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Distress among Parents of Overweight Children with Developmental Disabilities

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Distress among Parents of Overweight Children with Developmental Disabilities

by

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the requirements for the degree
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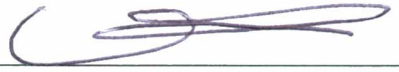
Each person whose signature appears below certifies that this project in his/her opinion is adequate, in scope and quality, as a project for the degree Doctor of Psychology.



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ABBREVIATIONS

ADHD	Attention-Deficit/Hyperactivity Disorder
ASD	Autism Spectrum Disorder
BMI	Body Mass Index
CBCL	Child Behavior Checklist
CES-D	Center for Epidemiologic Studies Depression Scale
CP	Cerebral Palsy
DD	Developmental Disabilites
DSM-5	Diagnostic and Statistical Manual, 5th Edition
ID	Intellectual Disability
IDD	Intellectual and Developmental Disabilities
IRC	Inland Regional Center
KBIT	Kaufman Brief Intelligence Test
PSI	Parental Stress Index
SSIS	Social Skills Improvement System

ABSTRACT OF THE DOCTORAL PROJECT

Distress among Parents of Overweight Children with Developmental Delays

by

Lilit Hovsepyan

Doctor of Psychology, Graduate Program in Psychology
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Dr. Cameron Neece, Chairperson

The epidemic of childhood obesity, which occurs at higher rates for children with intellectual and developmental disabilities (IDD), has been shown to have many deleterious health effects for both children and their parents. Previous research has consistently shown that child externalizing and internalizing behaviors are predictive of parenting stress in parents of children with IDD. Less is known about the nature of this relationship when an additional barrier, child weight status, is examined in the context of this relationship. The current study investigated child and parent factors related to parental distress in a sample of children with IDD who present with elevated weight status. We aimed to examine whether child overweight status predicted parental distress, above and beyond factors typically predictive of parenting stress in this population. Child factors examined in this study included weight status, behavioral problems, and social skills. We hypothesized that child overweight status would be a significant predictor of parental distress. Data was collected from children (ages 9-15 years old) with IDD and their parents enrolled in a week-long camp targeting health knowledge and behaviors. Using multiple linear regression, data was analyzed to determine whether the child functioning variables are predictive of parental distress and whether their combination accounted for a significant portion of the variance in parental distress. There was no

significant relationship between child BMI and parental distress. Increased child behaviors were predictive of increased parental distress, while decreased social skills problems were predictive of increased parental distress. Results suggested that despite overweight/obesity status, children's behavior problems and skills deficits remain as the dominant sources of parental distress.

CHAPTER ONE

INTRODUCTION

The prevalence of childhood obesity is at an all time high (Hales, Carroll, Fryar, & Ogden, 2017), and is associated with negative health impacts for youth (Wang & Beydoun, 2007). Obesity rates are highest among children with intellectual and developmental disabilities (IDD), who face existing mental and physical health challenges through their primary disabilities (Segal, 2016; Strahan & Elder, 2013). Parents caring for children with IDD experience stressors related to social isolation, child behavior problems, and emotional dysregulation (Emerson & Einfeld 2010; Valicenti-McDermott, 2015). Parents of children with overweight experience difficulties with feeding and weight management, weight-related health problems, and behavioral and emotional problems (Guilfoyle et al., 2010; Wang & Beydoon, 2007). Less is known about parents who care for children with IDD and overweight. In this study, we examined factors in children with IDD and overweight that may predict parental distress. Given our previous knowledge of the deleterious impact of parental stress on parents' caregiving abilities (Emerson, 2003; Dwyer et al., 2008), this study sheds light on areas of focus and intervention that can ultimately benefit both parents and youth.

Childhood Obesity

The most prevalent health problem facing American children today is the epidemic of obesity (Ebbeling, Pawlak, & Ludwig, 2002; Hales et al., 2017). Obesity in children and adolescents is frequently measured on the basis of Body Mass Index (BMI),

using percentile distributions relative to gender and age and producing relationships based on weight-height ratios (Krebs et al., 2007). BMI between the 85th and 95th percentile is considered to be in the "overweight" category of weight, whereas BMI over the 95th falls in the "obese" category of weight (Barlow, 2007). According to the National Center for Health Statistics, obesity among youth increased from 10.0% in 1988-1994 to 17.0% in 2011–2014 (Ogden et al., 2015). In more recent years (2015-2016), prevalence of obesity slightly rose to 18.5% among youth, with rates being lowest among preschool aged children (13.9%), higher among school aged children (18.4%), and highest among adolescents (20.6%). There were no significant overall gender differences by age group (Hales et al., 2017).

