliability in assessing quality of life in a variety of child and adolescent populations. In contrast to disease-specific measures, generic quality of life measures allow comparisons across different disease groups and

comparisons to healthy controls (Gerharz et al., 2003). In addition, many of these measures allow for both child and parent informants regarding a child's quality of life. These generic measures allow researchers to quantify a child's beliefs regarding their health and well-being and to understand their overall quality of life (Crosby et al., 2003).

Despite the number of measures available, only a few researchers have studied the quality of life of overweight children and adolescents. Ravens-Sieberer and colleagues (2001) studied the quality of life of more than 500, inpatient, overweight children (mean age 12 years) using the German KINDL, a generic quality of life measure that includes an additional 12-item obesity-specific module. They successfully distinguished between overweight children and children with asthma and found that obesity was negatively correlated with quality of life. In addition, they found that psychosocial predictors of stress, coping, and emotional support significantly predicted quality of life in this population. Unfortunately, certain limitations were inherent in this study. Specifically, Ravens-Sieberer and his colleagues designed the KINDL for German-speaking youth. Consequently, it was not appropriate for a sample recruited in the United States without accurate translation because it was beyond the scope of the current study.

Researchers have also studied the quality of life of overweight children and adolescents in the United States. Researchers used a generic quality of life measure, the Child Health Questionnaire (CHQ), to understand the quality of life of overweight pediatric populations (Landgraf et al., 1991). Similar to other generic quality of life measures, the CHQ offered a reliable look at pediatric quality of life and its broad use allowed comparisons between overweight pediatric populations and other groups. Similar to German researchers, researchers in the U.S. also found a significant

relationship between body mass index and quality of life. Overweight children in this study scored significantly lower than did normal weight participants on the CHQ – Parent Form. Regrettably, these researchers recruited only a very restricted age range, 8 to 11 years, and relied exclusively on parents' reports of their children's quality of life (Friedlander, Larkin, Rosen, Palermo, & Redline, 2003).

Schwimmer, Burwinkle, and Varni (2003) also found similar results in a pediatric population of 106 clinically referred overweight children. Using the PedsQL, another generic quality of life measure, they demonstrated discriminate validity in distinguishing between overweight children and healthy controls. In addition to reporting a quality of life significantly lower than their normal weight peers, Schwimmer, and his colleagues found that overweight children reported an overall quality of life similar to that of peers diagnosed with cancer. Williams and colleagues (Williams, Wake, Hesketh, Maher, & Waters, 2004) reported similar findings regarding quality of life using the PedsQL in a community sample of overweight children and adolescents in Australia. Although these researchers found significant differences between overweight and normal weight children on both physical and social functioning dimensions, differences were smaller than those found comparing children recruited from a clinical sample (Wake, Salmon, Waters, Wright, & Hesketh, 2002).

Child and Parent Report of Quality of Life

Few researchers have recruited multiple informants to measure the quality of life of overweight children and adolescents; however, both parent proxy report and child self-report measures of quality of life exist. For example, Friedlander and his colleagues (2003) used parent ratings of children's quality of life to determine the relationship between pediatric obesity and quality of life. In contrast, Schwimmer and colleagues

(2003) recruited both children and parents to determine children's quality of life.

Comparing both child and parent reports of child's quality of life, these researchers found that parents consistently reported worse quality of life than did their overweight children.

Although these findings have important implications for both clinicians and researchers, no other researchers have confirmed these results in additional samples of overweight children. This discrepancy between parent and child report of quality of life suggests that parents perceive their children's quality of life differently than do the children themselves and also indicates that reliance on only one report of quality of life may be inaccurate. Given these findings, the current study will examine the difference between child and parent report of child quality of life to determine if multiple informants should be utilized when attempting to describe children's quality of life.

Determinants of Quality of Life

Researchers have studied a number of determinants of quality of life. Although a greater number of investigators have studied adult populations, over the past few decades several investigators have shown interest in pediatric populations. Factors including demographic and psychosocial variables offer potential with reference to successfully predicting quality of life in overweight pediatric populations.

