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Impact of Treatment on Body Image in Obese Children

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Impact of Treatment on Body Image in Obese Children

By

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Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree of Master of Arts.

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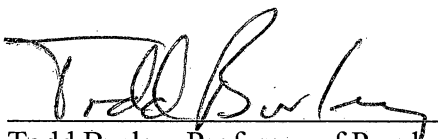

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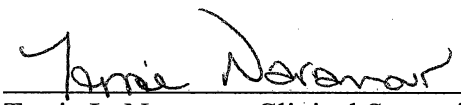

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ABSTRACT OF THE THESIS

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Pediatric obesity is a national epidemic with serious medical implications. Currently, almost one-quarter of children in the United States are overweight. Without intervention, children typically are unable to outgrow obesity and the majority of overweight children become overweight adults. Further, childhood obesity results in numerous psychological consequences, including dissatisfaction with body image. Thus, prevention and treatment of childhood obesity are crucial to protect children from the resultant physical and psychological risk factors which will impact their future health. The Growing Fit Program is a pediatric clinic in the Department of Pediatrics at Loma Linda University, which seeks to serve the critical need of the increasing numbers of obese children. Growing Fit employs a multi-disciplinary approach including nutrition education, exercise, support group, medical and psychological evaluation, and parental involvement. This study evaluated children attending Growing Fit in order to assess whether the child's physiological (diastolic blood pressure) and emotional (emotional eating) health is associated with an improvement of body image from commencement of the program until completion of the program. Further, the study evaluated ethnic

differences and gender differences in perceived body image after having participated in the program.

As a full model, diastolic blood pressure and level of emotional eating were not significant variables in predicting body image satisfaction at exit, with emotional eating approaching significance. However, the difference in degree of emotional eating from intake to exit did predict higher body image satisfaction at exit. Additionally, ethnic and gender differences in body image satisfaction were discovered. These results can provide vital information about how perceptions and outcomes on body image play a role in treatment for obese children who are at risk for negative social and psychological consequences.

Introduction

Over the last 30 years, the prevalence of overweight and obesity among American children and adolescents has more than doubled (Pesa, Syre, & Jones, 2000). Recent data from the National Center for Health Statistics suggest that 15% of adolescents in the U.S. are overweight and that 22% are at risk for becoming overweight (Butryn & Wadden, 2005).

Pediatric obesity affects the physical well-being of children with potential long-term health consequences. According to Kimm and Obarzaneck (2002), at the beginning of this new millennium, the prevalence of obesity has paralleled chronic diseases at an earlier age. Among such are Type 2 Diabetes, which is traditionally associated with middle-aged adults but is now occurring several decades earlier as obesity afflicts a greater number of children and adolescents in the United States.

Numerous studies also attest to the multiple psychological health risks associated with obesity. Overweight children and adolescents appear to be at risk for body image disturbance, negative self-perceptions, difficulty with peer relationships, and depression (Jelalian & Saelens, 1999). Additionally, Pierce and Wardle (1997) found that clinically overweight children are vulnerable to low self-esteem.

Various psychological-theoretical approaches have been tested in clinical research with obese adults. However, because an excess of body fat can be detected from a very early age, professional attention should be directed toward children for disease prevention. Most symptoms evident in children on the road to childhood obesity include unhealthy eating habits, insufficient exercise, and a generally unhealthy lifestyle (Bosch,

Stradmeijer, & Seidell, 2004). Therefore targeting high-risk children and high-risk periods of life should be encouraged.

Review of the Literature

Etiology of Pediatric Obesity

Throughout the 20th century, the major epidemiologic transition was the shift in mortality from infectious diseases to chronic diseases, with cardiovascular disease leading the list. This has been mostly attributable to the social, economic, and public health changes that took place during the first half of the century. The availability of food not only led to better nutrition for children and improved health, but it also led to the current population's state of sedentary lifestyle in the most recent decades (Kimm & Obarzaneck, 2002). Given the current prevalence of childhood obesity and its geographic distribution throughout the United States, Kimm and Obarzaneck (2002) have labeled the current status of childhood obesity a "pandemic".

Measures of Pediatric Obesity

Obesity refers to an excess of body fat, which can be found in almost one fourth of the child and adolescent population. Though body fat can be measured by a number of methods, it is usually now estimated by the Body Mass Index (BMI), which is calculated as weight in kilograms divided by the height in meters squared (Wadden, Brownell, & Foster, 2002). The BMI is highly correlated with measures of body fat and has replaced the more traditional measure of percentage over ideal weight. According to the World Health Organization, obesity is defined as BMI $\geq$ 30kg/m^2 (Wadden, Brownell, & Foster, 2002).

Another area of physical measurement in patients with pediatric obesity is blood pressure (BP) (Sujiyama, Xie, Graham-Marr, Inoue, Kobayashi, & Stettler, 2007). All overweight children and adolescents should be assessed for blood pressure elevation. The national BP standard for children and adolescents requires plotting each individual's height on standard age-adjusted growth curves to determine the height percentile. This height percentile, age, and sex are then used to ascertain the 90^{th} and 95^{th} percentiles for BP for that individual. Adolescents whose BP is higher than or equal to the 95^{th} percentile, regardless of family history, should be considered to be in critical need of intervention. Diastolic blood pressure is one of the strongest variables to measure BP change in a short-term treatment facility. Any drop in percentile rank is considered positive change, because the heart is exerting less pressure to work when it is at rest (K. Hamai personal communication, April 20, 2007).

Genetic Factors

Bray (1998) succinctly summarized the etiology of obesity as, "Genes load the gun, the environment pulls the trigger." Genes are currently thought to explain 25%-40% of the variance in BMI. Though specific genes that contribute to pediatric obesity are yet to be identified, a handful of genes do potentially interact, causing the risk for obesity to be present at birth. The most recent discovery of a genetic factor to obesity is that of the ob gene and its protein product, leptin (Wadden, Brownell, & Foster, 2002). Leptin is secreted from adipose tissue and acts on neural networks in the hypothalamus which is responsible for energy intake and expenditure. Thus, this suggests that obese individuals lack the protein required for necessary energy balance.

Additionally, several studies have reported that obese children frequently have obese parents (Bar-Or et. al., 1998; Strauss & Knight, 1999). In one study by Dietz, (1998), both parents of obese children were obese in an estimated 30% of cases. Strauss and Knight (1999) also found maternal obesity to be the most significant predictor of childhood obesity.

Despite the fact that the risk of becoming obese is higher if one has obese parents, 25-35% of cases of obesity occur in families with normal weight parents (Bar-Or et al. 2000). However, disparities exist among the literature and the question of nature vs. nurture. This may suggest that genes might interact with obesity in a correlational manner rather than causal, per se. Perhaps the environment, rather than genetics, may play an even greater role in the development of pediatric obesity.

Environmental Factors

Wadden and colleagues (2002) have called the major contributing force of pediatric obesity "the toxic environment." This is a composition of social and cultural factors that promote an energy rich diet and sedentary lifestyle. The "toxic" refers to the exposure to energy dense, heavily advertised, inexpensive and highly accessible foods. These foods have been combined with an increasingly sedentary lifestyle in which children watch an average of 28 hours of television a week (Wadden, Brownell, & Foster, 2002). Additional examples of the toxic environment contributing to the explosion in pediatric obesity are fast food restaurants, buffet restaurants, fast-food franchises in school cafeterias, school districts signing with soft-drink companies, and powerful food advertising. What occurs in schools is even more concerning due to the recent de-

emphasis on physical education classes, poor food choices available in cafeterias, easy access to vending machines, and junk/fast food advertisement on educational television networks. Clearly, these are all signs that in regards to promoting obesity, the environment is worsening, leading to an increased prevalence of pediatric obesity.

While these factors contribute to and maintain the increased prevalence of pediatric obesity, issues that occur as a result of being overweight must also be discussed.

Consequences of Pediatric Obesity

Health Risks

Severe obesity poses immediate health risks for the child by stressing both the metabolic and the skeletal systems (Dietz, 1998). During childhood, diet has been related to skeletal growth and bone mineralization. Bone formation, growth, and bone mineralization are also promoted by physical activity among children (Baranowski, et. al., 2000). Thus, long-lasting effects on bone fitness can result from improved diet and physical activity. Other health related conditions such as hypertension, hypercholestrolemia, hyperinsulinemia, respiratory disorders, and orthopedic problems associated with obesity can also lead to future negative consequences (Bar-Or, et. al., 1998; Pinhas-Hamiel & Zeitler, 2000).

Formerly considered an adult disease, Type 2 Diabetes is now also a concern among children and adolescents (Baranowski, et. al., 2000). This may be linked to the increase in pediatric obesity. Recently, a large clinical center in the Midwest reported a 10-fold increase in the incidence of Type 2 Diabetes among adolescents over the past decade (Pinhas-Hamiel, Dolan, Daniels, Standiford, Khoury, & Zeitler, 1996).

Studies also show a link between pediatric obesity and hypertension. Calderon, Yucha, and Schaffer (2005) cite research that pooled data from eight large U.S. epidemiological studies involving over 47,000 children to describe blood pressure (BP) differences in relation to body size. Irrespective of race, sex, or age, the risk of elevated BP was significantly higher for children in the upper compared to the lower decile of BMI, with an odds ratio of systolic hypertension ranging from 2.5 to 3.7. In a school based hypertension screening program, Bernard and Portman (2002) also found a three times greater prevalence of hypertension in obese compared to non-obese adolescents.