Obesity Risk Factors

Overweight and obesity in youth are multifaceted conditions that can occur as a result of genetic, environmental, social, emotional, behavioral, and cultural risk factors (Harrison et al., 2011). Heritability estimates suggest that genetic factors explain approximately 40-70% of the variation in BMI (Wardle, Carnell, Haworth, & Plomin, 2008; Farooqi & O'Rahilly, 2005). It has been well documented that parental obesity is a strong predictor of childhood obesity, posing a risk through gene transmission (Bays & Scinta, 2015; Anderson & Butcher, 2006; Bell, Walley, & Froguel, 2005) and predicting higher BMI rates for youth (Agras, Hammer, McNichola, & Kraemer, 2004; Wardle et al., 2001).

While genetics influence weight status, it is not the only cause of the rapid increase in childhood obesity (Sahoo et al., 2015). Environmental factors have played a

pivotal role in influencing people's lifestyles and fueling the obesity epidemic in the United States and worldwide, beyond individual characteristics (World Health Organization [WHO], 2000). The risk for obesity increases when genetic factors interact with environmental signals to influence behaviors (Jimenez-Chillaron et al., 2012; Wu & Suzuki, 2006) through culture, social status, resources, geographical location, and lifestyle (Fernandez et al., 2012).

Increased rates of obesity are observed in children with lower economic backgrounds (Wang & Beydoun, 2007; Hanson & Chen, 2007) and children of certain ethnic minority backgrounds (Anderson & Whitaker, 2015). Individuals from low-income neighborhoods have decreased access to healthy food options (Popkin, Duffy, & Gordon-Larsen, 2005) and as a result, have higher rates of overweight (Li, Robinson, Carter, & Gupta, 2015). The prevalence of obesity is highest among non-Hispanic, African American (22.0%) and Hispanic (25.8%) youth. In comparison, rates among non-Hispanic white (14.1%) and non-Hispanic Asian (11.0%) youth are significantly lower (Hales et al., 2017). Although obesity prevalence generally decreases as income increases, this trend is not consistent across race and ethnicity groups (Ogden et al., 2010; Rogers et al., 2015).

Over the past few decades, significant changes have occurred in the nutritional and physical activity patterns in youth. Specifically, there have been reductions in energy expenditure, with children spending less time outdoors and more time engaging in sedentary behaviors. The increase in sedentary behaviors (i.e., electronic games, television viewing) has been shown to be positively correlated with child weight status (Pentice-Dunn & Pentice-Dunn, 2012; Oliver, Schluter, Rush, Schofield, & Paterson,

2010) and be predictive of lower levels of active play (Anderson, Economos, & Must, 2008). This trend becomes most evident in the pre-adolescent years, when by age 15 years, only 31% meet recommended daily activity guidelines on weekdays and 17% do so on weekends (Nader et al., 2008). Changes in dietary patterns have also been observed and identified as risk factors for childhood obesity with contemporary children's diets being higher in caloric density compared to previous generations (Barlow, 2007; Biro & Wien, 2010). The dietary factors associated with obesity include fast food consumption, high sugar consumption, increased snacking, and large portion sizes. Families often turn to fast food restaurants for the convenience (Niehoff, 2009), but the food in such restaurants is larger in portion size, higher in calorie content, and lower in nutritional value (Ebbeling et al., 2004). In addition to being convenient, processed foods have been targeted to be more appealing through the use of media and advertising effects (Story, Neumark-Sztainer, & French, 2002).

Socialization processes that occur after birth can also determine whether obesity becomes realized (Moore, Wilkie, & Desrochers, 2017). Children are predisposed to emulate the lifestyle behaviors of their parents, siblings, and friends (Grusec & Davidov, 2007), and adapt cognitive and behavioral processes accordingly (Moore & Lutz, 2000). Such influences can encourage overeating and an inactive lifestyle (Budd & Hayman, 2008). Parental obesity, for instance, has been shown to double the risk of adult obesity among both obese and non-obese children (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). Parental obesity can also interact with childhood appetitive traits to amplify the risk of childhood obesity (Fuemmeler, Lovelady, Zucker, & Ostbye, 2013). Other social factors affecting obesity related behaviors include parental stress (Moens, Braet,

Bosmans, & Rosseel, 2009), which will be discussed in more detail in later sections.

