Psychological and quality of life outcomes in pediatric populations: A parent-child perspective

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Abstract

Objectives: To compare the levels of quality of life (QoL) and psychological adjustment of children with different chronic health conditions with healthy children; to compare the QoL of parents of children with a chronic condition to parents of healthy children; and to examine the role of parents' QoL and children's psychological adjustment (internalizing/externalizing problems) on children's QoL.

Study design: The sample included 964 family dyads composed of a child/adolescent aged 8-18 years with diabetes (*n*=85), asthma (*n*=308), epilepsy (*n*=68), cerebral palsy (*n*=94), obesity (*n*=110), or no medical conditions (*n*=299) and one of their parents. Children completed self-report measures of QoL and psychological adjustment, and parents completed a questionnaire on QoL.

Results: Children with epilepsy and obesity reported the lowest levels of QoL and elevated levels of psychological problems, and parents of children with obesity reported the lowest levels of QoL. Adolescents reported worse adjustment than children. Regression models revealed that children's internalizing and externalizing problems were important, though distinctive, explanatory factors of QoL across all groups.

Conclusions: Children with chronic conditions, particularly epilepsy and obesity, are at increased risk of maladjustment. A routine assessment of their QoL and psychological functioning should be performed to better understand how specific conditions affect the lives of children and their families. Family-oriented pediatrics should be considered, particularly in the treatment of obesity.

Key-words: quality of life; psychological adjustment; internalizing problems; externalizing problems; family.

Over the past decades, tremendous medical advances have been made in the diagnosis and treatment of childhood chronic health conditions, resulting in increased rates of survival. Consequently, children and adolescents' (hereafter both referred to as *children*) quality of life (QoL) has increasingly been recognized as a key health outcome measure that should complement traditional health indicators (e.g., survival rates)[1]. Based on the World Health Organization's definition of health, QoL has been conceptualized as a multidimensional and subjective construct that reflects an individual's subjective assessment of several domains of his or her life, such as physical, social, and psychological functioning[2,3]. Given the subjective nature of this construct, it has been argued that it should be self-reported by both adults and children whenever possible[3]. However, children have traditionally been viewed as unreliable informants of their QoL, although there is growing evidence that they are able to provide this patient-reported outcome[4].

It has been found that the QoL of chronically ill children is frequently compromised[1,5,6], as is the QoL and psychological adjustment of their parents[7]. Moreover, a recent meta-analysis indicated that the risk of internalizing and externalizing problems is higher among children with chronic physical illnesses[8]. Studies that compare children and their parents' QoL across several conditions may be particularly useful for pediatric health care providers because they allow the identification of high-risk populations and facilitate understanding of the unique impact of each condition on the psychosocial functioning of children and their families[5,7]. Although valuable efforts have already been made to compare the QoL of children with different conditions[1,6], such studies have relied solely on proxy reports of children's QoL and have not analyzed the influence of children's age on their outcomes, examining children and adolescents as a single group. However, childhood and adolescence are distinct developmental stages characterized by different maturational issues and developmental tasks[9]; therefore, these stages should be studied independently. Moreover, although there is general agreement that a childhood health condition affects and is affected by the entire family[10,11] and a number of recent studies have stressed the relevance of studying and promoting the psychosocial adjustment of parents[7], research on the differential impact of different chronic conditions on parents' QoL is remarkably limited.

To further understand the impact of a chronic condition on children's lives, it is important to identify the determinants of children's QoL. Children's psychological adjustment has been noted as a key predictor of QoL[12], but its role in the context of pediatric chronic conditions has been theorized more than investigated, and the differential impact of internalizing and externalizing problems has not yet been ascertained. In addition, given the widely acknowledged interrelation between children and parents' adjustment[10,11], parental QoL is hypothesized to be an important predictor of children's QoL.

To fulfill the aforementioned research gaps, this study aims to (1) compare the levels of self-reported QoL and psychological adjustment (internalizing/externalizing problems) of children with a chronic condition (asthma, diabetes, obesity, cerebral palsy (CP), and epilepsy) to those of healthy peers; (2) compare the QoL of parents of children with different chronic conditions to parents of healthy children; and (3) examine the influence of children's psychological adjustment and parents' QoL on children's QoL. It is expected that children with chronic conditions would exhibit decreased QoL and more psychological problems than their healthy peers and that the parents of chronically ill children would present lower QoL. Finally, it is hypothesized that more psychological problems and lower QoL among parents would be associated with poorer QoL among children.

