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Parental Perceptions of Weight in Their Own Children and in Other Children

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Parental Perceptions of Weight in Their Own Children and in Other Children.

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Abstract

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Childhood obesity rates have risen dramatically in the past 50 years. Interest in the issue of obesity in the United States has grown significantly as our population has become increasingly heavier and our obesity associated health issues have become ever more apparent. Childhood obesity is a persistent problem as 80% of obese children grow up to be obese adults. Despite the alarming increase in childhood obesity little has been done to reverse this epidemic. The purpose of the present study was to determine if parents are able to identify excess weight in children other than their own. It was hypothesized that we have become desensitized to excess weight because of its prevalence and as a result, parents would not only be unable to recognize excess weight in their own children, but they would also fail to recognize excess weight in other children. Eighty-four parents completed surveys that required them to categorize their own child in the appropriate weight category and then to view 14 pictures of other children in various weight categories and classify them into appropriate weight categories. The results were consistent with the hypothesis as parents were unable to identify excess weight in both their own children, and in other children.

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Parental Perceptions of Weight in their own Children and in other Children

Introduction

The prevalence of childhood obesity in the United States has more than doubled for children ages 6-11 and tripled for adolescents age 12-19 since 1960 (CDC, 2006; Ogden, 2003). Depending on the source, estimates of the percentage of children in the United States that are overweight or obese range from 20 to 35% (Institute of Medicine, 2006; Green & Reese, 2006; Strauss & Knight 1999). The C.S. Mott Children's Hospital National Poll on Children's Health, (2007) reported that when parents provide estimates of their children's height and weight the percentage of overweight and obesity is closer to 20%, however, when actual height and weight are measured, the prevalence jumps to 35%. This is because parents tend to overestimate the height and to underestimate the weight of their own children.

The prevalence of overweight and obese children may be even worse in West Virginia. An eleven year study of 26,000 West Virginia fifth grade students, known as the Cardiac West Virginia Project, found that 47% of fifth grade students were either overweight or obese, (Murphy, Cottrell, Ward, Minor, Elliot, & Neal, 2007).

Obese children, like obese adults, are at an increased risk for many health issues including type II diabetes, hypertension, hypercholesterolemia, obstructive sleep apnea, coronary artery disease, and nonalcoholic steatohepatitis (Daniels, 2006). In addition to these health related issues, childhood obesity is observed to result in poor self esteem, social discrimination, depression and anxiety (Strauss, 2000). With this alarming information, it would seem that our society would be taking intensive measures to address this issue. While there has been a recent dramatic increase in public attention to this national health crisis in our children, more needs to be done to address the issue. Some recent research indicates that many parents fail to accurately identify excess weight in the own children and therefore it is not identified as a problem (Carnell, Edwards, Croker, Boniface & Wardle, 2005 ;Jeffery, Voss, Metcalf, Alba, & Wilkin, 2005;

Maynard & al, 2003; Genovesi, Giussani, Faini, Vigorita, Pieruzzi, Strepparava, Stella, & Valsecchi, 2005; Baur, 2005; Baughman, Chamberlin, Deeks, Powers & Whitaker, 2000). Obviously if a problem is not identified then there is no hope that it will be addressed. Given that the general population in the United States has increased in body size it is possible that we have become desensitized to excess weight as our society has become increasingly heavier. The need to understand what prevents parents from addressing weight issues in their children prompted this research project. The purpose of this project was to investigate parental perceptions of their children's weight and factors that may affect parental perceptions. Further, this project sought to assess whether parents could recognize weight issues in children more generally. This should help to clarify whether we have become desensitized to excess weight in general, or if parents are specifically unable to identify excess weight only in their own child, a phenomenon akin to that termed optimistic bias, wherein one fails to accurately assess personal risk (Weinstein, 1989).

In the present study criteria for being classified as overweight or obese was determined by use of the body mass index.

Body Mass Index

Body Mass Index or BMI is calculated differently for children than it is for adults. For adults, BMI is calculated with the following formula: BMI= weight (in pounds) x 703/ (height (in inches) x height (in inches)). In children under the age of 20, calculation of BMI factors in a child's gender and age where as there is no consideration for such factors when calculating BMI for adults (CDC, 2006). In this study a child's BMI percentile for age/gender was obtained by entering the child's date of birth, gender, actual measured height and weight, and the day of the measurements. The height was measured to the nearest quarter inch and the weight was measured to the nearest quarter pound in order to obtain the most precise measure. The American Academia of Pediatrics defines obesity in children as a body mass index (BMI) at or above the 95th percentile (CDC, 2006). Children with a BMI between 85th and 94th percentile are

considered overweight. A healthy weight is defined as being between the 5th and 84th percentile. A child under the 5th percentile is considered to be underweight. The Center for Disease Control (CDC) takes gender and age into account when calculating a child's BMI, because the amount of normal body fat changes with age and gender. Body Mass Index is considered to be a reliable indicator of body fat in children and adolescents. Research has shown that BMI correlates with other direct measures of body fat, including underwater weighing and dual energy x-ray absorptiometry (CDC, 2006). BMI is frequently used because of the ease of calculation and the lack of expense in calculating.

Associated Health and Mental Health Issue Related to childhood Obesity

Parents' failure to recognize childhood obesity leaves their child susceptible to obesity associated health and mental health risks.

Obese children, like obese adults, are at an increased risk for many health issues including type II diabetes, hypertension, hypercholesterolemia, obstructive sleep apnea, coronary artery disease, and nonalcoholic steatohepatitis (Daniels, 2006). Their risk for hypertension in adulthood is ten times greater than that of normal weight children. They also have a three to eight times greater likelihood for dyslipidemias as adults. Their risk for developing diabetes mellitus is more than double that of normal weight children (Must & Strauss, 1999).

In addition to these physical health related issues, childhood obesity is observed to result in poor self esteem, social discrimination, depression and anxiety (Strauss, 2000; Puhl & Latner, 2007). Overweight and obese children also are more likely to have lowered self esteem, as measured by their generation of more negative and less positive self-esteem related explanations for ambiguous situations, as compared to normal weight children (Jansen, Smeets, Boon, Nederkoon, Roefs & Mulkens, 2007). The same study showed that overweight children were more likely to overestimate the probability that negative weight/shape related events would occur as compared to normal weight children. Their threat perception of such situations was also

significantly greater than for normal weight children. (Jansen et al., 2007).