Social Support and Quality of Life

Social support becomes an important factor in understanding a child's overall quality of life. For example, researchers have found support for the buffering hypothesis in which social support might serve as a buffer or safeguard, protecting the individual from stressful life events (Cohen & Wills, 1985). In other words, social support might serve as a protective factor for overweight children, limiting any decrease in their quality of life. Despite this seminal work done by Cohen and Wills regarding the importance of

social support in pediatric coping, there is little research investigating the relationship between pediatric obesity and social support and the unique impact that peer and parental support might have on children's weight and resulting quality of life. For example, in a study of over 17,000 adolescents, researchers found that overweight participants received significantly fewer friendship nominations by their peers than did their normal weight classmates (Strauss & Pollack, 2003). In light of information such as this, the Centers for Disease Control and Prevention (1996) recommends that social support be included as an important component in health programs for children and adolescents. However, how different sources of social support might relate to quality of life and which components of social support should be included in future programs is not entirely clear.

Although quality of life measures typically include a social functioning component, the limited scope of this dimension does not capture the extent to which peers and parents might uniquely contribute to a child's well-being or quality of life. Only Ravens-Sieberer and colleagues (2001) have attempted to relate social support specifically to quality of life in pediatric overweight populations. They found that greater emotional support, in addition to other psychosocial variables, uniquely predicted a significant amount of the variance in quality of life (Ravens-Sieberer et al., 2001). Despite these promising results, these researchers did not examine the unique contributions that parents and peers each offer to overweight youth's quality of life, an important consideration in understanding their relation to pediatric populations (Zimet, Dahlem, Zimet, & Farley, 1988). Thus, examination of the unique contributions of family and peer social support may offer insight into which sources of social support are important for improving quality of life in overweight pediatric populations.

Race and Quality of Life

Research examining the relationship between race and quality of life is somewhat mixed. For example, researchers studying adult overweight populations found that race and gender significantly interact; Caucasian women tend to report lower quality of life and incorrect perceptions of body weight than do men and African Americans (Paeratakul, White, Williamson, Ryan, & Bray, 2002; White, O'Neil, Kolotkin, & Byrne, 2004). In contrast, researchers studying overweight pediatric populations have not found evidence for a similar interaction. Researchers found that race did not significantly predict quality of life in a predominantly Caucasian (28%) and Hispanic (63%) sample (Schwimmer et al., 2003). The small sample size of African American participants recruited (8%) limited the comparisons the researchers made to previous findings in adult populations.

Although researchers have not demonstrated a significant relationship between race and quality of life in overweight pediatric populations, researchers have found some support for differences between overweight Caucasian and African American children on other psychosocial dimensions. Researchers studying perceived body image, for instance, have found significant differences between Caucasian and African American children. Welsch and colleagues (Welch, Gross, Bronner, Dewberry-Moore, & Paige, 2004) found that African American children reported being more satisfied with their current body size than Caucasian children. Perhaps a better body image, as reported by African American children, may also impact children's emotional and social functioning, and consequently impact their quality of life. Thus, the current study will extend the previous findings in adult populations to pediatric populations and examine if such

differences exist between Caucasian and African American overweight pediatric populations on measures of quality of life.

Current Study

The current study aimed to extend the results of previous studies and examine the relationship between quality of life and obesity in a clinically overweight pediatric population. The study included three primary aims: (1) to examine the relationship between obesity and quality of life and the possible moderating effect of social support, (2) to investigate the discrepancy between child and parent report of the child's quality of life, and (3) to explore differences in quality of life between Caucasian and African American children. It is hypothesized that body mass index will predict a significant amount of the variance in quality of life after controlling for race, age, and gender. Children with a higher BMI will experience a worse quality of life according to both parent and child report. In addition, it is expected that social support will moderate this relationship; social support will act as a protective factor such that children reporting greater social support from family and peers will experience less adverse effects of BMI on quality of life. Given previous findings that parents report worse quality of life than do their children, it is hypothesized that a similar discrepancy will exist between child and parent report of the child's quality of life in this study. Lastly, it is hypothesized that a significant interaction between race and gender will exist between overweight children and adolescents. Caucasian females will report a significantly worse quality of life than other children.