Methods

Participants and Procedure

A total of 964 family dyads composed of a child/adolescent aged 8-18 years and one of the child's parents participated in the study. These dyads included a child/adolescent with diabetes (*n*=85), asthma (*n*=308), epilepsy (*n*=68), CP (*n*=94), obesity (*n*=110), or no medical conditions (*n*=299). Children with diabetes, asthma, epilepsy, and obesity were recruited at the pediatric departments of three public and urban hospitals in the central region of Portugal, and children with CP were recruited at ten Portuguese Cerebral Palsy Associations between March 2009 and December 2012. The Ethics Committee and Direction Boards of both hospitals and CP Associations approved the study. To be included in this study, dyads with a chronic condition had to meet the following inclusion criteria: (a) youth between the ages of 8 and 18 years at the time of recruitment; (b) clinical diagnosis of asthma, type 1 diabetes, CP, epilepsy, or obesity; (c) absence of comorbidity with other health conditions; (d) ability to understand and answer the questionnaires; (e) parents had to be the primary caregivers (i.e., parents should identify themselves as primarily responsible for the child's illness management). Additionally, children with CP were required to have a minimum intelligence quotient of 70, and children in the obesity group were required to have a body mass index (BMI; Kg/m^2) at or above the 95^{th} percentile for children of the same age and gender, according to the Centers for Disease Control and Prevention (CDC) growth curves. Participants completed the self-report questionnaires in a consultation office of their health institution. A research assistant was available to assist them whenever necessary. Written informed consent from parents and adolescents aged 13 or older and child assent were obtained.

A community sample of healthy and normal-weight children and one of their parents was recruited in two Portuguese regular public schools between January 2010 and June 2012. The eligibility requirements for these families included children between the ages of 8 and 18 years at the time of recruitment, parent and children's informed consent, and child's assent. In addition, the children could not have any chronic health condition or

developmental delays, and the parent had to be the one who spent the most daily time with the child. After the Direction Boards of the schools authorized the study, the parents were given a letter explaining the study and the informed consent. Parents who returned the informed consent received a packet with questionnaires to be completed at home and returned a week later.

Measures

Children's quality of life. QOL was assessed by the Portuguese self-report version of the KIDSCREEN-10 index[13,14]. This instrument assesses the general subjective health and well-being of children and adolescents between 8 and 18 years old, and it can be applied to both healthy and chronically ill children. The KIDSCREEN index has ten items ("Have you felt fit and well?"; "Have you had fun with your friends?") answered on a five-point Likert scale ranging from 1 (never; not at all) to 5 (always; extremely), with higher scores indicating better QoL. Adequate internal consistency values were obtained in the present study (α = .77).

Children's psychological adjustment. Psychological adjustment was assessed using the Difficulties subscale of the Portuguese self-report version of the Strengths and Difficulties Questionnaire[15,16]. This subscale comprises 20 items ("I worry a lot"; "I am easily distracted, I find it difficult to concentrate"), which, according to recent recommendations[17], were clustered into internalizing and externalizing problems. These questions are answered on a Likert-type response scale with three options (0 = not true, 1 = somewhat true, and 2 = certainly true), with higher scores indicating more psychological problems. Adequate internal consistency values were obtained for the internalizing (α = .67) and externalizing subscales (α = .72).

Parent's quality of life. To assess parents' perceptions of their QoL, the Portuguese version of the EUROHIS-QOL-8[18,19] was used. The EUROHIS-QOL eight-item index is a brief indicator of overall QoL and was developed as an adaptation of the WHOQOL-100 and WHOQOL-Bref. It contains eight items (e.g., "How satisfied are you with your health?"; "Have you enough energy for everyday life?"), two per QoL domain (social, psychological, physical, and environmental), and uses a five-point Likert scale ranging from 1 (not at all/very dissatisfied) to 5 (completely/very satisfied), with higher scores indicating better QoL. Adequate internal consistency values were obtained in our sample (α = .83).

Socio-demographic and clinical characteristics. Socio-demographic information was reported by parents and included parents and children's ages and genders and parents' marital status. Parents of obese children also reported their weight and height, and their BMI was classified into four categories (underweight: under 18.5; normal: 18.5 – 24.9; overweight: 25.0 – 29.9; obese: 30 or above) according to the CDC. Clinical information included the length of chronic conditions (except for CP and obesity) and specific information for each clinical group. Following the Global Initiative for Asthma guidelines[20], asthma severity was classified by clinicians into

four categories: intermittent, mild persistent, moderate persistent, and severe persistent. Values of glycosylated hemoglobin (HbA1c) at the time of assessment were obtained for children with diabetes. The weight and height of obese children was obtained from parents and/or the nutritionist. Epilepsy severity was assessed by clinicians through the Global Assessment of Severity of Epilepsy (GASE)[21], which is a single-item, seven-point global rating scale ranging from 1 (extremely severe) to 7 (not at all severe). Levels of CP function were obtained according to the Gross Motor Function Classification System (GMFCS), expanded and revised[22].

