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Health-Related Quality of Life in a Community Sample of Preschool-Age Children with and without Obesity

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Abstract

While mothers seeking obesity treatment for preschoolers report poorer child health-related quality of life (HRQOL) than mothers of healthy-weight peers, little is known about this relationship in non-clinical preschoolers. Eighty-six mothers of 3-5-year-olds completed the parent-proxy PedsQL. HRQOL scores for children with obesity and without were compared. No significant differences were found between groups for any PedsQL subscales, nor did differences reach established Minimally Clinically Important Differences. Mothers of preschoolers with obesity from the community did not report poorer HRQOL. If parents do not view their child's HRQOL as impacted by weight status, they may be unlikely to seek treatments.

Recent estimates report that obesity affects nearly 10% of preschool-age children (Ogden, Carroll, Kit, & Flegal, 2014). Consequences of childhood obesity are serious, and include higher risk of both physical (e.g., hypertension, insulin resistance, obstructive sleep apnea) and psychosocial impairments (e.g., peer stigmatization, depression, low self-esteem) (Daniels et al., 2005; Koplan, Liverman, & Kraak, 2005). Despite this, obesity in the preschool age-group is understudied compared to older youth. Our research group is among the first to have examined a behavioral intervention aimed at reducing obesity in already obese preschool children. In a secondary analysis of our treatment data, we examined the association of obesity and health-related quality of life (HRQOL) for children enrolled in the family-based weight management intervention compared to a normative sample of preschoolers matched on age, gender, and ethnicity (Kuhl, Rausch, Varni, & Stark, 2012). In that study, parent-proxy report of child HRQOL was significantly lower for preschoolers enrolled in a weight management program in all HRQOL domains except for school functioning compared to a healthy normative sample of same-aged peers. Furthermore, differences between groups for overall HRQOL met criteria for the minimal clinically important difference (Kuhl et al., 2012).

Examining HRQOL can provide information about both the physical and psychosocial impact of weight on children's functioning, and deficits in HRQOL may be a motivating

factor for parents in choosing weight management treatment for their young child. Most parents of preschool-age children do not perceive their child as being overweight. Only 17% of parents of preschool-age children with obesity correctly identified their child's weight status (Carnell, Edwards, Croker, Boniface, & Wardle, 2005). Moreover, Eckstein and colleagues (Eckstein et al., 2006) found that parents of preschool-age children were not only less likely to correctly identify their child as being overweight but they were less concerned about their child's weight status than parents of older children. Thus, we hypothesized that lower HRQOL might be an effective way to engage parents in understanding the impact excess weight is having on their child and therefore be a more effective motivator for parents of preschool-age children to engage in appropriate treatment.

Studies of older children (ages 5 to 18) have similarly found lower HRQOL in treatment-seeking youth with obesity. Children and adolescents with obesity endorsed significantly poorer HRQOL in all domains compared to a normative sample of healthy children; furthermore, their scores were comparable to children diagnosed with cancer (Schwimmer, Burwinkle, & Varni, 2003). However, these differences in HRQOL decrease or are eliminated when examining children with obesity from a community rather than a clinical sample (e.g., (Swallen, Reither, Haas, & Meier, 2005; Williams, Wake, Hesketh, Maher, & Waters, 2005).

Only one study has examined HRQOL in a community sample of children ages 4 and 5 meeting criteria for obesity and overweight. This study found that the children with overweight/obesity only differed from the healthy weight youth on parent-report of higher prevalence of special-needs healthcare, but no significant differences in HRQOL (Wake, Hardy, Sawyer, & Carlin, 2008). As this study assessed HRQOL utilizing a community-based sample of preschool-age children that included preschoolers with overweight not just obesity, we sought to assess HRQOL in a community sample of children who met criteria for obesity only, compared to children within the criteria for healthy weight. Given the difficulty of parents recognizing weight status in preschoolers, differences in HRQOL might not be perceptible in until children reach a higher weight designated by being 95th percentile for Body Mass Index (BMI). As family-based behavioral treatments can be successful for weight management in preschoolers (Stark et al., 2011), if parent perception of their child's HRQOL varies by whether their child is in the obese or healthy weight category measurement then discussion of HRQOL could be an important tool for healthcare providers in motivating parents to seek treatment for preschoolers 95th percentile and thus an important avenue to investigate. Based on our prior study of treatment seeking families of preschoolers with obesity, we hypothesized that non-treatment seeking preschoolers with obesity would have lower parent-proxy HRQOL compared to healthy weight preschoolers.