METHOD

Participants

The current study included 79 overweight children and adolescents (44% male, 56% female) ages eight to 17 years ($M = 12.91$, $SD = 2.29$), and ranging from first to twelfth grade ($M = 7.24$, $SD = 2.39$). Children and adolescents were primarily Caucasian (53%) and African American (33%). A smaller percentage of children were Hispanic (4%), other racial minority (5%), or unknown (5%). Legal guardians included primarily mothers (81% mothers, 10% fathers, 5% grandparents, 1% stepparent, 3% unknown) with a more evenly distributed marital status (54% married, 42% single, 4% unknown). The median family income ranged from 20,000 to 40,000 dollars per year. Additional demographic information is available in Table 1.

Inclusion criteria for participation in the study required that the child or adolescent was overweight or at risk for overweight, had a scheduled outpatient appointment at the University of Florida Lipid Clinic or the University of Florida Cardiac Prevention Clinic (located within the unit of Pediatric Specialties at Shands Medical Plaza in Gainesville, Florida), and was accompanied by a legal guardian who provide consent for participation. Potential participants were excluded from participation if they were unable to read the questionnaires or were diagnosed as being mentally retarded or having a psychotic disorder.

Measures

Participants independently completed the following measures while waiting for their scheduled medical appointment. The measures included in the current study are part of a larger project investigating possible barriers to healthy lifestyle recommendations experienced by overweight children and adolescents.

Anthropometrics

Medical staff at the University of Florida Lipid Clinic and the University of Florida Cardiac Prevention Clinic measured children's height and weight as part of their routine medical examination. Research assistants then obtained this information from the participant's medical chart following their visit to the clinic and used height and weight information to calculate body mass index (BMI).

Unlike in adult populations where individuals with a BMI falling above 25 are classified as overweight or obese, child populations are classified as overweight according to gender-specific growth charts. In addition, the term obese is not typically used to describe overweight children. A child with a BMI at or above the 85th percentile is considered "at risk for overweight," while a child with a BMI at or above the 95th percentile is considered "overweight" (Pietrobelli et al., 1998; World Health Organization, 2003).

Demographic Questionnaire

The participating child or adolescent's parent or legal guardian completed a demographic questionnaire. Information obtained included age of child, gender, race, current year in school of child, highest grade completed by adult, relationship of adult to child, adult marital status, and family income.

Pediatric Quality of Life Inventory

Both children and parents completed versions of the Pediatric Quality of Life Inventory (PedsQL) consistent with child age. The PedsQL is a generic quality of life instrument consisting of 23 items that assesses physical, emotional, social, and school dimensions of quality of life. Four versions of the PedsQL were used in this study: a child form (ages 8 to 12), a teen form (ages 13 to 18), and two parent-proxy age-appropriate counterparts. The PedsQL asks respondents to rate on a five-point Likert scale “how much of a problem” certain items have been for the child or adolescent over the past month. Participants’ scores are reverse transformed to a 0 to 100 scale such that higher scores on each dimension indicate less limitation and a higher quality of life. The measure yields three scores: a Psychosocial Health Summary Score, a Physical Health Summary Score, and a Total Scale Score. The PedsQL has demonstrated good reliability and validity in pediatric populations. Researchers have reported that the PedsQL has excellent internal consistency (alpha = .88 for child reported total score, alpha = .90 for parent reported total score), clinical validity, and have found factor-analytic support for the conceptually derived scales (Varni et al., 2003; Varni et al., 1999).

Multidimensional Scale of Perceived Social Support

Children also completed the Multidimensional Scale of Perceived Social Support (MSPSS), a self-report questionnaire designed to assess an individual’s perceived social support. The complete instrument includes 12 questions relating to three subscales of social support: family, friend, and significant other. The current study utilized only family and peer subscales. Consequently, the current study asked only eight of the 12 questions. Respondents answered items using a seven-point Likert scale, ranging from “very strongly disagree” to “very strongly agree” (Zimet et al., 1988). The four items

from the family subscale were added to compute a total family social support score. The four items from the friend subscale were added to compute a total peer social support score.