Data Analyses

Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 20.0; IBM SPSS, Chicago, IL). Missing data were random and low level (<5%) and were handled by simple group mean substitution. Demographic and clinical data were not substituted. Chi-square tests and univariate analyses of variance (ANOVAs) were used for comparisons between groups on socio-demographic characteristics, and variables that differed significantly between groups were entered as covariates into subsequent comparison analyses. The effects of condition (healthy, asthma, diabetes, epilepsy, obesity, CP) and age groups (children: 8-12 years old; adolescents: 13-18 years old) on children's and parents' QoL were assessed with two-way univariate analyses of covariance (ANCOVAs). A two-way multivariate analysis of covariance (MANCOVA) was performed on internalizing and externalizing problems. When a multivariate effect was found, subsequent univariate analyses were performed (one per dependent variable). Post-hoc analyses were conducted using pairwise comparisons with a Bonferroni correction to control alpha inflation due to multiple testing. Significant interaction effects between condition and age groups were explored using simple effects tests, which compared the effect of the condition at each level of age category and the effect of age category for each condition.

Hierarchical regression analyses assessed the influence of parents' QoL and children's psychological adjustment on children's QOL for each condition. Before conducting these analyses, correlations between the main socio-demographic and clinical variables and children's QoL were analyzed to select the appropriate covariates to introduce into the regression model. The predictor variables were entered in four blocks into the regression equation to examine the additional explained variance of each block, in the following order: covariates, parents' QoL, internalizing problems, and externalizing problems.

Significance was set at the .05 level, and partial eta-squared (η^2_p) provided the estimate of the effect size for the analyses of variance and covariance. Post-hoc power calculations (G*Power[23]), with a significance level of .05 and power of .80, demonstrated that the sample size allowed for the detection of small to large effects in ANCOVA and MANCOVA tests. In testing the regression models, the sample size and the number of predictors

for each group allowed for the detection of medium to large effect sizes in the diabetes, obesity, epilepsy, and CP groups. Small to large effects could be detected in the asthma and healthy groups.

Results

Sample Characteristics

Table 1 presents the socio-demographic and clinical characteristics of the sample. The total sample of the five chronic health conditions included 665 children (56.1% boys; M_{age} = 12.43 years; *SD* = 2.78) and their parents (88.3% mothers; M_{age} = 41.66 years; *SD* = 5.94). The comparison group included 299 healthy children (53.2% girls; M_{age} = 11.75 years; *SD* = 3.25) and their parents (91% mothers; M_{age} = 41.72 years; *SD* = 5.54). No differences between the six groups were found for parents' age, $F(5, 954) = 1.73$, $p = .16$, $\eta^2_p = .009$, gender, $\chi^2(5, N = 963) = 6.64$, $p = .20$, or marital status, $\chi^2(15, N = 958) = 19.56$, $p = .19$. In contrast, significant differences were found in the children's age, $F(5, 955) = 4.49$, $p < .000$, $\eta^2_p = .023$ and gender, $\chi^2(5, N = 961) = 21.30$, $p = .001$. Bonferroni post-hoc analyses showed that children with diabetes were significantly older than children with no medical conditions and CP. Chi-square tests showed that the asthma sample included significantly more boys than the healthy, diabetes, epilepsy, and obesity groups. Hence, children's gender was entered as a covariate into subsequent analyses. The mean BMI of parents of children with obesity was 29.12 (*SD* = 4.95) and ranged from 19.11 to 41.91. The majority was obese (42.4%), 38% were overweight, and 19.6% had a normal weight. Regarding the clinical characteristics of the sample, 54.2% of the asthmatic children had intermittent asthma; the mean HbA1c of children with diabetes was 7.62% (*SD* = 1.16); the mean GASE score for children with epilepsy was 2.64 (*SD* = 1.30); the BMI of children with obesity ranged from 19.84 to 40.56 and had a mean value of 29.31 (*SD* = 4.53); and more than half of the CP cases corresponded to milder forms of CP, including spastic subtypes (87.2%) with no limitations to walking (62.8% in level I of function according to the GMFCS). (*INSERT TABLE 1 ABOUT HERE*)

