

# Body Image Dissatisfaction among Pediatric Patients with Inflammatory Bowel Disease

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**Objectives** To determine risk factors for body image dissatisfaction among pediatric patients with inflammatory bowel disease (IBD).

**Study design** We performed a cross-sectional study of children aged 9-18 years in the IBD Partners Kids & Teens cohort. Participants completed surveys including demographics, disease characteristics and activity indices, and psychosocial outcomes measured by IMPACT-III questionnaires. We defined body image dissatisfaction if participants answered “I look awful” or “I look bad.” Bivariate analyses assessed associations between body image dissatisfaction and demographic, disease-related and psychosocial factors; logistic regression models evaluated associations between risk factors and body image dissatisfaction.

**Results** IMPACT-III was completed by 664 patients, with 74 (11.1%) reporting body image dissatisfaction. Patients with body image dissatisfaction were more likely to be female ( $P < .01$ ), older (median age 15 vs 13 years,  $P < .01$ ), and diagnosed with IBD at an older age (12 vs 10 years,  $P < .01$ ). Those with body image dissatisfaction had greater body mass index percentile ( $P = .02$ ), more active disease ( $P < .01$ ), more current steroid use ( $P < .01$ ), and more depression and anxiety ( $P < .01$ ). Female sex (OR 2.31; 95% CI 1.22-4.39), depression (OR 4.73; 95% CI 2.41-9.26), and anxiety (OR 5.42; 95% CI 2.48-11.80) were independently associated with body image dissatisfaction.

**Conclusions** In this cohort, risk factors for body image dissatisfaction include female sex, older age at diagnosis, active disease, current steroid use, greater body mass index, and comorbid mood disorder. Interventions targeting modifiable risk factors for body image dissatisfaction may improve quality of life in pediatric patients with body image dissatisfaction. (*J Pediatr* 2020;223:68-72).

Inflammatory bowel diseases (IBD), which include Crohn’s disease (CD) and ulcerative colitis (UC), are chronic conditions characterized by relapsing and remitting inflammation of the gastrointestinal tract, with a combined estimated incidence in the US of 24.3 per 100 000 person-years.<sup>1</sup> Although new diagnoses can be made at any age, 20% of CD and 12% of UC cases are diagnosed before the age of 20 years. Periadolescent patients with IBD face risks of growth failure and delayed puberty due to ongoing inflammation, poor nutritional status, and frequent steroid exposure.<sup>1-3</sup>

Similar to many chronic disease states, IBD confers a greater risk of poor psychosocial outcomes, including anxiety, depression, poor self-esteem, and worse health-related quality of life (HRQoL).<sup>4</sup> Chronic disease states also have been associated with body image dissatisfaction, which is defined as negative perceptions a person has about his or her body and is influenced by factors like body shape and appearance, attitudes toward weight gain, and cultural norms regarding an “ideal” body.<sup>5,6</sup>

Studies of risk factors for body image dissatisfaction among pediatric populations with chronic diseases have had conflicting results. One study identified boys with any chronic disease as having a greater risk of altered body image; a second suggested girls with physical problems of high visibility were at greater risk.<sup>7</sup> A large study of adolescents with many chronic conditions (including asthma, attention-deficit/hyperactivity disorder, and physical disability, among others) noted greater rates of body dissatisfaction and use of unhealthy weight-loss practices compared with healthy controls.<sup>8</sup> These trends may be amplified among children with body image dissatisfaction and diet-

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BMI	Body mass index
CD	Crohn’s disease
CF	Cystic fibrosis
HRQoL	Health-related quality of life
IBD	Inflammatory bowel disease
CDAI	Pediatric Crohn Disease Activity Index
PROMIS	Patient-Reported Outcomes Measurement Information System
UC	Ulcerative colitis

related chronic health conditions, such as type 1 diabetes, cystic fibrosis (CF), and IBD.<sup>9</sup>

Clarifying associations with body image dissatisfaction in specific chronic disease populations, such as IBD, could help better tailor early disease-specific interdisciplinary treatment strategies to improve HRQoL. Therefore, we sought to determine the prevalence of and determine risk factors for body image dissatisfaction among patients with IBD.

