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ORIGINAL ARTICLES

Health-Related Quality of Life in Pediatric Patients with Functional and Organic Gastrointestinal Diseases

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Pediatric Quality of Life Inventory (PedsQL) Gastrointestinal Symptoms Module Testing Study Consortium*

Objective To compare health-related quality of life (HRQOL) in pediatric patients with functional gastrointestinal disorders (FGIDs) and organic gastrointestinal (GI) diseases with an age-, sex-, and race/ethnicity-matched healthy sample across GI diagnostic groups and with one another.

Study design The Pediatric Quality of Life Inventory 4.0 Generic Core Scales were completed in a 9-site study by 689 families. Patients had 1 of 7 physician-diagnosed GI disorders: chronic constipation, functional abdominal pain, irritable bowel syndrome, functional dyspepsia, Crohn's disease, ulcerative colitis, and gastroesophageal reflux disease. The healthy control sample included 1114 families. School days missed, days in bed and needing care, parent missed workdays, work impact, and healthcare utilization were compared as well.

Results Patients with an FGID or organic GI disease demonstrated lower HRQOL than the healthy controls across all dimensions (physical, emotional, social, and school; $P < .001$ for all), with larger effect sizes for patients with an FGID. Patients with an FGID manifested lower HRQOL than those with an organic GI disease. Patients with an FGID or organic GI disease missed more school, spent more days in bed and needing care, had greater healthcare utilization, and had parents who missed more workdays with greater work impact ($P < .001$ for most), with larger effect sizes for the patients with an FGID.

Conclusion Patients with an FGID or organic GI disease demonstrate impaired HRQOL compared with healthy children. HRQOL can be used as a common metric to compare patient outcomes in clinical research and practice both within and across groups of patients with FGIDs and organic GI diseases. *(J Pediatr 2015;166:85-90).*

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Generic (general or non–disease-specific) health-related quality of life (HRQOL) measurement is increasingly being used to assess the impact of pediatric diseases and treatments from the perspective of pediatric patients and their parents.[1-3] HRQOL is a multidimensional construct, consisting at a minimum of the physical, psychological (including emotional and cognitive), and social health dimensions delineated by the World Health Organization.[4,5] Well-validated generic HRQOL instruments provide a common metric that facilitates comparisons across patient groups and benchmarking with healthy populations.[6]

The emerging paradigm shift toward patient-reported outcomes in clinical trials has provided an opportunity to emphasize the importance of pediatric patient self-report measurement as efficacy outcomes.[5,7,8] The Pediatric Quality of Life Inventory (PedsQL; available at http://www.pedsql.org.) 4.0 Generic Core Scales is a reliable and valid measurement instrument that has been used to assess the HRQOL of children with numerous acute and chronic health conditions, as well as healthy populations.[1-3,6,9-11] It has been an explicit goal of the PedsQL

CC	Chronic constipation
CD	Crohn's disease
FAP	Functional abdominal pain
FD	Functional dyspepsia
FGID	Functional gastrointestinal disorder
GI	Gastrointestinal
HRQOL	Health-related quality of life
IBS	Irritable bowel syndrome
PedsQL	Pediatric Quality of Life Inventory

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*A list of PedsQL Gastrointestinal Symptoms Module Testing Study Consortium sites is available at www.jpeds.com (**Appendix**).

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Measurement Model[12] to develop and test brief measures for the broadest age group empirically feasible, specifically including child self-reporting for the youngest children possible.[13] The items chosen for inclusion were initially derived from the measurement properties of the child self-report scales, and the parent proxy report scales were constructed to directly parallel the child self-report items. Thus, the development and testing of the PedsQL as a pediatric patient-reported outcome explicitly emphasizes the child's perceptions.[6]

The PedsQL 4.0 Generic Core Scales also has been used to measure the HRQOL of pediatric patients with functional gastrointestinal disorders (FGIDs) and organic gastrointestinal (GI) diseases.[14-21] However, previous studies used the older Rome II diagnostic criteria for FGIDs, had substantially smaller sample sizes overall and particularly for individual GI diagnostic groups, were single-site studies, and/or included a more limited age range, which in combination limit the generalizability of their findings. To our knowledge, the generic HRQOL of a geographically diverse large sample of pediatric patients with FGIDs (using Rome III diagnostic guidelines[22]) and organic GI diseases has not been previously compared with a large age-, sex-, and race/ethnicity-matched healthy sample encompassing an age range of 2-18 years for parent proxy report and 5-18 years for patient self-report.