Methods

Recruitment

Participants included 86 mother-child dyads. Families were recruited from flyers posted on a study board created specifically to invite families for studies being conducted at a children's hospital, a hospital-wide employee email, as well as through mailings from local pediatrician practices. For families who received mailings from their pediatricians, study

staff contacted mothers who did not return a “do not contact” postcard to provide further details about the study, determine if they met inclusion/exclusion criteria, and assess interest in participating. Inclusion criteria specified children between 3-5 years of age with age- and gender-specific body mass index (BMI) falling within the 5th-84th percentile (“Healthy Weight”; HW), or 95th percentile (“Obese Group”; OB). There were no BMI requirements for the participating mother. Families were excluded from the study if the child had a medical condition known to impact weight (e.g., Prader-Willi or Cushing’s syndrome) or was taking a weight-affecting medication (e.g., Ritalin), or if the mother reported a cognitive impairment or developmental delay had been diagnosed in their child.

Procedure

The observational, cross-sectional study design was approved after review by the local Institutional Review Board. After obtaining informed consent, study measures were completed during an individual appointment with study staff. Mothers were compensated \$10 for completing the assessment measures.

Measures

Anthropometrics—Mother and child height and weight were obtained using standardized procedures during their individual study appointment. Weight was measured with participants dressed in light clothing and without shoes in triplicate to the nearest 0.1kg using a digital Scaletronix scale (Wheaton, IL). Height was measured in triplicate to the nearest 0.5cm using a Holtain stadiometer, calibrated with a calibration bar prior to each assessment (Crymych, England). The mean for each measurement was used for analyses. Child BMI percentiles were calculated using the Centers for Disease Control & Prevention protocol (Kuczmarski et al., 2000) while maternal BMI was calculated with the formula weight (in kilograms) divided by height (in meters squared).

Demographics Information—Mothers completed a Family History Form, which included questions regarding family demographic factors: parent and child age, gender, race/ethnicity, parent marital status, education, occupation, and annual household income.

Health-Related Quality of Life—The Pediatric Quality of Life Inventory 4.0 Generic Core Scales (PedsQL 4.0; (Varni, Seid, & Kurtin, 2001) parent-proxy versions were utilized to obtain health-related quality of life information. The PedsQL is a 23-item questionnaire that utilizes a 5-point Likert-type scale. The versions for Toddlers (ages 2-4) and Young Children (ages 5-7) were used for the current study. Totals of raw items are converted to scale scores and higher scores indicate better HRQOL. The measure yields scale scores, including Physical Functioning, Emotional Functioning, Social Functioning, and School Functioning, in addition to three summary scores: Total Scale Score, Physical Health Summary, and Psychosocial Health Summary. The measure has demonstrated good validity and reliability (internal consistency ranges 0.68-0.90; (Varni et al., 2001) and has been shown to discriminate between weight status in older children and adolescents (Schwimmer et al., 2003). Internal consistency for the current sample ranged from good to excellent, with Cronbach’s alpha values ranging from 0.76 - 0.93.

Statistical Analyses

All analyses were conducted using SPSS statistical software version 22. Demographic variables (age, race, gender) were examined to identify any potential covariates and were controlled for in subsequent analyses. Linear regression analyses were utilized to examine between group differences on the individual subscales of the PedsQL measure. Finally, group differences in subscale scores were examined to see if they met the Minimally Clinically Important Difference scores (MCID) previously established for the measure (Varni, Burwinkle, Seid, & Skarr, 2003). The MCID was calculated via the Standard Error of Measurement, and represents the smallest difference in a score that can be perceived as meaningfully beneficial by the patient and that could dictate a change in patient care (Varni et al., 2003).

Results

Descriptive Statistics

See Table 1 for details on the sample characteristics. No differences were found between groups for child gender or age. There was a significant group difference for child race, such that there were more children classified as Caucasian in the HW group compared to the OB group, $\chi^2(1) = 6.69, p = .01$. As expected, child weight status was significantly associated with maternal BMI, $r(84) = .43, p = .001$.

Quality of Life

Table 2 presents PedsQL scores by weight group. A multiple regression model with the PedsQL subscales predicting weight group, controlling for race was examined. No significant differences in HRQOL were found between groups for any of the PedsQL subscales ($R^2 = .14, F(7, 67) = 1.56, p = .16$) nor did the difference in scores reach the MCID scores previously established for the measure (Varni et al., 2003).