Obesity Implications

Children with overweight and obesity face weight stigmatization and stereotyping by their peers (Latner & Stunkard, 2003; Hayden-Wade et al., 2005; Greenleaf et al., 2006), educators (Bauer, Yang, & Austin, 2004), and parents (Crandall, 1995; Davison & Birch, 2004). Such experiences likely have negative effects on their social, emotional, and cognitive development. Academically, higher BMI in children and adolescents is associated with lower levels of achievement for boys. This effect was evident despite controlling for socio-demographic factors (Black, Johnston, & Peeters, 2015). Emotionally, children with overweight and obesity are at high risk for teasing and bullying (WHO, 2012), which in turn is associated with low body satisfaction, low self-esteem, & high depressive symptoms (Eisenberg, Neumark-Sztainer, & Story, 2003). Beyond emotional implications, depressive symptoms are related to decreased motivation for health promoting activities, increased food consumption for the purpose of distracting from negative emotions, and increased intake of high carbohydrate foods to regulate serotonin levels (Reeves, Postolache, & Snitker, 2008). Youth with obesity are also likely to adopt and internalize the stereotypes and stigma associated with their weight (Pizzi & Vroman, 2013), contributing to social isolation and feelings of worthlessness (Sjoberg, Nilsson, & Leppert, 2005).

Substantial research suggests that childhood obesity is also associated with serious physical health consequences (Wang & Beydoun, 2007; Haflon, Larson, & Slusser, 2013), including high blood pressure, Type 2 diabetes (Dickelbaum & Williams,

2001), and possible musculoskeletal problems (Krul et al., 2009). Although obesity and related conditions develop in childhood, they persist into adolescence (Nader et al., 2006; Munthali, Kagura, Lombard, & Norris, 2017) and adulthood (Ward et al., 2017). At current rates, it is estimated that around 86.3% of adults will be overweight or obese by 2030 (Wang et al., 2008). If these predictions prove true, total health care costs related to the obesity epidemic in America could double in the next few decades, creating a financial strain on families, institutions, and the government (USDHHS, 2001). The direct medical costs of treating obesity and related illnesses are estimated at $14.1 billion for children (Trasande & Chatterjee, 2009) and $147 billion for adults, with treatments accounting for 27% of the healthcare costs in the United States (Thorpe, Allen, & Joski, 2015). The indirect costs are related to the impact of delayed skill acquisition in children (Cawley & Speiss, 2008), as well as lower wages and poor productivity (i.e., absenteeism) in adulthood, costing $4.3 billion annually (Cawley, 2004).

Intellectual and Developmental Disabilities

According to American Psychiatric Association Diagnostic and Statistical Manual, 5th Edition (DSM-5, APA, 2013) developmental disabilities (DD) are chronic and have an onset before age 22 years. The population of children with DD is heterogeneous along multiple dimensions, including the presence of one or more cognitive, behavioral, physical, and/or sensory impairments. Common DDs include Autism Spectrum Disorder (ASD), Down Syndrome, and Cerebral Palsy (CP). Estimates of the prevalence of DD in the U.S. indicate 1 in 7 children are affected (Boyle et al., 2007). DDs often co-occur with an intellectual disability (ID), which is characterized by

deficits in cognitive abilities and adaptive functioning (APA, 2013). ID is found in approximately 1% of the US population and affected persons often have other associated conditions such as ASD, attention-deficit/hyperactivity disorder (ADHD), sensory and motor impairments, and depression (Matson & Matson, 2015). In research, the term IDD captures individuals diagnosed with ID, DD, or both (Rojahn, Medeiros, Farmer, 2016).

Studies have repeatedly shown that obesity rates among youth with IDD are significantly higher than rates in neurotypically developing children (Slevin & Elder, 2013; Strahan et al., 2014; Segal et al., 2016; Chen, Kim, Houtrow, & Newacheck, 2010). Secondary health conditions, including elevated blood pressure and cholesterol, also occur at higher rates (Shedlock et al., 2016). Various explanations have been proposed for the increased risk of greater body mass in youth with IDD, including biological predispositions, cognitive and physical limitations, diets, pharmacotherapy, and food used as reward. Given the nature of their disorders, children with IDD are more likely to have restricted food preferences and difficulties accepting novel food items (Curtin, Anderson, Must, & Bandini, 2010; Cermak, Curtin, & Bandini, 2010). Sensory, cognitive, and physical limitations contribute to decreased physical activity in children (Rimmer & Marquez, 2012). Youth with IDD reportedly spend increased time participating in sedentary activities, such as watching TV and sitting through instruction (Slevin et al., 2004). Despite comparable use of media in normal weight peers, obesity risks are higher for children with IDD (Segal, 2016). The use of primary reinforcers, including food, is common practice in the behavioral treatment of IDD (Fiske et al., 2015). Food has been shown to influence the reward pathways of the brain and contribute to the overconsumption of unhealthy foods (Adam & Epel, 2007; Birch, Zimmerman, &