While health risks pose significant immediate and long-term threats to the well-being of the obese population, psychological factors also contribute to the negative consequences of being overweight in childhood.

Psychological Risks

Studies have indicated that subgroups within the obese population, such as obese individuals presenting for clinical weight-loss treatment, show elevated psychopathology. Adults seeking treatment for weight loss have demonstrated a higher prevalence of distress such as depression and low self-esteem than their non-treatment-seeking counterparts. Research has also found links between psychosocial factors, such as body image dissatisfaction and pediatric obesity. Though Burrows and Cooper (2002) point out that minimal literature exists on the relationship between body image and obesity in youth, it is nevertheless an important risk factor to examine.

Psychosocial factors. Associations between obesity and psychopathology have been found across several studies. Ackard and Neumark-Sztainer (2002) report this association as occurring with high prevalence especially among adolescents where weight-related behaviors and psychological challenges are strongest. For example, Isnard, Michel, Frelut, Vila, Falissard, and Naja (2000), found adolescents seeking weight loss management have higher psychological stress, especially on dimensions of anxiety.

Higher levels of depression and low self-esteem are linked with obese children and adolescents as well (Isnard, et. al., 2002; Ackard & Neumark-Sztainer, 2002). Reports indicate that girls and boys who overeat endorse a higher frequency and severity of depressive symptoms than their peers who do not overeat. Similar results are found with self-esteem, in that youth who reported overeating scored the lowest on self-esteem scales (Ackard & Neumark-Sztainer, 2002). However, differences in self-esteem do exist between pre-adolescents and adolescents. Where self-esteem arises from family interaction and support for pre-adolescents, self-esteem for adolescents is related more to approval from peers (Ackard & Neumark-Sztainer, 2002).

Several studies also indicate that youth who are overweight are at greater risk for suicidal thoughts and behaviors. For instance, a study assessing binge-eating reported that more than one fourth of girls and boys who met the criteria for binge-eating also reported that they had attempted suicide (Ackard & Neumark-Sztainer, 2002). Eaton (2005) also points out that perceptions of one's body alone is sufficient enough to warrant increased suicide risk. Perceiving oneself as very overweight is associated with higher risk for suicide attempts, and according to this research, the way children and adolescents

perceive their bodies are more important than their actual weight. (You should quote the GF study with high rates of suicidal ideation)

Body image. Body image is a complex, multidimensional construct, which attempts to examine and account for how individuals experience perceptually, cognitively, and emotionally, their body size and shape (Wolff & Clark, 2001). Also included in this construct is attitude, behavior, affect, fear of fatness, body dissatisfaction, cognitive behavior investment, evaluation, preference for thinness, and restrictive eating (Banfield & McCabe, 2002). The way in which body image is conceptualized is not just of theoretical interest, but has implications for the way in which disturbances in body image are treated or acted upon in ones daily life.

The nature of the dimensions included in models of body image is diverse. Slade (1994) viewed body image as "a loose mental representation of body shape, size, and form which is influenced by a variety of historical, cultural and social, individual, and biological factors, which operate over varying time spans." Researchers have typically dichotomized body image into a perceptual and subjective dimension. The perceptual counterpart describes anthropometric size estimation, while the subjective dimension covers the attitudinal component with affective and cognitive subcomponents (Sands, 1999). Cash et al. (2004) describe core facets of body image attitudes to include evaluation (e.g., body satisfaction), investment (e.g., appearance self-schemas and the importance of internalized appearance ideals) and affect (e.g., body image emotions in specific situations).

The assessment of body image also falls into two broad classes: the perceptual dimension and the subjective dimension (Sands, 2000). The instruments of a visuo-spatial

nature measure perceptual size estimation. These include manipulation of a photograph, video image, or mirror image, where the subjects adjust an image of themselves until it corresponds with how they perceive their body. However, Banfield and colleagues (2002) report that the problem with manipulation techniques is that the adjustments work on the body as a whole, and it is difficult to alter the size of one part of the body independent of other parts. Silhouettes or figure drawings representing physiques from thin to obese or adjusting widths of light beams have also been commonly used. According to Sands (1999), this category has the most direct, objectively defined links with anthropometry. Secondly, the subjects' appraisal of concern, value, or satisfaction is typically conveyed through questionnaire or interview format. These include body esteem, social physique anxiety, body cathexis, and body part by body part analyses (Sands, 1999).

The problems associated with negative body image have received substantial attention in the research literature. This is culturally consistent given that in Western cultures there are pressures to be thin, particularly for girls and women. Friedman et al. (2002) cites that large-sample survey research suggests 52% of men and 66% of women in America are dissatisfied with their weight. Further, Littleton and Ollendick (2003) report that among a sample of approximately 200 elementary school children between the ages of eight and ten, 55% of girls and 35% of boys were dissatisfied with their weight. Additionally, in the ethnically diverse city of Los Angeles with a sample of over 200 eight year old children, 23% of girls and 18% of boys said they always wished they were thinner (Littleton & Ollendick, 2003).

Body image has been found to lie at the heart of adolescence. Adaptation to the bodily changes of puberty exerts a strong influence on adolescents' social adjustment,

psychological well-being, and health behaviors (Ferrone, 1997). Stereotypes about the male and female body images which are the most aesthetically appreciated in Western societies seem to be interpreted and integrated in a very strict way by most adolescents.

Since early childhood, Ferrone (1997) cites that boys express a preference for the mesomorph type of male figure. When they reach adolescence, they aspire toward it and judge themselves negatively if their physical appearance falls short of this ideal. Through the media, girls are subject to highly valued images of an extremely thin female body, and very often react negatively to the natural modifications of their figure due to puberty. Ferrone (1997) further cites that among some girls, the desire to change their looks associated with a drop in their self-esteem, may herald the onset of eating disorders. In some cases, these disorders may evolve to a real pathology, such as anorexia or bulimia.

Most body image research has used eating disorder populations or student samples. Only a few empirical studies have investigated body image disturbances in obese individuals and even less research has addressed this in the overweight child. Within the obese population, body image factors constantly discriminate obese from their non-obese counterparts. Obese individuals distort the size of their body more, are more dissatisfied and preoccupied with their appearance, and tend to avoid more social interactions because of their appearance. Additionally, Friedman et al. (2002) has reported that overweight individuals, particularly women, are more negative about their level of fitness and overall health status than their normal weight counterparts. It seems, therefore, that obese individuals have a more negative evaluations and greater disturbance in perception of their body.

Foster, Waddden, and Voyt (1997) found that weight loss treatment for obese women resulted in improvements in ratings of appearance and body satisfaction. These improvements in body image were unrelated to the amount of weight lost by the subjects. Thus, the authors hypothesized that improvements in body image may have been due to the treatment components rather than actual weight loss. Participation in a complete treatment program addressing the feelings and emotions regarding their obesity can have a greater positive outcome than if weight loss occurred alone without any psychological treatment.

Gender differences on body image. Limited literature exists on gender differences on body image of obese children and adolescents. Most studies have focused on gender differences among average-weight individuals, without taking into account that those who are obese often experience the most distress over the size of their body. However, Diehl (1999) studied average weight adolescents and compared them to overweight children and adolescents attending a weight management clinic. Here, he found that in both genders, mean scores of scales on eating to cope with emotional stress, fear of weight gain, and body image dissatisfaction increased with increased weight gain. Across the non-clinical population, however, male and female children and adolescents express concern about their body image and report body image dissatisfaction, females tend to overestimate their body size and report more body image dissatisfaction than males (Sorbara & Geliebter, 2001). Loeb (1997) cites a study in which 26% to 80% of girls reported disturbed feelings about their body, whereas only between 8% and 12% of boys worried about their weight and their bodies. This is attributed to boys expecting

their bodies to change drastically during puberty with heavier bone structure and muscle mass.

A review of the literature by Ricciardelli and McCabe (2001) on body image among children describes gender differences to be minimal among children between ages 6 and 7. The authors attribute this data to the possibility that sociocultural standards of ideal body size have not yet been internalized by this age. However, notable differences do tend to emerge between 8 and 10 years of age. This suggests a possible interrelationship between age and gender. As age increases, gender differences on body image appear to become more prominent.

When examining the different psychological factors contributing to pediatric obesity, it becomes evident that a model describing the relationship between psychological processes and behavior is appropriate.

The Influence of Emotions on Eating Behavior

Emotions differ in their antecedent conditions, physiological correlates, frequency of occurrence, and duration (Canetti, Bachar, & Berry, 2002). Thus, it would be expected that the association between a particular emotion and eating behavior should be stronger if this emotion occurs more frequently in eating contexts other than emotions. A frequent self-observation of treatment-seeking individuals is that their plans to diet are compromised by their use of food as a palliative agent for the reduction of negative feelings (Costanzo, Reichmann, Friedman, & Mustante, 2001). Other studies have shown that higher food consumption was reported during boredom, depression and fatigue, and lower food intake was reported during fear, tension, and pain (Canetti, Bachar, & Berry,

2002). Costanzo and colleagues (2001) also found a tendency to consume healthy foods during positive emotions and junk food during negative emotions. The assumption that affect and eating are related has its origins in the literature on obesity. Early theories identified a psychosomatic approach for obesity, describing obesity as influenced or exacerbated by one's emotional state (Cannetti, et. al., 2002).

