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Health-Related Quality of Life in Children with Hemifacial Microsomia: Parent and Child Perspectives

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Abstract

Purpose—To compare health-related quality of life (HRQOL) among children with and without hemifacial microsomia (HFM) as assessed by parents and the children themselves during the elementary school years.

Methods—One hundred thirty-six children with HFM (49 females, mean age = 6 years, 11.9 months, SD = 1.004) were compared with 568 matched controls (285 females, mean age = 6 years, 10.2 months, SD = 0.998) for parent and child responses on the PedsQL Version 4.0.

Results—After adjustment for sociodemographic factors, parent-reported summary scores were worse for affected children than control group children for physical (effect sizes [ES] = 0.26, $p = .004$), social (ES = 0.34, $p = .001$), and school (ES = 0.32, $p = .001$) functioning. There were no significant mean differences in summary scores based on children's self-reported functioning.

Conclusions—Case-control mean differences in HRQOL were more apparent based on parent report, but not child self-report. Summary score findings suggest that case parents have concerns about their child's HRQOL, particularly with respect to their child's physical, social, and school functioning. Additionally, our findings highlight the potential differences between child and parent perspectives and the importance of collecting data from multiple reporters.

Index terms

health; well-being; subjective; parent-report; child-report; craniofacial

Health-related quality of life (HRQOL) is increasingly recognized as an important patient-reported outcome in pediatric medicine and rehabilitation¹ and is defined by the World Health Organization Quality of Life Group (WHO-QOL) as “individuals’ perceptions of their position in life in the context of culture and value systems in which they live, and in

relations to their goals, expectations, standards and concerns”.² Conceptualizing health as life satisfaction reinforces the need for health professionals to understand the meaning ascribed to a patient’s health condition in the context of their everyday lives. Health professionals can enact a patient-centered approach whereby they (1) prioritize the patients’ assessment of their lives based on their own goals and expectations and then (2) apply the results of the patients’ assessment to shared decision-making about the organization of services to help patients achieve their personal standard of health and well-being.³ To address this clinical need, researchers have developed and validated parent and child self-report instruments to advance research on this outcome for diverse groups of children.⁴ HRQOL measures have been used to help examine how the child’s functional impairments (physical, cognitive, social, and/or sensory) and environmental factors (e.g., transportation, housing, social support, services) contribute to the child’s participation in everyday activities and HRQOL.⁵

Hemifacial microsomia (HFM) is the third most common craniofacial birth defect, with a prevalence of 1 in 3,500 to 18,000 live births.⁶ The origin of HFM is not fully understood but is generally characterized by unilateral or bilateral asymmetric underdevelopment of facial structures, including the ear, maxilla, mandible, facial nerves, and muscles of facial expression.^{7–9} Previous research has suggested that children with HFM are more likely to experience vision, hearing, speech, feeding, and breathing impairments¹⁰ that are associated with sleep, oral health, learning, and behavior difficulties.¹¹ Children affected by HFM may also experience psychosocial adjustment problems due to differences in facial appearance.¹² However, most existing studies have been limited by small sample sizes of children with HFM (fewer than 100 cases) relative to the complex and highly variable HFM phenotype, ranging from isolated microtia to severe bilateral facial malformations.^{12,13} Dufton et al¹⁴ also noted that the broad age ranges and lack of demographically matched control groups in previous studies limited the generalizability of results to a broader population of children with HFM and their families. To our knowledge, there is no large-scale study examining the HRQOL for children with HFM.

We conducted the first large-scale epidemiologic study to systematically ascertain and compare children with and without HFM to better understand the etiology of this condition^{15,16} and a follow-up study to examine its consequences on children’s health and development during childhood.^{14,17,18} We have shown that HFM-affected children are 2 to 3 times as likely to score in the at-risk range for neurocognitive and psychosocial problems with receptive language and visual-motor impairments¹⁸ and have less social competence and peer acceptance per teacher report.¹⁴ In addition to assessments of the child’s neuropsychological performance, social competencies and behavior, and sleep patterns, we also gathered information from children and their parents about the child’s HRQOL, that is, the primary focus of this study. Two questions were addressed: (1) How do parents’ of children with and without HFM compare in their perceptions of the child’s HRQOL? and (2) How do children with and without HFM compare in their perceived HRQOL?