Hind,1980). Youth with IDD also experience significant weight gain related to the effects of medications prescribed for reducing behavioral and emotional symptoms (Yoon et al., 2016). These medications bear a subsequent impact on glucose and lipid metabolism and contribute to poor cardiovascular outcomes (Correll et al., 2009; Maayan & Correll 2011; Galling et al. 2016).

Parenting Stress and Obesity

In addition to negative implications for children, obesity has been linked to increased parental stress, which is defined as the affective, cognitive, or behavioral response to the demands of parenthood (Deater-Deckard, 2004). Research has shown that parents of children with overweight or obesity experience greater levels of stress than parents of healthy weight children (Moens, Braet, Bosmans, &Rosseel, 2009).

Among factors related to elevated stress levels are parental concerns for children's health status, socio-emotional status, and caregiving responsibilities that include diet and weight management (Guilfoyle et al. 2010). Children and adolescents with obesity are more prone to behavioral and emotional problems (Eisenberg, Neumark-Sztainer, & Story, 2003; Erermis et al., 2004). A strong relationship has been established between parenting stress and internalizing and externalizing symptoms in overweight children (Ohleyer et al., 2007). The added stress of managing children's disruptive behaviors or emotional problems increase stress and hinder the parent's ability to manage their child's health (Ohleyer et al., 2007). Additionally, parents attempting to influence their children's weight status may face barriers, such as negative parent-child interactions (Norman et al., 2015) and disagreements with other adult family members about the

correct approach to children's weight (Pocock et al., 2010).

Obesity treatment for children requires ongoing parental monitoring and involvement by caregivers who often share the same chronic condition (Semmler et al., 2009; Wright et al., 2010). Higher levels of parenting stress can influence parents' health decisions for themselves, as parents who are stressed and unable to make healthy diet decisions may inadvertently model unhealthy behaviors for children (Dwyer, Needham, Simpson, & Heeney, 2008). Additionally, poor caregiver functioning may prevent significant weight loss in children (Ohleyer et al., 2007; Zeller and Modi 2008) and impair children's health-related quality of life (Guilfoyle et al., 2010; Janicke et al., 2007). In a study on parenting styles of highly stressed parents, it was found that more permissive approaches are taken by parents with children with overweight, which was associated with lower quality of life in the children (Frontini, Moreira, & Cannavarro, 2016). In utilizing more permissive styles, parents set fewer limits on screen time and put less emphasis on children's nutritional and physical goals (Walton, Simpson, Darlington, & Haines, 2014). P**arent**-perceived **stress** has been linked to behaviors that increase obesity risk in children (Shankrandas et al., 2014), including increased fast-food consumption (Parks et al., 2012) and sedentary behaviors, such as screen time (Parks et al, 2016). Furthermore, parenting stress has been shown to negatively impact the emotional and behavioral functioning of children due to bidirectional trends in stress, disease, and behavior progression (Ohleyer et al. 2007).

Parenting Stress and IDD

Parents of children with IDD carry increased responsibilities for longer durations

of their lives (Algood, Harris, & Hong, 2013). Consequently, they experience adverse consequences and stress which has the potential to decrease their quality of life and impact their parenting (Gerstein, Crnic, Blacher, & Baker, 2009). Across numerous studies, parents of children with IDD reported significantly higher levels of parental distress, anxiety, and depression than parents of typically developing children (Padden & James, 2017; Baker et al., 2003; Emerson, 2003). Stressors unique to families of children with IDD include social isolation, difficulties with child behaviors, time constraints, fatigue, access to services, and additional responsibilities (Curtin, Jojik, & Bandini, 2014; Polfuss et al., 2016; Baker, Blacher, Crnic, & Edelbrock, 2002; Emerson & Einfield, 2010; Rivard et al., 2014). Predictors of parenting stress include behavior problems and concerns about children's functioning and development (Emerson & Einfield, 2010; Voight, et al., 2009). Children's social, motor, communicative, adaptive and cognitive abilities have been shown to predict parent stress, with social skills difficulties being the strongest predictor (Smith, Oliver, & Innocenti, 2001). Research has also demonstrated that as children get older, social skills difficulties have a greater impact on parenting stress (Neece & Baker, 2008). Other traits that have been shown to predict parenting stress include child aggression, irritability, gastrointestinal problems, and sleep difficulties (Gupta and Singhal, 2005; Valicenti-McDermott, et al., 2015). Similar to patterns in typically developing children, a transactional relationship exists between parenting stress and child behavior problems, where each variable is considered an antecedent and a consequence of the other (Neece, Green, & Baker, 2012; Hastings, 2002). This pattern is evident in parental concern about child weight status, the use of counterproductive interventions, and child oppositional behaviors in children with IDD