Eighty percent of obese children grow up to be obese adults (Epstein, Wing, Koeske Valoski, 1987; Whitaker, Wright, Seidel, & Dietz, 1997; Guo, 1999). While childhood onset obesity accounts for only 25 percent of obese adults, individuals with childhood onset of obesity are more likely to be severely obese than those with adult onset obesity (Freedman, Khan, Dietz, Sathanur & Srinivasan, 2001). This is not surprising since the prevalent theory of how fat cells change with age speculates that adipose tissue (fat) grows by increases in both cell number and cell size during early childhood, while in adulthood the number of fat cells remains constant as adipose tissue only increases by growth in cell size. In other words, we do not generate new fat cells in adulthood. The fat cells we have simply increase or decrease in size. Even with dieting, fat cells may shrink in size, but they do not disappear. Fat cells also take less energy to maintain, and therefore, once a person becomes fat, it takes less food to maintain the fat than it did to attain it (Myers, 2004). This information makes identifying and addressing obesity in childhood even more imperative. An awareness of factors contributing to obesity may assist with identification or with the understanding of why parents fail to identify excess weight in their own child.

Factors affecting obesity

Genetic Influences Genetics are considered to influence obesity. African-American and Hispanic children are disproportionately more obese than Caucasian children in the United States, but culturally influences may be a factor as well. Females are also more likely to be obese than males (Gore, Brown & West, 2003).

Grilo and Pogue-Geile (1991) found that body weights of adoptive siblings are uncorrelated with one another and with their adoptive parents, but highly correlated with that of their biological parents. Identical twins have highly correlated body weight even when reared apart, (Plomin, Fulker, Corley, & Defries, 1990). The weight of identical twins is much more highly correlated (.74) than that of fraternal twins (.32) (Maes, Neale, & Eaves, 1997). Research

suggests that malfunctions in brain chemistry may contribute to obesity. For example, it is speculated that obese individuals may be less sensitive to leptin, which signals the brain that the body is full (Considine, Sinha, Heiman, & Kriauciunas, 1996). It should be noted that the issue of causation is not clear. It could be that obese people have become less sensitive to leptin, rather than decreased leptin sensitivity resulting in excess weight. Recent research suggests that obesity is associated with a common genetic variant that makes one predisposed to obesity (Herbert, Gerry, McQueen, Heid, & Pfeufer, 2006). One to two percent of obese children have underlying genetic conditions such as Down's syndrome, Prader-Willi, or Bardet-Biedle syndrome (Gomez, LeBlanc, Murray, and al, 2006).

Environmental Influences Environment also plays a role in the development of obesity. Strauss and Knight (1999) identified several home environmental influences on the development of obesity in children. This national survey of youth looked at 2,913 normal weight children between the ages of 0-8 years, over the course of a six year period. This study examined the role of race, marital status, maternal education, family income, parental occupation, cognitive stimulation within the home and the emotional relationship between the child and mother on the development of obesity. The results indicate that maternal obesity is the most significant predictor of childhood obesity. The study also found that children who lived with a single mother, nonworking parents, nonprofessional parents or a mother without a high school diploma were at a significantly increased risk of development of obesity. African-American children were also more likely to develop obesity, though income and level of cognitive stimulation were not controlled and, thus, amount to confounding variables. The results also indicate that children who live in environments with low levels of cognitive stimulation, as measured on a standardized assessment, were more than twice as likely to become obese as compared to those who had the highest levels of cognitive stimulation. These findings were also said to duplicate earlier research that showed a more than two fold increase of obesity for children living in dilapidated living conditions (Strauss and Knight, 1999).

Other societal influences are known to contribute to the development of obesity, including media that target children in the advertising of high fat foods (Arnas, 2006). Changes in lifestyle have also contributed to the incidence of childhood obesity, with children spending an increased amount of time in sedentary activities such as watching television, playing video games and using computers. The American Academy of Pediatrics (AAP) found that 26 percent of children and adolescents in the United States watch more than four hours of television a day, and that is in addition to their other sedentary activities (CDC, 2006). Sixty-two percent of US children age 9-13 do not participate in organized physical activities and 23 percent do not participate in non-organized physical activity outside of school. (CDC, 2006). Other factors contributing to childhood obesity include access to foods and drinks with little nutritional value at school, along with decreased time allotted for physical education in recent years (CDC, 2006). .

While we have some information about which environmental factors appear to be predictors of obesity, more information about factors that limit a parents' ability to identify weight issues in their children is needed. By assessing not only their ability to identify excess weight in their own children, but in other children as well, it may be possible to gain insight into the reasons parents have difficulty at identifying overweight and obesity. Such information could serve to determine whether or not there are specific segments or subgroups of parents who might be targeted for education on this issue, or if the problem is pervasive among parents in general.

Interventions

The physical and mental health risks for obese individuals are cause enough for intervention in this growing epidemic. The enormous cost of treatment for medical intervention for obesity related issues, estimated at $147 billion in the United States in 2008 (Finkelstein, Trogden, Cohen & Dutz, 2009) highlight the need to delineate effective primary, secondary and tertiary preventive treatment

Medical and Surgical Treatment Treatment options for childhood obesity include medication and surgical procedures. There are various surgical procedures that may be employed such as adjustable gastric banding, in which an inflatable band is used to partition the stomach into two parts. The vertical banded gastroplasty divides the stomach into two parts. The biliopancreatic diversion involves removal of a portion of the stomach. The effectiveness of these options in the treatment of obesity for children and adolescents has yet to be evaluated (Mayo Clinic.com). There are known possible risks associated with adult recipients of surgical weight loss procedures, they include death, blood clots in the legs, leaking at one of the staple lines in the stomach, pneumonia, narrowing of the opening between the stomach and the small intestine and dumping syndrome (Mayo Clinic.com). Common complications include vitamin and mineral deficiency, dehydration, gallstones, bleeding stomach ulcer, hernia at the site of incision and intolerance for some foods.

Educational Interventions Programs that educate children and their parents on how to make changes in diet, exercise and other behaviors have also been shown to be efficacious for both short and long-term positive outcomes. Current treatment trends are focused on school based programs to address the obesity epidemic. School is viewed as a way to reach a broad range of children, as over 95 percent of young children are enrolled in schools (National Center for Education Statistics, 2001). Some states have passed laws that address issues such as nutritional guidelines that reduce the availability of foods with low nutritional value at school. Attention has been given to the need for modification of physical education programs and other opportunities for physical activity. Additionally, some schools are providing educational information to both students and parents about BMI and the need for an increase in physical activity and a decrease in calorie consumption. Some schools are sending home health reports that include an assessment of the student's BMI so parents are informed about the status of their child's weight. An initiative in Arkansas showed that after parents were informed of their child's weight, they were significantly more accurate in recognizing that their child was overweight

(Ryan, Card-Higginson, McCarthy, Justice & Thompson, 2006).

While it would seem that parents would readily recognize that their child is overweight, research shows that despite the public attention to this rising epidemic, parents often fail to recognize that their child has a weight problem (Carnell et al., 2005). This information is likely to be useful because parents are unlikely to address an issue that they fail to recognize. Parents are better able to identify weight problems in their daughters than in their sons (Jeffery, Voss, Metcalf, Alba, & Wilkin, 2005). In addition, mothers are better than fathers at identifying weight problems in their children (Jeffery et al., 2005). Baur (2005) speculated that westernized communities have become desensitized to obesity.