Kaplan and Kaplan Psychosomatic Theory of Obesity

Kaplan and Kaplan (1957) proposed that obese people overeat when anxious, as eating reduced the feelings of anxiety. Although the mechanism by which eating reduces anxiety is not completely understood, studies have found effects of protein and carbohydrates to affect the synthesis of brain neurotransmitters, particularly serotonin (Canetti et. al., 2002).

Learning factors are also probably involved, such as having an earlier association of pleasure with feeding. However, simply eating to reduce anxiety cannot be solely explained on the basis of learned habits. There must be a degree of physiological incompatibility between the act of eating and intense fear or anxiety and that while eating, these emotions are temporarily diminished. Obese individuals are unable to distinguish between hunger and anxiety because they learn to eat in response to anxiety as well as in response to hunger. Thus, eating in order to reduce anxiety is what may lead to compulsive overeating and obesity. This may lead to a permanently unhealthy lifestyle and low body image. The circle is then closed: the concern, shame, and guilt associated with low body image is finally related to excessive overeating (Bosch, Stradmeijer, &

Seidell, 2004). According to Costanzo et al. (2001), the psychosomatic model views negative emotional arousal as a direct cause of overeating in the obese.

While emotional and psychological factors play an important role in the onset and maintenance of pediatric obesity, diversity factors also exist, and these must be considered when evaluating success of weight management treatment.

Sociocultural Determinants

Ethnic Differences

Ethnicity and culture affect the development of body image and body size perceptions. Various studies have shown that obesity is culturally defined and not equally stigmatized by all cultures (Adams, Sargent, Thompson, Richter, Corwin, & Rogan, 2000). According to data by Fitzgibbon, Blackman, and Avellone (2000), recent data indicate that 37.4% African-American women, 22.4% of Mexican-American women and 22.4% of Caucasian women are obese.

Given the particular importance of sociocultural factors in the development of eating disorders, investigations of body image and eating behaviors of ethnic minorities can offer important insights. (Henriques & Calhoun, 1996). That African-American women are at less risk for the development of anorexia and bulimia nervosa than Caucasian women has been well documented. In addition, studies have revealed that although African-American women are, on average, heavier than Caucasian women, they possess greater body satisfaction and have less of a discrepancy between their perceived and ideal body size.

Most clinical theorists agree that negative body image and low body satisfaction play a crucial role in the etiology of eating disorders (Henriques & Calhoun, 1996). Thus, the relatively low prevalence of eating disorders among African-American women, compared with Caucasian women, may be attributable, in part, to the relatively greater satisfaction they have with their bodies.

The growing body of research does in fact document major differences in body image and eating disturbance among African-American and Caucasian women. These studies have found high levels of body-image disturbance and eating disordered behavior and attitudes, particularly among white adolescent girls (Lovejoy, 2001). For instance, one study found that 83% of the Caucasian adolescent girls surveyed wanted to lose weight, although 62% were in their normal weight range for their height and gender. By contrast, research on African-American girls and women suggests that they tend to be more confident and satisfied with their body size and weight, despite them being heavier on average. Compared with Caucasian women, Lovejoy (2001) reports that African-American women also tend to exhibit lower levels of eating disordered behavior and attitudes related to a drive for thinness, such as excessive dieting and fear of fat. However, African-American women do have significantly higher levels of obesity and its associated eating problems, such as compulsive overeating.

Studies of eating behaviors and body image on other ethnicities such as Hispanics also show that body image is more of a cultural reflection than a response to one's actual physical dimensions (Guinn, Semper, & Jorgensen, 1997). Research has found that among a sample of 120 adolescent Hispanic girls in central Texas, 20% reported significant anorexic behavior and 15% reported bulimic symptomatology. Similarly,

Littleton and Ollendick (2003) cite that in another sample, 90% of Hispanic and Native Americans surveyed in New Mexico reported worrying about being too fat and 11% met the full DSM-IV criteria for bulimia based on their responses.

The most comprehensive study examining the role of ethnicity on disordered eating in youth was conducted by Neumark-Sztainer and colleagues (1999). This study involved a sample of almost 10,000 early and mid adolescents. Results supported high levels of dieting and disordered eating among all ethnic groups. For example, Asian-Americans had comparable levels of dieting to Caucasians. Although African-American and Hispanics had lower rates of dieting, such behavior was still present in a significant percentage of them. While 41% of the Caucasians and 40% of the Asian-Americans reported dieting, 22% of the African-Americans and 32% of the Hispanics reported dieting as well. The Hispanic girls also engaged in similar levels of disordered eating compared to Caucasian girls. Thus, these problems appear to be quite common, particularly among the adolescent girls.

With respect to obesity, research by Sanchez-Johnson, Fitzgibbon, Martinovich, Stolley, & Dyer (2004) demonstrated that Caucasian girls were more likely to express concern about their weight and to have greater body-dissatisfaction than their average-weight peers than are African-American or Hispanic girls. In a study by Vander Wal and Thomas (2004), body image dissatisfaction in African-American and Hispanic girls were contrary to expectation. African-American girls associated higher weight with positive characteristics, such as strength and success. This was possibly due to the African-American culture where there is less pressure to be thin. Regardless of their heavy weight or obesity, these girls felt positive and confident about their bodies. However, the

tendency to report less body dissatisfaction and feelings of attractiveness despite a higher weight status may also place African-American women at an increased risk for obesity (Fitzgibbon, Blackman, & Avellone, 2000). Among the Hispanic girls, although a curvaceous body is desired, obesity is not. Sanchez-Johnson et. al. (2004) found that Hispanic women perceive their current body image as heavier and report greater body dissatisfaction than African-American women.

In another study assessing body image differences across ethnicities, results indicated that body dissatisfaction did not emerge among Hispanic and African-American women until they were already considered as overweight (Fitzgibbon et. al., 2000). Therefore, they may have been less successful at losing weight because they felt they had more weight to lose at the point they initiated weight control efforts.

According to the psychosomatic model, this can be a vicious cycle. Anxiety about being overweight and feelings of being unsuccessful at losing weight can cause ethnic women to eat even more, therefore causing them to gain weight and decrease their body image satisfaction instead of reversing the cycle and defeating those negative emotions. Thus, it would appear that prevention and early intervention may be very important when treating obese ethnic children and adolescents. As such, it may be essential to begin treatment as soon as possible before body dissatisfaction has so increased that motivation to lose weight declines.

Treatment of Pediatric Obesity

Once established, obesity is difficult to treat, especially when the obese state has become chronic. Research by Magarey, Daniels, and Boulton (2003) indicate that the risk

of adult obesity is at least twice as high for obese children as for non-obese children. As a consequence, prevention is not only appealing, but also necessary. Because those who seek treatment for their weight are at least partially motivated by negative evaluations of their body, the relationship between body image and psychological distress is likely to be even more prominent in the most obese of the treatment seekers (Isnard et. al., 2003). This would suggest that in treatment- seeking populations, the degree of obesity is related to the level of psychological distress.

In terms of curative interventions, psychological aspects of obesity should be seen as important treatment goals. It is suggested then that by learning to cope with negative emotions, obese children will learn to distinguish between the negative emotions and hunger. It would be expected that this then would result in an improvement in weight loss, because they are learning to separate food from feelings. Psychological treatment primarily aims at coping strategies for dealing with their weight and methods of increasing their self-esteem. Thus, Bosch, Stradmeijer, and Seidell (2004) suggest that besides changing their eating patterns, levels of physical activity, and general lifestyle, obese children also need to learn to accept themselves as they are and to stand up for themselves when confrontations regarding their weight arise. Further, they need to establish more healthy eating behavior patterns and enhance their daily physical activities.

Positive cognitive outcomes have been found among those attending treatment for their obesity. In a weight loss camp, for instance, there was a reduction in negative thoughts along with an increase in positive automatic thoughts (Barton, Walker, Lambert, Gately, & Hill, 2004). Further weight loss camp participants had more negative than

positive thoughts and more dysfunctional beliefs at intake. However, by the end of the camp, the number of positive thoughts no longer differed from those expressed by the lean comparison adolescents. Additionally, improvements in automatic thoughts about exercise and appearance were strongly related to improvements in global self-worth (Barton, et. al., 2004).

In the Growing Fit program, where this study will take place, participants have shown to increase positive feelings and decrease negative ones. In a study by Beck et. al., (2003), psychosocial factors after treatment intervention were examined. Results indicated significant changes in indicators of psychosocial distress. Scores on a depression scale decreased significantly, while scores measuring self-concept increased. Results also indicated that obesity interventions appear to improve mood, based on a scale measuring happiness and satisfaction.

Improvements on perceived self-competence and body-image satisfaction have also been observed across studies. Overall, theses have shown that the greater the weight loss, the greater the exchange of negative for positive thoughts, especially in relation to exercise and appearance (Isnard et. al., 2003) This also reflects the psychosomatic theory perspective in that increasing positive thoughts and decreasing negative ones can allow for a reduction in the amount of food consumed, because one is experiencing less of the negative emotions which they are trying to replace by eating (Barton et. al., 2004).

