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THE HEALTH CARE PROVIDER'S EXPERIENCE WITH FATHERS OF
OVERWEIGHT AND OBESE CHILDREN: A QUALITATIVE ANALYSIS

A Thesis Presented

by

Eliza Anti

to

The Faculty of the Graduate College

of

The University of Vermont

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Abstract

The purpose of this study was to uncover the experience of health care providers (HCPs) as they work with fathers of children who are overweight and obese in the outpatient setting. Interpretative phenomenological analysis was used for data collection and analysis in this study. Seven HCPs were interviewed about their experiences. Two major themes emerged from the experiences of these HCPs: “dad in the backseat,” and “paternal resistance.” The theme of “dad in the backseat” captured to the HCPs’ perception of parental roles and related stereotypes with respect to fathers’ lack of presence in the health-care setting, family roles that relegate fathers to the backseat in dealing with this issue, and the tendency of fathers to take a passive role and defer to mothers in the management of their child’s weight. “Paternal resistance” reflected the perceived tendency of the father to resist the acceptance of their child’s weight as a problem, and to resist change and even undermine family efforts to make healthier choices. Health care providers’ experiences of fathers as having a minimal role in the management of their child’s overweight and obesity may lead them to neglect fathers as agents of change in this important issue.

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Chapter 1: Introduction

Overview of the Research Problem

Childhood obesity has reached epidemic proportions (Whitaker, 2011). In the past 30 years, obesity has more than doubled in children and quadrupled in adolescents (CDC, n.d.). The most recent data available on prevalence of childhood overweight and obesity is from 2011-2012, which concluded that 16.9% of youth in the United States were obese and 31.8% of youth were overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). Prevalence was equal among boys and girls, but disparity existed among race/Hispanic origin. Black (20.2%) and Hispanic (22.4%) youth had the highest prevalence of obesity, followed by white (14.1%) youth and Asian (8.6%) youth (Ogden, Carroll, Kit, & Flegal, 2014). Obesity prevalence differed among age categories as well, with more than 8% of two to five year-olds being obese, compared with 17.7% of six to eleven year-olds and 20.5% of twelve to nineteen year-olds (Ogden, Carroll, Kit, & Flegal, 2014). The approximate 12.5 million obese children in this country (CDC, n.d.) warrants the continued ranking of childhood obesity as a critical health threat.

The Body Mass Index (BMI) calculation is the preferred measure for evaluating obesity among children and adolescents two to 19 years of age as it is easily obtained, correlates strongly with body fat percentage, weakly associated with height, and identifies the fattest individuals correctly, especially at the upper end of the distribution (Krebs et al., 2007). Currently, the recommendation is to follow the Expert Committee on Clinical Guidelines for Overweight in Adolescent Preventive Service (Himes & Dietz, 1994) guidelines, which state that children with BMI (expressed as kg/m^2) greater than

30, or $\geq 95^{\text{th}}$ percentile for age and gender, (whichever is smaller) are considered obese and children with BMI between 85^{th} and 95^{th} percentile are considered overweight. The seriousness, urgency, and medical nature of childhood obesity outlined in the 2005 Institute of Medicine report (Koplan, Liverman, & Kraak, 2005) prompted the change from previous recommendations that children whose BMI exceeded 30, or $\geq 95^{\text{th}}$ percentile be considered overweight, and those with BMI between 85^{th} and 95^{th} percentile be considered “at risk of overweight”(Guo & Chumlea, 1999).

The short and long-term effects of childhood obesity are significant physically, psychologically, and economically for the individual, as well as for society. Childhood obesity has been shown in several studies to persist into adulthood (Reilly et al., 2003), with one longitudinal study finding that higher BMIs of two to five year olds were moderately associated with future adult adiposity, and that 53% to 90% of overweight or obese children continue to be obese or overweight into adulthood (Freedman et al., 2005).

Adverse outcomes related to obesity in childhood are numerous and the growing list of acute and chronic health problems related to childhood obesity include those affecting children immediately and those undetected until adulthood (Guo & Chumlea, 1999). Childhood obesity has been linked to orthopedic conditions such as slipped capital femoral epiphysis and Blount’s disease (Taylor et al., 2006) as well as respiratory conditions such as asthma (Liu, Kieckhefer, & Gau, 2013). Obese children are affected at a greater prevalence and experience more frequent exacerbations and complications than lean children (Black, Zhou, Takayanagi, Jacobsen, & Koebnick, 2013; Liu et al., 2013). Other conditions linked to childhood obesity include obstructive sleep apnea

(Arens & Muzumdar, 2010), pseudotumor cerebri and proteinuria (Lakshman, Elks, & Ong, 2012), early puberty (Currie et al., 2012), menstrual irregularities (Tharian & Warner, 2011) and steatohepatitis (Leung, Williams, Fraley, & Klish, 2009). There is also strong evidence for type 1 diabetes mellitus as a consequence of childhood obesity (Verbeeten, Elks, Daneman, & Ong, 2011). Chronic diseases previously seen only in adults, such as type 2 diabetes mellitus (Hannon, Rao, & Arslanian, 2005), hypertension (Tu et al., 2011) and hyperlipidemia (Lai, Ng, Lin, & Chen, 2001) are now being seen in children, and the risk factor they all share is obesity.

The incidence of metabolic syndrome in adolescents is 4% overall, but is as high as 30 to 50% in overweight children (Weiss et al., 2004). Thus, illustrating the significance that childhood obesity has on the physical health of affected children. Further, 15 years ago, type 2 diabetes mellitus accounted for less than 3% of all cases of new-onset diabetes in children and adolescents, while today it accounts for 45% of new-onset cases in adolescents (Pinhas-Hamiel & Zeitler, 2005). It is predicted that the lifetime risk of developing type 2 diabetes mellitus, for children born in the US in 2000, is 30% for boys and 40% for girls if obesity rates plateau (Koplan et al., 2005).

Children with type 2 diabetes are at increased risk for complications such as hypertension, hyperlipidemia, nephropathy and retinopathy, the development and progression of which might be especially rapid when the diagnosis is early in life (Pinhas-Hamiel & Zeitler, 2007). Additionally, the rate of progression of macrovascular complications may be higher for children with type 2 diabetes, than for young people with type 1 diabetes (Pinhas-Hamiel & Zeitler, 2007), underscoring the significance of

this devastating obesity-related disease.

Research suggests greater psychopathology among obese youth, compared with non-obese youth, although the relationship appears reciprocal, with unclear causation. There is a suggested relationship between obesity and disorders such as depression (Harriger & Thompson, 2012) and ADHD (Kalarchian & Marcus, 2012), but low self-esteem and behavioral problems are the psychological issues most commonly correlated with obesity (Reilly et al., 2003). Studies have found that adiposity also predicts future low self-esteem, with variables such as weight-related teasing, criticism and external control beliefs hypothesized to influence this relationship (Harriger & Thompson, 2012).

The economic consequences of obesity are realized both by society and the individual. In 2006, childhood obesity was estimated to account for \$14 billion in direct health expenses annually, and the annual total health expense for an obese child was approximately three times that of the average child's cost (Marder & Chang, 2006). Total national health care expenditures related to obesity and overweight in adults in 2008 were estimated at about \$147 billion (Finkelstein, Trogon, Cohen, & Dietz, 2009). Because of the likelihood of obese children remaining as such into adulthood, these costs are projected to rise. In addition, several studies have found evidence of a negative relationship between increasing BMI and skill attainment and academic performance in childhood and a robust association between obesity and labor market outcomes in adults, particularly among women (Palermo & Dowd, 2012). However, the degree to which these relationships can be attributed to biological, cognitive or social pathways has yet to be determined.

Overweight and obesity in childhood and adolescence have been associated with increased mortality rates in adulthood (Reilly et al., 2003). Should children continue to gain weight at the current rates, obesity may soon become the leading cause of preventable death in the USA (Miller, 2008). The grave sequelae of childhood obesity raise the imperative to seek causes and related solutions for this issue.

While it is well known that obesity is a result of an imbalance between energy intake and energy expenditure, the contributing factors are vast and complex.

Overweight in children is thought to be related to genetic factors interacting with environmental variables (Faith, Tepper, Hoffman, & Pietrobelli, 2002) and rarely can obesity be solely attributed to genetic causes (Miller, 2008). Environmental factors, beginning in utero, influence susceptibility to obesity (Daniels et al., 2005) and ongoing parental influences play a major part in the development or avoidance of obesity in children (Tzou & Chu, 2012). Parenting styles (Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006) parental control over food intake, parental eating habits and activity levels, and parental attitudes toward eating, feeding, weight of child and responsibility for this weight have all been associated with child overweight and obesity (Tzou & Chu, 2012). Further, the home environment, family functioning and parenting style have all been shown to affect children's weight-related behaviors, such as lack of sensitivity to internal satiety, fast and over-eating, and poor food choices (Rhee, 2008).

Much of the research on parental influences on childhood obesity has focused solely on the mother, or on the attitudes or parenting styles and practices of both parents (Tzou & Chu, 2012). To date, the role of fathers in childhood obesity has been largely

absent in the literature, outside of the evidence showing that obese fathers have children who become obese (Brophy, Rees, Knox, Baker, & Thomas, 2012; Francis, Ventura, Marini, & Birch, 2007; Lloyd, Lubans, Plotnikoff, Collins, & Morgan, 2014; Burke, Beilin, & Dunbar, 2001; Freeman et al., 2012). Research into the father's role in parenting has been expanding over the past several decades as fathers are increasingly spending more time with their children and assuming a broad range of roles and responsibilities that previously would have been performed by the mother (Garfield & Isacco, 2006; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). Research suggests that fathers may have influence over their child's obesity by modeling and encouraging healthy behaviors (Berge, Wall, Bauer, & Neumark-Sztainer, 2010). Health care providers are poised to interact with fathers regarding overweight and obesity in their children and therefore have a unique perspective on the paternal role, with regard to child weight management.

Purpose

The purpose of this study is to explain the experience of health care providers as they work with fathers of children who are overweight and obese in the outpatient setting. This study seeks to interpret and explain the experience and to identify common themes. This information will assist in understanding the health care provider's attitudes, beliefs and perceptions of fathers of overweight and obese children with regard to weight management, and inform future practice for health care providers who work with this population.

APRN Competencies

The 2012 Nurse Practitioner Core Competencies, developed by the National Organization of Nurse Practitioner Faculties (NONPF), are identified as essential behaviors that all nurse practitioners must demonstrate in order to meet the challenges of translating knowledge into practice in the rapidly changing health care environment. This study demonstrates achievement of several of these competencies, primarily in the areas of Scientific Foundation and Quality. The literature review process demonstrates the ability to critically analyze data and evidence for improving advanced nursing practice. Similarly, the analysis of literature from several different disciplines shows an ability to integrate knowledge from the humanities and sciences within the context of nursing science. The purpose of this study is to generate new nursing knowledge, which can then be used to develop new practice approaches in order to improve practice processes and outcomes, thus satisfying two of the Scientific Foundation competencies.

Research Question

“What is the experience of health care providers as they work with fathers of overweight or obese children in the clinical setting, with regard to weight management, and what is this experience like for them?” Sub-questions include: “What is the meaning embedded in the perceptions of health care providers’ interactions with fathers of overweight or obese children?” and “How do health care providers perceive the paternal role in parenting, with regard to their children’s overweight or obesity?”

Significance

Health care providers are in a unique position to interact with fathers on the

subject of overweight and obesity in their children. The previous experiences of health care providers have a direct effect on current and subsequent interactions with fathers of overweight and obese children, and the care that they deliver. Understanding the experience of health care providers can give us valuable insight into their attitudes, beliefs and perceived role of the father in managing their child's weight and weight-related behaviors. In this study, the researcher will explore the health care provider's experience with fathers of overweight or obese children in order to begin to understand how these perceptions might affect their ability to engage fathers in this important issue. This knowledge will help us to understand what health care providers might need in order to effectively influence the families they work with to make the necessary changes to reduce obesity in their children. This understanding will assist in strategizing family-based approaches to child weight management in the effort to reduce the epidemic of childhood obesity.