The MSPSS has demonstrated good internal and test-retest reliability, adequate construct validity, and factorial validity (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). Each of the three independent subscales measures different aspects of an individual's social support. Researchers have used the MSPSS reliably in both adult and adolescent populations (Zimet et al., 1990). Family and peer subscales individually demonstrate good reliability and validity in younger populations (Chou, 2000).

Procedure

A research assistant approached potential participants in the waiting room of either the University of Florida Lipid Clinic or University of Florida Cardiac Prevention Clinic as they waited for a scheduled appointment. The research assistant described the general purpose of the study and obtained informed consent from both the adult and child participant before they completed the questionnaires. The research assistant also provided general instructions for completing the packet of questionnaires and gave participants the packet of questionnaires to complete independently in the waiting room or in the examination room while they were waiting for the physician. Participants were able to consult with the research assistant at any time with additional questions regarding completion of the questionnaires. Completion of the questionnaires took approximately 30 minutes. The child's parent or guardian received five dollars compensation following completion of the questionnaires. All parents and/or guardians were given information on available psychological services at Shands at the University of Florida. The Health

Science Center Institutional Review Board at the University of Florida approved the above research protocol.

Statistical Analyses

A hierarchical regression was completed to test the hypothesis that body mass index explains a significant amount of variance in quality of life, as measured by the PedsQL, and that body mass index is negatively correlated to quality of life.

Demographic variables including age, gender, and ethnicity were entered into the first block of predictors. Ethnicity was re-coded as a dichotomous variable, minority (African American, Hispanic, other) or non-minority (Caucasian). Body mass index was entered into the second block. To test the moderating effect of social support, social support was added to the second block of the model and the interaction between body mass index and social support was entered into the third block of the model. To reduce multicollinearity between the interaction term and main effects, the interaction term was residualized before testing for a moderator effect.

To test the hypothesis that a significant difference existed between child and parent reports of child quality of life, paired-samples t-tests were conducted. Lastly, two univariate analysis of variance tests (ANOVAs) were conducted to test the hypothesis that a significant difference existed between Caucasian and African American children on quality of life. Specifically, two separate 2x2 ANOVAs were completed. Child and parent reports of quality of life were entered as the dependent variable in separate ANOVA equations, with race and gender entered as the independent variables in both equations.

RESULTS

Descriptive statistics and correlations among variables of interest are shown in Table 2. Correlations revealed that parent and child report of child quality of life and social support were each significantly related to body mass index ($M = 35.94$, $SD = 11.06$). Other variables of interest are also correlated with one another, with the exception of parent report of quality of life which was not significant related to any scale of social support, and child report of quality of life which was not significantly related to the family scale of social support.

Relationship between Obesity and Quality of Life

The researchers expected quality of life to decrease with increasing BMI, and social support to moderate this relationship. A hierarchical regression predicting child's report of quality of life revealed a main effect for body mass index, controlling for child age, gender, and race ($F(5,63) = 2.86$, $p < .05$, $R^2 = .19$). The main effects of age, gender, and race were not significant. The main effect for social support was not significant. Thus, the model accounted for 19% of the variance in child's report of quality of life, such that children with higher BMI reported lower quality of life. A hierarchical regression predicting parent's report of child quality of life also revealed a main effect for body mass index, controlling for child age, gender, and race ($F(5,63) = 2.73$, $p < .05$, $R^2 = .18$). The main effects of age gender and race were again not significant. Similarly, the main effect for social support was not significant. Thus, the model accounted for 18% of the

variance in parent's report of child quality of life; parents of children with higher BMI reported lower quality of life for their children.