Problem Statement and Hypotheses

Pediatric obesity is growing at an alarming rate and is clearly placing children at high risk for numerous consequences. Among these is low body image, which can disrupt

the normal physical and mental developmental process of a child. Thus, treatment should also address outcome of body image across the child and adolescent obese population. The current study will evaluate body image outcomes for children who have attended the Growing Fit Program at Loma Linda University. With a multi-disciplinary approach to pediatric weight management, this program consists of components suggested by researchers to contribute to weight maintenance and reduction in children (i.e., Jelalian & Saelens, 1999); specifically, nutrition education, exercise, psychosocial and medical elements, and parental involvement for children six to sixteen years of age. Because pediatric obesity can result in immense psychological consequences, it is important to determine if there are positive and lasting body image outcomes for children who have attended the Growing Fit Clinic. This study is especially important considering various negative health and psychological consequences of child obesity. In light of the theories and research outcomes discussed in the literature review above, the following study hypotheses are proposed:

Hypotheses

1.) Body image in participants will differ across ethnic groups.
    a. Caucasian participants will report lower body image satisfaction at the beginning (intake) and end (exit) of treatment than the African-American participants.
    b. Hispanic subjects will report lower body image satisfaction at the beginning and end of treatment than will African-American subjects.

c. There will be no significant difference in body image satisfaction between Caucasian subjects and Hispanic subjects.

2.) Diastolic blood pressure (DBP) at time 2 and the Emotional Eating Subscale of the Dutch Eating Behavior Questionnaire (DEBQ) at time 2 will be associated with Body Image at time 2, such that higher scores on each of these dimensions will result in lower levels of body image.

3.) The change in DBP and DEBQ from time 1 to time 2 is associated with body image at time 2, such that a greater degree of change in each of these dimensions will predict higher body image satisfaction.

4.) Girls will report lower levels of body image satisfaction at time 1 and time 2 than will boys.

Methods

Participants

All study measures were part of the routine care in the Growing Fit Program. As part of routine care at the Growing Fit Program, participants received a medical evaluation by the staff pediatrician, where measurements such as Body Mass Index, weight, height, systolic/diastolic blood pressure and their percentiles, and neck, waist, chest, and hip measurements were taken. This evaluation occurs at intake (time 1), six weeks into the program, and at exit (time 2). A psychosocial evaluation is also part of the care Growing Fit participants receive. Self-report questionnaires assessing for depression, level of self-esteem, behavioral problems, body image and perceived readiness for change are among the instruments that participants are required to fill out at both intake and exit. Parental reports are also required at intake and exit, with questionnaires measuring behavioral concerns. Additionally, parents are asked to answer a complete developmental questionnaire regarding their child to provide information on their developmental, academic, and social progress starting at infancy.

The information from routine care included all data necessary for inclusion in this study. The data attained for this study, however, only included those children whose parents consented for research use of their child's Growing Fit data. Further, only data for children who had completed both the intake and exit psychological evaluations were eligible for inclusion. Thus, while 71 children were seen at the Growing Fit Program at the time of this study only 60 children's data was utilized as consent for research was available AND both intake and exit information had been completed.

Measures

Medical characteristics.

The diastolic blood pressure percentile (DBP) was gleaned from the database for each child. DBP was measured according to national standards and is dependent on individuals' height percentile, age, and sex.

Demographic characteristics.

Demographic characteristics including age, gender, and ethnic background were obtained from intake data.

The Piers-Harris Children's Self-Concept Scale.

This self-report instrument was regularly attained at intake and exit from the program. This scale is designed for children to measure how they feel about themselves. Though it contains six-subscales, the 24-item Body Esteem subscale was the only scale used in this study as it specifically measures satisfaction regarding the body. The items reflect how children value their appearance and body and how they believe they are being evaluated by others. A higher score on the scale reflects higher body-esteem. The scale has strong reliability as demonstrated both by measures of internal consistency, which have ranged from a .88 to .93, and also by test-retest coefficients, which have ranged from a .74 for a four-month interval to a .85 for a five-month interval. (Piers, 1986).

Dutch Eating Behavior Questionnaire (DEBQ)

This questionnaire was also attained at intake and exit in the Growing Fit Program. It is a scale designed to assess the structure of an individual's eating behavior. Corresponding to psychosomatic theory (as well as externality theory and restraint theory), the DEBQ contains separate scales for emotional, external, and restrained eating behavior. Thirty-three items for these three scales; ten items are on restrained eating, ten items are on external eating, and thirteen items are on emotional eating. The items measuring emotional eating were only utilized for the data. An example of the type of question in this scale is, "Do you have a desire to eat when you are irritated?" Each of the three subscales have been shown to have good internal consistency and factor validity (van Strien, 1996). It has been used by a growing body of researchers for theoretical research into the etiology and maintenance of obesity. Additionally, it has been used by therapists who work with individuals having problems with overeating, weight gain, and obesity.

Procedure

This study was an archival study utilizing data collected as part of routine care at the Growing Fit Program. At the time of entry into the program parents consent to their child's participation to all components of the program, including a separate section of consent for use of their information for research purposes. Thus, archival data from participants whose parents had agreed to use of the data and children who had completed intake and exit appointments which included the questionnaires for this study were utilized. All data was provided to this study with identifying information having been

removed. Prior to the implementation of the study, the LLU Institutional Review Board (IRB) reviewed and approved this study.

Results

This study compared six groups in an ethnicity (Caucasians, African-Americans, Hispanics) x gender (girls, boys) quasi-experimental design; the participants were assessed before and after program completion to examine programmatic effectiveness. This design allowed analysis of group differences (males vs. females, Caucasians vs. African-Americans vs. Hispanics) and relative contributions of study variables in relationship to body image satisfaction. According to psychosomatic theory, emotions regulate eating behavior. Additionally, direct physiological changes can influence eating behavior. In this study, it was hypothesized that these two variables would correlate with body image satisfaction, which in turn would differ across gender and the three group ethnicities.

Statistical Analyses

Screening of the Data

In the study sample, several variables (measures) were age dependent, indicating that the measure was not administered if the subject did not meet the age criteria for that questionnaire. Thus, some participants did not complete either one or both of the questionnaires from which some of the variables of interest were extracted for the study. However, as their diastolic blood pressure was measured regardless of age, permitting at least some contribution to the study, all children with this measurement were included in the study.

When screening for normality, diastolic blood pressure at intake resulted in a slight positive skew. This indicated that most of the participants, as would be expected in the Growing Fit Program, fell in the higher percentile ranking for resting diastolic blood pressure upon admission. Additionally, screening of ethnicity indicated that African Americans were underrepresented in the data pool, perhaps not representing that group. No univariate outliers were found within the study sample on any of the other measures.

Sample

There were a total of 60 participants in the study. The mean age for all subjects was 10.50, SD = 2.68. Mean age of female participants (N = 25) was 10.32 (SD = 3.10), while mean age of male participants (N = 35) was 10.64 (SD = 2.18). The mean age for both males and females did not significantly differ from another. There were three different ethnic groups comprising the data pool (20% Caucasian, 73% Hispanic, and 7% African American). Table 1 illustrates the total number of participants according to gender and race.

Table 1.
Gender and Ethnic Breakdown of Participants (N = 60)

	Caucasian (#)	Hispanic (#)	African-American (#)
Males	5	29	2
Females	5	16	3
Total	10	45	5

Body Image Satisfaction. The mean score of body image satisfaction for all participants at intake, as measured by the Physical Attributes Subscale of the Piers-Harris, was 43.35 (SD = 14.43). Scores at this level indicate that participants reported both positive and negative appraisals of their physical appearance, with the positive evaluations tending to outnumber the negative ones. The average level of body image satisfaction at the end of treatment slightly increased, with a mean score of 47.71 (SD = 10.37), although it was an insignificant statistical difference. Generally, all participants reported to have higher levels of body image satisfaction upon completion of the Growing Fit Program, with some negative appraisals remaining. Tables 2, 3 & 4 provide the gender and ethnic breakdown of body image satisfaction at the beginning and end of treatment. The mean for all participants suggest that on average body image satisfaction fell in the average range at both time intervals.

Table 2.
Mean body image satisfaction for Caucasian participants at time 1 and time 2

	Time 1 (Intake)	Time 2 (Exit)
Males	28.00	51.4
Females	44.6	51.4
Total	36.33	52.12

In addition, Caucasian females appeared to have higher levels of body image satisfaction than Caucasian males at the beginning of treatment. Importantly, overall as an ethnic group, Caucasians reported in the low range of body image satisfaction at intake in the low range. Scores at this level indicate low self-esteem in relation to their

body image. Notably, all Caucasian participants had an increase in body image satisfaction by the end of the treatment program and increased overall scores to the high average range.

Table 3.
Mean body image satisfaction for Hispanic participants at time 1 and time 2

	Time 1 (Intake)	Time 2 (Exit)
Males	42.11	46.13
Females	49.28	46.35
Total	44.20	46.65

Overall, both male and female Hispanic participants were in the average range for body image satisfaction, with the males reporting in the lower end of the average range. Hispanic females slightly dropped in their body image satisfaction at the end of treatment, though it still remained in the average range. Generally, scores remained relatively stable for Hispanic participants between the beginning and end of treatment. Overall, Hispanics reported an average level of body image satisfaction at both time intervals. They report both positive and negative attributes about their physical appearance, with positive self-evaluations outnumbering the negative ones.