Chapter 2: Literature Review

An in-depth understanding of factors that contribute to childhood obesity is crucial in the understanding of how parents, and fathers in particular, have the potential to influence child weight. This literature review examines the contribution of diet and lack of physical activity to children's weight and the propensity of media to influence these factors. Parental factors such as changes in roles of parents, household factors, parent traits and behaviors and parenting practices are examined to shed light on what role parents play in their child's weight status. The available research on the role of the father with regard to childhood obesity is reviewed to outline what is known on this subject and to highlight the need for further research in this largely unexamined area.

Determinants of Childhood Obesity

While the basic physiology of weight gain is well understood: energy intake exceeds energy expenditure, the causes for the trend in increasing obesity in childhood are less clear. In order to understand this trend, much research has focused on changes in the diet, eating habits, and activity level among children and on media and parental factors.

Dietary composition. Both high fat and sugar-rich diets have been implicated in the promotion of weight gain and subsequent childhood obesity (Collison et al., 2010; Guillaume, Lapidus, & Lambert, 1998; Shang, O'Loughlin, Tremblay, & Gray-Donald, 2013). The World Health Organization has concluded that the fundamental causes of the obesity epidemic are sedentary lifestyles and high-fat energy-dense diets (WHO, n.d.). Using cross-sectional nationally representative data from the National Health and

Nutrition Examination Survey (NHANES), Duffey and Popkin (2013) concluded that in the period from 1977 to 2010, there was a significant increase in total energy intake among children and adolescents, aged two to eighteen years, and, over that time, in the period from 2005 to 2010, the average energy density per eating/drinking occasion for children reached its highest level. Reedy and Krebs-Smith (2010) analyzed the same data set (spanning 2003-2006) and found that the top sources of energy for two to 18 year olds were grain desserts, pizza and soda. Sugar sweetened beverages (soda and fruit drinks combined) provided the largest percentage of kcal per day, compared with all other food categories, with 20% of 9-13 year-olds and 28% of 14-18 year olds calories coming from this source. Additional evidence suggests that soft-drink consumption is positively associated with overall energy intake in children and adolescents (Harnack, Stang, & Story, 1999).

Using data obtained by interviews of 1,562 fifth-grade students, Nicklas, Yang, Baranowski, Zakeri, & Berenson (2003) determined that consumption of sweetened beverages, sweets, and meats, along with total gram consumption of food, particularly low-quality foods and snacks, were positively associated with overweight status. Similarly, daily energy intake, meal portion size, and meal energy have been significantly and positively related to BMI in children, after adjusting for television viewing hours and demographic confounders (Huang et al., 2004). This relationship was only significant for children over age six (Huang et al., 2004), emphasizing the importance of establishing good eating habits at a young age to control weight gain later in childhood.

The important element of this research by Huang et al. (2004) is the exclusion of

implausible reports of energy intake (those within the 1 standard deviation cut-point for reported energy intake as a percentage of predicted energy requirements), which they postulate to have been responsible for much of the past research showing either no relationship or a negative relationship between energy intake and overweight. Wolkoff et al. (2011) demonstrated a robust association between adiposity and under-reporting of energy intake among children, further supporting the exclusion of implausible reports of energy intake from studies assessing the relationship between energy intake and BMI.

The U.S. Department of Health and Human Services [USDHHS] promotes the consumption of whole grains, fruits, vegetables, low-fat or fat-free milk products, and lean meats and other protein sources, and recommends a limited of intake of saturated and trans fats, cholesterol and added sugars to promote healthy weight (USDHHS, 2013). Yet, 83% to 88% of American children, ages four to nine have a diet that “needs improvement”, or is “poor” (USDA, 2001). The most recent data from the NHANES show that American children consistently fall short in their consumption of vegetables and whole grains, while consuming an excess of refined grains and empty calories (USDA, 2013). The discrepancy between nationally recognized dietary recommendations and the reality of the diets of most contemporary children makes it clear that there is much work to be done on improving children’s eating habits to promote healthy weight.

Disordered eating and increased frequency of eating. Overeating (Ackard, Neumark-Sztainer, Perry, & Story, 2003), binge eating (Mirch et al., 2006) and loss of control (LOC) eating (Tanofsky-Kraff et al., 2004) have all been associated with higher

BMI in children. Although it is recognized that self-reports, such as those used in these studies, may not be entirely accurate (Tanofsky-Kraff et al., 2003), self-reported dietary intake has been shown to result in underreporting of food intake in obese subjects (Schoeller, 1995). While it cannot be concluded that overeating and binge eating causes obesity from these cross-sectional studies, the identification of these correlates of childhood obesity is still important, as these behaviors have also been associated with compromised psychological health (Ackard et al., 2003). Because depression (Harriger & Thompson, 2012) and low self-esteem (Reilly et al., 2003) are also correlated with obesity, eating behaviors suggesting psychopathology cannot be overlooked. Furthermore, LOC eating has been shown to be predictive of child weight gain over time, in a small sample of children at risk for adult overweight (Tanofsky-Kraff et al., 2009).

In their survey of 88, eight to twelve year-old children of varied weight status, Tanofsky-Kraft et al. (2003) found that approximately 20% reported overeating in the past month, while about 8% reported a loss of control associated with eating, and close to 7% reported one or more binge eating episodes. In a cross-sectional survey of 4,746 middle and high school students, 17.3% of girls and 7.8% of boys reported engaging in overeating and 11% of girls and 3.3% of boys reported binge eating (Ackard et al., 2003).

The frequency of reported overeating and binge eating in children is concerning, as it indicates that children may often override their own internal satiety. External eating, characterized by eating in response to external, rather than internal cues was found by Braet et al., (2008), to correlate strongly with overweight in children. Although, this study was cross-sectional, limiting its ability to assess causality, it had several important

strengths including the large sample of overweight and normal-weight children (2,474 children, aged 7-18), varied recruitment regions, and strong validity and reliability of the questionnaires used.

Evidence suggests that increased frequency of eating has resulted in higher average calories consumed by children. From their analysis of the cross-sectional nationally representative data from several surveys involving food consumption, ranging from 1977 to 2010, Duffey & Popkin (2013) concluded that over the full 33 year period, the largest contributor to changes in total energy intake by children was the increase in the number of daily eating occasions reported (accounting for +19 kcal/day/year). Increased caloric intake due to increased frequency of eating may be connected to the rise in childhood obesity over this same period of time. Because of the possible connection between disordered eating and increased frequency of eating and child overweight and obesity, understanding the causes behind these potentially obesogenic behaviors, as well as identifying potential mitigating factors, are important.

Lack of physical activity. Data from 6,329 participants in the NHANES suggested that only 42% of children ages 6 to 11 meet the recommendation for 60 minutes per day of physical activity, while only 8% of adolescents achieve this goal (Troiano et al., 2008). Males were more active than females across all age groups, with this recommendation being met in only 3% of 12 to 15 year old girls (Troiano et al., 2008). These statistics are troubling, as children with low daily physical activity (PA) levels have been shown to have an increased odds of being obese compared to ideal weight (Hohensee & Nies, 2012). Hohensee and Nies (2012) found that among a

nationally representative sample of 1,306 children aged 11-18, those engaging in less than 30 minutes a day of PA had 1.8 times the odds of being obese as children engaging in 30 minutes or more of PA per day. However, obesity prevalence among those children with the highest level of PA was still 20.4% (Hohensee & Nies, 2012).

Previous studies have supported the findings that obese children are significantly less active than their normal-weight peers (Deforche, Bourdeaudhuij, D'hondt, & Cardon, 2009; Trost, Kerr, Ward, & Pate, 2001). Cross-sectional studies such as these cannot exclude the possibility that lower levels of activity are a result of, rather than a cause of, obesity, but details within the following studies support the suggestion that lack of PA contributes to obesity. In a cross-sectional analysis of 5,595, 12 year-old children, strong inverse correlations between objectively measured PA, particularly moderate and vigorous PA, and fat mass (measured by DXA scanner) and obesity were found, with the inverse correlation being much stronger for boys than for girls (Blair et al., 2007). Physical activity was measured by accelerometer and worn for a minimum of 10 hours per day for 3 days by each child. Additional findings showed a similar correlation between PA and fat mass across the range of fat mass, not just in obese children, making it less likely that obesity led to lower levels of PA and more likely that lower PA levels influenced obesity (Blair et al., 2007).

The suggestion of lack of activity as a contributor to obesity is further strengthened by a prospective longitudinal study by Drenowatz et al. (2013), which showed that, among normal weight children, increased odds for a rise in BMI were observed with lower levels of moderate vigorous PA vs. higher levels. Of equal concern

are the secondary benefits which inactive obese children do not receive from PA, unrelated to its effect on their weight (Warburton, Nicol, & Bredin, 2006).

While there is a connection between PA and BMI, PA alone may not be a good determinant of adiposity. A recent systematic review of 10 prospective studies on the associations between PA and adiposity in children determined that baseline PA is not an important predictor of change in adiposity in children (Wilks, Besson, Lindroos, & Ekelund, 2011). Stevens et al. (2007) found a strong correlation between PA (measured by accelerometer) and BMI and fat mass in their cross-sectional analysis of over 4,500 middle-school girls. The follow-up longitudinal analysis of 984 of these girls demonstrated only a very small association between changes in PA and body fat and no statistically significant association between changes in PA and BMI (beta coefficient of -1.04 for 85th vs. 15th percentile of MVPA for BMI). Bandini, Must, Phillips, Naumova, & Dietz (2004) found no significant relationship between PA in the pre-menarchal period and change in fat mass by 4 years post-menarche in a sample of 196 non-obese girls.

It has been suggested that cardiorespiratory fitness (CRF) be considered as a moderating factor in child obesity (Rizzo, Ruiz, Hurtig-Wennlöf, Ortega, & Sjöström, 2007) as CRF has been shown to be a stronger correlate and better predictor of obesity than PA alone (Galavíz et al., 2012; Rizzo et al., 2007). Physical activity has been shown to be related to CRF and has been associated with significantly higher CRF in children (He et al., 2011), but the type of PA may be important in determining CRF (Rizzo et al., 2007). Low CRF, but not low PA, was predictive of increasing adiposity over 3-5 years in a prospective longitudinal study of 95 four-11 year old children by Fields et al. (2000).

Low CRF has been associated with high cardiometabolic risk, while high CRF appeared to attenuate the health risks associated with obesity in children (Rizzo et al., 2007). Additionally, declining CRF in children has been inversely associated with BMI change over time (He et al., 2011), suggesting that improving CRF in children, through increased vigorous PA may prevent or reduce obesity. Dencker et al. (2006), in their cross-sectional study of 248 children with relatively normal body mass distribution, found that only objectively measured vigorous PA, and not moderate PA, was associated with lower body fat. Because intensity of PA appears to predict higher CRF (Rizzo et al., 2007), this study further strengthens the assertion that CRF, attained through vigorous activity, is an important area of focus for obese children.

Increase in sedentary activities. Television (TV) viewing has been associated with higher BMI and increased fat mass in children (Jackson, Djafarian, Stewart, & Speakman, 2009) and longitudinal studies have supported this relationship over time (Blair et al., 2007; Miller, 2011, Proctor et al., 2003). Blair et al. (2007) identified time spent in sedentary activity, as well as time spent watching TV, as risk factors for childhood adiposity in their longitudinal study of 871 children from birth to age 7. Strengths of this study included its large sample size and differentiation between television viewing and general sedentary activity, but a few important limitations exist. Activity and TV viewing data were only collected at age 7, thus increased sedentary activity time could have been a result of increased weight. Further, this sample contained a disproportionate number of small for gestational age children (44%) and did not control for sociodemographic variables. Additionally, accelerometers were only worn for 24

hours, which limits the ability of this data to accurately depict activity levels.