(Polfus et al., 2017).

Purpose of the Study

While research has consistently shown a strong bi-directional relationship between parenting stress and behavioral concerns in children with IDD, the effect of child weight status on parenting stress levels in this population is unclear. Considering the increased dependence that children with IDD have on their parents and the increased stressors experienced by them, further assessment of the relationship between parent stress and child weight status, as well as child behaviors is warranted. Therefore, the goals of the current project were to 1) explore the factors related to parent emotional functioning in a sample of treatment seeking children with IDD and overweight/obesity, and 2) investigate whether obesity status in children with IDD is significantly predictive of parental stress.

CHAPTER TWO

METHOD

Participants

Operation Fit is a pilot study of a four-day camp-based intervention developed to improve health knowledge and physical activity in youth with IDD and overweight/obesity.

Participants included 53 parents and children from two cohorts of the study recruited through the Inland Regional Center (IRC), local parent support groups, and Loma Linda University's website.

Parents who expressed interest were screened to determine whether they met the following eligibility criteria: (1) child age of 9 – 15 years, (2) mild to moderate intellectual or developmental disability diagnosis, (3) overweight or obese status according to CDC guidelines (BMI percentile ≥ 85), (4) child and parent who spoke and understood English, (5) child needed the ability to follow simple group directions. Exclusion criteria included children with debilitating physical disabilities, severe aggressive behaviors, and severe intellectual impairments. A total of 172 families expressed interest in the study and 145 were screened. Of those screened, 83 were deemed eligible to participate and 53 enrolled in the camp. The inclusion criteria were further refined for the second cohort in order to include children with basic communication abilities and an objective measure of cognitive abilities was completed to ensure that children enrolled in the camp had a minimum of moderate or mild non-verbal intellectual functioning scores. These changes were made to increase the feasibility and

efficacy of the intervention.

Participants included 53 children and adolescents aged 9-15 years with an average age of 11.67 years (*SD* = 1.89). The majority of children were male (71.4%) and almost half of them were from families whose incomes fell below the poverty level (41.9 %). The sample was racially and ethnically diverse with parents reporting 63.0% as Hispanic, 18.5% as Caucasian, 13.0% as African American, 1.9% as Asian, and 3.7% as "Other." The primary caregivers in the study were majority female (83.6%). Regarding diagnoses, 58.9% of the children were reported to have an autism spectrum disorder (ASD), while the remaining children were diagnosed with another form of IDD, including Down syndrome and global developmental delays. All children were categorized as overweight or obese based on BMI percentile, with 70.9% of the children falling into the obese category (*z*-score, *M* = 1.90, *SD* = .50). The parents in the sample had a mean BMI of 36.02 (*SD* = 8.79), with the majority (65.5%) falling in the overweight or obese categories of weight. Of those children who attended the follow-up assessment and fell in the moderate IQ range or above, 61.1% did not have intellectual disability (ID), while 30.6% fell in the mild ID range and the remaining 8.3% fell in the moderate ID range. There were no significant differences between children with ASD and children without ASD or between cohorts across all demographic variables.

Procedures

For each year of the study, the IRC sent recruitment flyers to approximately 1000 families who met the age and diagnostic criteria for enrollment. Interested families contacted the Operation Fit staff by phone or by e-mail and participated in a phone screen

to determine initial eligibility. Given the modifications in the inclusion criteria, there were slight differences in the procedures between the two cohorts. In the first cohort, eligibility was determined during the phone screen and eligible families completed a packet of parent and child questionnaires prior to the start of the camp. In the second cohort, eligibility was determined after the phone-screened families visited the lab and participated in an in-person assessment. At this assessment, the Kaufman Brief Intelligence Test (KBIT; Kaufman & Kaufman, 1990) was administered to evaluate the nonverbal abilities of the children and the Child Behavior Checklist (CBCL) was completed by the primary caregiver to assess the severity of children's maladaptive behaviors. Participants from both cohorts attended a registration day that served as a baseline assessment. At registration, parents returned the packet of questionnaires and signed the consent and Protected Health Information forms. The children signed assent forms and participated in interviews measuring body image and eating behaviors. Parent and child height and weight were measured using a digital beam scale.