Table 4.

Mean body image satisfaction for African American participants at time 1 and time 2

	Time 1 (Intake)	Time 2 (Exit)
Males	65.0	45.5
Females	48.5	57.0
Total	54.0	51.25

Among the African-Americans, males reported to have higher than average body image satisfaction at the beginning of treatment, indicating a general satisfaction with their physical appearance. This positive appraisal, however, dropped considerably by the end of treatment to an average level of satisfaction. Conversely, females reported higher than average body image satisfaction at exit, as compared to the average level they reported at the beginning of treatment. Across all participants, body image satisfaction remained in the average range at both time intervals.

Diastolic blood pressure. Table 5 provides diastolic blood pressure percentiles at the beginning and end of treatment for both males and females. At intake, the average percentile rank for boys was 84th percentile, while at exit, it was 86th percentile. In contrast, for girls, at intake it was 77th percentile, and at exit, it was 75th percentile. The relatively high percentiles for both genders is indicated by standard blood pressure charts, in which higher weight is associated with higher blood pressure levels. At exit, the boy's average increased their percentile by 4.1, while the girls decreased their percentile by 4.7.

Table 5.

Diastolic blood pressure percentile and time 1 and time 2.

	Time 1 (Intake)	Time 2 (Exit)
Males	84th percentile	86th percentile
Females	77th percentile	75th percentile

Emotional eating. Degree of emotional eating was measured using the Emotional Eating Subscale of the DEBQ. Male participants, at intake, reported a Scaled Score average of 1.84 (SD = 0.70). This reflects that males reported an average level of emotional eating, neither overeating nor under-eating in response to emotional arousal. At he time of exit, emotional eating subscale scores declined to 1.51 (SD = 0.73). This score falls at the below average level, indicating that male participants at the time of exit reported eating less in response to emotional arousal or stress. Female participants, at intake, reported a Scaled Score average of 2.0 (SD = 0.98). Scaled scores at this level, when compared to the standardized group, indicate a below average level of emotional eating. Thus, females in this study did not report overeating in response to emotional distress at the time of intake. However, at the time of exit, the Emotional Eating Subscale for females rose to 2.8 (SD = 1.63), indicating a high level of emotional eating as compared to the normative group. Table 6 provides a description of gender differences on emotional eating.

Table 6.

Gender differences on Emotional Eating Subscale of DEBQ at time 1 and time 2

	Time 1 (Intake)	Time 2 (Exit)
Males	1.84	1.51
Females	2.00	2.79

Testing of Hypotheses

Hypothesis 1 (first part)- It was hypothesized that body image satisfaction would significantly differ between Caucasian and African-American girls. This hypothesis could not be completed due to the small sample of African-Americans, making analysis inappropriate and as such could not be tested.

In the second part of Hypothesis1 it was hypothesized that Hispanic girls would report lower levels of body image satisfaction at the beginning and end of treatment than the African-American subjects. Again, due to the small sample of African-Americans, as compared to the Hispanics, this hypothesis could not be analyzed.

Hypothesis 1 part C proposed that there would be no significant differences between Caucasian and Hispanic girls in body image satisfaction at the beginning and end of treatment. An independent t-test was conducted to explore this. Results indicate no significant differences between Caucasians and Hispanics at the beginning of treatment ($t = -.38$, $p = .70$), nor at the end of treatment ($t = 1.30$, $p = .22$).

Hypothesis two hypothesized that diastolic blood pressure (DBP) at time 2 and the Emotional Eating Subscale of the Dutch Eating Behavior Questionnaire (DEBQ) at time 2 will be associated with Body Image at time 2, such that higher scores on each of these dimensions will result in lower levels of body image. A multiple regression analysis was conducted explore this hypothesis. Results indicate that the predictor variables explained 21% of the variance in body image satisfaction ($F = 1.92$, $p = .18$). In this analysis, neither of the predictor variables contributed a significant amount to the overall variance explained (BP, $\beta = 0.86$, $p = 0.81$; DEBQ, $\beta = .48$, $p = 0.08$). Thus, neither level of emotional eating nor diastolic blood pressure percentiles can significantly predict participant's body image satisfaction upon completion of the program.

Hypothesis three predicted that the change in diastolic blood pressure and the change in level of emotional eating will predict body image satisfaction at the end of treatment, such that a greater degree of change in either of the variables will result in higher satisfaction. A multiple regression analysis was performed to assess this hypothesis. The model explained 45% ($p = 0.07$) of the variance in body image satisfaction. In this group, the most significant contributor (in terms of standardized beta weights) to the overall variance explained was the change in level of emotional eating ($\beta = 0.69$, $p = 0.02$). A greater level of change in emotional eating was also found to positively correlate with higher levels of body image satisfaction ($r = 0.63$, $p = 0.01$). Change in diastolic blood pressure percentile did not significantly contribute ($\beta = 0.18$, $p = 0.48$) to the overall variance explained in body image satisfaction.

In hypothesis four, it was hypothesized that girls will report lower levels of body image at both time intervals than will boys. At intake, a significant difference was found

in levels of body image between boys and girls, ($t = 2.24$, $p = 0.03$). Mean level of body image satisfaction for girls was 49.42 (SD =2.10), and 41.28 (SD = 2.95) for boys. No significant differences in body image were found between boys ($M = 48.27$, SD = 2.34) and girls ($M = 48.90$, SD = 2.03) at the end of treatment ($t = 0.20$, $p = 0.83$).

Exploratory Analysis

A paired samples t-test was analyzed to determine level of emotional eating for all participants at both time intervals. Results indicated a significant difference ($t = 3.49$, $p = 0.02$) between level of emotional eating at the beginning of treatment and end of treatment. Overall, all participants reported a significantly lower level of emotional eating at exit, as compared to what they reported at intake.

Because African-Americans were under-represented in the data pool, statistical analyses were run for all hypotheses without African-Americans in the sample. Exclusion of this ethnicity did not significantly affect the results. Additionally, Hypothesis 1c was re-analyzed combining both genders to allow for greater sample size. There were no significant differences between Hispanic and Caucasian participants in body image satisfaction at the beginning of treatment ($t = -1.90$, $p = .29$). However, significant differences between the two ethnicities did emerge at the end of treatment ($t = 2.10$, $p = 0.04$). Caucasians reported a significantly higher level of body image satisfaction at the end of treatment, as compared to the Hispanic participants.

Additionally, blood pressure and weight (in pounds) are related variables which should both be considered when assessing for any physiological changes. Descriptive comparisons and frequency analyses were explored between genders to assess the

association between weight and blood pressure. Results indicated that 52.8% of female participants lost an average of 3.1 pounds (5.3% had no change, 43.3% gained weight) and thirty-eight percent of males lost an average of 2.6 pounds (14.3% had no change, 47.7% gained weight).

Discussion

Conclusions

Childhood and adolescent obesity has reached epidemic proportions at an alarming rate. Due to a combination of an inactive lifestyle, genetics, and the (socially toxic) environment, obese children are at risk for numerous medical and psychological complications that will follow them into their adulthood. Both prevention and intervention of pediatric obesity is critical in assisting the nation's youth in making healthy lifestyle choices that will benefit them physically, behaviorally, and emotionally. This study examined body image satisfaction among 60 children and adolescents at entry and after having participated in a 12- week weight management program. The study utilized both physiological and psychological variables and centered on the child's satisfaction with their physical appearance. Gender and ethnic differences were also examined.

Of note, the study sample's general characteristics, which is fairly representative of children who attend the Growing Fit Program, are perhaps unique to the population in the Southern California area are in the study and likely impact the study objectives. Participants are primarily referred by physicians who serve an HMO/MediCal population throughout the San Bernardino and Riverside county community. As such, the sample is fairly representative of the local Medi-Cal (lower income or perhaps higher risk) pediatric obese population in terms of their physiological and psychological well-being. Further, due to the overrepresentation of Hispanics in the San Bernardino County (61% of youth under 18 are Hispanic, Children's Network, 2006), this sample is more representative of

that culture and perhaps most generalizable to Hispanic families in the lower socioeconomic bracket.

Body image was a primary variable and as such was assessed across all ethnicities, with results demonstrating variability in the level of self-satisfaction. Though some cultural differences seem evident, it is difficult to make meaningful comparisons between the groups given the small sample size of the African-Americans (n=5) and Caucasians (n=10), and the larger sample of Hispanics (n = 45).

In Hypothesis 1, it was predicted that body image satisfaction would differ across the Caucasian, Hispanic, and African-American girls. Due to the small representation of African-Americans in San Bernardino County, very few referrals to Growing Fit are received from this population, and as such for this study only a sample size of 5 was available. Therefore comparisons involving this ethnic group were not statistically appropriate (Hypothesis 1a and 1b). However, the third section of the first hypothesis (Hypothesis 1c), was analyzed. This hypothesis predicted that there would be no significant differences between Caucasian and Hispanic girls in body image satisfaction neither at intake nor exit. In contrast to the literature of Sanchez- Johnson and colleagues (2004), which found that Caucasian girls were more likely to express greater body image dissatisfaction than Hispanic girls, body image differences in this study did not emerge between Hispanic and Caucasian females. Both groups had mean scores of body image satisfaction that fell in the middle to higher average range at both intake and exit. However there were some potential interesting trends; Hispanic females reported to have higher body image satisfaction at the beginning of treatment, and slightly lower level of satisfaction at the end of treatment. Alternatively, Caucasian girls maintained themselves

at the average level of body image satisfaction at intake, while their scores increased to the higher end of the average range at exit.