Exploratory item-level analyses were performed to determine if any differences existed between specific items on the PedsQL by weight group, after controlling for race. With regards to physical functioning, mothers of preschoolers with obesity endorsed that their child had more difficulties with participation in sports and exercise than youth of healthy weight ($R^2 = .12, F(2,81) = 5.77, p = .005$, difference between groups = -8.86). No other items were significantly different.

Discussion

Parents of a community sample of preschool-age children did not report poorer HRQOL for children with BMI 95th percentile compared to those within a healthy weight (BMI 5th to 84th percentile). This contrasts with a previous study of parents seeking weight management treatment for preschool youth who endorsed significantly poorer HRQOL compared with a healthy normative sample, but is similar to another community sample of 4-5 year-olds with overweight and obesity where no differences were found in HRQOL scores compared to healthy weight peers (Kuhl et al., 2012; Wake et al., 2008). Overall, this pattern is consistent with findings from older children and adolescents that show treatment-seeking youth with

obesity have poorer HRQOL than non-treatment seekers (Kolotkin et al., 2006; Wille et al., 2010; Wille, Erhart, Petersen, & Ravens-Sieberer, 2008). The discrepancy between treatment-seeking and community samples raises important questions about the implications of parent perception of their child's HRQOL with regards to seeking appropriate treatment for obesity. One study of treatment-seeking older children with obesity revealed significantly lower parent-proxy and self-report physical and emotional HRQOL compared to children with healthy weight and overweight who were rated as "proper weight" by themselves or their parents. However, healthy-weight and overweight youth rated as "too fat" by themselves or their parents had similar HRQOL scores compared to the youth with obesity (Finne, Reinehr, Schaefer, Winkel, & Kolip, 2013). Parents of adolescents with obesity tended to underestimate their child's HRQOL in most domains compared to the teen's self-report (Bianchini et al., 2013). Furthermore, while only 53% of parents of preschoolers in a community sample expressed concern about their child's weight, increased parental concern was associated with poorer physical, psychosocial, and behavioral HRQOL (Wake et al., 2008). Indeed, in adolescents, parental concern regarding obesity in their teen has been found to be related not to actual weight but rather the effect that the teen's weight has on their HRQOL (Cushing, Bishop-Gilyard, Boles, Reiter-Purtill, & Zeller, 2013). Thus, poor HRQOL may be more a result of perceived weight status rather than objective weight status, and parents may be underestimating the true deficits in HRQOL in their children. Families who choose to seek treatment for obesity may recognize impairments in their child's HRQOL, which may drive motivation for treatment. Parents of younger school-age children with obesity who did not believe that their child was overweight or have concern about their child's weight were less likely to sign up for an obesity intervention program (Taylor et al., 2013). It may be that if families do not view their child's HRQOL as being impacted by weight, they may be less likely to seek treatment. This has potentially significant implications as appropriate treatment may prevent not only negative weight-related health consequences, but possibly also prevent future deficits in HRQOL.

A contrasting possibility is that deficits in HRQOL related to weight become more apparent to parents as their children age. This could explain why poorer HRQOL has been reported in some non-treatment seeking older children and adolescents with obesity, compared to peers of healthy weight, but this is not seen in community preschoolers (Swallen et al., 2005; Williams et al., 2005). Indeed, a large, longitudinal, population-based study of Australian children found that differences in HRQOL by overweight status were not present in children at ages 4 and 5 years, but were reported when the children were age 6-7 (Jansen, Mensah, & Clifford, 2013). Correlates of HRQOL in school-age children with obesity have been examined, and include classmate social support, peer teasing during physical activity, and disordered eating attitudes (Gowey, Lim, Clifford, & Janicke, 2014; Herzer, Zeller, Rausch, & Modi, 2011; Jensen, Cushing, & Elledge, 2014). Thus, it is likely that these particular factors are not yet salient in very young children, but develop as children mature. It is possible that as the social, emotional, and academic demands of childhood increase with development, HRQOL impairment may become more apparent. However, this only reinforces the necessity of early intervention, to prevent HRQOL decreases from occurring in the first place.