During the week-long camp, the children were assisted through various educational and physical activities led by medical, nutrition, and psychology students. Hands-on practice, demonstrations, and games were utilized to facilitate understanding of the concepts. Examples of activities included swimming, obstacle course, and sports. The children were served healthy snacks and lunch.

Measures

Demographic Data

Parents provided demographic information in as a part of the pre-treatment questionnaire packet, reporting child's age, ethnicity, gender, diagnostic information, and family income.

Body Mass Index (BMI)

Body Mass Index (BMI) was used to categorize the children in the study as underweight, normal weight, overweight, or obese, and determine study eligibility. In youth, BMI is compared against the percentile for children of the same sex and age (Krebs et. al., 2007). BMI percentile is measured by the following formula: (Weight in Pounds / (Height in Inches x Height in Inches)) x 703. This formula can be embedded in a syntax on the computer software SPSS to assist in mass calculations of percentile distributions. BMI less than the 5^{th} percentile is considered underweight, 5th to 85th percentiles is considered normal or healthy weight, 85th to 95th percentile is considered overweight, and 95th or greater percentile is considered obese (Dietz & Bellizzi, 1999). To account for changes in body composition over time, each child's BMI was transformed into standardized z-scores. In this study, child weight status was used in relation to parental distress.

Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001)

The CBCL is a measure of child behavior problems completed by parents during the baseline assessment. Each item of the 113 item measure ranges from "not true" (0), "somewhat or sometimes true" (1), to "very true or often true" (2). The CBCL is comprised of eight syndrome scales, which are separated into two broadband scales; externalizing and internalizing problems. The internalizing problems broadband scale includes the anxious-depressed, withdrawn-depressed, and somatic complaints syndrome scales. The externalizing problems broadband scale combines the rule-breaking and aggressive behavior syndrome scales. The CBCL also produces a total problems score, which is the sum of the scores of all the problem items. The current study utilized the two broadband scales and the total problems scale to examine the relationship between behavior problems and parental distress. Scores were also used to predict parental distress. The reliability for the total CBCL subscale is 0.96 in the current sample.

Social Skills Improvement System (SSIS; Gresham & Elliott, 2008)

The SSIS is a parent report measure of problem behaviors and social skills in children. Within the larger, 79-item scale exists a 46-item Social Skills scale that measures children's social interactional abilities on a four-point scale ranging from "never" to "almost always." Scores were used to predict the impact of social skills deficits on parental distress. The SSIS has been shown to have adequate validity and the internal reliability for the current sample was strong (α = 0.93).

Parental Stress Index (PSI-SF; Abidin 1995)

The PSI is a 36-item self-report instrument that measures various factors related to perceived stress in parents. The instrument measures parents' endorsement of various statements on a 5-point Likert scale ranging from "strongly agree" (1) to "strongly disagree" (5). The parental distress subscale has been validated for use with parents of children with ASD (Zaidman-Zait et al., 2010). The reliability for the PSI is 0.96 for the current sample.

Center for Epidemiologic Studies Depression Scale (CES-D)

The CES-D scale is a 10-item self-report measure of depressive symptomatology. The ratings on the 4-item scale range from "Rarely or none of the time" (0) to "All of the time" (0). The scale has been shown to have high internal consistency, test- retest reliability, and convergent and divergent validity (Radloff, 1977). Scores on the scale were used to correlate parental depressive status with perceived parental stress and also to predict parental distress. The reliability for the CES-D is 0.74 for the current sample.

CHAPTER THREE

DATA ANALYTIC PLAN

According to power calculations (using G*Power, Faul, Erdfelder, Bychner & Lang, 2013) based on the multiple regression that required the highest power, the total sample size of 53 allowed for 97.0% power to detect a large effect size (f^2 = .35), 68.7% power to detect a medium effect size (f^2 = .15), and 13.3% power to detect a small effect size (f^2 = .02). Prior to conducting analyses, the distribution of the data was examined for normality and the presence of outliers. No outliers or violations of the assumptions of linear regression were found.