Miller (2011) found TV watching to be an independent predictor of rise in BMI among 11,400 children followed longitudinally between kindergarten and 5th grade. The large sample size, in addition to robust control for several confounders such as sociodemographic characteristics, early health and overall levels of activity, were strengths of this study. An important limitation was that data on TV watching was collected by parent report and no details were provided regarding the instrument or frequency of data collection. Proctor et al. (2003) found time spent watching TV (including video game time) was predictive of increased body fat over time in their longitudinal study of 106 children followed from preschool through early adolescence. Strengths of this study included yearly data collection regarding TV viewing, BMI and body fatness. Important potential confounders related to obesity risk, including parental body fat and children's baseline body fat, were well controlled for but the authors failed to control for parental education, an established correlate with TV viewing time. These studies each have important strengths and weaknesses and together they provide compelling evidence for the contribution of television viewing and sedentary activity as determinants of child obesity.

Sedentary activity is not always correlated with obesity in the literature. Colley et al. (2013) found few associations between accelerometer-measured sedentary time and BMI in their study of 1,600 children and youth aged 6 to 19 years. Participants in this study wore accelerometers during their waking hours for 7 consecutive days, but provided no data regarding the type of sedentary activities they engaged in. Evidence

such as this suggests that the type of sedentary behavior children engage in may have more of an impact on their BMI than total time spent in sedentary activities.

Sedentary behaviors such as TV watching, recreational computer use and sedentary video game play (i.e.: “screen time”) have been implicated in child obesity by mechanisms other than displacement of PA time. Jackson et al., (2009) found a strong positive association between TV viewing and body fatness in preschool children, but in this cross-sectional study the effect of TV viewing on percentage of body fat was not mediated by accelerometer-measured physical activity. This suggests that displacement of PA time may be an unlikely connection between TV viewing and body fat in children.

These activities have been shown to decrease the resting metabolic rate (Klesges, Shelton, & Klesges, 1993; Salmon, Bauman, Crawford, Timperio, & Owen, 2000). Klesges, Shelton, and Klesges (1993) found that metabolic rate was significantly lower in 8-12 year old children while watching TV than during rest and this difference was noted in the same children tested under both conditions and in both obese and non-obese children, although the differences were greater in obese children. The sample size in this study was small (15 obese, 16 non-obese children), but variables potentially affecting metabolic rate were controlled for, strengthening the results.

Another explanation for the relationship between screen time and weight gain may be its effects on dietary intake. Television watching has been shown to disrupt habituation of food cues among children leading to an increase in energy intake. Temple, Giacomelli, Kent, Roemmich, and Epstein (2007) designed a rigorous randomized controlled trial that showed TV watching increased the time spent eating

($p=0.0001$), amount of food eaten ($p=0.007$), and energy intake ($p=0.007$) among 56 children, aged nine-12. Because this study was conducted in normal weight children and only assessed acute energy intake as a result of TV viewing, generalization of its results are limited.

Watching television during family meals has been associated with poorer dietary quality, including lower intake of vegetables and higher intakes of soft drinks, fried food, and snack food among adolescents (Feldman, Eisenberg, Neumark-Sztainer, & Story, 2007). Higher rates of television viewing has also been positively associated with consumption of high-fat and high-sugar foods and negatively associated with fruit and vegetable intake among adolescents (Ramos, Costa, Araújo, Severo, & Lopes, 2013). Considering that today's children are spending an average of 5.5 hours per day on television viewing, video games, and computer use combined (Iannotti & Wang, 2013), the potential impact of screen time on children's diet and weight is considerable.

Media influences. The food and beverage industry spends approximately two billion dollars per year marketing to children (Federal trade commission, 2008). The fast food industry spends an additional five million dollars daily on advertising to children (Federal trade commission, 2008). Total fast-food advertising spending reached \$4.6 billion per year in 2012 (Harris et al., 2013). In 2012 it was estimated that, on average, preschool-age children were exposed to over 1,000 fast-food restaurant ads alone, while teens were exposed to nearly 2,000 fast-food advertisements (Harris et al., 2013).

Overall, the vast majority of foods marketed to children are unhealthy and contain large amounts of fat, sugar, and sodium (Cheyne, Dorfman, Gonzalez, & Mejia, 2011).

The level of exposure to food advertising, coupled with the types of foods advertised creates a significant potential for food marketers to influence the consumption of unhealthy foods by children. Evidence suggests that children's exposure to food advertisements increased their preferences for the advertised products and influences their consumption habits (Institute of Medicine, 2006). Dixon, Scully, Wakefield, White, & Crawford (2007) found a strong correlation between self-reported TV exposure and positive attitudes toward junk food and higher self-reported frequency of consumption of junk food among 5th and 6th grade children, even after controlling for gender, grade, and socioeconomic status. Results must be interpreted cautiously as cross-sectional studies cannot demonstrate causality, as TV use itself is associated with snacking and may influence the types of foods consumed (Temple et al., 2007). Additionally, self-reports may be unreliable. In the experimental arm of the same study, Dixon et al. (2007) did not find increased pro-junk food attitudes or intentions in children following exposure to a half-hour TV show embedded with four clusters of five ads for junk food. The relatively small exposure to junk food ads in this experiment could explain the result and is unlikely reflective of the cumulative effect of children's lifetime exposure to advertisement on their food preferences.

Halford et al. (2008) found that exposure to food advertisements under experimental conditions produced substantial and significant increases in consumption of high-fat and/or sweet energy-dense snacks among a representative sample of 59, nine to 11 year old UK children. The observed increase in intake was higher in overweight children than normal weight children and more so in obese children. This study used a

within-subject counterbalanced design with control (toy advertisement), which strengthened its results. The main limitation was its small sample size.

While the majority of advertising exposure is viewed through television, the expansion of social and mobile media allows for increased marketing opportunities to target children. The development of smart phone applications and location-based services allows marketers to reach youths anywhere and at any time without parental supervision (Cheyne et al., 2011). Eleven of 12 major fast-food restaurant companies were found to maintain at least one Facebook account, nine of which had more than a million fans in 2009, maintained Twitter accounts, and had at least one YouTube channel between 2009 and 2010 (Cheyne et al., 2011).

Online gaming is very popular with children and adolescents and in 2009, more than two million children and adolescents visited food company websites to access “advergames” promoting primarily candy, high-sugar cereals and fast food, every month (Harris, Speers, Schwartz, & Brownell, 2012). Under experimental conditions, children exposed to advergames featuring unhealthy foods consumed 56% more unhealthy snacks and one-third fewer healthy snacks than those exposed to advergames with healthful foods (Harris et al., 2012). Children in this study whose parents reported that they had played advergames previous to the study consumed almost three times as much unhealthy snack food after playing unhealthy advergames as compared to playing control games or healthy advergames, illustrating the potential power of marketing on children’s food preferences. Although the results in this study are compelling, children participated under experimental conditions that may not be representative of the naturalistic

advergame playing habits of children. This, along with the lack of repeated measures, poses concern for generalization of the results.

Food advertisers understand the buying power of children and youth, as collectively children and youth spend over \$200 billion of their own money annually (Institute of Medicine, 2006). The top four leading items children ages eight to eleven select, without parental permission, are high-calorie and low-nutrient foods and beverages (Institute of Medicine, 2006). Among the top leading items that 13-17 year olds purchase are candy, soft drinks, and salty snacks or chips (Institute of Medicine, 2006). In support of the negative effect of food advertising on childhood overweight and obesity, Lobstein & Dobb (2005) found a significant positive correlation between levels of childhood overweight in nine countries and the number of television advertisements for sweet or fatty foods broadcast in a 20-hour period. Additionally, Zimmerman & Bell (2010) found a significant association between commercial viewing and BMI z-scores in children, even after adjusting for eating while watching television and exercise. This study used data from time-use diaries completed by over 2000 families at two occasions, 5 years apart, in order quantify TV viewing habits and to differentiate between content with and without advertisements. Both mother's BMI and child's baseline BMI were controlled for, strengthening the results. Reliance on self-reported time use data from only 2 days per child per wave was a limiting factor, as this may not have been adequate to accurately represent types of TV viewing.

Overall, evidence appears to support that exposure to advertisement influences children's weight. The potential of food advertisement to reach children is significant,

particularly considering the time children spend exposed to media and the increased opportunity of advertisers to reach children via expanded media markets.

Parental Influences

Parents have the potential to influence each of the previously mentioned determinants of child obesity. Several parental factors have been shown to affect the development, persistence, and treatment of obesity in children. These determinants include parental employment and time spent with children, household environment, parent traits and behaviors and parenting practices.

Parental employment and time spent with children. The increase in prevalence of childhood obesity coincides with a significant rise in maternal labor force participation, especially among women with young children (U.S. Census Bureau, 2009). In their analysis of matched mother-child data from the National Longitudinal Survey of Youth, Anderson, Butcher and Levine (2003), found that mothers' work intensity (hours per week over the child's life) correlated with overweight in their children, although the effect was only observed for children of higher socioeconomic status (SES) mothers. This effect does not seem to be limited to mothers. Benson & Mokhtari (2011) found a strong relationship between time spent in the labor force by fathers and increases in childhood obesity. They found that among a nationally representative sample of over 1,000 children aged 10 to 19, additional labor force participation by fathers was a stronger predictor of childhood obesity than that of mothers (Benson & Mokhtari, 2011).

It is proposed that because fathers, compared with mothers, continue to perform much smaller portions of the domestic and child-rearing activities (Meier, McNaughton-

Cassill, & Lynch, 2006; Sayer & Gornick, 2012), increased work hours for fathers may have a disproportionate potential impact on fathers' involvement in these activities, thus contributing to child obesity. Research supports this hypothesis, as Champion et al. (2012) found that having a father who worked a nonstandard schedule was strongly associated with child overweight and obesity, while maternal nonstandard work schedules had no independent effect on child BMI, even after adjusting for parental work hours, socio-demographic covariates, and time the child spent in front of a TV, computer or game system. In this study, nonstandard work hours were considered to be from 1800 to 0900 hours on weekdays and any weekend hours, which are likely times for potential interaction with children. It is important to note that while several studies have found no connection between paternal work hours and childhood obesity (Cawley & Liu, 2012; Courtemanche, 2009; Phipps, Lethbridge, & Burton, 2006), none of these studies looked at paternal work schedules.

Effect of parental employment on child diet and physical activity. Cawley and Liu (2012) suggested that the most probable mechanism of influence of parental employment on childhood obesity is the displacement of time away from food-related and child-rearing activities. Cawley and Liu (2012) found that both full-time maternal and paternal employment was associated with spending significantly less time grocery shopping, cooking, eating with their children, playing with their children, and caring for their children, but more time purchasing prepared food when compared to non-working parents, although the differences were much greater for mothers than for fathers. This study included a sample size of 24,902 mothers and 14,826 fathers who responded to the

American Time Use Survey between 2003 and 2009. The large sample size strengthens this study, but a causal relationship between parental employment and time spent in activities associated with child diet and physical activity cannot be demonstrated due to methodological limitations.

Parents who were employed have been shown greater consumption of away-from-home foods and prepackaged ready-to-eat foods (Cawley & Liu, 2012; DeLeire, Kalil, & Ziol-Guest, 2006), which tend to have higher fat density and lower nutrient density than home cooked meals (Cutler, Glaeser, & Shapiro, 2003; USDA, n.d.). Energy dense, nutritionally poor foods have been implicated in the rise of obesity (Cutler et al., 2003; Institute of Medicine, 2005). Married dual-earner families have been shown to spend a smaller portion of their total food and beverage expenditure on fruits, vegetables, meat, milk and beans and a higher portion on food away from home than married families in which only the father is employed (DeLeire et al., 2006). Single fathers have been shown to allocate a smaller share of their food and beverage dollars toward fruits and vegetables and a larger share toward food away from home than single mothers (DeLeire et al., 2006), suggesting that fathers may make poorer food choices than mothers.

Parental employment may have an effect on child obesity by decreasing the supervision of child food choices. Klesges, Stein, Eck, Isbell, & Klesges (1991) found that under experimental conditions, unsupervised children aged 4-7 of various weight status chose foods higher in calories, sugar, saturated fat, and sodium than did the same supervised children. A major limitation of this study was its small sample size (n=53) and the majority of the children being from families of high SES, limiting the ability of

the results to be generalized to children of lower SES.