METHODS

Participants

A total of 279 mothers of children with hemifacial microsomia (HFM) (cases) and 884 mothers of children without HFM (controls) initially enrolled in a case-control study of pregnancy risk factors for this condition in offspring.¹⁵ Cases were recruited from 26 craniofacial centers throughout the United States and Canada from 1996 to 2002. Mothers of unaffected controls were recruited through the case's pediatrician or a nearby pediatric practice of comparable size. In addition to identifying case-control sets based on geographic region, approximately 3 controls were matched to each case by the child's age (within 2 months). Among participants in the case-control study, 267 cases and 839 controls were eligible for enrollment in the follow-up study when they were between the ages of 5 and 12 years. Institutional review board restrictions precluded enrollment of 12 cases and 45 controls in the follow-up study.

Cases—Of the 267 eligible cases, 43 could not be contacted, 17 refused participation, and 9 were excluded due to family circumstances (e.g., child death, out of home placement), resulting in enrollment of 198 cases. From this analysis, we excluded 40 cases with unilateral microtia and no other evidence of HFM to create a more diagnostically homogenous group, 11 twin gestations because quality of life may be impacted by twin status,¹⁹ and 11 cases with either isotretinoin-related or genetically inherited HFM because neurodevelopment may be different for these subtypes.^{20,21} We therefore report results for 136 cases in this report.

Controls—Of the 839 eligible controls, 142 could not be contacted, 121 refused participation, and 8 were excluded due to family circumstances or twin gestation, resulting in a final sample of 568 controls.

Measures

Demographic Questionnaire—For the follow-up study, mothers were asked to report on their annual household income, language spoken at home, household composition (e.g., number of siblings, marital status), and maternal education. Additional demographic information gathered during the case-control study by phone interview included factors such as race/ ethnicity, maternal age at the time of the child's birth, and geographic region of residence.

Peabody Picture Vocabulary Test—Third Edition—The Peabody Picture Vocabulary Test—Third Edition (PPVT-III)²⁰ is a norm-referenced measure of a child's receptive vocabulary and can be administered to children beginning at 2 years. Children are presented with vocabulary words and 4 target pictures per word and are asked to point to the picture that best represents the target word. PPVT-III has a normative mean of 100 and SD of 15; internal consistency (0.92–0.98), split-half (0.86–0.97), alternate forms (0.88–0.96), and test-retest reliability (0.91–0.94) have been reported to be excellent; strong correlations between the PPVT-III and other measures of verbal ability, such as the WISC-III VIQ (0.91), have been established.²¹

Pediatric Quality of Life—The 23-item PedsQL 4.0 Generic Core Scales measures 4 core dimensions of health-related quality of life (HRQOL): physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). As indicators of HRQOL, the items assess the degree of difficulty in performing these functions, as indicators of HRQOL, and therefore are reverse scored and linearly transformed to a 0 to 100 scale (0 = 100; 1 = 75; 2 = 50; 3 = 25; 4 = 0) so that higher scores indicate better HRQOL. The instrument yields scores for each core dimension as well as a Psychosocial Health Summary score (based on 15 items included in the emotional, social, and school functioning sections) and Total Health Score (based on all 23 items). Composite scores are computed as the sum of the items divided by the number of items answered to account for missing data.²² Numerous studies have reported on the psychometric properties of the PedsQL and support its validity across age subgroups²³ and its ability to distinguish between children with and without acute and chronic health conditions.^{22,24} The PedsQL 4.0 Generic Core Scales has been translated into multiple languages and parent and child report versions are available. The items for each of the versions differ in developmentally appropriate language and/or use of the first- or third-person pronoun.