How do we identify excess weight

Doctor's identification of excess weight It would seem reasonable to expect one's doctor to identify excess weight, particularly given the dramatic increase in health risks for obese individuals. Are doctors advising their patients of excess weight? Data from the 1999-2002 National Health and Nutrition Examination Survey (NHANES) was analyzed by the Center of Disease Control (CDC) The results of this analysis found that only 36.7% of overweight or obese children and teens ages 2-19 had been told by a doctor or other health care professional that they were overweight. The majority, 63.3%, had never been advised of their excess weight status. The child's age had a direct impact on the likelihood that information about their excess weight was shared. Doctors were more likely to inform teenagers, ages 12-19, of their weight problems than to inform the parents of younger children, ages 2-11 of the child's excess weight. Of the children between the ages 2-5, 17.4% of their parents were advised of the child's excess weight. Of the children from ages 6-11 years of age, 32.6% of their parents were advised of their excess weight. Slightly more than 39% of teenagers between the ages of 12-15 were advised of their excess weight, while 51.6% of teenagers between the ages of 16-19 were advised of their excess weight.

Parents' identification of excess weight The research on maternal/parental perceptions of children's weight consistently shows that parents fail to recognize weight issues in their own children. Data from the Third National Health and Nutrition Examination Survey (1988-1994) were analyzed (Maynard, Galuska, Blank, and Serdula, 2003). This study included 5,500 children aged 2-11 years. Maternal perceptions of children's weight were compared to children's BMI percentiles. Mothers were asked if they perceived their child to be "overweight", "underweight", or "about the right weight". Slightly more than thirty-two percent of the mothers reported that they thought their overweight child was "about the right weight". The younger the child, and the closer their BMI was to normal limits, the more likely the mother was to misclassify her overweight child. For children whose BMI placed them "at risk of becoming overweight" (BMI $\geq$ 85th to $\geq$ 95th percentile), mothers were significantly more likely to classify their daughters as overweight than their sons. Mothers were more likely to misclassify their at-risk children as overweight if the child was female, older, had a higher BMI for age and if the mother herself had a lower BMI. Race/Ethnicity was not a significant predictor for misclassification. The data in this study were taken from surveys completed from 1988 to 1994. Given the significant rise in obesity over the past decade, it is likely that today we would see even greater numbers of mothers who are unable to appropriately classify their children as overweight. This study classified children whose BMI was between the 85th and 95th percentile as being "at risk for being overweight" while the American Academy of Pediatrics defines children with a BMI between the 85th and 95th percentile as overweight. This difference would actually make the mothers correct when they identified these children as overweight. Children with a BMI at the 95th percentile or higher would be classified as obese according to the Academy of Pediatrics. Therefore the parents in this study who failed to identify these children as overweight were failing to identify obese children as overweight. While the data base was very large in this study, the differing definitions used for weight classification make the information in this study difficult to interpret because most of the other available studies consistently utilize the Academy of Pediatric standards for weight

classification.

A study of parental perceptions of weight with preschool age children was conducted in the United Kingdom, where obesity rates are said to be similar to those in the United States, (Carnell et al., 2005). The study looked at 564 parent-child dyads, with children between 3 and 5 years of age. Parents were asked to describe their child's current weight by placing them in one of five categories: very underweight, underweight, normal, overweight, or very overweight. They were also asked about their concern that their child would become overweight in the future. Children's BMI was calculated using actual weight and height. Results indicated that only 2 of the 104 children who were overweight were correctly identified by their parents. Only 7 of the 41 obese children were described as being "overweight", while none of them were described as being "very overweight". Perception of a child's being overweight was not associated with the child's age or gender, or with the parent's weight status, age, education level or ethnicity. Fortunately, parents of overweight children were more likely to express concern about their child becoming overweight than were parents whose children were not overweight. Parents who were overweight themselves were more likely to express concern about their child becoming overweight than were parents who were not overweight. The results of this study indicate that 94% of parents with overweight or obese children failed to correctly classify their child as overweight. The authors point out that this is significantly higher than results from the Maynard study (2003), and they also suggest that Maynard's differing definition of overweight likely produced this difference. The children in this study were all preschoolers, a factor that may have accounted for some of the difference, as research suggests that parents are more likely to misclassify their preschool age child than an older child.

Another study looked at maternal perceptions of overweight preschool children in the United States, (Baughcum, Chamberlin, Deeks, Powers & Whitaker, 2000). This study sought to

explore factors associated with mother's failure to perceive their preschool children as overweight. Six hundred twenty-two mothers of children between the ages of 23 to 60 months completed a questionnaire designed to examine their perceptions of their own weight, as well as their child's weight. Specifically, the questionnaire included items in four areas: maternal practices and beliefs about feeding, child eating behaviors, maternal attitudes about their own weight, and family demographics. The study used two groups. The first group consisted of mothers who brought their children to the pediatric primary care clinic at Children's Hospital Medical Center in Cincinnati, Ohio, and the other group was comprised of mothers who brought their children to 1 of 2 clinics of the Special Supplemental Nutrition Program for Woman, Infants, and Children (WIC), in northern Kentucky. Mothers with low income and/or low education were more likely to be overweight and to have overweight children. Obesity was more prevalent in mothers of nonwhite children, but there was no significant difference in the prevalence of overweight between white and nonwhite children. Mothers were able to accurately perceive their own weight issues when they were overweight or obese, as the majority of overweight mothers classified themselves as overweight; however, nearly one third of normal weight mothers also perceived themselves as overweight. Education was not a mediating factor, but other demographics did play a role. Nonwhite mothers were less likely than whites to perceive themselves as overweight and smokers were less likely than nonsmokers to perceive themselves as overweight. Among normal weight mothers, those in the higher income group were more likely to misperceive themselves as overweight than those in the low income group. Mothers in this study were not as good at perceiving overweight or obesity in their children as they were in themselves. Of the 99 overweight children, only 21% of their mothers accurately identified them as overweight. Among the 66 children that were obese, only 29% of their mothers believed them to be overweight. In a bivariate analyses of the sample of 99 mothers with overweight children, low maternal education was the only factor associated with a failure to perceive the child as overweight. The proportion of mothers who correctly identified their overweight child as

overweight did not differ by maternal obesity status, child gender, or any of the six demographic factors assessed (low income, race of the child, pregnancy, current smoker, under 26 years of age, child enrolled in WIC).

A study completed with British parents and their children explored parents' ability to perceive both themselves and their children's weight accurately (Jeffery et al., 2005). There were 277 children with a mean age of 7.4 years in the study. Parents were asked to categorize their children's weight on a 5-point Likert scale. The results indicated that not only do parents have difficulty recognizing when their children are overweight, but they often underestimate their children's weight when weight issues are noted. Parents were more accurate when assessing weight for daughters than for sons and mothers were better than fathers at accurately assessing their child's weight.