Group Differences in Study Variables

Table 2 presents the descriptive statistics of the study variables according to the condition and age groups as well as the condition, age, and interaction (condition x age) effects. With regard to the children's QoL, the two-way ANCOVA, controlling for children's gender, yielded significant condition, age, and interaction effects. Simple effects tests comparing the effect of the condition in each age category showed that children who were diagnosed with obesity and epilepsy presented poorer QoL than children with no medical condition, asthma, or diabetes. Children with CP presented poorer QoL than children with no medical condition or diabetes. Among adolescents, the only significant difference was found between children with obesity and asthma, with the former presenting poorer QoL. Furthermore, simple effect tests comparing the effect of age category for each condition

revealed significant differences between children and adolescents for those with no medical conditions, $F(1, 297) = 59.48$, $p < .001$, $\eta^2_p = .17$, diabetes, $F(1, 83) = 35.31$, $p < .001$, $\eta^2_p = .30$, obesity, $F(1, 108) = 11.06$, $p < .001$, $\eta^2_p = .09$, and asthma, $F(1, 297) = 59.48$, $p = .002$, $\eta^2_p = .03$. Children presented higher levels of QoL than adolescents for all of these conditions (see Figure 1).

The MANCOVA for psychological adjustment, controlling for children's gender, revealed a significant multivariate effect of condition, Pillai's trace = 0.07, $F(10, 1984) = 7.32$, $p < .001$, $\eta^2_p = .04$, and a significant multivariate interaction, Pillai's trace = 0.03, $F(10, 1984) = 2.44$, $p = .007$, $\eta^2_p = .01$. With regard to internalizing problems, a significant main effect of condition and a significant interaction were found in the subsequent two-way ANCOVA. Simple effects tests comparing the effect of the condition for each age category showed that children with obesity reported more internalizing problems than those with diabetes and that children with epilepsy reported more problems than their healthy counterparts and than children with asthma, diabetes, or CP. Among adolescents, those with obesity, epilepsy, and CP presented more internalizing problems than those with no medical condition, asthma, or diabetes. When comparing the effect of age category for each condition, children presented fewer internalizing problems than adolescents for the diabetes, $F(1, 83) = 5.24$, $p = .03$, $\eta^2_p = .06$, and CP groups, $F(1, 91) = 5.21$, $p = .03$, $\eta^2_p = .05$ (see Figure 1). For externalizing problems, the two-way ANCOVA only revealed a significant main effect of condition, with children/adolescents with epilepsy presenting more problems than children/adolescents with no medical condition, asthma, diabetes, and CP. In addition, children/adolescents with obesity reported significantly more problems than their healthy counterparts.

Finally, the two-way ANCOVA for parents' QoL, controlling for children's gender, yielded significant condition and age effects, showing that parents of children/adolescents with obesity had poorer QoL than parents of children/adolescents with no medical condition, asthma, or epilepsy, regardless of their age group. The main effect of age revealed that parents of adolescents had poorer QoL than parents of children.

(INSERT TABLE 2 AND FIGURE 1 ABOUT HERE)

Regression Analyses

Prior to conducting the main analyses, bivariate relationships between the main sociodemographic (age and gender) and clinical variables (length of disease; GASE score; HbA1C; PC function level [0 = *no mobility limitations*, 1 = *with mobility limitations*]; asthma severity [0 = *intermittent*; 1 = *persistent*]; children's BMI) and the children's QoL were examined for each condition to identify potential covariates. The children's age was correlated with the QoL of children with no medical conditions ($r = -.38$, $p < .001$), asthma ($r = -.13$, $p = .022$), diabetes ($r = -.54$, $p < .000$), and obesity ($r = -.29$, $p = .002$). The length of disease was only significantly correlated with the QoL of children with diabetes ($r = -.28$, $p = .011$), and BMI correlated significantly with the

QoL of obese children (r = -.30, p = .005). These variables were included as covariates in the regression analysis when appropriate.

As presented in Table 3, the parents' QoL explained a small amount of the variance in the children's QoL and it was a significant predictor only among the asthma condition. Internalizing problems explained a large part of the QoL variance in all groups, with values ranging between 11.7% (obesity) and 24.3% (epilepsy). The amount of variance explained by externalizing problems was lower, ranging from 5.2% (healthy) to 9.6% (epilepsy). *(INSERT TABLE 3 ABOUT HERE*)

Discussion

The present study provided relevant and innovative results about the QoL and psychological adjustment of a large sample of children and adolescents with different chronic health conditions as well as the QoL of their parents. The results suggest that children with obesity and epilepsy are particularly at risk of impaired QoL and of developing psychological problems and that parents of children with obesity exhibit the lowest levels of QoL. Another relevant finding is that children's internalizing and externalizing problems are important, though distinctive, explanatory factors of QoL across all groups.