## Methods

We conducted a cross-sectional study of all participants aged 9-18 years enrolled in IBD Partners Kids & Teens.<sup>3,10</sup> The IBD Partners Kids & Teens cohort began recruitment in August 2013. The development of this cohort has been previously reported.<sup>11</sup> Children and their parents complete biannual questionnaires, which include demographic information, current IBD-related medications, information on disease characteristics, type, and activity (either short CDAI [pediatric Crohn Disease Activity Index] or pediatric Ulcerative Colitis Activity Index), and questions from PROMIS (Patient-Reported Outcome Measurement Information System), which was developed as a National Institutes of Health initiative to measure the physical, social, and emotional health concerns of patients with chronic diseases.<sup>11,12</sup> Beginning at age 9 years, patients enrolled in the cohort complete patient-reported outcome reports directly; parent proxy is used before this age. If a participant filled out multiple surveys, their first response after age 9 was included in our analysis.

Psychosocial PROMIS values are reported as T scores, which are standardized scores representing a reference pediatric population with a mean of 50 and SD of 10. A T score >50 indicates greater levels of the symptom or trait being measured. A change of 2-3 in the T-score represents a minimally important difference. Pediatric PROMIS metrics for anxiety and depression are included in the Kids & Teens questionnaires, in addition to the IBD-specific IMPACT-III instrument, which has been validated for children ages 9-18 years.<sup>3</sup> The IMPACT-III is a metric of patient-reported HRQoL specific to the pediatric IBD population. Children with IBD have scored worse on all psychosocial measures in the IMPACT-III than their healthy peers.<sup>3</sup> Among the measures included in IMPACT-III is body image dissatisfaction. We defined body image dissatisfaction as a dichotomous outcome, where looking “awful” or “bad” was selected on a 5-point Likert scale from an IMPACT-III question asking how the child feels about the way he or she looks.

We used bivariate analyses to assess associations between the presence of body image dissatisfaction and demographic, disease-related, or psychosocial features. Current age, age at diagnosis, PROMIS T scores for anxiety and depression, and body mass index (BMI) percentiles were reported as medians with IQRs. Disease classification, sex, ethnicity, ever having had an IBD-related hospitalization, IBD-related surgery, medication use, and extra-intestinal manifestations

were reported as percentages. Clinical remission was defined by scoring <10 points on the pediatric Ulcerative Colitis Activity Index or <150 points on the CDAI.

Logistic regression models evaluated independent associations between selected risk factors and body image dissatisfaction. PROMIS T scores for anxiety and depression were dichotomized using 1 minimally important difference (averaged at 2.5) above the mean as the cutoff for presence of anxiety or depression. Thus, any patient T score above 52.5 was considered a positive response. aORs are presented with 95% CIs. Statistical significance was defined by *P* values with an alpha less than 0.05. All analyses were performed using Stata 14.0 (STATA, College Station, Texas). The study protocol was approved by the institutional review board at the University of North Carolina.

## Results

A total of 664 pediatric patients completed a Kids & Teens survey including the IMPACT-III between August 2013 and June 2017, of whom 74 (11.1%) met criteria for body image dissatisfaction. Of the respondents, 75% had CD; 54% were male; and 89% were white in ethnicity. Median age was 13 years. A total of 55% were taking biologic therapies at time of survey completion, and 12% were taking daily steroids. Only 98 patients (14%) in this cohort reported a history of IBD-related surgery, 19 with ostomy creation and 79 with ileal pouch anal anastomoses.