Fertig, Glomm, and Tchernis (2009) analyzed data from the Child Development Supplement of the Panel Study of Income Dynamics. In a sample of 2,500 children from 1,100 families, increased maternal work hours over a child's lifetime were correlated with more hours of TV watching and fewer meals, in general, eaten by children, both of which have independently been correlated with child BMI (Jackson et al., 2009; Drenowatz et al., 2013). The magnitudes of the associations were small and the researchers were unable to estimate the effects based on age, limiting the scope of this study. Skipping breakfast, in particular, has been associated with higher child BMI in several studies (Drenowatz et al., 2013; Haug et al., 2009; Niemeier, Raynor, Lloyd-Richardson, Rogers, & Wing, 2006; Tin, Ho, Mak, Wan, & Lam, 2011). Self-reported breakfast habits were analyzed from a sample of 68,600, 4th to 6th grade Hong Kong children by Tin et al. (2011). They found that breakfast skipping was correlated with higher mean BMI at baseline as well as greater increases in BMI over 2 years. This cross-sectional study was strengthened by its large sample size. The main weakness of this study was its reliance on children self-report. In sum, it appears that the parental workforce and parental time spent with children affects food quality and food choices for, and by, their children and may influence child obesity.

Household Influences. Research supports the role of the home environment on child food consumption and physical activity. Because parents are instrumental in establishing the home environment, aspects of the environment that have been shown to correlate with, or influence child eating and activity habits are reviewed.

Influence of availability of food at home on child diet. Even with the trend of eating meals away from home in the US, nearly 70% of children's total calories are still consumed at home (Adair & Popkin, 2005). Children, in general, choose to eat the foods they are served most often and prefer foods that are readily available in the home (Birch & Marlin, 1982). Availability of fruits and vegetables (F/V) in the home as well as a higher ratio of healthy food choices have both been associated with higher fruit and vegetable intake among youth. Ding et al. (2012) surveyed 171 adolescents-parents pairs and 116 parents of children, with diverse geographic and socio-demographic characteristics, about types of food available in the home. Results showed a consistent association between home food environment and youth F/V intake, with a larger ratio of more healthful as compared to less healthful food having the strongest association with higher F/V intake among youth. This finding suggests that providing fewer unhealthful food items and more F/V in the home may encourage children and adolescents to consume more F/V. Strengths of this study included its test-retest design and inclusion of 3 separate surveyed samples (adolescents, parents of adolescents, and parents of children). This study was limited by its reliance on self-report and that it did not control for household income, when higher-income families in this study were shown to provide more F/V in the home.

Adolescents have reported that food availability and convenience is one of the most influential factors in their food choices (Story, Neumark-Sztainer, & French, 2002). Results from a study by Reinaerts, de Nooijer, Candel, & de Vries (2007) showed that, even when controlling for food preferences, exposure to vegetables contributed to more

vegetable consumption in children. A convenience sample of 1,739 parents of 4-12 year-old children completed surveys to assess their child's F/V consumption, habits, attitudes and preferences, psychosocial factors, social influence and self-efficacy, as well as availability, exposure and accessibility of F /V in the home. Parental F/V consumption was also assessed. Child F/V intake was found to be significantly correlated with exposure, availability and parental consumption, and most highly correlated with habit ($p < 0.05$). Further, exposure to a variety of F/V tasted was correlated with intake, even after controlling for food preferences. The large sample size and number of determinants analyzed strengthened the results of this study. Parental report likely skews representation of child intake and no predictive relationship between determinants can be made using a cross-sectional design, therefore limiting its results. In addition, determinants of F/V intake are likely to differ among age groups and results of this study may not be pertinent to all ages.

Neumark-Sztainer, Wall, Perry, & Story (2003) found home availability to be the strongest correlate of fruit and vegetable intake, even in light of low taste-preferences in a survey of 3,957 adolescents. Several additional factors were assessed in relation to F/V intake and social support for healthy eating and taste preference were the second and third strongest correlates of F/V intake, after home availability. This study included a large and diverse sample of adolescents and considered a wide range of socio-environmental, personal and behavioral factors of potential relevance to dietary intake, and examined the interactions between them, strengthening its results. This study did not only focus on F/V intake. Scales within the survey were not always specific to fruit and

vegetable intake, and the survey was not as comprehensive as other surveys in terms of the number of F/V items included.

Findings from a longitudinal study by Pearson, Ball and Crawford (2011) support the role of home environment as a determinant in child eating habits. They found that, among 1,850 adolescents, after adjusting for baseline F/V consumption and sex, perceived home availability of F/V, as well as modeling of healthy eating by mother, were positively associated with a change in vegetable consumption over a two year period. Perceived home availability of energy-dense food was negatively associated with the change in fruit consumption and positively associated with the change in energy-dense snack consumption. The longitudinal design with a long follow-up period combined with the diverse sample and the range of predictors strengthened this study. In a similar study, higher availability of sugar-sweetened beverages at home was found to be predictive of increased intake of these beverages in a sample of 348 adolescents over a 4-month period (Ezendam, Evans, Stigler, Brug, & Oenema, 2010). The range of cross-sectional and longitudinal studies on this topic strengthen the associations and support a causal relationship between available food in the home and parental modeling with the consumption patterns of healthy and unhealthy food among children.

Family meals. Less time spent eating meals as a family has been associated with maternal employment status as well as with increased consumption of unhealthy fats and nutritionally poor meals (Gillman et al., 2000; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003) and with child overweight (Gable, Chang, & Krull, 2007; Taveras et al., 2005). In a study by Neumark-Sztainer et al. (2003) 4,746 adolescents of diverse racial

and socioeconomic backgrounds, from 31 urban and suburban public middle and high schools were interviewed to determine frequency of family meals. Data from questionnaires were used in this study to analyze dietary intake as well as a number of socio-demographic variables. Frequency of family meals was positively associated with intake of fruits, vegetables, grains and calcium-rich foods and negatively associated with soft-drink consumption (Neumark-Sztainer, Hannan, et al., 2003). There were notable ethnic/racial and SES differences in frequency of family meals, with Asian American and higher SES adolescents reporting more frequent family meals. Although the researchers adjusted for co-variant socio-demographic characteristics, it is possible that there were other factors, not controlled for, which affected diet quality. Additionally, adolescents may not accurately report their own dietary habits.

Influence of household environment on physical and sedentary activity. The home environment has been shown to influence child activity level and BMI. Crawford et al. (2010) examined environmental determinants of youth physical activity over 5 years among a sample of 301, 10 to 12 year old children, the majority of which lived in two-parent households. Among boys, both sibling PA and maternal modeling of moderate to vigorous PA (MVPA) were positively associated with child MVPA, and maternal modeling of MVPA and number of home sedentary items (TVs, DVD players, computers, electronic games) were positively associated with BMI. Among girls, paternal MVPA modeling, PA rules, and parental PA co-participation were positively associated with MVPA. Maternal sedentary behavior modeling was positively associated with child BMI, while number of sedentary behavior rules and PA items (balls,

bats/rackets, bikes, home gym equipment, rollerblades, skateboards, skipping ropes, scooters and toys that encourage active play) were inversely associated with child BMI. The high attrition rate (66% over full 5 years) was a limitation of this study. Baseline characteristics of those lost to follow up were similar to those who did, but boys who participated in follow-up had significantly lower baseline BMI z-scores than boys who did not. Additionally, assessment of the home environment was done at one time point and may not accurately reflect the changing home environments over the study period. The 5-year follow up was a major strength of this study, with data on PA and BMI being collected at three time points, as was the use of accelerometry to objectively assess PA.

Further supporting the association between the home environment and child PA levels and BMI change, Timperio et al. (2008) found that over a three-year period, number of home sedentary items at baseline was associated with relatively greater increases in objectively measured BMI z-scores (age and sex standardized BMI) among boys. Physical activity equipment in the home at baseline was inversely associated with BMIz change among girls. This study did not control for energy intake or baseline pubertal maturation, which represent potential factors in BMIz change.

Research by Salmon, Timperio, Telford, Carver and Crawford (2005) found that among 403, 10-12 year old boys, those with electronic games in the home were 2.6 times more likely than those without these games to have lower levels of physical activity. Similarly, a systematic review of correlates of TV viewing among youth by Gorely, Marshall, & Biddle (2004) found that having a television set in a child's bedroom has been consistently associated with higher levels of television viewing. These findings

suggest that the home environment affects both electronic game use and TV viewing times, which have both been independently associated with higher child BMI (Jackson, 2009; Miller, 2011).

Van Zutphen, Bell, Kremer, & Swinburn (2007) found that living in a family with tight rules governing TV viewing time, never watching TV during dinner, having only one TV in the household or not having a TV in their bedroom were all associated with approximately 20-30 minutes less TV time in 1,926, 4-12 year-old children. Overweight or obese children were more likely to have a TV in their bedroom than healthy weight children. Television in the bedroom was more strongly associated with increased risk of child overweight than the child's actual TV viewing time. It may be that TV viewing times were based on parent report, and underreporting was likely higher for bedroom based viewing. Only a few of many family factors potentially influencing TV viewing were examined. However, the associations persisted after controlling for a number of socio-demographic variables such as parent education, income, and SES, suggesting that the associations were robust. These associations suggest that having tight rules around TV time, not watching TV during dinner and having only one TV in the home may reduce TV watching among children, and lend strong evidence to the hypothesis that TV in a child's bedroom contributes to more TV watching and higher child BMI.

Parent-supported reduced TV viewing and computer use time may affect BMI in young children. Epstein, Roemmich, Robinson, et al. (2008) conducted a randomized controlled trial involving 70 children aged 4-7 years whose BMI was at or above the 75th percentile for age and sex and who had free access to TV and computer use. Researchers

randomized children to two groups. The intervention group had parents reduce child TV viewing and computer use by 50% with positive reinforcement and parental praise. The control group consisted of no reduction in TV viewing and computer use. Children were monitored every 6 months over 2 years for BMI, TV viewing, energy intake, and PA. Monitoring devices with codes were installed on all the TVs, computers and video game systems in the homes of the children in the experimental group to objectively determine their usage. PA was monitored via accelerometer and energy intake by a validated questionnaire. Children in the intervention group showed greater reductions in targeted sedentary behavior ($p < 0.001$), BMI ($p < 0.05$) and energy intake ($p < 0.05$) compared with those in the control group. Changes in BMIz were moderated by child SES, with the children in families of lower SES having the greatest reduction in BMI. This suggests that children of low SES may benefit the most from reductions in screen time. Changes in energy intake, but not PA, were differentially related to changes in the targeted sedentary behavior, suggesting that reductions in screen time affect child BMI through a reduction in energy intake, not an increase in PA, further implicating media influences in child BMI. This study presents strong evidence that parent directed changes in the home environment may be important targets for reducing BMI in children.

In sum, TV and computer game use appear to be important determinants of weight in children. Parents can contribute to a healthy BMI in their children through limiting the amount of sedentary activities in the home, increasing the amount of PA equipment, not allowing a TV in the bedroom, encouraging reduced screen time, setting limits on TV use and turning the TV off during family meals.

Parent Traits and Behaviors.

Relationship between parental obesity and child obesity. Parental obesity has been consistently positively correlated with child obesity (Agras et al., 2004; Strauss & Knight, 1999; Zeller et al., 2007) and has been shown to be an independent predictor across all socioeconomic status groups. Keane, Layte, Harrington, Kearney and Perry (2012) conducted a cross-sectional analysis of a nationally representative sample of 8,568, 9 year-old children in Ireland. After adjusting for household SES characteristics, children with obese parents had 3.9 times the odds of being overweight when compared to children with normal weight parents, and when both parents were obese, the odds rose to 15.3. The degree of overweight in parents appears to affect child obesity as well. Obesity in parents increased the odds of child obesity nearly 3 fold compared to parental overweight. While cross-sectional studies are not able to infer causal relationships, such strong correlational evidence is significant.