Several reasons may explain these findings. First as it relates to overall average body image perception, age is an important developmental factor which influences ones perceptions of their physical appearance. With an average age of ten in both groups, females are indeed more aware of their exterior self-image, as described by Riciardelli and McCabe (2001). However, pressures about body image do not typically surface until the adolescent years (Ferrone, 1997). For this hypothesis, there was a total of 44 pre-adolescents, while only 12 adolescents comprised the data pool. With the majority of participants in their pre-adolescents years, results on body image satisfaction appear to reflect the perceptions of younger children, who likely have not yet made the association between weight and body image satisfaction. Instead, females at this developmental level may be content with what they perceive, independent of their actual weight. Beck and colleagues (2006) discovered this possibility in a study in which Growing Fit participants' perceptions of their physical selves was a more powerful motivator for change than their actual physical characteristics, illustrating the impact that body image has on overweight children.

Secondly, the slight drop in body images satisfaction among the Hispanic girls could be attributed to several factors, perhaps a lack of participation in groups, decreased motivation, or unnoticeable physical change. By not participating in groups, they were not engaging in the exercises recommended to them to improve their body image satisfaction. Their motivation may also not have been strong enough to make any noticeable or meaningful change, most likely contributing to the decrease in body image

satisfaction. It is also possible that the groups, by nature of discussing weight management issues etc. made them think about this more than they had when they started, causing them to increase their awareness about their physical appearance. Because the emphasis on being overweight is not as strong in the Hispanic culture when compared to other cultures, perhaps some of the Hispanic girls did not consider themselves as "overweight" or did not consider it a problem until they started treatment. Nevertheless, even at exit they reported feeling more positive attributions about their physical appearance than negative ones. The trends noted in the Caucasian group may be related to strong parental involvement and the more notable effort put forth in the self-esteem groups by Caucasian girls, which could have made the difference in boosting the body image satisfaction of this ethnic group. Furthermore, though African-American girls could not be statistically compared to the other ethnicities, measured, their results on body image satisfaction are consistent with the literature (Lovejoy, 2001; Vander Wal & Thomas, 2004). They expressed a high degree of body image satisfaction at both time intervals, suggesting a high level of self-esteem regarding their physical appearance. Because, as noted in the literature review above, the African-American culture is more accepting of a fuller figure, this cultural influence may have been the reinforcement that females received to be able to enter and leave the treatment program with a positive self-image.

In Hypothesis 2, level of emotional eating and diastolic blood pressure at exit were hypothesized to account for a significant amount of variance in understanding body image satisfaction when the participants had completed the program. The linear regression model did not yield significant results. In this analysis the predictor variables,

emotional eating and diastolic blood pressure, did not account for a significant amount of variance in body image outcomes in a weight management program. Emotional eating, however, approached significance in terms of contributing to the overall variance and should not go completely overlooked. In fact, emotional eating may be influential as a predictor variable, in that even in this small study it reflected a large standard effect size. Certainly the relationship between emotional eating and body image necessitates further examination and with a larger sample. This study suggests that children, at the end of treatment by the nature of how treatment may focus on these issues, may become more aware of their eating habits. This awareness may include a better understanding of such concepts as when they eat out of boredom or stress. Thus taken further this may suggest that post treatment techniques or perhaps longer treatment may better help them monitor their eating habits, eventually lose weight, and subsequently increase their body image satisfaction.

Diastolic blood pressure, a physiological variable, did not significantly contribute to the overall variance. Again, sample size most likely contributes to this limitation. In addition, while internal measures are important to assess for progress, perhaps they do not play a significant enough role in children's perceptions of their physical appearance. Instead, physiological variables might better contribute to a model predicting a physiologically related outcome, while psychological variables best predict psychologically related outcomes.

Hypothesis 3 stated that a higher degree of change in level of emotional eating (from intake to exit) and a higher degree of change in blood pressure (from intake to exit) would predict a higher level of body image satisfaction, when compared to their intake

score of body image. The linear regression model did not yield significant results as it relates to the physiological variable. The change scores in blood pressure did not account for a significant amount of variance in the outcome in body image satisfaction. However, change in level of emotional eating was found to be a significant predictor variable (as well as a positive correlate) to degree of change in body image satisfaction. Overall, 8% of participants maintained their level of emotional eating, 20.2% increased their level, and 71.8% decreased their level of emotional eating. This indicates that the majority of participants were, to a certain degree, able to separate their emotions from hunger by the end of treatment. Conversely, their body image satisfaction increased by an average of 11 points (SD = 1.55).

These findings support the literature of the psychosomatic model (Kaplan and Kaplan, 1957), in which eating in response to a negative emotional state leads to further eating, causing unpleasant feelings such as guilt or shame. In this study it appeared then that when Growing Fit participants learn how to appropriately respond to negative emotional arousal, they are breaking the cycle and can complete the program with higher level of self-esteem and body image satisfaction. Additionally, as noted by Beck, Stevens, Hamai, and Freier (2006), those who experience an increased positive physical perception of themselves are more likely to be emotionally and cognitively ready to make positive changes.

A change in blood pressure did not significantly predict body image satisfaction. Overall, 17.9% of participants maintained their original diastolic blood pressure, 35.9% increased their blood pressure, and 46.2% decreased their blood pressure. Percentile scores at both intake and exit were relatively high; however, this is not surprising given

that several studies have shown a positive correlation between hypertension and obesity (Schiel, Beltschikow, Kramer, & Stein, 2006). Important to note were the gender differences, where males increased their average diastolic blood pressure while females decreased theirs. This difference could be due to a variety of factors. The female participants could have changed their diet more than males did, with healthier foods decreasing their overall blood pressure. A stronger support system for the females may have also contributed to this change; for example, Trost, Sallis, and Pate (2003) found that parental support is an important correlate of youth physical activity and acts through its influence on self-efficacy. Perhaps Growing Fit parents were involved in participating in physical activity with their daughters and provided additional reinforcement for her progress in making positive changes. Regardless, the role that physical variables such as diastolic blood pressure plays in body image in obese children needs further examination.

Hypothesis 4 stated that gender differences in body image satisfaction would emerge at both intake and exit, with boys reporting higher levels of satisfaction than girls at both times. Contrary to the expected, girls reported a significantly higher level of body image satisfaction at intake than the boys did. However, no differences emerged at exit. At intake, both genders reported to perceive positive physical attributes; however, the perception of boys was more negative than what the girls experienced. This may be due to the ethnically diverse girls (Hispanics and African-Americans) learning that, in their culture, it is acceptable (and sometimes preferred) to be slightly heavier. Boys, on the other hand, are taught to gain muscle mass (not fat), possibly causing them to internalize some of their physical attributes in a negative way. Additionally, as supported by Ricciardelli and McCabe (2001), the average age of ten years between both males and

females may have contributed to this difference in body image satisfaction, when they have begun to internalize what the socially accepted ideal body sizes are. With treatment, both genders reported body image satisfaction that fell in the higher end of the average range. Self-esteem and body image exercises, in addition to parental involvement and support, may have led males to increase their self-esteem regarding their physical appearance to a level that was similar to the female participants.

Emotional eating resulted in being an important variable in a treatment program with interesting gender differences. Boys decreased their level of emotional eating at exit, while girls increased their level of emotional eating. Several reasons may explain these findings. That boys were able to decrease their level of emotional eating may indicate that through treatment, they were able to separate their emotions from their hunger. Group sessions focused on how to identify one's feelings and emotions, and finding appropriate, healthy ways to cope with negative emotions rather than through food. Thus, boys may have benefited from the exercises and started practicing more effective methods of dealing with any negative emotions or feelings they may have encountered.

Girls, on the other hand, had a higher level of emotional eating at exit. They reported responding more to negative emotions such as boredom, anxiety, stress, or sadness with food. Though it is important that one be able to learn to distinguish their emotions from their hunger, group sessions also taught participants to gain better insight into their own feelings and become aware of any positive and negative emotions they might be experiencing. Consequently, the increase in level of emotional eating could be attributed to the girls becoming more aware of their emotions, and this could have been reflected through an increase in their scores. High attendance and level of participation

from the girls is also indicative of strong effort placed into group work, bringing females to a higher level of insight than when they began treatment.

Additional analysis were conducted that contributed to the findings of the study. First, as suggested above there was a significant change in level of emotional eating from the beginning of treatment to the end of treatment. Participants reported a decrease in their response to emotional arousal with food, perhaps demonstrating increased awareness of their emotions and how to appropriately respond to them. Because parents were taught skills in how to help their children cope with stress or anxiety, parental involvement was a strong factor in this change. Group exercises focusing on different emotions and ways to manage the negative ones further contributed to their ability to distinguish between different physiological processes, such as hunger versus anxiety or sadness.