There was no significant difference in the prevalence of body image dissatisfaction between pediatric patients with UC and those with CD, and both groups were primarily composed of white patients (both 89%). Female patients were significantly more likely to endorse body image dissatisfaction than their male counterparts (**Table 1**, 69% vs 44%,  $P < .001$ ). Pediatric patients reporting body image dissatisfaction were older (median age 15 [IQR 12-16] vs 13 [IQR 11-15] years,  $P < .001$ ) at time of survey completion and were diagnosed with IBD at an older median age (12 [IQR 10-14] vs 10 [IQR 8-12] years,  $P < .001$ ). Those endorsing body image dissatisfaction also had greater BMI ( $P = .022$ ). When divided into quartiles of BMI percentile, patients in the 2 highest quartiles (50-100th percentiles) reported increasingly high rates of body image dissatisfaction (**Figure**, 16% and 20% prevalence). The lowest rate of body image dissatisfaction was found in Quartile 2 (25-50th percentile, 8%), with increased body image dissatisfaction in the lowest-weight group (Quartile 1, 0-25th percentile, 9.5%).

Participants with body image dissatisfaction were more likely to be treated with steroids than those without body image dissatisfaction (18% vs 7.6%,  $P = .004$ ), but there was no significant difference in use of biologic therapies (47% vs 56%,  $P = .195$ ). Those endorsing body image dissatisfaction were significantly more likely to have ever had an IBD-related hospitalization (68% vs 54%  $P = .027$ ). There was no significant difference in history of IBD-related surgery or having an

**Table I.** Characteristics of the study population by presence of body image dissatisfaction

Characteristics	Body image dissatisfaction present	No body image dissatisfaction	P value
	n = 74	n = 590	
Disease classification (% CD)	67.5	77	.088
Sex (% female)	68.9	44	<.001
Median current age, y (IQR)	15 (12-16)	13 (11-15)	<.001
Median age at Dx, y (IQR)	12 (10-14)	10 (8-12)	<.001
Ethnicity (% white)	89	89	.744
Median BMI percentile (IQR)	75 (50-90)	75 (50-75)	.022
IBD-related hospitalization, %	67.6	54	.027
IBD-related surgery, %	21.6	14	.077
Remission,* %	42.9	74	<.001
Ostomy at baseline, %	4.1	2.7	.514
Pouch at baseline, %	20.3	13	.1
Current steroid use, %	17.6	7.6	.004
Current biologic use, %	47.3	56	.195
PROMIS† Depression T score (median, IQR)	53 (41-69)	41 (36-48)	<.001
PROMIS† Anxiety T score (median, IQR)	60 (53-65)	46 (35-65)	<.001

Dx, diagnosis.

\*Remission defined by a pediatric Ulcerative Colitis Activity Index score <10 or a CDAI score <150.

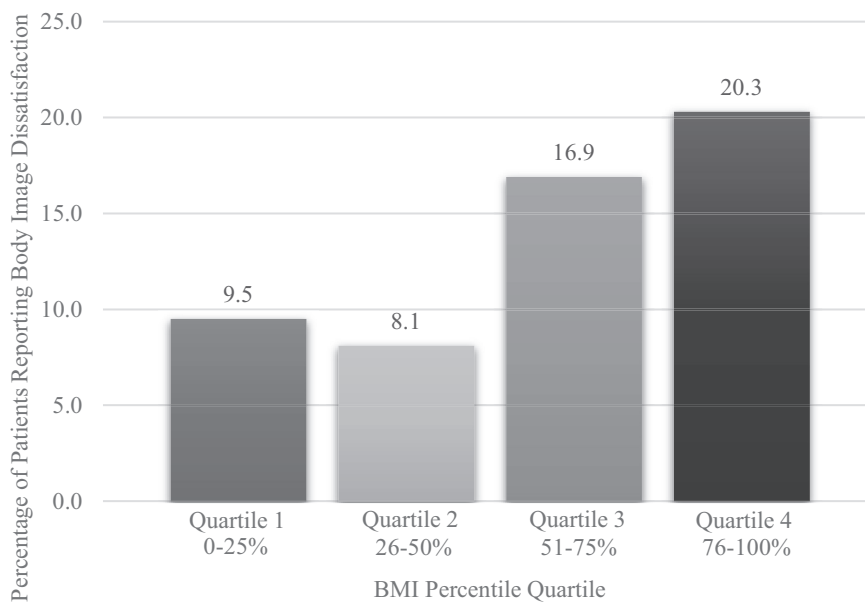
†PROMIS.

ileal–anal pouch between those with and without body image dissatisfaction. A total of 19 patients had an ostomy, 3 with and 16 without body image dissatisfaction; there was no significant difference in presence of ostomy between patients with or without body image dissatisfaction (4% vs 3%,  $P = .514$ ).