A study in Italy sought to establish whether maternal perceptions of a child's body weight and food intake was related to the level of maternal education (Genovesi, Giussani, Faini, Vigorita, Pieruzzi, Strepparava, Stella, & Valsecchi, 2005). The study employed 569 mother-child dyads. Mothers had a mean age of 37.4 years and children had a mean age of 6.8 years. Mothers completed questionnaires with demographic data and answered questions about their perception of their own weight and that of their child. The mothers' concern that their child could become overweight was assessed, as were their perception of the quantity of food their child consumed. Of the sample group, 28.8% of mothers were overweight or obese. Just over half (50.6%) of the children were overweight or obese. Girls were more likely to be overweight, as were older children. Mothers with less education were more likely to be overweight and to have overweight children. Mothers were able to accurately recognize that they were overweight and some even misperceived their own normal weight as overweight. Mothers were not as good at recognizing excess weight in their children. Mothers with low education were also more likely to fail to recognize that their child was overweight. The mother's perception was not significantly affected by the child's gender in this study. The maternal evaluation of their child's food intake

corresponded to the child's actual body weight as mother's of heavier children expressed that their children consumed more food; however, 43.4% of mothers with an overweight or obese child felt that their child was not overeating. Slightly more than 25% of mothers with normal weight children believed that their child was not eating enough. This perception was not limited to overweight or obese mothers. More than 40% of mothers with overweight or obese children did not express concern regarding health implications of excess weight.

Two hundred parents of obese children (BMI percentile rank of 95 or higher), primarily Hispanic (95%), completed surveys regarding their perceptions of their child's weight (Myers & Vargas 2000). Most of the children were 2 to 4 years of age with an additional 6.5% being 5 years of age. The parents were simply asked if they believed their child was overweight or not. In addition to the parent's response, the staff member administering the survey was also to indicate if they thought the child looked obese while observing them fully dressed. The staff members were either nurses or nutritionists. Forty-three percent of parents did not perceive their obese child (95% or >) to be obese, though it should be noted that 7% of them viewed their child as "a little overweight" and the remaining 35.5% saw no problem with their child's weight. Interestingly, 18.7% of the staff observations were also incorrect, as they failed to appropriately identify the child as obese. While the staff perceptions were based on observing the child fully dressed, one would imagine that, given their training, they would be more accurate in indentifying excess weight. Most parents in the study (72%) knew that an obese child would be at an increased risk to later develop cardiovascular problems despite the fact that most of them had low education levels. They were less aware of the associated mental health consequences. When asked what they had done to try to control their child's weight, 37% said they had done nothing, which is not surprising given that 45% felt that their child's weight was fine. Forty-eight percent indicated that they had decreased snacks, 3.5% allowed fewer sodas, 5% had attempted to increase exercise and another 6.5% provided other responses. While the majority indicated that they had no difficulty controlling what their child ate, 30% expressed that their child would cry if not allowed

certain foods or portions.

A metasynthesis of the current research on parental weight perceptions provided an overview of the current research on this issue (Doolen, Alpert & Miller, 2009). This metasynthesis included the research presented above and pointed out that Myers et al. (2006) suggested that misperception in the parents' ability to indentify excess weight in their own child resulted from their reluctance to accept the fact that their child is overweight. This lack of acceptance is said to be explained by what Weinstein (1989) termed optimistic bias, a phenomenon in which a person minimizes, or fails completely to accept the known risk to one's self, or in this case to one's child.

Overview of Study

The purpose of the present study was to attempt to determine whether or not parents can identify excess weight in children in general or if their inability is only limited to their own children. The present study is also seeking to assess if there are any mediating factors that make parents better or worse at identifying excess weight. Current research has demonstrated that parents are not good at identifying excess weight in their own children, though most of the research has looked primarily at preschool age children. The large study by Maynard et al. (2003) did not make use of the Center for Disease Control's weight classifications and thus it may have underestimated the inability of parents to correctly classify their children into appropriate weight categories. More information is needed about the prevalence of this misperception with parents of older children as well as information about the variables that mediate a parents' ability to identify weight issues in their own children. The purpose of the present study was to determine if this is an issue only observed in one's own child, which would suggest that optimistic bias is occurring, or if the phenomenon is more indicative of desensitization to excess weight in our increasingly overweight society.

It was hypothesized that parents would be unable to identify excess weight in their own

child. It was further hypothesized that parents would not be able to classify other children into the correct weight category. Finally, it was hypothesized that various demographic factors will not prove to be mediators of parents' ability to identify excess weight.

Method

Subjects

Participants were recruited from a university affiliated pediatric practice that services a broad base of children from surrounding counties in a tri-state area. Ninety-four surveys were completed by parents of patients at this local pediatric practice. Ten of these surveys could not be used due to a lack of pertinent information such as the child's date of birth or the nurse's actual height and weight measurements. One of the 10 was omitted due to an extremely large (100 pounds) discrepancy between the parents' estimated weight and the child's actual recorded weight. It was felt that this was an error and therefore not included. The participants' children included 48 males and 36 females. There was little variability in ethnicity of the children as 88 % of the children were Caucasian, 8.4% were African American and the remaining 3.6% were Asian American. No other ethic groups were represented. The mean age of the children was 9.57 years with a range of ages from 2 years to 17 years. Forty-four percent of the parents reported that their child had health problems with 49% of these reporting asthma and 46% of these reporting diabetes. The remaining 5% expressed other health problems. Of the remaining 84 usable surveys, the participants' children's weight groups were as follows:

Table 1

Subjects

Actual weight Category	Number of Subjects
Underweight	2
Normal weight	46
Overweight	16
Obese	20
Total number of subjects	84

Ethical Considerations

Informed anonymous consent was obtained from the parents choosing to participate in the study. Each parent was given a copy of the anonymous consent form and there participation in the study was accepted as consent as they could choice to throw the survey away and not participate. This consent was reviewed and approved by the Marshall University Office of Research Integrity. The informed anonymous consent explained who was conducting the research, the procedures of the research and how long participation would take. The form also advised participants that they could terminate their participation at any time. They were advised that the information would be anonymous and that they were not to put their name or their child's name anywhere on the survey.

Procedure

Stimuli books containing 14 pictures of children from four weight categories were constructed. Four books were constructed so that the pictures could be presented in varying order to assure that presentation order of the pictures did not affect parents' ratings of the pictures. The pictures were ordered by use of block randomization. The faces in the pictures were digitally obscured so the identify of the children in pictures were concealed. The pictures were obtained from various sources including a previous weight loss project and from volunteers who were known to one of

the investigators. All of the children in the pictures had their weight and height calculated by a nurse and this information was entered into the Center for Disease Control (CDC) website BMI for children calculator in order to obtain a BMI percentile for age and gender so that their weight category status could be identified. The pictures were selected to include one underweight child, four normal weight children, four overweight children, four obese children, and one very obese child. Only one underweight child was available to choose from. The very obese child, meaning his data was considered " off the chart" on the CDC BMI children's calculator, was included as it was felt that this extreme excess weight might be the only size that parents perceive to represent obesity. Of the remaining 12 pictures, there were four from each category and in each category there were two males and two females.