In accordance with administration guidelines and to ensure continuity across our sample, we used the PedsQL 4.0 Parent and Child Report measures for ages 5 to 7 years. For all items, the parent is asked to report on how often their child has had problems over the past month on a 5-point scale (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem). In contrast, the child is asked to rate how often they have had a problem over the past 1 month at school and in their health and activities, feelings, and getting along with others on a 3-point scale (0 = not at all a problem; 2 = sometimes a problem; 4 = a lot of a problem) with each response choice anchored to happy, indifferent, and sad faces, respectively.²⁴ Parent-child agreement on the PedsQL 5- to 7-year-old version has been reported as fair to moderate.²³ For this study, we observed the following estimates of parent-child agreement measured by intraclass correlations: Total Health Score 0.36 for cases and 0.16 for controls; Psychosocial Health Summary Score 0.40 for cases and 0.19 for controls; Physical Functioning 0.02 for cases and 0.15 for controls; Emotional Functioning 0.07 for cases and 0.17 for controls; Social Functioning 0.32 for cases and 0.13 for controls; and School Functioning 0.45 for cases and 0.31 for controls.

Procedure

Approval was obtained from the Institutional Review Board before subject recruitment and data collection. The research nurse who interviewed mothers in the original case-control study¹⁵ re-contacted all eligible mothers by telephone about the follow-up study. Mothers who expressed interest in the follow-up study were mailed an enrollment packet containing consent and assent forms, a teacher contact form, and parent questionnaires (including the Demographic Questionnaire and PedsQL). For Spanish-speaking families, translated consents and parent questionnaires were provided. Mothers who read and obtained verbal assent from their children provided study staff with contact information for a classroom teacher or similarly trained adult (e.g., speech therapist, school counselor) who was familiar to their child and who could administer standardized tests (PPVT-III) and questionnaires

(including the PedsQL) to the child in his or her native language. Study staff then sent a packet containing all test materials, questionnaires, and written instructions for administration. Children were administered the PedsQL individually in a quiet room at their school or in their home. PedsQL standardized instructions were included in materials provided to the administrator, and children completed the PedsQL by having the items read aloud to them and their responses recorded on the form. All completed forms were mailed back to study personnel for review and scoring. For children who were home-schooled ($n = 19$), parents were mailed the child questionnaires to administer to their child at home using the established PedsQL administration guidelines.

Statistical Analysis

Demographic characteristics of cases and controls were summarized and compared using χ^2 tests. For both parent and child reports, PedsQL Generic Core composite and subdomain scores were compared between children with HFM (cases) and unaffected children (controls) using independent sample t tests. We used multivariate linear regression analyses to control for the potentially confounding effects of variables that differed statistically between groups (p -values $< .05$) including child's gender, mother's race and ethnicity, annual household income, marital status, and language spoken at home. Any relationship between HFM and PedsQL scores could be mediated by the child's verbal ability. Thus, multivariate regression analyses were repeated with PPVT-III standard scores included in the models to identify any changes in effect that would suggest child's verbal ability mediates the relationship between HFM and HRQOL. Effect sizes were calculated for summary-adjusted case-control comparisons to estimate the magnitude of case-control mean differences. We defined 0.20 to 0.49 as small effect, 0.50 to 0.79 as medium effect, and 0.80 and above as large effect.²⁵ Due to our use of the PedsQL version for 5 to 7 year olds for all study subjects, subgroup analyses were performed to examine the moderating effect of the child's age (5–7 years vs 8–12 years) on parent and child case-control mean differences in HRQOL. Chi-square analyses were conducted to examine parent case-control differences in total HRQOL scores below the established clinical cut-off score of 77 on the PedsQL.²⁶ Since this is the first large-scale study of HRQOL in children with and without HFM, we maintained an alpha level of .05 for 2-tailed tests and did not adjust our alpha level for multiple comparisons. All analyses were conducted using SPSS 20.0.²⁷