Secondly, in re-evaluating ethnic differences, a significant difference in body image satisfaction was found between Caucasians and Hispanics when genders were combined. Though no significant differences in body image satisfaction resulted at intake, Caucasians did report significantly higher levels of body image satisfaction than Hispanics at exit. Because there was a strong discrepancy in body image satisfaction with Caucasian males from intake to exit, their addition to the analysis increased the overall score for all Caucasian participants. As such, a significant difference at exit was found between all Caucasians and Hispanics participants. Perhaps Caucasian males internalized more of the self-esteem and body image exercises than did Hispanics, giving themselves more credit for any positive changes.

Lastly, frequency analysis determined the percentage of participants who lost weight to assess the consistency with the changes in diastolic blood pressure. Given the positive correlation between blood pressure and weight, results are consistent with previous studies (Fuiano, Luciano, Pilotto, & Pietrobelli, 2006). More than half of female participants lost weight, which conversely, resulted in an average decrease of diastolic blood pressure. Less than half of male participants, on the other hand, gained weight, contributing to an overall increase in blood pressure. While internal (physiological and hormonal) changes could explain these findings, level of commitment to a weight management program also contributes to any changes that occur. Lack of interest to groups, low support level, or a low desire to make a healthy change could explain why boys increased their weight and blood pressure. Conversely, girls may have had a stronger commitment to lose weight. Of all female participants, 32% were twelve years of age or older. Of those, 50% lost weight by the end of treatment. Females at this age may have been more aware of their overweight status and its peer implications, causing them to make an active effort to lose weight (and decrease their blood pressure).

Limitations

A primary limitation is that of sample size, particularly the under-representation of the Caucasian and African-American children. However, while there were ethnic disparities in terms of the children attending the program, this discrepancy is also visible in the local community. According to San Bernardino Children's Network (2006), Hispanics are over-represented in San Bernardino County. Thus this demographic is similar to the percent representation of Hispanics in the study. As such this study is best

generalized to this county or other areas in which there is a high representation of the Hispanic population.

Further, for effective treatment and a positive outcome, it was important for participants to attend and participate in all components of the treatment program. However, participant drop-out did exist in the study, and 15% of participants who completed intake protocols did not complete exit protocols. As such, no physiological or psychological measures at exit were recorded in the database, thus affecting analysis and interpretation.

It was also noted that participants would attend physical exercise and nutrition groups, but skip support groups for self-esteem. It is in the support group where the psychological component of obesity was addressed and exercises to increase their overall self-esteem were practiced. Thus some of the participants, particularly those with frequent absences, did not benefit entirely from the program, specifically from components that focused on self-esteem or the encouragement and participation of their peers. These absences may explain some of the findings in body image satisfaction among the participants, particularly if they were absent on the day that body image was discussed. The fact that learning about body image and ways to improve it was only allotted one group session was also a limitation.

Significant Contributions

This study has, as reported in the literature, demonstrated that emotions and stress are involved in participants' eating behavior, thus contributing to their weight gain and health risks. By measuring level of emotional eating, it was determined that participants

were responding to negative emotional arousal with the comfort of food. Their high diastolic blood pressure alone was a clear indicator of the health risks that participants were facing by not appropriately coping with stress or anxiety. Thus, in addition to genetics and the environment, this study has demonstrated that a psychological component is also present in children's negative eating behavior. Though a significant model predicting body image satisfaction was not found, the maladaptive cycle explained by psychosomatic theory is evident with these variables: Anxiety or stress provoking situations are being alleviated by distracting one's self with food. This coping method is leading to weight gain, subsequently placing the heart and blood pressure in jeopardy. As weight increases, body image satisfaction is at risk for decreasing. Ultimately, those who cannot separate their emotions from hunger will most likely repeat the cycle over again.

This study has provided to our understanding of the impact of pediatric obesity. Given the fact that Hispanics represent a large proportion of the US nation, further research and interventions addressing Mexican overweight children is of significant importance in reducing the obesity epidemic and improving quality of life. Of import, some preliminary information on that population is offered by this study.

In terms of the Growing Fit Program, body image satisfaction among Growing Fit participants had not been evaluated until this study. Using standard protocols of Growing Fit intake and exit questionnaires, the program may now have a better understanding of participants' perceptions about the way they look and the potential impact of this on outcomes important to Growing Fit. It is hoped that these findings will encourage more opportunity to incorporate body image exercises into their support groups and perhaps other components of the program. This might be done by offering exercises in which

participants are taught strategies to appreciate their bodies, such as by saying something positive about their body on a daily basis, or have their parents point out skills about specific physical features which makes him/her unique and that body part special. Additionally, participants are currently taught to explore internal attributes and qualities about themselves to increase their self-esteem; explaining that high self-esteem can also mean being proud of one's physical appearance can give them the opportunity to further increase their self-confidence.

Though a large majority of interventions for obesity focus on decreasing health risks, this study demonstrated that it is important to address personal, internal factors that exist within the individuals as well. Body image is an important construct which gives individuals a part of their identity. This study has shown that it cannot go overlooked in a weight management program and that in addition to minimizing physical health risks, body image must be incorporated to minimize psychological risks as well. Rosen (2001) found that it is possible to help obese persons change their body image attitudes and behavior using a strict psychological approach, without any intervention to change eating, exercise, or weight. Similarly, Allen, Byrne, Blair, and Davis (2006) point out the importance of addressing and treating psychological problems (such as body image dissatisfaction) in obese children.

Future Directions

Growing Fit addresses many dimensions which contribute to one's obesity. Through exercise, nutrition, parental involvement, and groups focusing on psychosocial issues, the clinic helps children and adolescents suffering from obesity to make a lifestyle

change. Given that body image is a construct which develops completely in the adolescent years, it must be addressed (Ferrone, 1997). This study utilized a sample of the Growing Fit participants to understand the perceptions that children and adolescents have regarding their obesity. It found that with increased efforts to separate emotions from hunger, body image satisfaction would increase. As such, for stronger outcome, incorporating more specific interventions related to body image, giving individuals the opportunity to understand this construct and engage in exercises that will help them improve their physical perception of themselves (regardless of any weight changes), seems to be an important and vital strategy for more effective treatment.

Because treatment is limited to twelve weeks, with only six self-esteem group sessions, participants cannot make a significant amount of change in this time. Therefore, it would benefit the individuals to go through two courses of treatment. Through this, their first treatment cycle would focus on gaining an understanding of emotions, behaviors, and learning to make small nutritional changes. Participating in a second round of treatment would allow the individuals to fully engage in the psychosocial components addressed in groups, continue to learn about nutrition and foster further nutritional changes, and remain physically active for more significant emotional and physical changes.

Importantly, research on pediatric obesity must remain an ongoing process from which effective interventions can be devised. First, with an ethnically diverse nation, culturally competent research methods are suggested to adequately assess and treat ethnic minority youth. This may involve inclusion of protocols or interventions that take into account their cultures, giving individuals something to identify with as familiar while

they go through treatment. Also, because body image is thought to be of more significant importance to females, few studies examining body image satisfaction among males, particularly Caucasian males, have been carried out. Thus, future research must broaden its scope from measuring this construct among females to assessing how obesity (and obesity treatment) impacts body image in (Caucasian) males.

Further, because level of emotional eating was found to be a strong variable in determining body image satisfaction, additional research examining its impact on other psychological variables should be investigated. Because obesity comes with numerous psychological risks such as depression, low self-esteem, and anxiety, research utilizing the psychosomatic model in its intervention can help individuals also decrease these other negative psychological symptoms as well.

Though the physiological variable of blood pressure did not yield significant findings, it is nevertheless a variable which deserves further research, as it clearly parallels with weight increase or decrease. Perhaps because blood pressure is not a visible marker of any weight change, other variables can be incorporated in assessing psychological outcome in weight management, such as body fat percentage. Having a visible change evident, for children, is probably more likely to positively alter their body image satisfaction. Overall, research examining the relationship between physiological variables and psychological outcome is scarce, and exploring the relationship between the two is necessary.

Lastly, gender and age differences on treatment outcome are suggested for future research, as psychological variables such as body image are dependent on the developmental level of the child (Riciardelli and McCabe, 2001). Body image

satisfaction in pre-adolescents differs greatly from body image satisfaction in adolescents and therefore must be evaluated differently at these distinct developmental periods. Because there was little variability in the age of the study participants, future research should involve comparisons on body image satisfaction between pre-and post pubertal obese individuals. Important to note is that puberty emerges at different age periods for different cultures. For instance, Anderson, Dallal, and Must (2003) found that African-American girls have a lower average age at menarche than did Caucasian girls, independent of the effect of their weight. Thus, these cultural/environmental differences may have contributed to some of the results in the study. Further, because males and females tend to mature at different rates, cross sectional studies evaluating body image satisfaction between sexes and across different developmental periods are encouraged to give clinicians a better understanding of how and when to incorporate this valuable construct into their intervention.

References

Ackard, D.M., & Neumark-Sztainer, D. (2002). Overeating among adolescents: prevalence and associations with weight-related characteristics and psychological health. *Pediatrics, 111,* 67-74.

Adams, K., Sargent, R.G., Thompson, S.H., Richter, D., Corwin, S., & Rogan, T. (2000). A study of body weight concerns and weight control practices of 4th and 7th grade adolescents. *Ethnicity and Health* 5, 79-94.