Parents of the children in the pediatric practice were asked to complete a brief questionnaire while waiting for their child's visit. The survey asked parents how they perceived their own child's weight relative to the four categories, underweight, normal weight, overweight, or very overweight. The survey also asked the parent to estimate their child's height and weight and to answer questions about their child's participation in physical activities. Additional family information was requested including the parents' estimated height and weight, parent education level and employment status and the family income and county of residence (Appendix A). Parents were then given a book containing the 14 pictures and asked to classify each child into one of the four weight categories, underweight, normal weight, overweight or obese. The parent then folded the completed questionnaire and put it into an envelope, sealed it, and gave it to the nurse upon entering the exam room. Actual weight and height information was recorded on the outside of the envelope by the nursing staff. The child's BMI percentile for age and gender were computed using the children's BMI calculator on the CDC website.

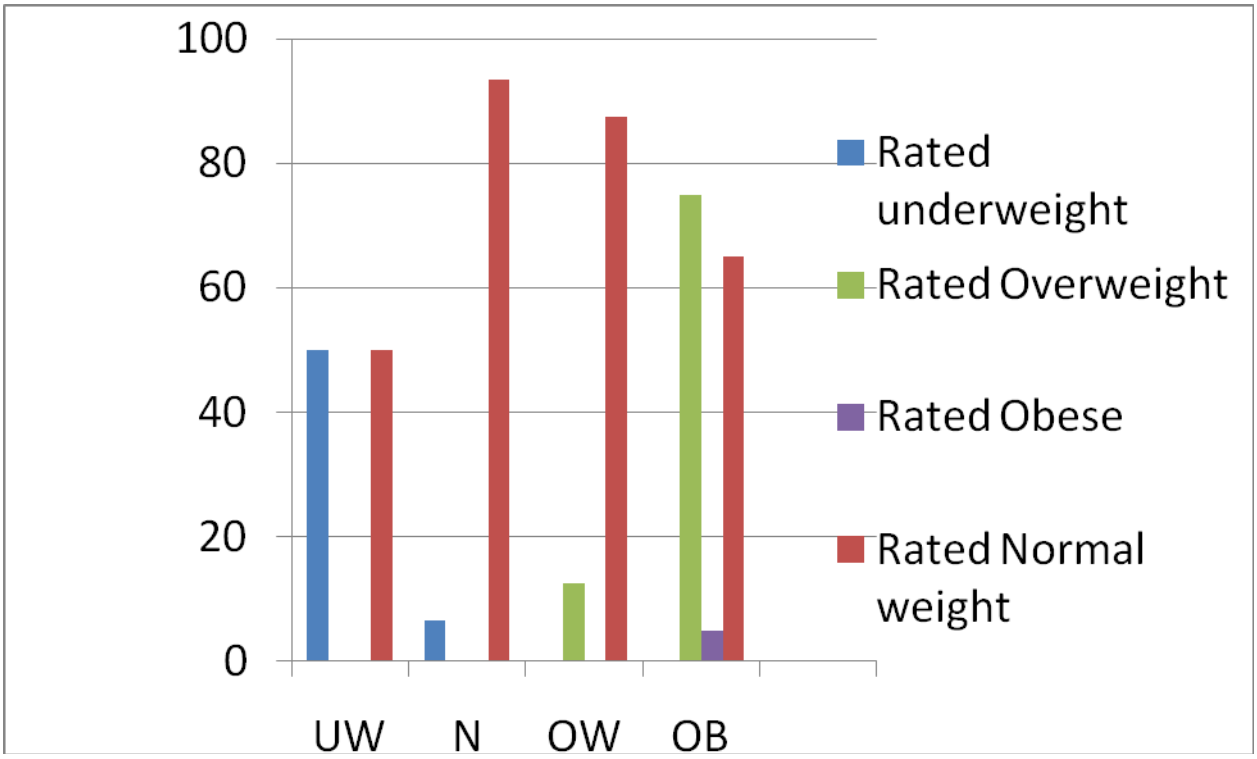
Results

To test the first hypothesis that parents would be unable to identify excess weight in their own child a chi-square analysis was conducted. The relationship between the child's actual

weight category and the weight category into which the parents categorized their child was examined. The results indicated that when a child is overweight or obese, their parents are often unable to accurately indentify excess weight, x^2 (9, N=84) =28.97, p=.001. Table 2 shows the distribution of parents' rating of their child's weight category with reference to their child's actual weight category based on the child's calculated BMI percentile.

Figure 1

Difference in how parents rated their child's weight category and the child's actual weight category



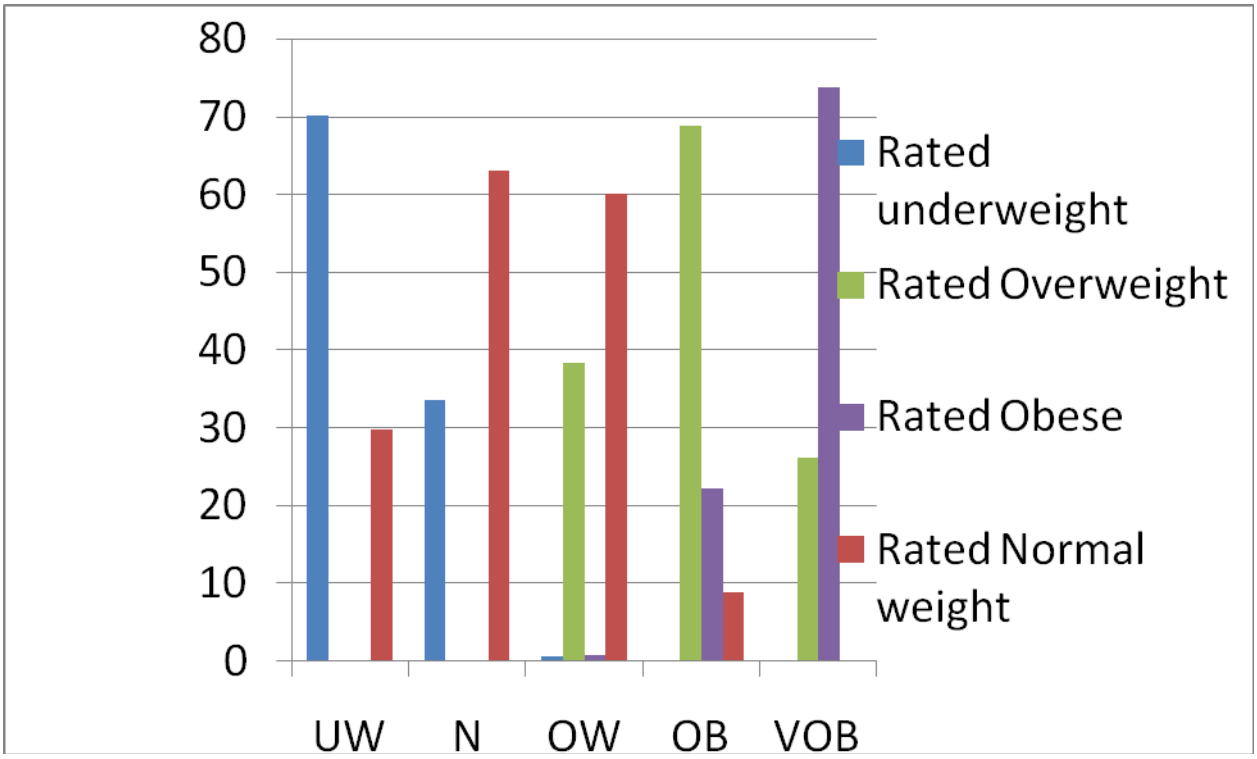
As can be seen from the figure, 84.5% of parents rated their own child as being of normal weight regardless of their correct weight category. Ninety-five percent of the parents of an obese