The researchers did not find support for the moderating effect of social support in the relationship between BMI and quality of life. Neither the addition of social support nor the interaction term between social support and BMI added significantly to the model. Variables entered into the regression equation predicting child report of quality of life are shown in Table 3. Variables entered into the regression equation predicting parent report of quality of life are shown in Table 4.

Discrepancy between Child and Parent Report of Quality of Life

As shown in Table 5, paired-sample t-tests revealed support for the hypothesis that a significant discrepancy exists between child and parent report of child's quality of life. Parents reported significantly worse quality of life than their children on all dimensions of quality of life: physical functioning scale score ($t = -4.58, p < .001$), emotional functioning scale score ($t = -2.13, p < .05$), social functioning scale score ($t = -4.08, p < .001$), school functioning scale score ($t = -2.51, p < .05$), psychosocial summary score ($t = -3.78, p < .001$), physical functioning summary score ($t = -4.58, p < .001$), and total score ($t = -4.73, p < .001$).

Differences in Quality of Life Between Caucasian and African American Children

The researchers did not find support for the hypothesis that Caucasian American females would report significantly lower quality of life than other children. Parent report of quality of life did not reveal a significant main effect for race ($F(1,63) = .22, p = .64$) or gender ($F(1,63) = .04, p = .85$) or a significant interaction effect ($F(1,63) = .13, p = .72$). Child report of quality of life did not reveal a significant main effect for gender ($F(1,63) = .226, p = .14$) or a significant race by gender interaction effect ($F(1,63) = .13,$

$p = .72$). The main effect for race, however, showed a trend toward significance ($F(1,63) = 3.57, p = .06$), such that Caucasian American children reported lower quality of life than did African American children.

Table 1. Demographic Data for Child and Parent

	<i>n</i>	<i>M</i>	<i>SD</i>	Range	%
Child					
Age	79	12.91	2.29	8-17	
Grade	66	7.24	2.39	1-12	
Gender					
Male	35				44.3
Female	44				55.7
Race/Ethnicity					
Caucasian	42				53.2
African American	26				32.9
Hispanic	3				3.8
Other	4				5.1
Parent					
Relationship to Child					
Mother	62				78.5
Father	8				10.1
Grandparent	4				5.1
Other Legal Guardian	3				3.9
Marital Status					
Married	43				54.4
Single	33				41.8
Other	1				1.3
Income					
Below 10,000	9				12.5
10,000-19,999	6				8.3
20,000-39,999	33				45.8
40,000-59,999	9				12.5
60,000-79,999	7				9.7
80,000 and above	8				11.1

Table 2. Summary Statistics and Correlations Among Variables

	1	2	3	4	5	6	<i>M</i>	<i>SD</i>
1. BMI	-	-.38**	-.41**	-.33**	-.28*	-.32**	35.94	11.06
2. Child PedsQL		-	-.46**	.23*	.11	.29*	74.42	16.29
3. Parent PedsQL			-	.16	.07	.20	64.75	18.17
4. MSPSS - Total				-	.88**	.90**	43.87	9.82
5. MSPSS - Family					-	.59**	23.31	5.19
6. MSPSS - Friend						-	20.56	5.83

*p<.05, **p<.01

Table 3. Regression Analysis Predicting Child Reported Quality of Life

Step and Variable	β	<i>B</i>	<i>t</i>	Total R^2	$R^2 \Delta$	<i>F</i>	<i>df</i>
Step 1							
Age	-.07	-.48	-.51	.05	.05	1.19	3,65
Gender	-.09	-2.91	-.77				
Race	-.10	-3.49	-.87				
Step 2							
BMI	-.29	-.40	-2.22*	.19	.13	2.86*	5,63
Social Support	.17	.27	1.34				
Step 3							
BMI x Social Support	-.01	-.001	-.12	.19	.00	2.35*	6,62