Anderson, S.E., Dallal, G.E., & Must, A. (2003). Relative weight and race influence average age at menarche: Results from two nationally representative surveys of US girls studied 25 years apart. *Pediatrics, 111* (4), 844-850.

Barton, S.B., Walker, L.M., Lambert, G., Gately, P.J. & Hill, A.J. (2004). Cognitive change in obese adolescents losing weight. *Obesity research, 12,* 313-319.

Bosch, J., Stradmeijer, M., & Seidell, J. (2004). Psychosocial characteristics of obese children/youngsters and their families: implications for preventive and curative interventions. *Patient Education and Counseling, 55*, 353-362.

Baranowski, T., Mendlein, J., Resnicow, K., Frank, E., Cullen, K. W., & Baranowski, J. (2000). Physical activity and nutrition in children and youth: An overview of obesity prevention. *Preventive Medicine, 31*, S1-S10.

Bar-Or, O., Foreyt, J., Bouchard, C., Brownell, K. D., Dietz, W. H., Ravussin, E., et. al., (1998). Physical activity, genetic, and nutritional considerations in childhood weight management. *Medicine and Science in Sports and Exercise, 30*, 2-10.

Beck, A, Stevens, J., Hamai, K. & Freier, K (2006). *Pediatric Obesity: Impact of Readiness for Change and Self-Concept*. Poster session presented at the annual meeting of the Pediatric Academics Society, San Francisco.

Beck, A., Stevens, J., Nichols, J., Hamai, K., Freier, K., Yin, & Chinnock (November, 2003). *Pediatric Obesity: Efficacy of Psychosocial Issues.* Poster session Presented at the annual meeting of the Society of Pediatric Research, Washington, D.C.

Bosch, J., Stradmeijer, M., & Seidell, J. (2004). Psychosocial characteristics of obese children/youngsters and their families: implications for preventive and curative interventions. *Patient Education and Counseling, 55*, 353-362

Burrows, A., Cooper, M. (2002). Possible risk factors in the development of eating Disorders in overweight pre-adolescent girls. *International Journal of Obesity, 26,* 1268-1273.

Butryn, M.L., Wadden, T.A. (2005). Treatment of overweight children and adolescents: Does dieting increase the risk of eating disorders? *International Journal of Eating Disorders, 37,* 285-293.

Calderon,K., Yucha, C., & Schaffer, S. (2005). Obesity related cardiovascular risk factors: Intervention recommendations to decrease adolescent obesity. *Journal of Pediatric Nursing, 20*(1), 3-14.

Cash, T.F., Theriault, J., & Annis, N,M. (2004). Body image in an interpersonal context: Adult attachment, fear of intimacy, and social anxiety. *Journal Of Social and Clinical Psychology, 23,* 89-103.

Canetti, L., Bachar, E., & Berry, E.M. (2002). Food and Emotion. *Behavioural Processes, 60,* 157-164.

Children's Network of San Bernardino County. (2006). 2006 Children's Network Annual Report. Retrieved May 2, 2007, from http://www.sbcounty.gov/childnet/.

Costanzo, P.R., Reichmann, S.R., Friedman, K.E.,& Mustante, G.J. (2001). The mediating effect of eating self-efficacy on the relationship between emotional arousal and overeating in treatment-seeking obese. *Eating Behaviors, 2,* 363-368.

Dietz, W. H. (1998). Health consequences of obesity in youth: Childhood predictors of adult disease. *Pediatrics, 101,* 518-524.

Eaton, D.K (2005). Associations of body mass index and perceived weight with suicide ideation and suicide attempts among US high school students. *Archives of Pediatric and Adolescent Medicine, 159,* 513-519.

Fitzgibbon, M.L., Blackman, L.R., & Avellone, M.E (2000). The relationship between body image discrepancy and body mass index across ethnic groups. *Obesity Research, 8*, 582-589.

Foster, G.D., Wadden, T.A., Vogt, R.A. (1997). Body image in obese women before, during, and after weight loss treatment. *Health Psychology,16,* 226-229.

Fuiano N, Luciano A, Pilotto L, Pietrobelli A.(2006). Overweight and hypertension: Longitudinal study in school-aged children. *Minerva Pediatrics, 58*(5), 451-9.

Guinn, B., Semper, T., Jorgensen, L. (1997). Mexican-American female adolescent self esteem: The effect of body image, exercise behavior, and body fatness. *Hispanic Journal of Behavioral Science, 18,* 356-366.

Henriques, G.R., Calhoun, L.G. (1996). Ethnic differences in women's body satisfaction: An experimental investigation. *Journal of Social Psychology, 136,* 689-696.

Isnard, P., Michel, G., Frelut, M.L., Vila, G., Falissard, B., Naja, W., Navarro, J., & Mouren-Simeoni, M.C (2003). Binge-eating and psychopathology in severely obese adolescents. *International Journal of Eating Disorders, 34,* 235-243.

Jelalian, E., & Saelens, B. E. (1999). Empirically supported treatments in pediatric psychology: Pediatric obesity. *Journal of Pediatric Psychology, 24,* 223-248.

Kaplan H., & Kaplan H. (1957). The psychosomatic concept of obesity. *Journal of Nervous Mental Disorders, 125*(2), 185-201.

Kimm, S.Y., Obarzaneck, E. (2002). Childhood obesity: A new pandemic of the new millennium. *Pediatrics, 110,* 1003-1007.

Littleton, H.L., Ollendick, T. (2003). Negative body image and distorted eating behavior in children and adolescents: What places youth at risk and how can these problems be prevented? *Clinical Child and Family Psychology Review,6,* 51-66.

Lovejoy, M. (2001). Disturbances in the social body: Differences in body image and eating problems among African American women and White women. *Gender and Society, 15,* 239-261.

Magarey, A.M., Daniels, L.A., Boulton, T.J (2003). Predicting obesity in early adulthood from childhood and parental obesity. *International Journal of Obesity, 27,* 505-513.

Pesa, J., Syre, T.,& Jones, E., (2000). Psychosocial differences associated with body weight among female adolescents: the importance of body image. *Jouranl of Adolescent Health, 26,* 330-337.

Pierce, J.W., & Wardle, J. (1997). Cause and effect beliefs and self-esteem of overweight children. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 38,* 645-650.

Pinhas-Hamiel, O., & Zeitler, P. (2000). "Who is the wise man?-The one who forsees consequences:" Childhood obesity: New associated comorbidity and prevention. *Preventive Medicine, 31,* 702-705.

Riccardelli, L.A., & McCabe, M.P. (2001). Children's body image concerns and eating disturbances: A review of the literature. *Clinical Psychology Review, 21*(3), 325-344.

Rosen, J.C. (2001). Body image, eating disorders, and obesity: An integrative guide for assessment and treatment. (Thompson, J.K., Ed). Washington DC: American Psychological Association.

Sands, R. (2000). Reconceptualization of body image and drive for thinness. *International Journal of Eating Disorders, 28*(4), 397-407.

Sanchez-Johnson, L.A., Fitzgibbon, M.L., Martinovich, Z., Stolley, M.R., & Dyer, A.R., & Van Horn, L. (2003). Ethnic differences in correlates of obesity between Latin-American and Black Women. *Obesity Research, 12,* 652-660.

Schiel R, Beltschikow W, Kramer G, Stein G. (2006). Overweight, obesity and elevated blood pressure in children and adolescents. *European Journal of Medical Research, 11* (3) 970101.

Slade, P.D (1994). What is body image? *Behavioural Research and Therapy, 32*, 497-502.

Stradjmeier, J.D., Bosch, W., & Seidell, J. (2000).Family functioning and psychosocial adjustment in overweight youngsters. *International Journal of Eating Disorders, 21,*110-114.

Strauss, R. S., & Knight, J.(1999). Influence of the home environment on the development of obesity in children. *Pediatrics, 109,* 85.

Sugiyamaa, T., Xie D., Graham-Maar, R.C., Inoue, K., Kobayashi, Y., & Stettler, N. (2007). Dietary and lifestyle factors associated with blood pressure among U.S adolescents. *Journal of Adolescent Health, 40*(2), 166-72.

Strauss, R.S. (2000). Childhood obesity and self-esteem. *Pediatrics, 105*, 15-19.

Trost, S.G., Sallis, J.F., Pate, R.R. (2003). Evaluating a model of parental activity on youth phsyical activity. *American Journal of Preventive Medicine, 25*(4), 277-282.

Vander Wal, J.S., & Helen, M. T.(2000). Eating and body image concerns among obese and average -weight children. *Addictive Behaviors,25*, 775-778.

Vander Wal, J.S. (2004). Eating and body image concerns among average-weight and obese African-American and Hispanic girls. *Eating Behaviors,5,* 181-187.

Vander Wal, J.S, & Thomas N. (2004). Predictors of body image dissatisfaction and disturbed Attitudes in African-American and Hispanic girls. *Eating Behaviors,5,* 291-301.

Wadden, T.A., Brownell, K.D., Foster, G.D. (2002). Obesity: Responding to the global epidemic. *Journal of Consulting and Clinical Psychology,70,* 510-525.

Wolff, G.E., & Clark, M.M (2001). Changes in eating self-efficacy and body image following cognitive behavioral group therapy for binge eating disorder: A clinical study. *Eating Behaviors,2,* 97-104.