Parent role modeling of diet and physical activity. Parental modeling has been proposed as a potential factor in child BMI. Parental consumption of fruits and vegetables has been shown to positively influence children's intake in several studies (Birch, Fisher, Mitchell, & Smiciklas-Wright, 2002; Cooke et al., 2004; Reinaerts et al., 2007; Wind et al., 2006). Alia, Wilson, George, Schneider, & Kitzman-Ulrich (2013) demonstrated that levels of parent fruit and vegetable intake were inversely associated with BMIz among a sample of 70 African American adolescents ($p < 0.01$). Berge, Wall, Bauer, & Neumark-Sztainer (2010), in a survey of 4,764 adolescents, found that overall, parents who modeled healthy behaviors had children with lower BMI as compared to

children whose parents did not model healthy behaviors even when those parents encouraged healthy behaviors in their children. Gender-related differential associations between parent modeling and child BMI were found. Mothers who encouraged, but did not model healthy behaviors had sons with higher BMI compared with those who modeled, but did not encourage healthy behaviors ($p=0.027$). Fathers who neither modeled nor encouraged healthy had daughters with higher BMI as compared to daughters whose fathers who only modeled ($p= 0.013$) or encouraged ($p= 0.043$) healthy behaviors. This study consisted of a large, diverse sample of children and controlled for several possible confounders of child BMI, thus strengthening the associations made. However, parental weight was not controlled for, representing a limitation of the results.

A meta-analysis, by Pugliese and Tinsley (2007) examined 36 studies related to the relationship between parental factors and child PA. A moderate positive relationship between parental support and modeling behavior and child PA was demonstrated. Mattocks et al. (2008) found parental activity level early in life (before the age of 5) predictive of physical activity in a sample of 5,451, 11-12 year old children. An additive effect on child PA was found when both parents were active early in the child's life. Cohort attrition and biased participation may have resulted in an unrepresentative sample, as children who participated in this study were more likely to be from socio-economically advantaged backgrounds. Strengths of this study included controlling for child sex and several socioeconomic variables.

Parental activity level may also affect PA in obese children. Kalakanis, Goldfield, Paluch, & Epstein (2001) found that parents' activity level significantly and

independently improved objectively measured PA levels among 51, 8-12 year old obese children. This was evident regardless of influential covariates such as age, gender, SES and BMI status of children and parents. The findings in this study may not be generalizable to all obese children, as this study was limited to obese children and parents seeking obesity treatment and may have represented a more motivated sample.

Parent gender, with regard to parental role modeling of PA, appears to affect child BMI differently in boys and girls. Crawford et al. (2010) found that maternal role modeling of MVPA was predictive of higher MVPA and lower BMI among boys, but not girls. Paternal role modeling of MVPA was predictive of higher MVPA and lower BMI among girls, but not boys. Additionally, maternal role modeling of sedentary behavior was predictive of higher BMI in girls, but not boys. These findings were consistent from childhood to adolescence, a time of increased independence and autonomy, suggesting that early parental modeling may have lasting effects on child PA and BMI.

Parents as agents of change in child weight management. Parent modeling has also been shown to be a significant predictor in child weight-loss efforts. In a prospective, randomized, controlled study, Epstein, Valoski, Wing, & McCurley (1990) found that obese children placed in a group that reinforced parent and child behavior change and weight loss had significant decreases in percent overweight (based on average weights for children based on age, sex and height) after five and ten years (-11.2% and -7.5%, respectively, $p < 0.05$). Children placed in a group that only reinforced child behavior change and weight loss showed increases in percent overweight at five and ten years (+2.7% and +4.5%, respectively, $p < 0.05$).

Even when children are not involved directly in obesity treatment efforts, children experience significant weight reduction when parents are targeted as agents of change. Golan, Weizman, Apter, & Fainaru (1998) conducted a randomized longitudinal study in which 60 obese children aged 6-11, of mixed SES status and with both parents living at home, were randomly assigned to one of two groups. In the experimental group, parents alone were designated as the agents of change for child weight loss. The control group consisted of children who were designated as the agents of change. Mean percentile weight reduction was significantly higher in children in the experimental group (14.6%; $p < 0.03$) than in the control group (8.1%) over one year. Treatment success was found to be independent of child gender and degree of overweight in children and parents. The dropout rate was far higher in the control group ($n=9$) vs. the experimental group ($n=1$). It is possible that the least motivated children may have dropped out, which may have potentially skewed the findings. The low drop out rate in the “parents as agents of change” approach to child weight loss may represent a strength of this approach, as children in this group may have felt less pressure to lose weight and therefore were more adherent. Interestingly, fathers, but not mothers in the experimental group, experienced a significant weight loss ($p < 0.05$), bringing into question the effect of fathers’ weight status on child weight.

Further evidence supports parent BMI change as an independent predictor of BMI change in obese children. Wrotniak, Epstein, Paluch, and Roemmich (2004) conducted a secondary analysis, involving 142 families of overweight and obese 8-12 year-old children, of parent and child BMI changes in three family-based randomized controlled

weight management studies. They found that parent BMI reduction significantly predicted child BMI reduction over 6 months ($p < 0.001$) and 24 months ($p < 0.009$), and that parents in the highest quartile of BMI reduction had children with significantly greater BMI reduction than that of children with parents in the other quartiles ($p = 0.01$). This evidence suggests that children may benefit the most from parents who lose more weight in family-based behavioral treatments. Parent praise and modeling of healthy eating habits were also shown to be independent predictors of child BMI reduction over 24 months ($p < 0.001$) (Wrotniak, Epstein, Paluch, & Roemmich, 2005). It is possible that the variance in child weight change previously explained by parent weight change may be, in part, a consequence of parent modeling. These results were consistent after controlling for SES, child gender and age, and parent gender and baseline parent and child BMI. The sample consisted of families who enrolled in an obesity treatment program which focused on parental involvement in child obesity treatment, thus the results may not be generalizable to the general population of obese children and parents. Cumulatively, the evidence supports the direct effect of parent role modeling on child health behaviors and child BMI, independent of parenting practices and other parent and child variables.

Parenting practices.

Effect of parenting practices on child eating and weight. Experimental, as well as cross-sectional, evidence exists supporting the relationship between parenting and child eating behaviors and weight status (Ventura & Birch (2008). Parental restrictive feeding practices have been shown to be significantly and consistently associated with

increased child weight and weight-related behaviors in the literature (Birch & Davison, 2001; Faith, Scanlon, Birch, Francis, & Sherry, 2004; Fisher & Birch, 2002; Jansen et al., 2012; Joyce & Zimmer-Gembeck, 2009; Patrick & Nicklas, 2005; Rhee, 2008; Stang & Loth, 2011). Jansen et al., (2012) found a significant positive association between parental restrictive feeding and child BMI, among a sample of 4,987 four-year-olds, independent of several confounders, such as child gender, birth weight, SES and parental BMI.

While most of the studies reporting this connection have been cross-sectional, limiting the ability to test direction of effect, it is suggested that restrictive feeding may cause intake dysregulation and increased attention to and desire of palatable foods, resulting in overeating at times when access to food is unrestricted (Fisher & Birch, 1999, 2002; Jansen et al., 2012). In support of this theory, Fisher and Birch (2002) found parental restrictive feeding practices at age 5 to be predictive of eating in the absence of hunger from at age 7 ($p < 0.05$) in non-Hispanic white girls from two-parent households, even after controlling for child weight status and eating in the absence of hunger at age 5. Girls in this study who engaged in this behavior were 4.6 times as likely to be overweight at both ages ($p < 0.01$), suggesting that parental restrictive feeding may contribute to child obesity.

Joyce and Zimmer-Gembeck (2009) determined that, among a sample of 230, 4-8 year-old children, children's disinhibited eating partially mediated the association between parent restriction and child BMI. Restriction was found to be directly associated with child BMI, while other aspects of parenting and parenting style moderated the

relationship between restriction and child disinhibited eating. Their findings suggest that the negative effects of restriction may be buffered in the context of the encouragement of healthy eating in a supportive, warm, and autonomy-granting way. The results of this study only reflect associations among a sample of predominantly white participants with a relatively low prevalence of overweight/obesity, limiting its generalizability.

Faith, Berkowitz, Stallings, Kerns, Storey, and Stunkard (2004) conducted a prospective study of 57 families identified at birth to test direction of effect of restrictive feeding practices. They determined that increased parental restriction of child food intake predicted higher child BMI at age 7, but only among children at high risk for obesity, and stable or increased parental monitoring predicted lower child BMI scores, but only among low-risk children. Parental feeding practices were also found to be related to child weight status in this study. Musher-Eizenman, Holub, Hauser and Young (2007) also found a significant relationship between parental concern about overweight in their child and restrictive feeding practices in both mothers and fathers. These findings highlight the interplay of family context, child weight, parent feeding practices and child BMI and caution against broad generalizations regarding the affects of parent feeding practices on child BMI.

Restrictive feeding practices have been shown to be more common in parents who perceive their child as overweight (Francis, Hofer, & Birch, 2001). In contrast, pressure to eat is a parent feeding practice correlated with lower child weight and parental perception of their child as underweight (Carnell & Wardle, 2007; Francis et al., 2001; Stang & Loth, 2011). These findings suggest a bi-directional effect of the influence of

parent feeding practices and child and family traits on child weight status.

Effect of parenting practices on child physical activity. The research regarding the affects of parenting practices, such as encouragement, over child PA suggests that the effects of parental encouragement on child PA may differ, depending on child characteristics. A systematic review of correlates of physical activity of children and adolescents concluded that while parental encouragement and direct help from parents were consistently associated with greater PA in adolescents, aged 13-18, this same association was not consistently found among children, aged 3-12 (Sallis, Prochaska, & Taylor, 2000). A more recent meta-analysis found a moderate association between parental encouragement and supportive behaviors, such as transportation and purchase of equipment, and child and adolescent PA levels (Pugliese & Tinsley, 2007). These studies suggest an overall association between parental encouragement and increased PA in children, but cannot determine direction of effect. Meaning, does parental encouragement lead to increases in child PA, or do more active children inspire more encouragement and support from parents regarding PA? Further, this relationship does not address whether parental encouragement and support for PA for children who are obese or overweight is effective.

Davison and Deane (2010) found that parental encouragement of PA for weight loss among a sample of 177 girls, across ages 9-15 years did not lead to increases in objectively measured PA and was linked to higher BMI and negative psychosocial and health outcomes among girls in this longitudinal study. These results were independent of covariates such as obesity status, parent logistic support for and modeling of PA, and

total energy intake. A major limitation was the use of a non-validated scale to quantify PA levels. Further, sample characteristics such as being white, non-Hispanic, and from generally middle class families weaken the study's generalizability to other more heterogeneous populations. Despite these limitations, this study provides preliminary evidence that parental encouragement of PA for weight loss may have unintended outcomes for girls, particularly during adolescence.

The Role of Fathers

Thus far, the majority of literature investigating the parental role in childhood obesity has focused on mothers (Birch & Fisher, 2000; Francis et al., 2001; Mamun et al., 2005; May et al., 2007; Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002). Attention to mothers can be attributed to the historical role of mothers as the primary caregivers of children. With more mothers working outside of the home, fathers' time with children has been increasing over the past several decades, but still remains well below that of mothers' (Bianchi, 2000). Active and regular engagement by fathers has been found to predict a range of positive child outcomes (Ball, Moselle, & Pedersen, 2007; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008). A growing body of evidence demonstrates that fathers play an important role in their children's weight status (Fraser et al., 2011; Khandpur, Blaine, Fisher, & Davison, 2014). Fathers' influences on children's weight outcomes may even be greater than that of mothers' (Stein, Epstein, Raynor, Kilanowski, & Paluch, 2005; Wake, Nicholson, Hardy, & Smith, 2007). What follows is a review of fathers' potential influence over child weight and factors that contribute to child obesity.