child were incorrect as they either failed to identify that their child had a weight problem or they underestimated the severity of their child's weight problem. Only 25% of parents were able to recognize at least some level of excess weight. Ninety-seven percent of parents with normal weight children were able to correctly categorize their child's weight. Thus the first hypothesis is confirmed that parents are not able to identify excess weight in their own children.

The second hypothesis that parents would not be able to classify other children into correct weight categories, was tested by examination of the frequency of correct response. It was found that no parent reached 100% accuracy. More than half of the participants, 51.2%, incorrectly categorized at least half of the 14 pictures. The mean number of errors was 7.04 with a standard deviation of 2.08. The minimum number of errors was 1 and the maximum number of errors was 11. The direction of the errors was primarily an underestimation of weight category as evidenced by the mean of the error of the pictures being a negative number representing an underestimation. Figure 2 presents how all 84 of the parents rated the 14 pictures.

Figure 2

How parents rated the 14 pictures.



Data were also analyzed to determine if the weight of one's own child had an impact on the parent's accuracy in identifying excess weight in other children. The results of this univariate analysis of variance indicated that there was no effect of the weight of one's own child on the ability to identify excess weight in other children, $F(3, 84) = 1.6$, $p > .2$. In other words most parents did poorly with this task regardless of the weight of their own child. Thus the second hypothesis is confirmed that parents were not able to successfully categorize other children into the correct weight categories. Figures 3, 4, and 5 provide a visual to demonstrate that there was relatively little difference in how parents of children in different the weight categories rated the various pictures.

Figure 3

How parents' rated the normal weight pictures broken down by the weight category of their own child.

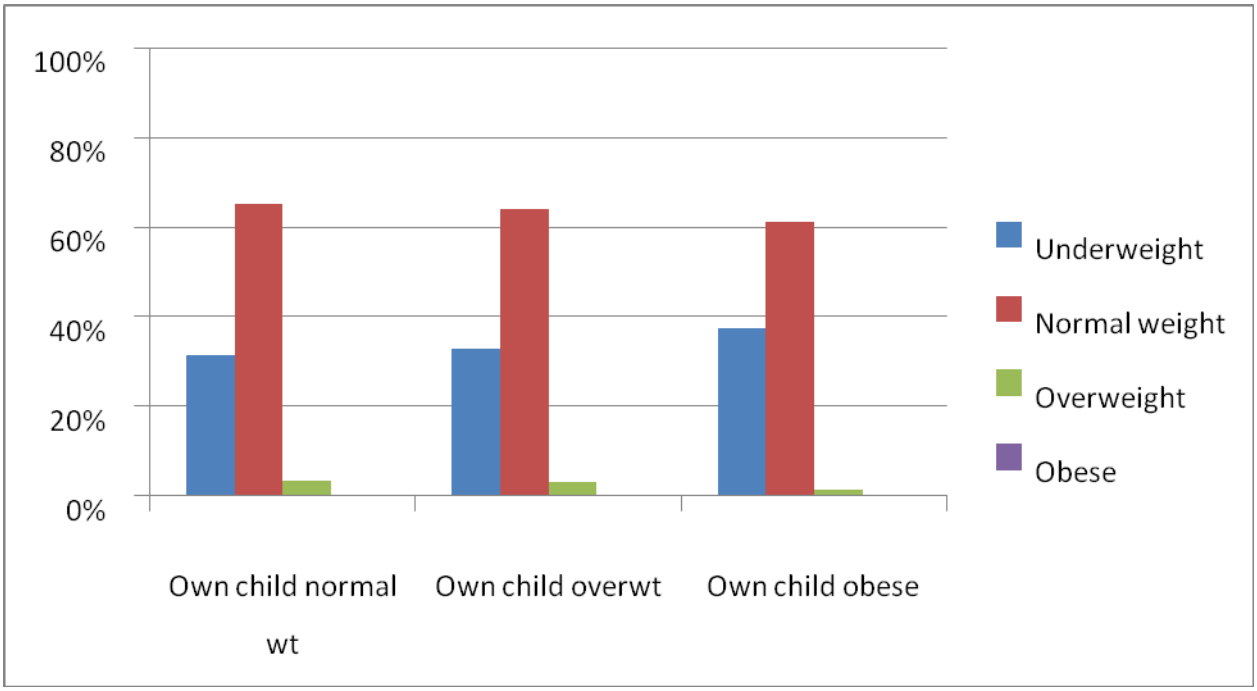


Figure 4

How parents' rated the overweight pictures broken down by the weight category of their own child.