To address these significant gaps in the literature, we used the PedsQL 4.0 Generic Core Scales to investigate the HRQOL of pediatric patients with 7 FGIDs and organic GI diseases and compare it with that of an age-, sex-, and race/ethnicity-matched healthy control sample. We hypothesized that patients with FGIDs and organic GI diseases would manifest lower HRQOL than the matched healthy controls. We further hypothesized that patients with FGIDs would manifest lower HRQOL than patients with organic GI diseases. Finally, we hypothesized that patients with GI disorders would miss more school days, spend more days sick in bed or too ill to play, require more days for a parent/caregiver to care for them owing to physical or mental health issues, and use more healthcare services than healthy children. We anticipated that the parents of these children would report missing more work days and report a greater impact on their work and ability to concentrate than parents of healthy children.

Methods

Pediatric patients aged 5-18 years and parents of pediatric patients aged 2-18 years with a physician-diagnosed GI disorder using *International Classification of Disease*, *Ninth Revision*, Clinical Modification diagnosis codes and/or Rome III criteria for FGIDs for 7 GI diagnostic groups, including both functional (chronic constipation [CC], functional abdominal pain [FAP], irritable bowel syndrome [IBS], and functional dyspepsia [FD]) and organic diseases (Crohn's disease [CD], ulcerative colitis, and gastroesophageal reflux disease), were recruited from 9 pediatric tertiary care GI clinical sites across the US for the PedsQL Gastrointestinal Symptoms Module field test study.[23] Only patients with a single primary diagnosis were included. Participants completed the PedsQL 4.0 Generic Core Scales during the field test as an aspect of the validation of the new PedsQL Gastrointestinal Symptoms Module scales.[23] Written parental informed consent and child assent (when age appropriate) for the use of these data were obtained during the field test study.[23] The research protocol was approved by the Institutional Review Board at each site before data collection.

The age-, sex-, and race/ethnicity-matched healthy sample was derived from the PedsQL 4.0 Generic Core Scales initial field test and a State Children's Health Insurance Program evaluation in California.[10,24] Children were assessed in physicians' offices during well-child visits, by telephone, or via a statewide mailing.

Measures

PedsQL 4.0 Generic Core Scales. The 23-item PedsQL 4.0 Generic Core Scales encompasses 4 domains: Physical Functioning (8 items), Emotional Functioning (5 items), Social Functioning (5 items), and School Functioning (5 items).[24] The Physical Health Summary Score is the same as the Physical Functioning Scale. To create the Psychosocial Health Summary Score, the mean is computed as the sum of the items divided by the number of items answered in the Emotional, Social, and School Functioning Scales. The scales use parallel child self-report and parent proxy report formats for children aged 5-18 years, and a parent proxy report format for children aged 2-4 years. The questions assess how much of a problem each item has been during the previous month. Items are reverse-scored and linearly transformed to a scale of 0-100, with higher scores indicating better HRQOL. Scale scores are computed as the sum of the items divided by the number of items answered (which accounts for missing data). If more than 50% of the items in the scale are missing, then the scale score is not computed.[25] This accounts for the differences in sample sizes for the scales reported in **Tables I-III** (**Table II** available at www.jpeds.com).

PedsQL Family Information Form Impact Items. Parents completed the PedsQL Family Information Form, which contains demographic information including the child's date of birth, sex, and race/ethnicity and parental education.[24] The form also contains an impact section that elicits information on the following: "In the past 30 days…" "how many days did your child miss from school due to physical or mental health?," "how many days was your child sick in bed or too ill to play?," and "how many days did your child need someone to care for him/her due to physical or mental health?"; "In the past 12 months, has your child had…" "any overnight visits to the hospital?" or "any emergency room/urgent care visits?"; "If yes, how many times?"; "In the past 30 days, how many days have you missed from work due to your child's physical or mental health?"; "Has your child's health interfered with…" "your daily routine at work" or "your ability to concentrate at work?" These last 2 items are scored on the PedsQL Likert scale (ranging from "never" to "almost