Quality of time. The disparity in the amount of time fathers and mothers spend with their children may be mediated by the differences found in the quality of time fathers spend with children as compared with mothers. Craig (2006) analyzed time-use data from just under 3,000 Australian mothers and fathers of children under 12. She found that while fathers spent about two-thirds as much time with children as mothers (Bianchi, 2000), 40% of that time was spent in interactive child care, including face-to-face activities such as teaching, reading, playing, talking, and disciplining. In contrast, only 22% of mothers' time with children was spent in these activities. Further, it is suggested that fathers are much more likely than mothers to perform these activities independent of other activities, while mothers are more likely to multitask (Craig, 2006). Consistent with these findings, data from the American Time Use Survey from 2005-2009 showed that married fathers spend more time playing with their children than married mothers (Bureau of Labor Statistics, n.d.).

Father role modeling of physical activity. Further evidence of fathers' potential to influence children's activity level includes that, independent of work status of fathers and mothers, fathers spend more time participating in sports, exercise and recreation, as well as watching television, than mothers (Bureau of Labor Statistics, n.d.). Among a sample of 187 predominantly African-American children, obese children were significantly less likely to report that their fathers were physically active than non-obese children ($p=0.04$) (Trost et al., 2001). The same discrepancy was not present for mothers. Obese children also exhibited significantly lower objectively measured daily accumulations of moderate and vigorous PA than non-obese children ($p<0.01$). These

findings suggest that child perception of father PA may influence child PA, which may contribute to child obesity, but causal relationships cannot be inferred from cross-sectional data.

Father modeling has been found to be positively associated with child PA (Edwardson & Gorely, 2010), but different associations have been found in the literature, depending on child gender. Davison, Cutting, and Birch (2003) found that among a sample of parents of 180 non-Hispanic white girls, fathers reported higher levels of explicit modeling of PA than mothers. In this study, fathers' modeling and encouragement of PA was correlated with higher levels of accelerometer-measured PA among their 9 year-old daughters. Crawford et al. (2010) found paternal modeling of PA to be predictive of daughters', but not sons', PA over 5 years among a sample of 301 Australian children. Conversely, among a sample of 104 overweight Chinese children, aged 8-12, fathers' modeling ($p < 0.01$) and encouragement of PA ($p < 0.05$) were significantly and positively related to their sons' attraction to PA, but not their daughters', although no objective measurements of PA were made (Lau, Lee, & Ransdell, 2007). Berge et al. (2010) found paternal modeling of healthy behaviors to be correlated with significantly lower BMI in daughters ($p = 0.013$), as compared with no modeling or encouraging.

While, in general, paternal modeling has been found to have a positive influence on child PA, conflicting evidence exists related to the influence of paternal encouragement of PA in children. Lloyd, Lubans, Plotnikoff, Collins, & Morgan (2014) found an inverse relationship between fathers' reinforcement and objectively measured

child PA ($p < 0.01$). This study had a higher than average proportion of overweight and obese children (42%) and it has been suggested that encouragement and promotion of PA may be different, or may be interpreted differently, depending on child weight status and that overweight and obese children may interpret encouragement as coercion (Davison & Deane, 2010), leading to resistance. Because of the cross-sectional nature of this study, it may also be true that the fathers provided more encouragement for children who were least active. Therefore, the correlation may have been a result of the inactivity, rather than the reverse.

Feeding practices. Fathers' potential to influence child weight is not limited to their effect on physical activity. Recent literature suggests that fathers are taking an active role in child feeding (Horodyski & Arndt, 2005), specifically in regards to organizing meals and making decisions regarding portions and what foods to feed (Mallan et al., 2013) and that fathers may employ different child feeding practices than mothers (Hendy, Williams, Camise, Eckman, & Hedemann, 2009; Lloyd et al., 2014). Among a diverse group of 439 fathers and 541 mothers, Hendy et al. (2009) found significant differences between the feeding practices of fathers and mothers. Fathers were found to use more forceful mealtime practices than mothers, such as insistence on eating ($p < 0.001$), while mothers were found to use more gentle approaches, such as setting daily snack limits ($p < 0.02$), ensuring daily fruit and vegetable availability ($p < 0.001$), and using positive persuasion during meals with their children ($p < 0.02$). In a study of feeding practices of Mexican American parents, by Tschann et al. (2013), pressure to eat and using food to control behavior were reported more often by fathers

than mothers. Fathers may also influence the quality of children's diets through modeling. Lloyd et al. (2014) found that children's percentage of energy intake from core foods was associated with paternal percentage of energy intake from core foods ($p < 0.01$).

Evidence suggests that the feeding practices of fathers may differ based on child weight, but the possibility that child weight may be a result of father feeding practices cannot be ruled out, as there are no longitudinal studies. Musher-Eizenman et al. (2007) found that fathers reported higher levels of restrictive feeding for children with a higher BMI ($p < 0.05$), regardless of child gender. Blissett and Haycraft (2008) found that paternal application of pressure to eat was significantly negatively correlated child BMI ($p < 0.013$), in a sample of 48 predominantly white, married or cohabiting fathers of preschoolers. Brann and Skinner (2005) found that both pressure to eat ($p < 0.0001$) and monitoring of eating ($p = 0.006$) were used more often by fathers of preadolescent boys with an average BMI (percentile between 33rd and 68th) than those with a high BMI (85th percentile or above). These findings suggest that fathers may be less likely to use pressure to eat and monitoring of eating on their overweight or obese children.

Further evidence suggests that associations between paternal feeding practices and child eating may vary, based on child gender. Matton, Goossens, Braet, & Durme (2013) analyzed the eating habits of 613, 8 to 12 year-old children of varied weight status and the feeding strategies of 714 parents (42.3% fathers). They found that paternal monitoring led to decreases in overeating among sons ($p = 0.053$), but not daughters, at 6 months.

Fathers' self-perception and weight status. Fathers' feelings about their own weight may also influence their parenting and their child's BMI. Blissett, Meyer and Haycraft (2006) analyzed data collected from questionnaires with good validity and reliability, returned by 188 co-habiting parents of 94, 1- 5 year-old children. They found fathers' body dissatisfaction to be correlated with monitoring of sons' but not daughters' food intake ($p < 0.03$). The response rate was low (18.8%) in this study and the families who responded may have had a greater interest or concern over feeding and eating, potentially skewing the results. Controlling for relevant covariates, such as socio-demographic variables, strengthened the results of this study. In analysis of the same cross-sectional data, paternal, but not maternal, drive for thinness was positively correlated with child BMI ($p < 0.047$) (Blissett and Haycraft, 2008). Data suggested that out of all of the parental variables analyzed, including several parenting practices and parenting styles, greater paternal drive for thinness was one of the strongest predictors of child overweight and obesity. These findings suggest that paternal extrapolation of weight concerns may be more likely to occur among father-son relationships and may have unintended consequences for child BMI.

The greatest influence fathers may have over their child's weight status may be in relation to their own weight, as fathers' BMI has consistently been identified as a significant risk factor for childhood obesity (Brophy et al., 2012; Francis et al., 2007; Lloyd et al., 2014). Obesity in fathers was associated with a four-fold increase in the risk of obesity of sons and daughters over a 9 year period, from the ages of 9 and 18 ($p = 0.033$ for sons, $p = 0.024$ for daughters), independent of children's physical fitness and parental

education, in a study of 219 Australian families (Burke et al., 2001). Similarly, Freeman et al. (2012) found that among a sample of 3,285 two parent households in which only one parent was obese, fathers', but not mothers', obesity significantly increased the odds of a child becoming obese ($p < 0.001$). This study used objectively measured child height and weight, but was limited by self-report of parents' own height and weight measurements. Importantly, parent and child dietary intake and physical activity were not assessed in this study. Despite these limitations, evidence exists supporting the relationship between fathers' obesity and their child's obesity over time, suggesting that fathers are influential in shaping the family environment that leads to child obesity.

The studies presented here represent the majority of the research on fathers' influence, or potential influence related to child obesity. The research is limited by quantitative studies, narrow in focus, with small homogeneous samples of fathers. Further, the majority of the studies were cross-sectional, therefore suggesting associations, but no directional or causal effect.

Health Care Providers' Perceptions of Parents of Overweight and Obese Children

In a survey of 939 HCPs, Story et al., (2002) found the most frequently reported barrier to addressing child weight issues was lack of parental involvement. This study surveyed registered dietitians ($n=441$), pediatric nurse practitioners ($n=293$) and pediatricians ($n=201$) about perceived barriers in the treatment of overweight children and adolescents. Overall, more than 77% of respondents cited lack of parental involvement as a barrier. While the type of parental involvement was not elaborated on in this survey, the frequency of this response suggests that HCPs value parental

involvement in the management of child overweight. The low response rate (approximately 26%) may limit the generalization of these results, as only the more concerned and motivated HCPs may have responded, but the inclusion of three professions strengthens the results.

Twenty six general practitioners (GPs), including males and females working in diverse geographical areas, of diverse cultural backgrounds, were interviewed in four focus groups by Pagnini, King, Booth, Wilkenfeld, and Booth (2009) on their opinions of childhood overweight and obesity. Participants believed that parents had the major responsibility for children's eating and activity, but felt as though parents' influence on children diminished as children got older. These beliefs were shared by the parents and children interviewed for this study. Additionally, early childhood was considered, by the HCPs, as the time when parents had the closest links with HCPs.

These results suggest that HCPs value parents' involvement in child weight management. While they recognize parents as instrumental in affecting children's eating and activity, the vast majority of HCPs perceive parents as lacking involvement in the treatment of their child's overweight. Despite the evidence supporting procedures to address overweight and its related health concerns with children and their families (Barlow, 2007), a large percentage of overweight children and their families are not receiving this care (He, Piche, Clarson, Callaghan, & Harris, 2010; Silberberg et al., 2012; Story et al., 2002). Clearly, there remains a disconnect between what HCPs see as important and what is recommended, in addressing the issue of childhood obesity, and what is actually happening in practice.

None of the studies addressing HCPs perceptions of parents of overweight and obese children specifically addressed fathers, leaving a void that this study sought to fill. The American Academy of Pediatrics (AAP) promotes family-centered care and emphasizes the importance of father-friendly practices to encourage father involvement in their child's health care (AAP, 2012). Increased attention to the involvement of fathers in the management of their children's overweight is warranted in light of the evidence suggesting fathers may play an important role in their children's weight status (Fraser et al., 2011; Khandpur, Blaine, Fisher, & Davison, 2014) and that active and regular engagement by fathers predicts a range of positive child outcomes (Ball, Moselle, & Pedersen, 2007; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008).

**The Health Care Provider's Experience With Fathers of Overweight and Obese
Children: A Qualitative Analysis**

Eliza Anti, RN, BA

Keywords: Childhood obesity, fathers, health care providers

Abstract

Purpose: The purpose of this study was to uncover the experience of health care providers (HCPs) as they work with fathers of children who are overweight and obese in the outpatient setting.

Method: Interpretative phenomenological analysis was used for data collection and analysis. Seven HCPs were interviewed about their experiences.

Results: Two major themes emerged from the experiences of these HCPs: “dad in the backseat,” and “paternal resistance.”

Discussion: The theme of “dad in the backseat” captured to the HCPs’ experiences and perceptions of parental roles and related stereotypes with respect to fathers’ lack of presence in the health-care setting, family roles that relegate fathers to the backseat in dealing with this issue, and the tendency of fathers to take a passive role and defer to mothers in the management of their child’s weight. “Paternal resistance” reflected the perceived tendency of the father to resist the acceptance of their child’s weight as a problem, and to resist change and even undermine family efforts to make healthier choices.

Conclusion: Health care providers’ experiences of fathers as having a minimal role in the management of their child’s overweight and obesity may lead them to neglect fathers as agents of change in this important issue.