There are several limitations of the current study that must be taken into consideration. First, the relatively small sample may have limited power to detect significant findings. Replication with a larger sample of community youth is recommended. Additionally, a generic measure of HRQOL was utilized for the study, rather than a weight-specific measure, which may not be specific enough to capture the weight-related deficits in HRQOL in this population. While weight-specific measures of HRQOL are available for older children, no measure of obesity-specific QOL currently exists for preschool-age children. This may contribute to the findings of differences in HRQOL in older youth but not younger children. The development of an obesity-specific measure for preschoolers may allow for more refined assessment of functioning specifically within the context of obesity and would be beneficial for future research. The overall study sample was diverse, but there were more youth of Caucasian racial background in the healthy-weight group compared to the obese group. While analyses in the current study controlled for race, future research may consider matching participants in each group on demographic variables. Further, this correlational study only examined one point in time. Future research examining HRQOL longitudinally would be valuable, to identify if and when the relationship between weight and HRQOL changes across development, and if there are any risk or protective factors that can be identified. Lastly, this study did not evaluate a parent's perception of their child's weight, nor did it assess motivation or intention to pursue weight management strategies or intervention. In addition, dietary intake and physical activity were not assessed for the current study, yet such factors play an important role on weight status and may impact HRQOL. Assessing these variables in future research would be valuable.

Implications for Practice

Despite these limitations, the study is an important first step in examining the relationship between weight and HRQOL in a community sample of preschool-age children. Behavioral, family-based weight management interventions have been shown to be successful in preschool-age children (Stark et al., 2011). In addition, preschoolers, school-age children and adolescents exhibit improved HRQOL following obesity interventions (both behavioral and surgical) that result in weight loss (Kolotkin et al., 2006; Pratt, Lazorick, Lamson, Ivanescu, & Collier, 2013; Stark et al., 2011; Zeller, Modi, Noll, Long, & Inge, 2009). This study shows that preschool-age children in the community are not yet experiencing significantly impaired HRQOL compared to their healthy-weight peers. Thus, the preschool years may be an optimal time for obesity intervention in order to prevent youth from exhibiting significant impairment in the future. However, successful strategies to motivate parents and increase their awareness of and concern for their child's weight must be identified.

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Table 1

Sample Demographic Characteristics

		All participants (N= 84)	HW (N= 44)	OB (N = 40)
Weight category				
	HW	52.4% (44)	100% (44)	---
	OB	47.6% (40)	---	100% (40)
Child BMI %ile		71.88 (30.00)	48.22 (23.09)	97.89 (1.61)
Child gender				
	M	52.4% (44)	56.8%(25)	47.5% (19)
	F	47.6% (40)	43.2%(19)	52.5% (21)
Child age			4.57 (0.77)	4.62 (0.77)
	3-years	22.6% (19)	20.5%(9)	25% (10)
	4-years	47.6% (40)	52.3%(23)	42.5% (17)
	5-years	29.8% (25)	27.3%(12)	32.5% (13)
Child race *				
	Caucasian	54.8% (46)	65.9% (29)	42.5% (17)
	African American	33.3% (28)	25.0% (11)	42.5% (17)
	Asian	3.6% (3)	4.5% (2)	2.5% (1)
	American Indian	1.2% (1)	2.3% (1)	0% (0)
	Biracial	7.1% (6)	2.3% (1)	12.5% (5)
Maternal age		33.74 (6.13)	33.20 (6.29)	34.32 (5.98)
Maternal BMI		32.64 (9.41)	29.22 (8.85)	36.41 (8.61)
Maternal weight category				
	HW	26.2% (22)	43.2% (19)	7.5% (3)
	Overweight	14.3% (12)	15.9% (7)	12.5% (5)
	Obese	59.5% (50)	40.9% (18)	80.0% (32)
Median annual income		\$50-75k	\$50-75k	\$50-75k

* There was a significant different in race by weight group, $\chi^2 (1) = 6.69, p = .01$.

Table 2

PedsQL 4.0 Generic Core Scales Means (and Standard Deviations) by Weight Group

	HW (N= 44)	OB (N=40)	MCID^I	Actual Difference
<i>Subscale</i>				
Physical	91.55 (9.54)	86.25 (17.04)	6.92	5.09
Emotional	77.61 (16.55)	80.75 (17.60)	7.79	3.14
Social	85.45 (18.98)	88.37 (13.75)	8.98	2.92
School	88.38 (14.20) (N = 37)	83.24 (22.50) (N = 38)	9.67	5.14
Psychosocial Health Summary	83.06 (14.33)	84.14 (14.19)	5.49	1.08
Total	86.34 (11.57)	84.88 (13.94)	4.5	1.46

^I MCID: Minimally Clinically Important Difference score