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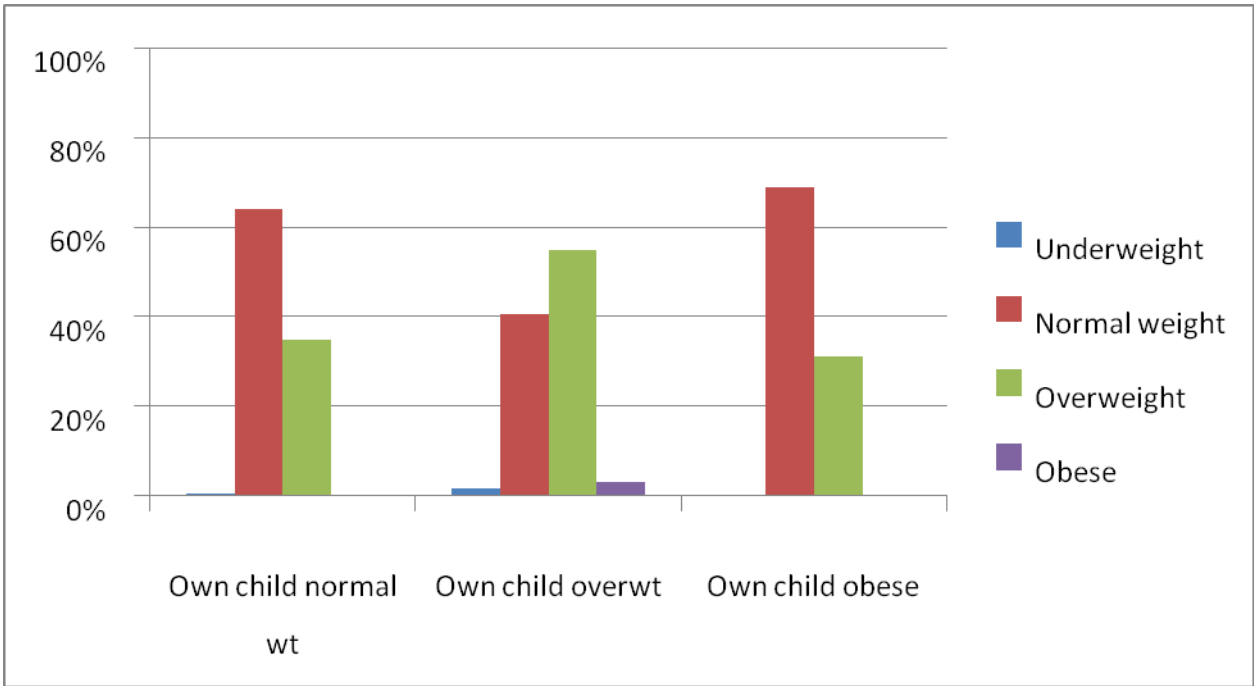
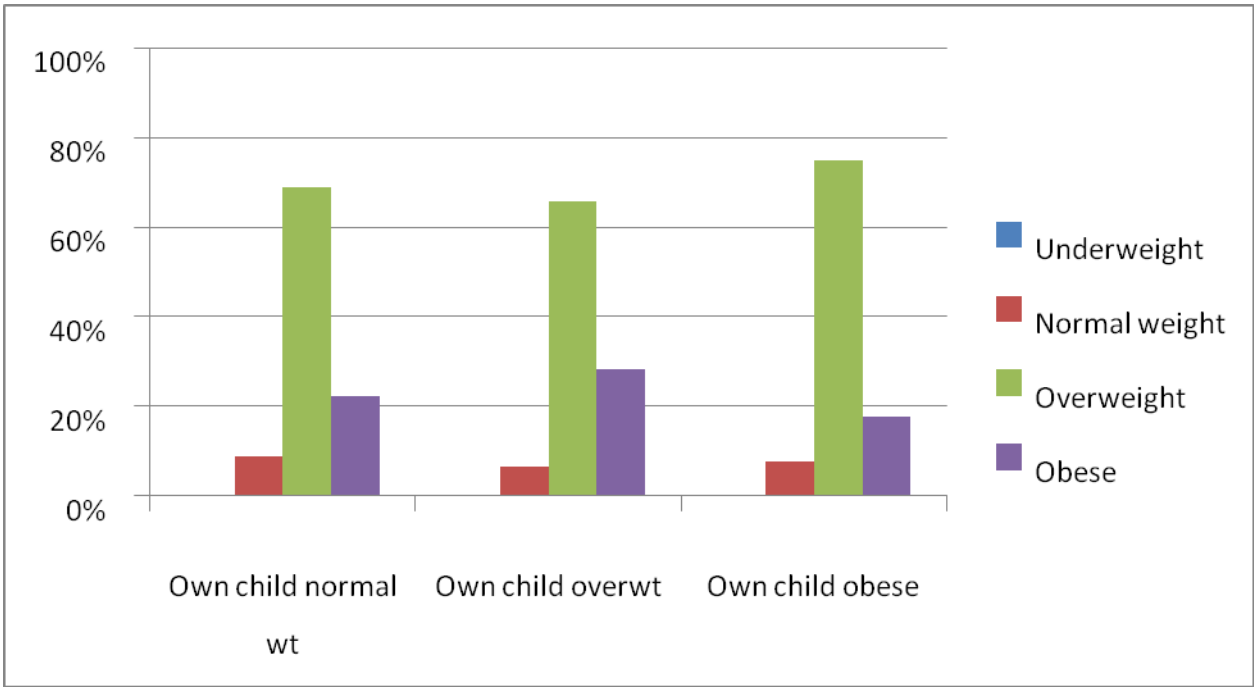


Figure 5

How parents' rated the obese weight pictures broken down by the weight category of their own child.



To test the third hypothesis that various demographic factors would not affect parents' ability to identify excess weight, a multi-factor analysis was conducted to assess whether any factors affected the parents' ability to identify excess weight in their own children. The results indicate no significant difference in accuracy with respect to family income $F(3,84)=1.52$, $p>.2$, mother's education $F(2,84)=1.02$, $p>.3$, father's education $F(2,84)=0.65$, $p>.5$, mother's weight $F(3,84)=0.28$, $p>.8$ or father's weight $F(2,84)=0.4$, $p>.68$.

Additional Findings Additional analyses of the data were conducted. A split file of the data to analyze only the data for the children who were identified as being overweight or obese based on actual height and weight was used to look at the relationship between being informed of

their child's excess weight by others and the parents' ability to accurately categorize their child into the correct weight category. A univariate analysis of variance for the split file was completed and results indicate that there is a significant $F(1, 36) = 5.31$, $p < .05$) relationship between these two variables. Results indicated that when a child is obese and the child's parent had been informed by others of their child's excess weight, then they were more likely to indicate that their child is at least overweight, but they still do not recognize that they were obese.

Information regarding whether or not parents had ever been informed by a doctor, nurse or others that their child was overweight was obtained from the 84 participants. Eighty-three percent of the parents of overweight or obese children reported that they had not been advised of their child's excess weight by a doctor. Slightly more than 63% said they had not been advised by anyone of their child's excess weight. When looking specifically at which children were informed, not surprisingly, obese children were more likely than overweight children to have been advised of their excess weight. Fifty-five percent of the parents of the obese children indicated that someone had advised them that their child was overweight, while only 12.5% of parents of the overweight children had been told that their child had excess weight.

A univariate analysis of variance was conducted to explore the relationship between a child's participation in organized and unorganized physical activities and a parent's ability to correctly categorize their child into the correct weight category. Would a parent be less likely to identify excess weight if they perceived their child to be active, as opposed to inactive? There was no significant difference observed $F(1, 84) = 0.92$, $p > 2$. Thus, whether or not a child participates in organized and/or unorganized activities made no difference in a parent's ability to correctly categorize their child into weight categories.

Gender has been identified in other studies as a factor that affects a parent's ability to identify excess weight. In some previous studies, parents were more likely to identify excess weight in their daughters than in their sons. In the present study no significant difference was found based on the child's gender $F(1, 84) = .002$, $p > 1.0$. Parents were neither more nor less

likely to identify excess weight in their daughters than in their sons.