Key Words: Childhood obesity; fathers; health care providers

Introduction

Childhood obesity is a critical health threat (Miller, 2008). Approximately one-third of youth in the United States are currently overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014) and childhood obesity has been shown to persist into adulthood (Reilly et al., 2003). The short and long term effects of childhood obesity are significant physically, psychologically, and economically for the individual, as well as for society. Adverse effects of childhood obesity are numerous and include both acute and chronic physical and psychological health problems, which may present in childhood or go undetected until adulthood. Overweight and obesity increases children's risk of orthopedic conditions (Taylor et al., 2006), respiratory disease (Liu, Kieckhefer, & Gau, 2013), sleep apnea (Arens & Muzumdar, 2010), steatohepatitis (Leung, Williams, Fraley, & Klish, 2009), diabetes (Hannon, Rao, & Arslanian, 2005), hypertension (Tu et al., 2011), metabolic syndrome (Weiss et al., 2004), depression (Harriger & Thompson, 2012) and ADHD (Kalarchian & Marcus, 2012). The grave sequelae of childhood obesity raise the imperative to seek causes and potential solutions for this issue.

Parents have been identified as critical influences on child weight and weight-related behaviors. In general, parents determine what food is available in the home, one of the most influential factors in affecting child food choices (Ezendam, Evans, Stigler, Brug, & Oenema, 2010; Reinaerts, de Nooijer, Candel, & de Vries, 2007). Parents are also instrumental in determining the household environment, shown to influence child eating habits (Pearson, Ball, & Crawford, 2011) as well as child activity level and BMI (Crawford et al., 2010). Parental obesity, parental role modeling and parenting practices

have all been shown to influence child weight status (Berge, Wall, Bauer, & Neumark-Sztainer, 2010; Keane, Layte, Harrington, Kearney, & Perry, 2012; Ventura & Birch, 2008). Thus far the majority of literature investigating the parental role in childhood obesity has focused on mothers. Fathers' time with children has been increasing over the past several decades (Bianchi, 2000) and fathers have been assuming a broad range of roles and responsibilities that previously would have been managed by the mother (Garfield & Isacco, 2006; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). What little research exists suggests that fathers may play an important role in their children's weight status (Fraser et al., 2011; Khandpur, Blaine, Fisher, & Davison, 2014). For example, fathers have been shown to positively influence their child's obesity by modeling and encouraging healthy behaviors (Berge et al., 2010), justifying increased attention to the father as an agent of change with regard to child obesity.

Health care providers (HCPs) are in a unique position to interact with parents regarding their child's overweight or obesity. These interactions may affect parents' motivation and propensity to elicit change in their household directed at several well-documented determinants of childhood obesity such as diet (Collison et al., 2010; Duffey & Popkin, 2013; Huang, Howarth, Lin, Roberts, & McCrory, 2004; Shang et al., 2013), screen time (Blair et al., 2007; Miller, 2011; Proctor et al., 2003) and physical activity (Blair et al., 2007; Drenowatz et al., 2013; Hohensee & Nies, 2012). Little is known about the father's role in the management of their child's weight, and even less is known about health care providers' interactions and experiences with fathers of overweight and obese children. The purpose of this study was to explain the health care provider's

experience as they work with fathers of overweight and obese children in the outpatient setting, so to understand how these perceptions might affect their ability to engage fathers in this important issue. This knowledge will help us to understand what health care providers might need in order to effectively influence the families they work with to make the necessary changes to reduce obesity in their children. This understanding will assist in strategizing family-based approaches to child weight management in the effort to reduce the epidemic of childhood obesity.

Research Methodology

Interpretative phenomenology was chosen as a research methodology because it is well suited to explore and explain the personal experiences of the individuals providing health care to affected children and families. Interpretative phenomenological analysis (IPA), as outlined by Smith, Flowers & Larkin (2009), was used to guide data collection and analysis for this study. This method reveals how similarly themed events in life (i.e. working with fathers of overweight and obese children) become “an experience” of importance to the individual through reflection and engagement in dialogue in order to make sense of their experience.

Participants

A purposive sample of seven HCPs who work with overweight and obese children and their families in an outpatient clinical setting were the participants in this study. The sample consisted of two family practice physicians, two pediatric nurse practitioners, and three family nurse practitioners. Three of the participants were working in a family practice setting, three were working in a pediatric setting and one was working in a

pediatric obesity clinic. All of the participants were female.

Recruitment

After obtaining Institutional Review Board approval, the participants were recruited from a rural region in the northeastern United States. Recruitment was solely by word of mouth. Inclusion criteria were health care providers (physicians, nurse practitioners, naturopaths, osteopaths) who worked with fathers of overweight and obese children.

Data Collection

Data were collected through semi-structured interviews with the primary investigator (PI), which were audio recorded in their entirety. Six of the interviews were conducted in person and one was conducted by telephone. A flexible interview schedule was used. Supplementary questions were tailored to the participants' responses and prompts were used to explore participants' responses in depth. The primary question "Can you tell me about your experience, overall, with fathers of overweight or obese children?" was asked of all participants, along with "What do you see as the father's role in parenting, with regard to their child's weight?" and "Is there anything else you would like me to know about your experience with fathers of overweight or obese children?" Each participant was also asked at what capacity they interact with fathers, on a professional level, as well as how often they interact with fathers of overweight or obese children to gain a sense of familiarity with the subject matter.

Analytic Procedures

Each interview was transcribed verbatim by the primary investigator and then de-

identified. Data was analyzed using a 6-step process outlined by Smith, Flowers & Larkin (2009), beginning with listening to the audio recordings of the interviews while reading the corresponding transcript in order to embed the voice of the participant in subsequent readings of the transcripts. The second step in the analysis involved noting initial impressions of the tone and content of the interview as well as making pertinent linguistic, descriptive and conceptual comments. For example, the participants' perception that fathers were largely absent from clinical encounters in which weight-related concerns were discussed was noted. In addition, a general tone of frustration was evident early and persisted throughout the interviews.

Next, common patterns and principles were identified to understand the perspective of the participant. Emergent themes were developed from the set of comprehensive notes and previous analyses. At this stage, the PI's interpretations and the participants' original words were combined to synergistically reflect the emergent themes embedded in the participant's experience and begin an interpretive account of the relationship between themes. For example, it became increasingly clear that HCPs experienced a sense of futility in working with fathers (and mothers to a lesser extent) of overweight and obese children to affect healthy changes.

With deeper analysis, clusters of related themes were developed and a diagram was created of the new overarching themes, with the original themes under each one. For example, the themes "gender roles", "mostly moms", and "parental generalizations and styles" were clustered under an overarching theme of "parental roles and stereotypes". Key phrases using the participant's words were used to connect the themes with the

source and to describe and support the emerging themes.

The previous analytic procedures were repeated with each of the remaining transcripts until themes were fully developed and revealed the full experience of the HCPs as they work with fathers of overweight and obese children. During the analysis, an attempt to bracket off the emergent themes from each of the preceding interviews was done through journaling and note taking, in order to allow new themes to emerge with each participant.

The final analytic phase involved looking for patterns across participants. A master diagram was created showing how themes for each participant fit into these final super-ordinate themes. Data saturation was reached and member checking was used in order to assure that the analysis was congruent with participants' experiences.

Results

Two major themes emerged from HCPs' experiences with fathers of overweight or obese children, "dad in the backseat" and "paternal resistance." "Dad in the backseat" refers to the participants' perception and experience of the paternal role as secondary to that of mothers'. Participants expressed this theme with respect to the perceived lack of paternal presence in the health-care setting, family roles that relegate fathers to the backseat in dealing with this issue, and the tendency of fathers to take a passive role and defer to mothers in the management of their child's weight. "Paternal resistance" reflects the experience and perceived tendency of the father to resist the acceptance of their child's weight as a problem, to resist change, and at times, to undermine family efforts to make healthier choices. Although quite difficult to extract from the greater whole during

analysis, there was an underlying context of frustration evident within each of the themes and by all of the participants. Each of these themes will be described individually, using the participants' own words to exemplify their meanings. Member checking and audit trails were used to ensure rigor (Lincoln & Guba, 1985).

Dad in the Backseat

Interactions with Health Care

All participants expressed that mothers were more likely than fathers to bring their children to health care appointments, especially for wellness visits. For many of the HCPs, this was when the issue of overweight was most likely to be brought up. Della made the strongest statement regarding the frequency of her interactions with fathers on the subject of child overweight:

I can't remember the last time I had a discussion with a dad about weight and exercise in that direction because it's been with moms. You know, I can probably count on one hand the number of times I've ever had a dad involved in that kind of discussion, just because they're not there for the visit. I have been a nurse practitioner since 1998, and in several states, and it hasn't been any different in any of them.

Della later commented that "once [the children] get to a certain age...[the fathers] don't come in the room with them...and many times the dads, more so than the moms, drop them off and they stay in the car and don't even come into the office." These quotes suggest that HCPs perceived mothers as taking more of an active role in their child's interaction with health care.

Family Roles

All of the participants identified the mother as the parent in charge of the aspects of the household and parenting which are more likely to affect change in their child's

weight status. These aspects included decisions surrounding the food that was brought into the house and what was served at meals as well as directing the children in their use of free time. In this way, the participants expressed their sense of the traditional nature of the family roles, and in doing so perceived the father as a less important target when advocating and recommending interventions that addressed the child's overweight or obesity. As Jessica stated, "even the dads who are concerned, it's usually not them that are making the choices." Sally reported:

I also have the sense that, in general, [dads] were less involved with doing the shopping or the cooking, so when I talked about things that would be helpful for the child, it seems like they were less...they weren't the key factors in determining what food was in the house, or even having, they didn't necessarily have as much time to be active with their kids, often.

Rebecca went one step further in stating that being in charge of these aspects of the household made mothers feel more empowered to affect their child's weight. She said "a lot of the moms are traditionally the ones who are usually in charge of preparing meals so they feel more connected to being able to do something to change [their child's weight status]." This same HCP went on to express understanding of fathers for not taking on a more active role related to the norms associated with these "traditional" roles. Rebecca found that "it can be frustrating to work with a dad who really isn't taking ownership, however, often times it's the mom who is really making more of those kinds of decisions on a day-to-day basis."

Even when fathers were the primary custodial parent, or when it was the fathers' time with the children, participants' comments suggested that they still did not feel that fathers were necessarily taking charge of the areas of parenting that could positively

influence their child's weight. Traditional gender roles seemed evident in this discussion. For example, Barbara stated "so, in families where there's, uh, fifty-fifty sharing of the child... of those fathers, I would say half the time they are in charge of the diet and the other half of the time, the girlfriend or the stepmother is in charge of the food." Paternal involvement, regarding the aspects of parenting likely to positively affect children's weight, was perceived as minimal by all of the participants.

Lack of Involvement and Deference to Mom

The perception by participants of fathers as lacking involvement, in regard to the issue of their child's overweight, and deferring to the mother was present in every interview. Many participants felt that fathers were generally unconcerned about or unreceptive to the HCPs' weight related concerns. Sally stated: "I can't even recall a time that a dad has brought up a concern, a weight-related concern about their child, it's more often me raising the issue with them." Della's sentiment was similar, "I don't know as I've ever had a dad directly address weight issues." When asked what she experienced as the father's role in the management of their child's weight, Christine replied, "for the most part, there's no role."

In general, these HCPs felt as though fathers lacked initiative in coming up with strategies to target this issue and tended to defer to the mother to take further action to address the child's overweight in the health care setting. Della explained her experience with fathers:

They all kind of will say 'ok, yeah, I see where you're coming from,' but they're not, like, buying into 'we've got to do something about this, we need to address it,' it's more, a lot of times it's, well, 'I'll take it home and talk about it with mother.' When I try and set up a nutrition referral or something like that they tend to defer to mom.

Rebecca also expressed the passivity she saw in fathers:

Dads seem a little more willing to go along with what the mom is identifying...it doesn't appear as though it is the father that is typically driving those questions about 'what changes can we make, what can we do about this?'

When Barbara was asked if she found the fathers in her practice taking on a role with regard to their child's overweight, she stated: "no, he kind of takes a backseat."