RESULTS

Child and Family Characteristics

The PedsQL 4.0 Generic Core Scales were completed by 94% parents of cases and 98% parents of controls. The PedsQL child-report versions were completed by 87% of cases and 83% of controls. Table 1 summarizes the demographic characteristics of the entire study sample. Most of the children sampled were 5 to 7 years of age (74% cases and 83% controls). Group differences between cases and controls on geographic region, maternal education, and child's age were minimal. Significant group differences were observed for child's gender, mothers' race/ ethnicity, annual household income, marital status, child's verbal ability, and language spoken in the home.

Case-Control Differences in Parent-Reported HRQOL

Mean summary scores based on parent report were lower for cases than controls on measures of physical, social, and school functioning. After adjustment for potential demographic confounds, mean difference effect sizes (ES) were small (0.26–0.34) but were statistically significant (p -values = .004–.001) with 1 exception: the ES for emotional functioning was 0.00, p = .659 (Table 2). After excluding the 19 children who were home-schooled, findings were similar with mean differences ranging from 0.20 to 5.46 (p -values = .001–.897). Assessment of child's verbal ability as a mediator was limited to 120 cases and 469 controls with Peabody Picture Vocabulary Test—Third Edition (PPVT-III) summary scores. Models that included PPVT-III summary score produced results that were similar to those without PPVT-III summary scores. Results also did not differ when limiting our analyses to the 530 study subjects with PPVT-III standard scores at or above an established clinical cutoff score of 85. Chi-square analysis of those with total health-related quality of life (HRQOL) scores below 77 showed similar results, with 22.1% of cases and 14.8% of controls in that group and a 2-sided p -value of 0.039.

Case-Control Differences in Child-Reported HRQOL

When child cases and controls were compared with adjustment for confounders, no significant case-control mean differences were observed in summary scores for physical, social, or emotional functioning (ES = 0.07–0.13, p -values = .25–.54) (Table 3). Child case-control mean differences were slightly higher (ES = 0.21) for school functioning but not statistically significantly different (p = .07). Again, findings were similar after excluding the 19 children who were home-schooled, with mean differences ranging from –0.14 to 3.64 (p -values = .048–.943). Results did not differ after adjusting for the child's verbal ability.

Subgroup analyses based on the child's age produced a similar pattern and magnitude of associations for the 570 children aged 5 to 7 years. Some variations in results were observed for the 134 children aged 8 to 12 years, but these comparisons were too unstable to evaluate due to sample size limitations.

DISCUSSION

This is the first large-scale study to examine both parent and child perspectives of health-related quality of life (HRQOL) among children with hemifacial microsomia (HFM) in comparison with unaffected peers. Parents' reports suggested that children with HFM encountered more difficulties with physical, social, and school functioning than controls after adjusting for demographic characteristics. These differences were apparent for average scores and for proportions with total summary scores below a suggested cut-off value.²⁶ In contrast, children's reports suggest minimal case-control differences in life quality.

Parental Perspectives of children's HRQOL

The average parent-reported PedsQL total score in our sample (M = 83.66) was comparable with that observed in a study of children with oral clefts (M = 86.1)²⁸ and higher than scores observed in studies of children with other chronic conditions, including diabetes (M = 76.62) and cerebral palsy (M = 51.28).²⁹ These findings suggest that children's HRQOL is less

affected by craniofacial anomalies than by other chronic conditions. Alternatively, it may be that the PedsQL lacks sensitivity needed to detect differences in HRQOL in craniofacial populations. For example, social stigmatization, peer teasing, and the burden associated with multiple craniofacial surgeries may not be reflected in children's scores on the PedsQL.³⁰