For the first aim, we used simple linear regressions to identify variables that were significant independent predictors of parental distress. Prior to analyses, we ran Pearson correlations to examine the relationship between child weight status (BMI), parent depression (CES-D), child social skills (SSIS), child behavior problems (CBCL), and parental distress (PSI). Only significant correlations were included in further analyses. For the second aim, a multiple linear regression was performed to assess whether the combination of child behavior problems and child social skills predicts parental distress. Standard multiple linear regression was used to enter all variables simultaneously into the model. The regression model was used to determine whether the listed variables accounted for a significant proportion of the variance in parental distress.

CHAPTER FOUR

RESULTS

Aim One: Independent Predictors Parental Distress

Correlation analyses revealed that child weight status was not significantly correlated with parental distress. Given the lack of correlation between child weight status and parental distress (Table 1), child weight status was excluded from further regression analyses predicting parental distress. Child social skills were significantly correlated with parental distress (Table 2). Behavior problems (externalizing, internalizing, total) were significantly correlated with parental distress (Table 3). Parental depression was significantly correlated with parental distress (Table 4).

Table 1. Child BMI: Correlation with Parental Distress using Pearson Coefficients.

	Child BMI
PSI: Parental Distress	.721

* Denotes significance at 0.05 level of a two-tailed test; p > .05.

Table 2. Child Social Skills: Correlation with Parental Distress.

	SSIS Social Skills
PSI: Parental Distress	-.353*

*Denotes significance at .05 level of a two tailed test.

Table 3. Behavior Problems: Correlation with Parental Distress using Pearson Coefficients.

	CBCL Subscales		
	Internalizing Problems	Externalizing Problems	Total Problems
PSI: Parental Distress	.536**	.375**	.486**

**Denotes significance at .01 level of a two tailed test.

Table 4. Parental Depression: Correlation with Parental Distress.

	CES-D
PSI: Parental Distress	.502**

** Denotes significance at .01 level of a two tailed test

Behavior Problems

Simple linear regressions were performed to predict the impact of child behavior problems on parental distress (Table 5). Results indicated that internalizing behaviors significantly predicted changes in parental distress, with one standard deviation increase in internalizing behaviors predicting a .54 standard deviation increase in parental distress (β = .54, 95% CI = [.34, .93], p < .01). Externalizing behaviors significantly predicted changes in parental distress, with one standard deviation increase in externalizing behaviors predicting a .38 standard deviation increase in parental distress (β = .38, 95% CI = [.100, .652], p < .01). Total child behaviors significantly predicted changes in parental distress, with one standard deviation increase in total child behaviors predicting

a .49 standard deviation increase in parental distress (β = .49, 95% CI = [.08, .25], p < .01).

Table 5. Behavior Problems: Results of Linear Regressions Predicting Parental Distress.

	b	β	*t*	Sig.	95% CI (*b*)	ΔR^2
CBCL Internalizing	.63	.54	4.30	.00	[.34, .93]	.29
CBCL Externalizing	.38	.38	2.75	.01	[.100, .652]	.14
CBCL Total	.17	.49.	377	.00	[.08, .25]	.24

Social Skills

The impact of child social skills on changes in parental distress were examined using a simple linear regression. Social skills significantly predicted changes in parental distress, with one standard deviation decrease in child social skills predicting a .35 standard deviation increase in parental distress (β = -.35, 95% CI = [-.37, -.04], p < .05; see Table 6).

Table 6. Social Skills: Result of Linear Regression Predicting Parental Distress.

	b	β	*t*	Sig.	95% CI (*b*)	ΔR^2
Social Skills	-.21	-.35	-2.56	.01	[-.37, -.04]	.12

Parental Depression

The impact of parental depression was used to predict parental distress using a simple linear regression. Parent depression significantly predicted changes in parental

distress, with one standard deviation increase in depression predicting a .50 standard deviation increase in parental distress (β = .50, 95% CI = [.32, .98], p < .01; Table 7).

Table 7: Parental Depression: Result of Linear Regression Predicting Parental Distress.

	b	β	*t*	Sig.	95% CI (*b*)	ΔR^2
CES-D Total	.65	.50	3.94	.00	[.32, .98]	.25.