*p<.05

Table 4. Regression Analysis Predicting Parent Reported Quality of Life

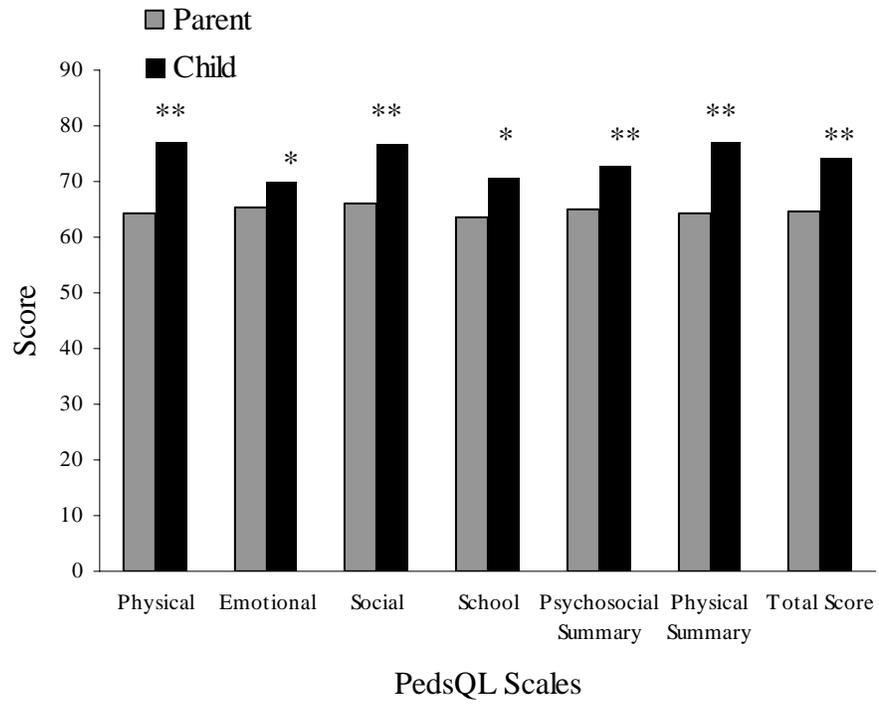
Step and Variable	β	<i>B</i>	<i>t</i>	Total R^2	$R^2 \Delta$	<i>F</i>	<i>df</i>
Step 1							
Age	-.01	-.01	-.05	.02	.02	.88	3,65
Gender	-.02	-.78	-.19				
Race	.03	.91	.21				
Step 2							
BMI	-.39	-.59	-3.03*	.18	.16	3.01*	5,63
Social Support	.07	.13	.59				
Step 3							
BMI x Social Support	-.07	-.003	-.64	.18	.01	2.66*	6,62

* $p < .05$

Table 5. Paired Sample T-Test of Discrepancy Between Parent and Child Reports of Quality of Life

	Parent		Child		<i>r</i>	<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Physical Functioning Scale Score	64.41	23.28	77.05	19.57	.36**	-4.58***
Emotional Functioning Scale Score	65.42	21.88	70.32	21.55	.57***	-2.13*
Social Functioning Scale Score	65.96	23.89	76.95	21.01	.45***	-4.08***
School Functioning Scale Score	63.63	23.18	70.65	19.56	.35**	-2.51*
Psychosocial Health Summary Score	65.01	18.65	72.68	16.31	.49***	-3.78***
Physical Health Summary Score	64.41	23.28	77.05	19.57	.36**	-4.58***
Total Score	64.75	18.17	74.42	16.29	.46***	-4.73***

* $p < .05$, ** $p < .01$, *** $p < .001$



*p<.05, **p<.001

Figure 1. Discrepancy between child and parent report of quality of life

DISCUSSION

The present study offers needed research regarding the unique perspectives of overweight pediatric populations by extending previous literature on quality life in overweight children and adolescents. Given the limited number of previous studies done in the field of pediatric obesity, it was important to continue to explore basic questions with regard to obesity and quality of life in both childhood and adolescence. To the researchers' knowledge, this is the first study of quality of life in pediatric populations that examined quality of life utilizing a continuous measure of weight in an exclusively at-risk for overweight and overweight sample and that recruited a wide age range and racially diverse sample of both children and adolescents.