In the current study, children with epilepsy were among the groups with lower QoL (during infancy) and the worst psychological adjustment (during infancy and adolescence), which is in line with previous research showing that children with epilepsy exhibit higher levels of psychopathology, both in comparison with healthy controls and with children with conditions not involving the central nervous system, such as asthma or diabetes[24]. Indeed, children with epilepsy are faced with a number of distressing issues that are common to chronic conditions in general (e.g., restrictions on gratifying activities, frightening symptoms, social stigma) and specific to epilepsy (e.g., unpredictability of seizures) that may have a detrimental impact on their QoL and psychological adjustment. In addition, it has been suggested that children with neurological disorders are more likely to develop psychopathology in comparison with children with conditions that do not involve any brain dysfunction[8,24]. Interestingly, we found that children with CP, which is also a neurodevelopmental condition, reported decreased QoL when compared with children with diabetes and asthma (during infancy) and more internalizing problems (during adolescence) than children with no medical conditions, asthma, and diabetes. Nevertheless, it is important to note that in comparison with children with epilepsy, children with CP reported better psychological adjustment, particularly during infancy. This may be due to the higher visibly of CP, which may lead children to receive more social support, in turn promoting better adjustment.

Another high-risk condition for poor adjustment results seems to be obesity. In fact, children and adolescents with obesity reported decreased QoL and poorer psychological adjustment than their healthy

counterparts and children with other conditions, particularly asthma and diabetes. As a result of the increasing prevalence rates of childhood obesity in recent years, concerns about understanding the effects of obesity on QoL have increased. Many studies have found that overweight children and adolescents have lower QoL than normal-weight[25] or chronically ill children[5]. A number of factors may contribute to these results, such as the frequently observed victimization by peers, weight-related teasing, or social marginalization as well as decreased satisfaction with body image[26].

Interestingly, the parents of obese children reported the lowest levels of QoL, not only in comparison with parents of normal-weight children but also in comparison with parents of children with asthma and epilepsy. Although previous studies have reported similar results using control groups of parents of normal-weight children[27,28], this study provides interesting and innovative results by showing that these parents exhibit worse adjustment compared with parents of children whose conditions involve more complex, time-consuming, and burdensome treatment management that might be considered to have a greater impact on their lives. One possible explanation is that most of these parents are overweight (38%) or obese (42.4%) themselves, so they may also struggle with self-esteem or stigmatizing issues, which are likely to have implications for their QoL. The so-called obesigenic family environment[28] may contribute to parents and children's difficulties and to their elevated weight.

Data from the present study suggest that during adolescence, there is a high risk of maladjustment. QoL levels were lower for adolescents for almost all conditions, more internalizing problems were reported by adolescents with diabetes and CP, and lower QoL was reported for the parents of adolescents for all conditions. These results are expected because the normative changes of this developmental period may increase the likelihood of disturbances, particularly in the context of chronic conditions. For instance, the urge for autonomy and independence may conflict with restrictions associated with the condition and its treatment and may decrease youths' perceptions of their QoL. Moreover, important challenges and transformations in the parent-youth dyad are likely to occur, and some level of parenting stress may be expected, with implications for parental QoL[29].

With regard to the associations between parental QoL and children's psychological adjustment, and the QoL of the latter, we found a consistent pattern across conditions. Specifically, and contrary to expectations, parents' QoL only explained a small proportion of variance in the QoL of children with asthma, although research has demonstrated that children's and parents' adjustment are interrelated[10,11]. It is possible that the link between parents' and children's QoL is not direct but is mediated by variables that were not evaluated in this study. Future research should investigate possible mechanisms (e.g., parenting styles) that may account for this relationship. However, our results clearly indicated that children's psychological adjustment has implications for their QoL. The results were quite consistent between conditions, demonstrating that internalizing symptoms explain a larger

amount of QoL variance than externalizing problems. Although there is general agreement that children's psychological adjustment predicts their QoL[12], to our knowledge, this is the first study to analyze the differential role of these two broad dimensions on the QoL of several pediatric conditions.

There are a number of limitations to this study that should be noted. First, the cross-sectional design is an important limitation because adjustment to a chronic condition is an ongoing dynamic process rather than a static outcome and may be better understood within a longitudinal design. Furthermore, cross-sectional studies do not allow causal inferences to be determined. Second, although we intended to recruit primary caregivers (regardless of their gender), the majority of caregivers were mothers. This disproportionate participation between mothers and fathers is common in pediatric research; however, it would be relevant to increase the number of fathers and to assess role differences. Third, data on the weight and height of parents were only collected for the obesity group, which limited our understanding of the impact of BMI on QoL across different conditions. Fourth, although the different sample sizes of chronic conditions reflect their prevalence rates, future studies should ensure a similar number of participants in all groups. Fifth, the children with diabetes were older, and the proportion of girls and boys was not equivalent between groups. Although these differences were statistically controlled in the data analyses, future studies should ensure homogeneity between groups. Despite these limitations, the current study demonstrated a number of strengths, such as the inclusion of a large sample of children and adolescents that self-reported their adjustment outcomes instead of relying on proxy reports and a focus on the developmental differences between children and adolescents. In addition, the analysis of the impact of different conditions on the QoL of parents and the examination of the role of parental QoL and of two key dimensions of children's psychological adjustment on children's QoL are important strengths of this study.