PROMIS T scores for anxiety and depression were markedly greater among patients with body image dissatisfaction ( $P < .001$ ). Although pediatric patients with IBD without body image dissatisfaction were significantly less depressed or anxious than the reference population, those with body image dissatisfaction were a full SD more anxious than the reference population. After we adjusted for confounders, pe-

diatric patients with IBD with body image dissatisfaction had a significantly greater odds of reporting both depression (Table II, OR 4.73; 95% CI 2.41-9.26) and anxiety (OR 5.42; 95% CI 2.48-11.80).

Female sex was associated with a greater odds of body image dissatisfaction, after we adjusted for age, BMI, remission, steroid use, anxiety, and depression (Table II, OR 2.31; 95% CI 1.22-4.39). Patients with body image dissatisfaction were significantly less likely to report remission than those without body image dissatisfaction (43% vs 74%,  $P < .001$ ), and current remission did not confer decreased odds of developing body image dissatisfaction (OR 0.61; 95% CI 0.32-1.18). Current steroid use did not confer an



**Figure.** Distribution among BMI quartiles of pediatric patients reporting body image dissatisfaction.

**Table II. Multivariate ORs for body image dissatisfaction among pediatric patients with IBD in the IBD Partners: Kids & Teens Cohort**

Characteristics	aOR (95% CI)
Female sex*	2.31 (1.22-4.39)
Current steroid use†	1.59 (0.63-4.07)
Depression‡	4.73 (2.41-9.26)
Anxiety§	5.42 (2.48-11.80)
Current remission¶	0.61 (0.32-1.18)

Remission defined by pediatric Ulcerative Colitis Activity Index score <10 or a CDAI score <150.

\*Adjusted for age, BMI, remission, steroid use, anxiety, depression.

†Adjusted for age, sex, BMI, remission, hospitalization, surgical status, anxiety, depression.

‡Adjusted for age, sex, BMI, remission, steroid use, hospitalization, surgical status, anxiety.

§Adjusted for age, sex, BMI, remission, steroid use, hospitalization, surgical status, depression.

¶Adjusted for age, sex, BMI, hospitalization, surgical status, depression, anxiety.

increased odds of reporting body image dissatisfaction after we adjusted for confounders (OR 1.59; 95% CI 0.63-4.07). Extra-intestinal manifestations were not significantly associated with body image dissatisfaction in this cohort (Table III; available at [www.jpeds.com](http://www.jpeds.com)).

## Discussion

We assessed body image dissatisfaction in a pediatric IBD population using a large, geographically diverse, patient-reported cohort. In this sample, 11.1% of respondents met criteria for body image dissatisfaction. We identified numerous risk factors for body image dissatisfaction in this pediatric IBD population: active disease, steroid use, female sex, older age at diagnosis, greater BMI percentile, anxiety, and depression. Among these factors, adopting steroid-sparing regimens, providing interventions to address comorbid mood disorders, and recommending nutritional support services may represent modifiable targets to decrease body image dissatisfaction. Further study should be devoted to the validation of such interventions that improve HRQoL for young patients with IBD.