Regression findings supported the hypothesis that children and adolescents report lower quality of life as a function of body mass index (BMI). Body mass index predicted both child and parent reports of child quality of life such that children with higher BMI reported lower quality of life. Unlike previous findings comparing overweight children to normal weight peers (Schwimmer et al., 2003); this study found that quality of life decreased as a function of increasing BMI. Thus, not only did overweight children report lower quality of life, but children with higher BMI reported lower quality of life than even other overweight peers. This finding suggests that even small changes in BMI may lead to improvements in quality of life. Numerous possible factors may explain these differences in quality of life reported by overweight children and adolescents. For example, overweight children may experience greater impairment in social and emotional

functioning as a result of social stigma or negative interactions with peers. Overweight children also likely experience greater physical activity limitations due to their weight status. Each of these factors may decrease overweight children's perceptions of their overall quality of life and is worthy of consideration in future studies of quality of life.

The data supported the hypothesis that significant differences exist between child and parent reports of child quality of life. Parents reported that their children experienced significantly worse quality of life than their children reported on all dimensions of the quality of life measure. Although it is not clear why parents consistently reported lower quality of life than their children, future studies in this population should examine possible explanations for this effect. Perhaps these parents are also overweight and rate their children's quality of life as lower based on their own experience. Children may minimize the distress associated with their weight or better adapt to their overweight status than parents believe. Whether children are under-reporting problems or parents are over-reporting problems is not clear; however, this finding has important implications with regard to selection of appropriate informants for quality of life measurement. Given these differences, it is clear that studies relying only on one informant may be biased. At the very least, researchers should exercise caution when making decisions as to who to recruit as informants of child quality of life and to use multiple informants whenever possible.

Unfortunately, the current data did not support the hypothesis that social support moderates the relationship between BMI and quality of life. It appears that in this sample, social support does not act as a buffer to limit decreases in quality of life experienced by overweight children. Nevertheless, interesting differences in quality of

life and social support were revealed through the calculation of simple correlations between the variables of interest. The friend subscale and total score of social support were significantly correlated to child report of quality of life, indicating that support from peers is positively related to children's perception of their quality of life. Although social support did not moderate the relationship between BMI and quality of life in this sample, the data does suggest that social support may have a more direct relationship on the quality of life experienced by overweight children. Greater social support may improve children's quality of life. Future research incorporating a larger sample size needs to comprehensively examine how social support impacts the quality of life of overweight children and adolescents. Nonetheless, correlational findings from the current study seem to support the Center for Disease Control's (1996) recommendation to include social support as a component in child and adolescent health programs.

The current data also did not support the hypothesis of an interaction between race and gender in either parent or child report of quality of life. When race (minority versus non-minority) was included in the first block of the hierarchical regression analysis examining the impact of BMI on quality of life, race was not found to be a significant predictor of quality of life. In addition, the univariate analysis of variance test (ANOVA) found no significant difference between Caucasian and African American children's quality of life. Similar to the findings of Schwimmer and colleagues (2003), the main effect for race was not statistically significant; however, the current study found a trend towards significance for child report such that Caucasian American children reported worse quality of life than African American children.

In addition, no support was found for an interaction effect between race and gender. Finally, no support was found for gender differences in reports of quality of life. Unlike in overweight adult populations where researchers have found that Caucasian women tend to report lower quality of life than other individuals (Paeratakul et al., 2002; White et al., 2004), no evidence was found for a similar relationship in overweight pediatric populations. Although it is not clear why findings in overweight adult populations were not reproduced in the current overweight pediatric population, the finding that African American children showed a trend toward reporting better quality of life suggests that differences between Caucasian and African American children's self-reported quality of life are beginning to develop. Given previous findings that African American children report a better body image than Caucasian children (Welch et al., 2004), this finding is not entirely surprising. Perhaps body image is one influence in children's quality of life and other differences begin to emerge (i.e. social stigma, perceived acceptance) as children progress into adulthood, thereby increasing the disparity in quality of life between different racial groups. Regardless, this finding does suggest that Caucasian children may be at increased risk for lower quality of life than African American children, and that psychosocial interventions with this population may avert the larger disparity in quality of life seen later in adulthood.