In sum, examining children's and parents' adjustment to different chronic health conditions has theoretical and practical relevance. This study provides a better understanding of the psychosocial consequences of pediatric conditions and helps clinicians to identify vulnerable groups of children and parents that may benefit from greater attention. Clinicians should be aware that chronically ill children, particularly those with epilepsy and obesity, are at increased risk of developing adjustment difficulties. This possibility should be seriously considered because it has been suggested that children's psychosocial adjustment plays a key role in adherence to treatment, which, in turn, has implications for their health as well as rates of health care utilization[30]. A routine assessment of QoL may provide clinicians with valuable information on how a certain condition affects the lives of patients. For instance, the KIDSCREEN-10 is a brief and easily scored measure that can be administered to children and adolescents between 8 and 18 years old. Furthermore, given the strong association between psychological adjustment, particularly internalizing symptoms, and the QoL of children, aspects such as worry,

depressive symptoms, or peer problems should be evaluated frequently so that children can be properly referred to a pediatric mental health specialist if necessary[8].

Because parents are usually the main people responsible for their children's health issues, it is important to understand, assess, and promote their QoL[11]. In this study, the parents of obese children reported the lowest levels of QoL. The majority of these parents were overweight or obese, which supports an intergenerational pattern of obesity[28] and the adoption of a parent-child perspective in the clinical management of such cases. We endorse the recommendation of the American Academy of Pediatrics Task Force on Family[11] that a family-oriented approach to pediatrics should be adopted. Pediatricians should include screening, assessment, and referral of parents who exhibit psychosocial difficulties that might affect the health and well-being of their children. Because children's outcomes are intrinsically related to the functioning of their parents and family, it is essential that pediatricians consider the family and not just the child as the patient.

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Table 1. Demographic and clinical characteristics of children/adolescents and their parents ($N = 964$)

	Healthy $n = 299$	**Asthma** $n = 308$	**Diabetes** $n = 85$	**Obesity** $n = 110$	**Epilepsy** $n = 68$	**Cerebral Palsy** $n = 94$
Children's characteristics						
Age (years) *M*(*SD*)	11.75 (3.25)	12.24 (2.64)	13.28 (3.14)	12.60 (4.76)	12.59 (2.92)	11.98 (2.82)
Length of disease (months) *M*(*SD*)	---	92.5 (47.31)	71.90 (49.56)	---	66.65 (48.33)	---
Age group (*n*/%)						
Children (8-12 years)	171 (57.2)	175 (56.8)	34 (40.0)	57 (51.8)	29 (42.6)	51 (54.3)
Adolescents (13-18 years)	128 (42.8)	133 (43.2)	51 (60.0)	53 (48.2)	39 (57.4)	42 (44.7)
Missing information	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.1)
Gender (*n*/%)						
Male	138 (46.2)	194 (63.0)	37 (43.5)	54 (49.1)	35 (51.5)	53 (56.4)
Female	159 (53.2)	114 (37.0)	47 (55.3)	56 (50.9)	33 (48.5)	41 (43.6)
Missing information	2 (0.7)	0 (0.0)	1 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)
Parent's characteristics						
Age (years) *M*(*SD*)	41.72 (5.54)	41.27 (5.82)	43.15 (5.89)	41.24 (4.77)	42.38 (7.15)	41.57 (6.49)
Gender (*n*/%)						
Male	27 (9.0)	44 (14.3)	8 (9.4)	8 (7.3)	8 (11.8)	9 (9.6)
Female	272 (91.0)	264 (85.7)	77 (90.6)	102 (92.7)	60 (88.2)	84 (89.4)
Missing information	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.1)
Marital status (*n*/%)						
Single	11 (3.7)	8 (2.6)	1 (1.2)	4 (3.6)	0 (0.0)	7 (7.4)
Married/living together	254 (84.9)	254 (82.5)	74 (87.1)	84 (76.4)	54 (79.4)	74 (78.7)
Separated/divorced	31 (10.4)	36 (11.7)	8 (9.4)	15 (13.6)	11 (16.2)	9 (9.6)
Widowed	3 (1.0)	8 (2.6)	1 (1.2)	5 (4.5)	3 (4.4)	3 (3.2)
Missing information	0 (0.0)	2 (0.6)	1 (1.2)	2 (1.8)	0 (0.0)	1 (1.1)