Aim Two: Model of Child Factors Predicting Parental Distress

A simultaneous multiple regression analysis was used to determine the influence of total child behavior problems and social skills on parental distress. Overall, the regression model accounted for a significant proportion of the variance in parental distress, such that the optimal linear combination of total child behaviors and child social skills accounted for 28% of the variance in parental distress, R^2_{adj} = .28, $F(2, 44) = 8.53$, p < .01 (see Table 8). Within this model, total behavior problems significantly predicted parental distress, such that a one standard deviation increase in behavior problems was associated with a .44 standard deviation increase in parental distress. Child social skills was not a significant independent predictor of parental distress above and beyond other child factors (p > .05).

Table 8. Child Factors: Results of Multiple Linear Regression Predicting Parental Distress

	b	*β*	*t*	Sig.	95% CI (*b*)	ΔR^2
Step 1						.28
CBCL Total	.15	.44	3.10	.00	[.05, .25]	
SSIS Social Skills	-.10	-.16	-1.14	.26	[-.26, .07]	

CHAPTER FIVE

CONCLUSION

Discussion

In this study, we examined correlates and predictors of parental distress in a population of parents who have children with IDD and whose weight status is in the overweight or obese range. We found that increased parental distress was associated with increased child behavior problems. Similarly, increased parental distress was associated with increased parental depression. With regards to child social skills, decreased social skills were related to increased parental distress. Child BMI was not related to parental distress. Internalizing behaviors, externalizing behaviors, and total child behaviors were predictive of parental distress, such that greater levels of child behaviors predicted increased parental distress. Child social skills were also predictive of parental distress, with lower levels predicting increased parental distress. The proportion of variance in parental distress was examined using total behavioral problems and child social skills. While the model was found to be significant, social skills were not predictive of parental distress over and above behavior problems.

Previous research has demonstrated the impact of child IDD status on parenting stress (Padden & James, 2017), the impact of child weight status on parenting stress (Moens, Braet, Bosmans, &Rosseel, 2009), and the impact of child behaviors on levels of parenting stress (Emerson & Einfield, 2010). The results of the current study are consistent with previous research on behavior problems, social skills difficulties, and parenting stress. Unique about the current study is the co-occurrence of these youth

factors and their individual and combined impact on levels of stress observed in parents. We found that unlike in typically developing children, obesity itself was not a predictive of parental distress. Given the obstacles faced by parents who are raising children with IDD and accompanying behavior problems, child weight may be less of a burden in this population. Other factors that may explain this lack of association between child weight and parental distress include the demographics of the sample (e.g., child age, ethnic background) and the limited BMI range.

Limitations

The results of the current studies must be considered within the context of several limitations. First, given the enrollment requirement of being in the overweight and obese weight category, there was little variability in child weight status, which may have explained the non-significant relationship with parental distress. Second, the use of BMI as the only objective measure of child physical health and the use of a self-report as the only measure of parental distress were limitations. The use of parent report as a measure of child behaviors and social skills was also a limitation. The use of objective measures (e.g., observational) from other sources, or the inclusion of additional reporters (e.g., therapists, teachers) would have strengthened the study. Finally, the small sample size collected from a single geographical location may not be reflective of all families of children with IDD and overweight.

Directions for Future Research

While the current study was able to identify various child factors associated with parental distress, the unique make-up of the sample must be considered when interpreting the results. The income of many of the participants in the study fell below the poverty level and 63% of the sample identified as Hispanic. These background factors may play a role in how parents interpret various child behaviors and their weight status. It may be valuable to examine the effects of culture on perceived stress and expand the study to include a sample more representative of the general population. It may also be beneficial to analyze the levels of parenting stress across parents of children with a greater range of BMI scores. This range would allow us examine the true effects of weight on parental distress without being limited by the inclusion criteria of overweight status. Such information may be gathered without the intensive week-long intervention, allowing us to collect data from more participants, and thus expand the sample size.

Summary

Obesity rates are highest among youth with IDD, who also frequently exhibit co-morbid skills deficits and behavior problems. Such conditions impact the wellbeing of youth and parents alike. Given the mental and physical health consequences associated with raising children while overly stressed, it is crucial to examine risk factors for parents of children with IDD and obesity. This knowledge would allow us to intervene in targeted ways to improve outcomes for children and families. The results of the current study were consistent with the existing literature, demonstrating once again that child behavior problems are predictive of parental distress. Unlike trends in parents of typically

developing children, obesity itself was not predictive of parental distress in the current sample. While obesity remains a significant health concern, parents of children with IDD appear to be more impacted by challenging youth behaviors and skills delays.

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