Our present findings regarding parent reports are in contrast to those of Dufton et al.,¹⁴ involving this same sample of children, on a different set of outcomes. In that study, teachers reported worse internalizing behavior and social competence scores for cases compared with controls, but parents reported similar levels of problem behavior across the 2 groups. In the present study, parents of children with HFM may have been more likely to report lower physical, social, and school functioning because functional limitations, rather than behavioral problems, are more clearly anticipated by the presence of a birth anomaly with long-term implications for service utilization. Alternatively, it is possible that results from both studies are more similar than not, given the lack of significant parent case-control differences when comparing emotional functioning subscale scores and only small effects for psychosocial health and social functioning summary scores ($ES = 0.28-0.34$). Future studies of child outcomes should examine the relative predictive significance of earlier parent reports of child behavior problems versus functional difficulties in the areas assessed by the PedsQL.

Children's Perspectives of Their HRQOL

Children with and without HFM reported, on average, similar levels of functional difficulty. These findings are congruent with results from previous studies examining the HRQOL of preschoolers with and without cleft lip and palate.³¹ The only child case-control difference that approached significance in our study was related to poorer school attendance among cases. Such differences are expected, given that children with HFM typically receive multiple surgical and other interventions to improve cosmesis. Although in the long term these procedures are expected to help improve the child's functioning by minimizing differences in appearance or addressing other sequelae, it is important to appreciate the potential adverse effects of surgical treatment on school absence and missed opportunities to participate with peers in school-related activities. Recent qualitative research supports our finding that children with craniofacial conditions and their parents describe missing out on social and school activities as a major stressor when living with a craniofacial condition.³²

Parent Versus Child Perspectives of HRQOL

Our finding of minimal differences between groups per child reports while their parents do identify significant differences raises the question of whose perspective is more accurate. Perhaps young children are in a better position to rate their level of functioning than their parents. Conversely, children may be unaware or reluctant to acknowledge the less desirable aspects of their life quality during the elementary years. Similar discrepancies between parent and child perspectives have been reported in several previous studies, particularly if the child has a chronic health condition.^{28,33-36}

In addition to the child's health status, other associated factors contributing to informant discrepancies may include parental stress^{37,38} and the child's age.³⁹ It is unclear, however,

whether children's future functioning is better predicted by child or parent reports on the PedsQL. Further follow-up of this cohort is underway that will allow examination of HRQOL at older ages and results will contribute to a growing body of longitudinal research on parent and child perspectives on HRQOL for chronic pediatric conditions.³⁹ Knowledge about parent-child discrepancies in life quality may help clinicians enact a client-centered approach to care, wherein multiple stakeholder perspectives guide shared decision-making around intervention priorities and the development of a focused and feasible plan of care to promote the child's HRQOL.

The observed lack of agreement is consistent with findings regarding parent-child agreement using other instruments that assess subjective experiences⁴ and highlights the importance of collecting data from multiple reporters to adequately assess a child's psychosocial function. Previous studies have also challenged the reliability of self-report for younger children and those with cognitive impairments,⁴⁰ such as a minority of the case children sampled in this study.¹⁸ Lower reliability of the PedsQL self-report for 5 to 7 year olds due to use of a 3-point versus 5- or 7-point scale may also help explain why no significant child case-control mean differences were found in this study.²³ Alternative methods for assessing the child's life satisfaction, such as qualitative approaches³² and assessment of participation, are worth exploring in future studies involving children with HFM.

Future research is also needed to explore the alternative pathways through which craniofacial differences might affect a child's HRQOL and to identify appropriate ways to intervene on this outcome. According to the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY),⁴¹ one of those pathways is through the impact of the child's health condition on his or her participation in everyday activities. Parents of children with and without disabilities have repeatedly identified factors beyond the child's impairments that impact participation, including the physical, social, attitudinal, and institutional features of their home, school, and community environments.⁴² Parents and teachers may be able to address these issues by regulating access to educational materials, tailoring activities according to the child's abilities, and defining social networks that impact how children experience their everyday lives. To inform the design of this type of activity-based intervention, detailed information is needed about the range of home, school, and community activities that children and youth with HFM want or need to participate in, their experiences when participating in these activities (e.g., how often and how much they participate, and how satisfied they are with their participation), and their perceptions about how various features of their environments are set up to support or challenge their participation. Participation measures that include items related to satisfaction may provide for more valid assessment of the child's life satisfaction than the PedsQL.