Table 2. Study variables by condition and age category ($N = 964$)

	Healthy[a] $n = 88$		**Asthma**[b] $n = 121$		**Diabetes**[c] $n = 121$		**Obesity**[d] $n = 121$		**Epilepsy**[e] $n = 121$		**CP**[f] $n = 121$		**Pairwise comparisons**
	Child[g] $n = 171$	**Adol.**[h] $n = 128$	**Child**[i] $n = 175$	**Adol.**[j] $n = 133$	**Child**[k] $n = 34$	**Adol.**[l] $n = 51$	**Child**[m] $n = 57$	**Adol.**[n] $n = 53$	**Child**[o] $n = 29$	**Adol.**[p] $n = 39$	**Child**[q] $n = 51$	**Adol.**[r] $n = 42$	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	
Generic QoL	83.46 (11.07)	72.85 (12.83)	82.92 (13.91)	77.99 (13.71)	86.62 (10.75)	72.90 (10.38)	76.80 (10.48)	69.72 (11.84)	71.55 (15.50)	73.59 (17.41)	77.45 (14.32)	73.87 (14.63)	m, o < g, i, k q < g, k n < j
Condition effect	$F(5, 947) = 7.99$, $p < .001$, $\eta^2_p = .040$												
Age effect	$F(1, 947) = 38.04$, $p < .001$, $\eta^2_p = .039$												
Condition x age effect	$F(5, 947) = 4.46$, $p = .001$, $\eta^2_p = .023$												
Internalizing problems	5.52 (3.25)	4.76 (2.69)	4.98 (2.96)	4.53 (2.69)	3.94 (2.21)	5.40 (3.25)	6.07 (2.96)	6.30 (3.23)	7.48 (3.92)	6.46 (3.25)	5.16 (2.93)	6.81 (4.04)	m > k o > g, i, k, q n, p, r > h, j, l
Condition effect	$F(5, 947) = 9.34$, $p < .001$, $\eta^2_p = .047$												
Age effect	$F(1, 947) = 0.39$, $p = .53$, $\eta^2_p = .000$												
Condition x age effect	$F(5, 947) = 3.98$, $p = .001$, $\eta^2_p = .021$												
Externalizing problems	4.97 (3.25)	5.03 (3.01)	5.89 (3.43)	5.78 (3.28)	4.74 (2.73)	5.60 (3.02)	6.35 (3.41)	6.49 (2.45)	8.07 (4.03)	7.05 (3.32)	5.76 (3.12)	5.52 (3.38)	e > a, b, c, f d > a
Condition effect	$F(5, 947) = 8.44$, $p < .001$, $\eta^2_p = .043$												
Age effect	$F(1, 947) = 0.00$, $p = .995$, $\eta^2_p = .000$												
Condition x age effect	$F(5, 947) = 0.72$, $p = .61$, $\eta^2_p = .004$												
Parents' QoL	69.04 (13.92)	68.73 (13.34)	68.34 (12.78)	67.41 (14.84)	65.63 (15.31)	64.15 (14.08)	62.23 (13.59)	59.67 (13.00)	68.64 (10.00)	66.11 (12.49)	69.18 (10.99)	63.62 (15.51)	d < a, b, e
Condition effect	$F(5, 947) = 6.18$, $p < .001$, $\eta^2_p = .032$												
Age effect	$F(1, 947) = 4.35$, $p = .04$, $\eta^2_p = .005$												
Condition x age effect	$F(5, 947) = 0.63$, $p = .67$, $\eta^2_p = .003$												

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Predicting children's QoL ($N = 964$)

	Healthy		Asthma		Diabetes		Obesity		Epilepsy		CP	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Block 1												
Length of disease	--	--	--	--	-.10		--		--	--	--	--
BMI	--	--	--	--	--	.290***	-.19	.10*	--	--	--	--
Age	-.42***	.142***	-.16***	.017**	-.42***		-.14		--	--	--	--
Block 2												
Parents' QoL	.06	.024**	.13**	.073***	-.05	.005	.13	.05*	-.01	.015	.17†	.066*
Block 3												
Internalizing problems	-.31***	.129***	-.36***	.181***	-.32**	.169***	-.28**	.117***	-.38***	.243***	-.26*	.128***
Externalizing problems	-.24***	.052***	-.27***	.066***	-.21†	.026†	-.19†	.031†	-.34**	.096**	-.31**	.081**
Total R^2	.347		.337		.490		.295		.354		.275	
Adjusted R^2	.338		.328		.455		.251		.323		.251	
F(final model)	38.85***		38.48***		14.04***		6.77***		11.68***		11.39***	

Note. The standardized regression weights concern the analyses in which all main effects were entered (last block). The variables marked with a dash were not introduced into the model because they were not significantly correlated with the dependent variable.
†p < .10. *p < .05. **p < .01. ***p < .001.