In the previous subthemes, the father's perceived minimal role in parenting with regard to their child's weight was in large part rationalized as traditional family roles. In other instances, the participants described the fathers' lack of involvement as more of a choice, and that there was a tendency to assign responsibility to the mother. The participants' frustration was an underlying context throughout this theme. Kate stated:

I just think that, in general, it doesn't seem like dads are involved or want to be that involved in these issues. It's the vast majority are moms that are taking control in these situations. It would be nice to see fathers taking a more active role, but I'm just not seeing that in general.

Jessica expressed her frustration to fathers' passivity outright, "Fathers are a lot more likely to say 'yep, you know I can see that' but then, just not necessarily engage in doing anything about it, so that is frustrating." Jessica felt that fathers may even be more receptive than mothers to their health concerns over their child's overweight, but appeared unwilling to take action. She said, "I think fathers are more likely to recognize that it's not ideal. Whether or not they do anything... it doesn't always translate into action on their part."

Paternal Resistance

All of the providers reported similar experiences. An undercurrent of fathers'

defiance and rebellion pervaded participant narratives, whether it was during an encounter with a HCP; in their refusal to accept their child's overweight as a problem or to make suggested changes; or at home, in their undermining of the mother's or child's efforts to make those changes.

In the Health Care Setting

Fathers' resistance to addressing the issue of their child's overweight and obesity and suggested strategies to affect this issue were commonly reported by participants.

Christine was quick to generalize her experience with fathers of overweight and obese children. She said, "I think in general, [fathers] downplay [the issue of overweight in their children]." In regard to her attempts to talk about this issue with fathers, she states: "they're not receptive in general." Jessica had a similar generalization, she felt "the vast majority [of fathers]...just really basically blow it off or minimize it or defer to moms." Kate expressed a nonchalance she has received from some fathers, "if you do bring [their child's overweight] up with them it's kind of like 'eh, it's ok.'"

Fathers' outright refusal to make changes was frequently reported by participants. Christine gave this example of one father who said, "I grew up hungry, so I'm not going to restrict anything." Barbara, who practiced in a pediatric obesity clinic, described her experience working with fathers:

Oftentimes they, um, will fervently say that they, um, they're not going to stop giving their child a certain type of food that they give them, the child likes it...for instance soda, 'well, we drink soda in our house and I'm not going to make him stop drinking soda, he likes it'.

She went on to say:

We'll offer a healthier choice than what they are giving their child and they'll say, right out no, or oftentimes they don't show a positive response

to that suggestion, or they'll come in 3 months later, because we do a 3 month follow up, and they have made no changes, they'll tell us that.

At Home

The participants recognized that the accounts of what was happening at home were many times secondhand and through the lens of the mother and may have biased their perception. Examples of paternal resistance were explicit from mothers so that participants spoke about them in the context of their own experience with fathers of overweight and obese children. Some participants expressed empathy with the mothers and the children in their efforts to make changes at home. Jessica explained "one of the more common scenarios" she experienced:

Mom...is concerned, wants to make changes and when we try to get to the root of the problem, 'dad wants soda, dad wants chips, if I don't buy it, he'll buy it and bring it into the house.' And so, sometimes the dad is even a hindrance in those cases when the mom is trying to make changes.

Christine also empathized with this mother: "I had one mother when we were discussing the topic say that she couldn't make changes, she couldn't make changes in the household because the father refused."

Sometimes, the issue of paternal resistance was presented more matter-of-factly.

Della stated:

I hear the stories about 'at dad's house, anything goes.' You know, in terms of mom is here, 'well, at my house we do this, this and this and it's healthy and then when they go to dads I have no control over what they are doing and they're eating junk and they're drinking soda and they're doing this kind of stuff' and I've heard that several times.

Yet, other participants presented the issue of paternal resistance as an unhelpful practice of mothers blaming fathers for the inability to make household changes. Barbara said:

Sometimes the mother blames the father and says 'he still is giving him

the bad foods and I try to give him the good foods, but I can't do anything about it if he continues to buy soda at the store or if he continues to buy Doritos or if he continues to buy whole milk.'

Rebecca experienced occasions when mothers patronized fathers during weight related clinical encounters. She described one example, "I certainly have had some circumstances where the mom says 'OK, more fruits and vegetables' and then she sort of gives this look to the dad, like 'this means you too,' and I don't think that's helpful."

Discussion

The narratives of the participants reflected their experiences and perceptions that the paternal role in the management of their child's overweight and obesity is minimal, less important than that of the mother in affecting change in this area, and may even create barriers. The HCPs' feelings about this issue were exemplified by the themes "dad in the backseat" and "paternal resistance." The participants in this study all expressed a feeling of futility in working with fathers on overweight and obesity in their children. This feeling stemmed from perceptions that fathers were not present in the health care setting, were not in charge of the household food and activity choices for their children, failed to get involved in the issue of their child's overweight, deferred the discussion and most decision making on this issue to the mother, and were resistant to acceptance of a problem and to changes to address this issue.

The HCPs in this study all experienced paternal lack of presence in the clinical visits, especially at the wellness visits, where the issue of child overweight was most likely to be discussed. This finding is supported by a study by Moore & Kotelchuck

(2004), which found a self-reported low overall attendance at well-child visits by fathers. In this study, fathers' attendance at these visits declined as their children got older (Moore & Kotelchuck, 2004), which was consistent with reports by participants in this study. Fathers' lack of presence during well-child visits represents missed opportunities for them to take part in discussions surrounding weight and to work as a family unit. Since the rate of child overweight and obesity rises with increasing age (Ogden, Carroll, Kit, & Flegal, 2014), the decline in paternal presence at well-child visits as children get older represents a barrier for HCPs in engaging fathers on this issue.

Garfield & Isacco (2006) found that fathers from diverse racial, ethnic and socioeconomic groups had definite interests in being involved in their child's well-child visits, which is in contrast to our findings. Most fathers reported some flexibility in their ability to participate in their child's health care appointments (Garfield & Isacco, 2006), but felt that their involvement on behalf of their child was reserved for illnesses or procedures that were beyond the usual well-child visits. This is a distinct barrier that must be overcome to increase their involvement in discussions regarding child weight. It may be important to reframe scheduled well-child visits to impart a sense of importance that may motivate fathers to participate in their child's health care. Such an approach is consistent with a study by Moore and Kotelchuck (2004), who found that paternal encouragement by their child's doctor to attend well child visits was a reported motivator. More research is essential into strategies to increase fathers' presence and engagement at well-child visits, particularly with older children, in order to assure their involvement with weight-related discussions.

According to the experiences of HCPs in this study, lack of parental involvement was not unique to fathers. Story et al. (2002), in their survey of 939 HCPs, found that one of the most frequently reported barriers to addressing child weight issues was lack of parent involvement. Health care providers in the present study perceived lack of concern about their child's weight and lack of receptivity to the HCPs' weight-related concerns as two contributing factors to fathers' lack of involvement, and to a lesser extent with mothers. Parental concern regarding their child's weight has been associated with limiting screen time and attempts to improve the family's diet (Moore, Harris, & Bradlyn, 2012). Rhee, Lago, Arscott-Mills, Mehta, and Davis (2005) found that belief that their child's weight was a health problem was associated with parents' readiness to make lifestyle changes for their child and that HCPs may have a strong influence on whether parents understand the health risks associated with childhood overweight. Although none of these studies were specific to fathers, it supports the importance of HCPs raising awareness of this issue. More research is needed to understand if the perceived paternal lack of concern by the HCPs about their child's overweight is founded, and if so, how to address it.

Many of the HCPs in this study reported or suggested a feeling of futility working with overweight and obese children and their families. Perceived lack of ability to affect change by the HCP may directly hamper their effort or willingness to counsel parents and children about their overweight or obesity. Perceptions of fathers lacking a strong role in positively affecting their child's weight as well as resistant to accepting healthy changes may also lead HCPs to neglect targeting fathers as agents of change.

Research suggests that HCPs often feel that their counseling may not make a

difference in the outcomes of their overweight and obese pediatric patients, and many HCPs feel inadequate in providing this counseling (He, Piche, Clarson, Callaghan, & Harris, 2010; Silberberg et al., 2012; Story et al., 2002). Health care providers' feelings of futility and inadequacy may contribute to the large percentage of overweight and obese children and their families not receiving this counseling in the health care setting (Kant & Miner, 2007; Saelens, Jelalian, & Kukene, 2002). This is concerning because the HCP has been shown to play an important role in parental awareness of children's overweight status, which is the first step in parental "buy-in" to making healthy changes (Laurent, 2014). Weight counseling by HCPs has also been shown to have a positive affect on attempted weight loss and avoiding weight gain by adolescents (Kant & Miner, 2007), reinforcing its importance in this setting. Health care providers have been identified as advocates by parents and as essential in their child's treatment and care, and the quality of the relationship and the communication between the HCP and the family are critical to this status (Farnesi, Newton, Holt, Sharma, & Ball, 2012; Laurent, 2014). Health care providers play a unique role in affecting positive change for overweight and obese children and must be encouraged to provide weight management counseling to the whole family. In order to encourage and increase the provision and the quality of this counseling, HCPs need support in the workplace for this endeavor.

Mothers' support and encouragement of fathers have been found to be a key predictor of fathers' involvement with their children (De Luccie, 1996). Many of the HCPs in this study perceived the lack of a team approach in the families they work with. Some found that mothers acted as barriers to the team approach by blaming or degrading

the father. Health care providers can play a strong role in facilitating the team approach by supporting and coaching mothers on strategies to increase positive father involvement.

A family-centered approach that is individualized and responsive to families' needs has been shown to optimize clinicians interactions with families seeking pediatric weight management care (Farnesi et al., 2012). Parents clearly influence determinants of child overweight and have been shown to influence child weight status (Ventura & Birch, 2008). Parents have been identified as the primary source of weight loss help among overweight and obese adolescents (Saelens et al., 2002). Involvement of the father, as part of the family, is critical to the family-centered approach to child weight management. Many of the HCPs in this study spoke of their ideals regarding father involvement in their child's weight management, in terms of a "whole family approach," which made clear that they value the role of the father and wish they were more involved, despite their experiences. Future research investigating how to best involve and engage fathers is essential to achievement of optimal family-centered care. Ultimately, having fathers actively involved in these discussions could facilitate a dialogue targeted at how to create the necessary changes to positively influence their child's weight status, while meeting the needs of the family.

Limitations

There are several limitations to this study. The HCPs who participated were all white females living in the northeastern United States, narrowing the scope of perspective. Most were mothers, leaving open the possibility for bias toward the maternal viewpoint. Further, the areas in which these HCPs practiced were populated by

primarily caucasians, further limiting the transferability of findings to a more diverse population. The majority of the small sample of HCPs interviewed were nurse practitioners, only three of the HCPs worked in a solely pediatric practice, and none were pediatricians. Replication of this study with a larger sample size in other regions of the country, with a more diverse population of HCPs would provide a more representative look at the HCP's experience with fathers of overweight and obese children. A reliance on recollection of experiences also left open the risk of bias by the participants.

Implications for Research and Practice

Despite perceptions that fathers lacked involvement in the management of their child's overweight or obesity, many of the HCPs in this study referred to the ideal of a "whole family approach" to this issue. Future research investigating how to best involve and engage fathers is essential to achievement of optimal family-centered care. More research is needed into strategies to increase fathers' presence at well-child visits, particularly with older children, in order to assure their involvement with weight-related discussions. One strategy HCPs can employ is the encouragement of fathers' presence at their child's health visits. Supporting and coaching mothers on ways to increase positive father involvement may be necessary to facilitate the team approach to child weight management. In order to encourage and increase the provision and quality of discussions surrounding child weight management, HCPs need support in the workplace for this endeavor.

Conclusion

The current study yields an increased understanding of the experiences of health

care providers as they work with fathers of overweight and obese children in the clinical setting. Health care providers' experiences of fathers as having a minimal role in the management of their child's overweight and obesity may lead them to neglect fathers as agents of change in this important issue. Further research is needed in order to understand how to best involve and engage fathers in positively influencing their child's weight.

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