Discussion

The results of the present study support previous research that found that parents are poor at indentifying excess weight in their children (Carnell et al., 2005 ;Jeffery et al., 2005; Maynard et al, 2003; Genovesi et al., 2005; Baur, 2005; Baughman et al., 2000). The present study also found that parents were also not able to identify excess weight in other children as well in terms of accurate categorization. These results provide some support for the notion that parents may have become desensitized to excess weight as the population has become heavier. If parents were able to identify excess weight in other children, then this would have provided evidence to disprove the notion that parents have become desensitized to excess weight, but that was not our finding. Rather, many parents seem to be either unable or unwilling to accept this problem in any child. The problem is pervasive. In addition, we found that neither income, mother's education, father's education, mother's weight nor father's weight had an impact on making parents better or worse at identifying excess weight. In other words the inability to correctly classify overweight and obese children is not limited to certain groups of people, but pervasive across income, education and gender. The parent's own weight and the weight of their own child also did not impact their ability to identify excess weight in a significant manner.

It is clear that childhood obesity is an alarming problem given all the associated physical and mental health risks, not to mention the associated health care costs. There has been an increase in the recent media attention to this issue, yet there does not appear to be an immediate effect in the actions taken to address the problem of obesity as there has been little change in the weight status of children (McCallum, Wake, Gerner, Baur, Gibbons, Gold, et al, 2006). If a problem is not identified then there should be no expectation that it would be addressed. Additional education and information of the associated physical and mental health risks would

likely prove to be ineffective in addressing childhood obesity if at first we do not provide information that is useful in identification of the problem. It is imperative that excess weight in children be identified as early as possible as prevention would seemingly be most effective in early childhood as the fat cell theory indicates that fat cells are generated in early childhood, (Myers, 2004) . Identification of excess weight may be best provided through school screening programs as this is an effective way to access large numbers of children (National Center for Education Statistics, 2001).

It is important that physicians become more aggressive in early identification and alerting parents. While one may assume that childhood obesity is a problem that would be easily recognized, the research indicates that this is not accurate (Carnell et al., 2005 ;Jeffery et al., 2005; Maynard et al, 2003; Genovesi et al., 2005; Baur, 2005; Baughman et al., 2000). It appears that our society needs to be educated on healthy weight ranges for children in order that we can halt and ultimately reverse this epidemic before the consequences for our children are insurmountable. It is necessary that both medical and mental health practitioners begin to address this problem and to address it early. The topic of excess weight should become a routine part of all medical and mental health assessments. Once medical and mental health practitioners begin to address this issue routinely, we may begin to notice an effect on rates of childhood obesity. We must be prepared to not only identify the issue, but to also provide information on effective ways to address the problem.

Future research should focus on effective ways to communicate excess weight issues to parents and to children as appropriate. Special attention should be given to how this information should be provided to children of a certain age and to determine at what age or level of development should children also be advised of their excess weight rather than just sharing that information with the child's parent. Given that teenagers are often significantly more in control of their own diet and exercise routine than younger children, it may be necessary and productive to share this information directly with an adolescent. Attention should be given to the possibility of

development of negative body image and self esteem issues, though it should be noted that poor self esteem is already considered to be correlated with overweight children. It is possible that the more excess weight is viewed and conveyed as a health issue rather than a beauty issue the less negative the impact of the identification of excess weight will be on one's body image. The American Academy of Pediatrics (AAP) recommends that BMI percentiles should be routinely reported and explained to parents, at least annually and that the presence of excess weight should be conveyed to parents in a non-judgmental, blame-free manner to decrease negative impact on the child's self esteem (Committee on Nutrition, 2003). The AAP further recommends that parents be provided education on how to manage their child's weight (Committee on Nutrition, 2003). This education should provide guidelines for television viewing time (maximum 2 hours a day), food choices and teaching children about autonomy in self-regulation of food intake, the importance of modeling healthy eating habits, and increasing physical activity.

Additional research to explore why doctors fail to communicate to parents and/or children when the child is overweight or obese could be useful. Doctors may fail to readily recognize excess weight in children (Spurrier, Magerey & Wong, 2006). Doctors often do not address weight issues if they are not the presenting problem, (Goldman, Moses, Bujanover, Glasser & Meyerovitch, 2004). Doctors do not always routinely weigh patients (Goldman et al., 2004). Doctors may be hesitant to discuss a child's excess weight with a parent who is also overweight. The doctor's own excess weight may make him or her more hesitant to address the issue of excess weight in the child.

Our society's tendency to view excess weight as a beauty issue rather than a health issue may lead doctors and others less likely to identify excess weight. It is likely that the more effectively it can be communicated that excess weight is health issue rather than a beauty issue then the more likely doctors will to be convey this information and the more receptive parents may be to accepting this information and ultimately addressing it. Given the enormous physical and

mental health issues associated with excess weight, it is necessary for practitioners to identify excess weight as early as possible and to make treatment options available to children and families.

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Appendix A

Child's D.O.B. ___/___/___

Child's Gender ___ Male ___ Female

Race/Ethnicity: ___African American ___Asian ___Caucasian ___Hispanic
___Other (please specify): _____

County of Residence _____

Estimated height ___ft ___inches Estimated weight ____ pounds

I believe my child is _____ for his/her height. (CHECK ONE):

___**Underweight** ___**Normal weight** ___**Overweight**___**Very Overweight**

Has anyone ever suggested that your child is overweight? ___Yes ___No
If yes, please list (i.e. Doctor, teacher, nurse, family member friend, etc.):
_____

Does your child participate in organized sports? ___Yes ___No
If yes please list: _____

Does your child participate in physical activity outside of school? ___Yes ___No
If yes please list: _____

Does your child have any chronic health problems? ___Yes ___No
If yes please list: _____

FATHER'S INFORMATION
height ___ft ___inches
weight ___ pounds
education level: ___**less than** a high school diploma or GED
___high school diploma or GED
___some college
___college graduate
Employed: ___Yes ___No

MOTHER'S INFORMATION
height ___ft ___inches
weight ___ pounds
education level: ___**less than** a high school diploma or GED
___high school diploma or GED
___some college
___college graduate

Employed: ___Yes ___No

Family Income Level:
___$25,000 or less
___$25,000 -$50,000
___$50,000-$100,000
___Over $100,000

Number of family members in the home ____

Please check one of the following three statements that best describes how you feel about your child's weight

___1.)I am not concerned about my child's weight.
___2.) I am concerned about my child's weight but I am not actively trying to address it.
___3.) I am concerned about my child's weight and I am actively trying to address it, by the following means: (check all that apply)

__ exercise
__ diet
__ other (please specify) _____

Please label each child's weight in the following categories by putting the indicated letter abbreviation or word beside the appropriate picture number.

PLEASE CIRCLE THE LETTER THAT IS ON THE COVER OF THE BOOK:

A B C D

U- Underweight
A- Average weight
OW- Over weight
OBESE- Extremely overweight or obese

PICTURES

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____