Study Limitations

Results should be considered in the context of limitations related to respondent selection and the measure we used. With respect to respondents, information provided by items related to school functioning may have been limited by the lack of reports by teachers, who likely have better detection than parents of school issues other than attendance. Furthermore, since mothers were the sole adult respondents in this study, it is not known whether case-control

differences in parent report would have been affected by parent respondent (e.g., mother vs father).

The PedsQL itself may have imposed 2 additional limitations on the study. First, although 26% of cases and 17% of controls were 8 to 12 years of age, we only used the PedsQL version for 5 to 7 year olds, which limited the Likert scale range for these older children (i.e., the PedsQL uses a 3-point scale for young children and a 5-point scale for 8–12 year olds). Second, there is considerable variation in definitions of HRQOL and construct labels (e.g., health status, functional status, disability scale, quality of life) such that definitions must be deduced from the dimensions assessed in a particular instrument.^{43,44} Although the PedsQL is one of the most frequently used measures of HRQOL in the medical literature, it focuses primarily on children's performance capacity or their ability to participate in age-appropriate activities. The PedsQL does not explicitly ask about the parent or child's satisfaction with performance of everyday tasks or participation in everyday activities. It is also important to note that the PedsQL may not fully address certain areas of children's functioning including friendships, peer interactions, and social engagement. These dimensions may be particularly important in characterizing HRQOL in children with craniofacial differences.⁴⁵ We were limited in the information available to us on HFM severity so were not able to examine HRQOL outcomes according to differences in the HFM phenotype. Despite these limitations, this study contributes to the growing body of literature on psychosocial outcomes among children with HFM and the HRQOL of children with disabilities from parent and child perspectives.

CONCLUSION

Childhood disability has been redefined as a socially constructed experience that is best explained by the child's appraisal of his or her own life experiences.² Practitioners who assess and intervene in the lives of children with disabilities need to obtain the perspectives of children with disabilities and their caregivers to understand the relative impact of a child's health condition on his or her quality of life. The present study expanded upon previous studies by including reports of health-related quality of life (HRQOL) by parents and their children, recruiting a large group of cases with hemifacial microsomia (HFM) and a demographically matched control group, and adjusting for selected demographic factors. We observed significant case-control differences in parental report of their child's HRQOL during the early and middle childhood period (5–12 years), but we did not find meaningful group differences in children's report. We are continuing to follow this cohort of children in adolescence and will be able to examine shifts in perceived HRQOL as children with HFM age and the relationship between their social participation and HRQOL. We will also have sufficient data on the performance and participation of children and youth with HFM to build and test robust models of participation and HRQOL problems using the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) as a guiding framework.