Figure 1

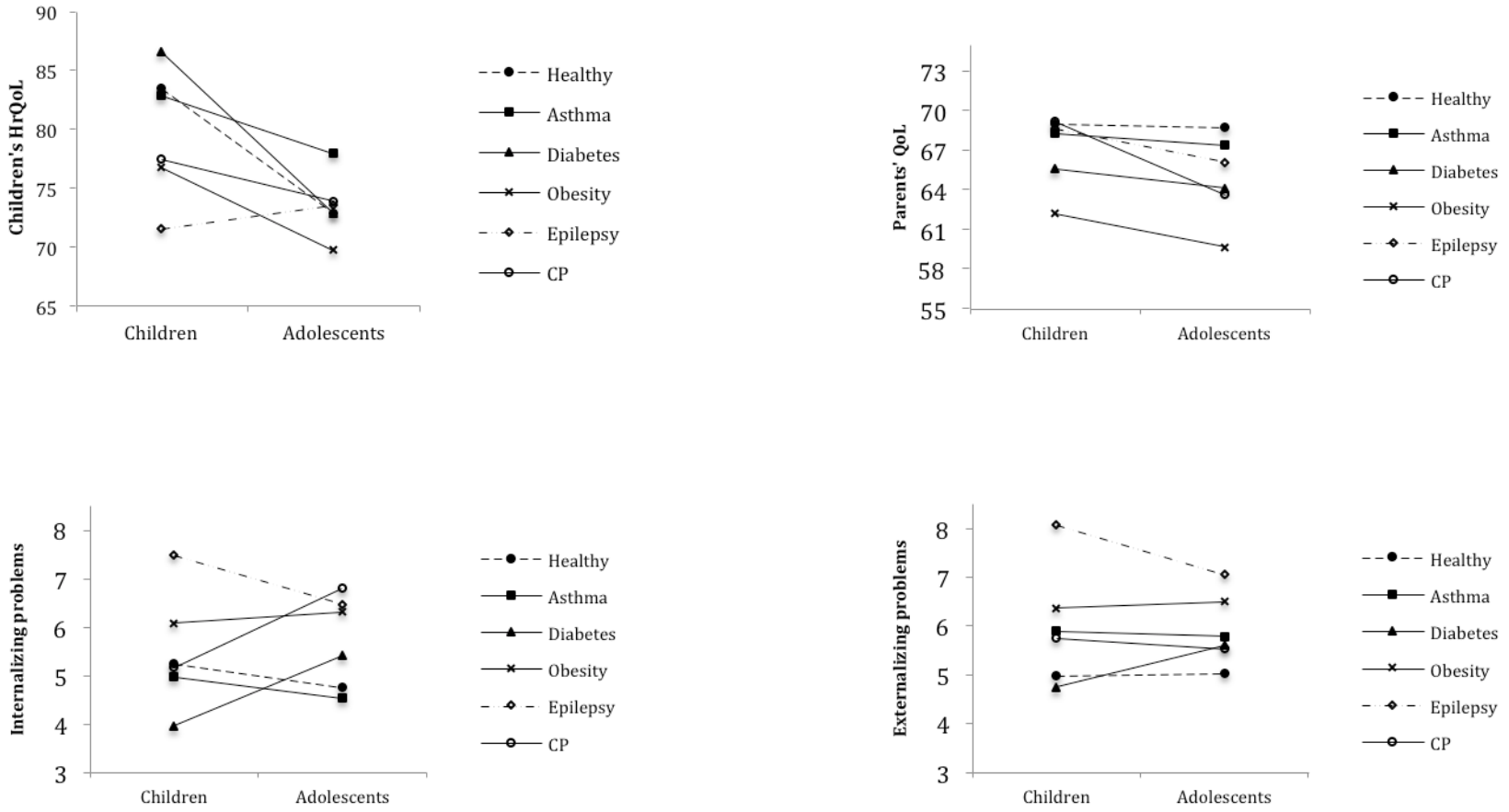

Figure 1. Children's QoL, parents' QoL, and internalizing and externalizing problems of children and adolescents across several chronic health condition