Limitations

There are a number of limitations to the current study. First, the sample size limited the number of variables that were able to be assessed. Future researchers may want to examine possible barriers or other psychosocial variables as they relate to quality of life. Secondly, the external validity of this sample must be considered with discretion. Participants in this study were all members of a special clinical sample of overweight

children and adolescents who were being seen by medical professionals. The weight problems facing these children were serious enough to have been referred to the University of Florida Lipid Clinic or the University of Florida Cardiac Prevention Clinic. Previous researchers studying community samples of children have found smaller effects of BMI on quality of life (Williams et al., 2004). Thirdly, the correlational nature of the current study limits the conclusions that are able to be drawn. Unfortunately, it is impossible to know if the poor quality of life reported in this sample of children and adolescents is due to BMI or to some other unmeasured construct (i.e. teasing). Longitudinal research examining the impact of obesity on children and adolescents may help to further clarify the relationship between BMI and quality of life. Lastly, as the PedsQL includes a dimension assessing social aspects of quality of life, there is potentially measurement overlap between the PedsQL and MSPSS. Thus, subsequent shared variance between these measures may have limited the researchers' ability to obtain a significant moderator effect.

Despite these limitations, the current study continues the progress made by previous researchers in the field of pediatric obesity and emphasizes the increasing importance of studying the impact of obesity on children and adolescents on psychological constructs such as quality of life. This study improved upon previous studies of pediatric obesity and quality of life in several important ways. For example, the current study examined the effect of pediatric obesity in an exclusively obese clinical sample rather than comparing overweight children to different pediatric populations. The current study also included a more racially diverse sample than that included in previous studies of pediatric obesity. In addition, this study examined children encompassing a

large age range, 8 to 17 years, and included both parent and child reports of quality of life. Finally, this study examined possible determinants of quality of life, such as social support, in addition to examining demographic variables of interest.

Future Directions

As rates of obesity in pediatric populations continue to rise, further research in this area is increasingly necessary. Future research utilizing an obesity-specific measure of quality of life may allow researchers to examine the unique aspects of quality of life associated with obesity that might not have been assessed using the generic quality of life measure utilized in the current study, the PedsQL. For example, an obesity specific measure of pediatric quality of life might examine limitations in physical functioning (i.e. fatigue and respiratory difficulties) and limitations in social and emotional functioning (i.e. body image and peer teasing) that were not addressed using the PedsQL.

As noted earlier, future researchers should recruit a larger sample of overweight children and adolescents in order to examine the impact of different sources of social support and race on quality of life. With a larger sample size, researchers can determine if different sources of social support act to moderate the relationship between BMI and quality of life or have a direct effect on quality of life. By recruiting a greater number of African American children, researchers can expand on the trend found in the current study and establish if significant differences in quality of life exist between children of different races and ethnicities. Finally, future researchers should investigate other potential factors that might impact children's quality of life including medical factors related to obesity, child behavior problems, and children's attitude toward weight loss. Future examination of potential factors that differentially impact parent and child

perceptions of quality of life may also inform clinicians who work with families of overweight children.

These preliminary studies of quality of life in overweight pediatric populations provide support for the use of quality of life measures to determine treatment outcomes of weight interventions targeting children and adolescents and to improve the quality of life of participants in these interventions. Quality of life measures can be utilized pre- and post-treatment to determine the changes in quality life experienced by children and the effects of interventions on weight and quality of life as a whole.

These factors not only help to highlight the importance of quality of life research in overweight pediatric populations, but also help to determine the specific factors to consider in future interventions and studies of this population. The value of quality of life measurement in studying the unique health perspectives of overweight children and adolescents cannot be discounted. Quality of life measurement in overweight populations offers both researchers and clinicians an integrative method to quantify the impact that obesity has on a child's life across a variety of different dimensions.

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BIOGRAPHICAL SKETCH

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