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Table 1

Sample Characteristics

	Cases (N = 136), n (%)	Controls (N = 568), n (%)	<i>p</i> ^a
Child gender			
Female	87 (36.0)	283 (50.2)	.003 **
Male	49 (64.0)	285 (49.8)	
Race/ethnicity			
White, non-Hispanic	92 (67.6)	429 (75.5)	.0001 ***
White, Hispanic	33 (24.3)	67 (11.8)	
African-American	4 (2.9)	49 (8.6)	
Other	7 (5.1)	23 (4.0)	
Geographic region			
Northeast	22 (16.2)	94 (16.5)	.957
Middle Atlantic	19 (14.0)	63 (11.1)	
Midwest	36 (26.5)	167 (29.4)	
South	22 (16.2)	90 (15.8)	
West	37 (27.2)	154 (27.1)	
Maternal education			
Less than high school	13 (9.6)	35 (6.2)	.100
High school graduate	31 (22.8)	108 (19.0)	
Some college	30 (22.1)	138 (24.3)	
College graduate	41 (30.1)	175 (30.8)	
Some graduate	14 (10.3)	83 (14.6)	
Other	4 (2.9)	18 (3.2)	
Annual household income			
<25,000	32 (23.5)	92 (16.2)	.021 *
25,000–34,999	9 (6.6)	68 (12.0)	
35,000–64,999	38 (27.9)	179 (31.5)	
65,000 or more	44 (32.4)	199 (35.0)	
Marital status			
Married	107 (78.7)	444 (78.2)	.045 *
Single, living with father	25 (18.4)	61 (10.7)	
Single, living without father	4 (2.9)	59 (10.4)	
Divorced, separated, or widowed	0	4 (0.7)	
Language spoken at home			
English	120 (88.2)	548 (96.5)	.0001 ***
Spanish	16 (11.8)	20 (3.5)	
Child age in years			
5–7	101 (74.3)	469 (82.6)	.354
8–12	35 (25.7)	99 (17.4)	
Child verbal ability			

	Cases (N = 136), n (%)	Controls (N = 568), n (%)	p^a
PPVT-III	97.39 (20.3)	106.28 (14.2)	.0001***

^aResults are based on 120 cases and 469 controls with known values only. PPVT-III, Peabody Picture Vocabulary Test—Third Edition.

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.

Table 2

Parent Case-control Comparisons on Quality of Life

	Cases		Controls		Case-Control Differences in Scores				
	Mean	SD	Mean	SD	t	95% CI	p	ES	Adjusted <i>r</i> ^a p
Physical functioning	88.19	15.21	91.79	12.11	-2.879	-6.052 to 1.144	0.004**	0.26	-2.874 0.004**
Psychosocial health	81.28	13.07	84.88	12.40	-2.833	-6.103 to 1.092	0.005**	0.28	-2.924 0.004**
Emotional functioning	81.91	15.54	82.05	15.71	-0.095	-3.158 to 2.867	0.924	0.00	-0.298 0.766
Social functioning	82.96	16.89	88.39	14.90	-3.344	-8.625 to 2.222	0.001***	0.34	-3.417 0.001***
School functioning	78.95	16.90	84.20	16.14	-3.192	-8.489 to 2.004	0.002**	0.32	-3.264 0.001**
Total scale score	83.66	12.36	87.29	10.87	-3.058	-5.969 to 1.286	0.003**	0.31	-3.304 0.001***

^a Difference when adjusting for child's gender, race/ethnicity, annual income, marital status, and language spoken at home.* $p = .05$.** $p = .01$.*** $p = .001$.

Table 3

Child Case-Control Comparisons on Quality of Life

	Cases		Controls		Case-Control Differences in Scores					
	Mean	SD	Mean	SD	t	95% CI	p	ES	Adjusted d^a	p
Physical functioning	79.04	12.93	79.96	13.16	-0.694	-3.551 to 1.702	0.48	0.07	-0.607	0.544
Psychosocial health	68.10	15.39	70.10	14.48	-1.280	-5.079 to 1.083	0.20	0.13	-1.279	0.201
Emotional functioning	69.76	20.67	71.92	20.54	-1.018	-6.338 to 2.024	0.31	0.10	-1.157	0.248
Social functioning	68.50	19.59	68.54	18.48	-0.019	-3.960 to 3.885	0.98	0.00	-0.022	0.983
School functioning	66.05	17.67	69.85	17.82	-2.096	-7.38 to 0.223	0.03 [*]	0.21	-1.814	0.070
Total scale score	71.91	13.09	73.52	12.68	-1.205	-4.244 to 1.025	0.23	0.12	-1.168	0.243

Items listed above were drawn from the PedsQL Version 4.0, Young Child Report (ages 5–7) and administered to all study subjects.

^a Difference when adjusting for child's gender, race/ethnicity, annual income, marital status, and language spoken at home.

* $p = .05$.

** $p = .01$.

*** $p = .001$.