A recent study of patients with IBD found that 16% warranted a formal evaluation for an eating disorder.<sup>13</sup> In this study, 90% of patients responded to at least 1 question in a manner indicating a pathologic attitude toward food. A qualitative study of children with IBD reported that children perceive themselves to be alienated by their necessity to be mindful of foods.<sup>9</sup> Other quantitative work has shown that age and body satisfaction are linked to a child's likelihood of adhering to a healthy diet that meets the demands of a chronic illness.<sup>14</sup> In a review of the psychosocial health of pediatric patients with a number of chronic diseases, including IBD, poor body image was shown to predict poor self-care and disordered eating, exacerbating the detrimental effects of disease and of medication-related malnutrition.<sup>9</sup>

Similar to studies in adult patients, our study demonstrated that female patients with IBD had greater odds of body image dissatisfaction.<sup>15-17</sup> Although the general prevalence of body image dissatisfaction among American adolescents has had highly variable estimates, several large community-based

studies assessing body image dissatisfaction among older adolescents found a markedly greater prevalence among female (24%-46%) compared with male (12%-26%) respondents.<sup>18</sup> A review of the psychosocial sequelae of pediatric patients with diet-related chronic health conditions similarly revealed a pronounced difference by sex. For example, young female patients with CF preferred lower body weights, even manipulating pancreatic enzymes to minimize weight gain. Male patients with CF, however, rigorously followed nutritional advice and supplemented their intake with anabolic steroids to achieve more socially acceptable forms.<sup>9</sup> Notably, despite their enhanced odds of body image dissatisfaction, female patients with IBD have been shown to have no sex-specific differences in severity of disease, BMI, height velocity, or medication use, which could have explained this common difference in experienced body image.<sup>19</sup>

Comorbid anxiety and depression independently conveyed increased odds of reporting body image dissatisfaction in our study. Both anxiety and depression are prevalent in patients of all ages with IBD, with previous work estimating a lifetime prevalence of 30%-80%.<sup>20</sup> The prevalence of anxiety disorders among the general pediatric population has been estimated at 13%, but among children with chronic medical illnesses, this value may be as high as 40%.<sup>21</sup> Although no age-matched norms for body image dissatisfaction exist against which to compare our patients with IBD, a large meta-analysis of 330 studies, albeit with heterogeneity among comparators and methods, found overall slightly greater rates of body image dissatisfaction among children with chronic illnesses, including asthma, cystic fibrosis, cancer, and diabetes, have greater rates of body image dissatisfaction.<sup>22</sup> A small prospective study at a single center found increased body image dissatisfaction among both IBD compared with age-matched controls, although not compared with age-matched patients with diabetes.<sup>23</sup> In contrast, a meta-analysis identified that youth with IBD had worse HRQoL and social functioning compared with other youth with chronic illnesses.<sup>24</sup> In a 10-year study of American teenagers aged 15-17 years, body image dissatisfaction rates ranged from 12% to 46%, which corroborates that as our cohort continues to follow our patients with IBD over time, the older teenager population may represent a valuable subgroup for further study.<sup>16</sup> Body image dissatisfaction among adult patients with IBD has been shown to remain constant over time, regardless of disease activity.<sup>15</sup> These data, along with our findings, support the importance of identifying children with IBD and risk factors for body image dissatisfaction as candidates for novel protective interventions.

Our data are drawn from a large, geographically diverse patient cohort. Further, the psychosocial metrics included in the surveys are well-validated instruments and have been shown to correlate linearly and meaningfully with clinical outcomes in this population. Our ability to assess validated scales of depression and anxiety also enriches this study.

Among the limitations to this study are its cross-sectional design, which makes any assessment of causality difficult. We

consider these findings hypothesis-generating. That 89% of our study participants identified as white limits the generalization of our findings to other ethnicities. We chose to use a single-question, binary assessment of body image dissatisfaction rather than a larger scale, such as the body image disturbance questionnaire, or qualitative patient responses. Beneficially, this question from IMPACT-III is validated in all pediatric populations, compared with more disease- or treatment-specific alternatives. Data from Kids & Teens are via self-report, including measurements of height, weight, and disease remission; because no pediatric measurements of Crohn's activity have been validated by self-report, we used the CDAI, which was validated in adult patients. At baseline, most of the patients with UC in our study were in remission, and most of our patients with CD had mild disease, leading to a potential for underrepresenting patients with more active disease. Misclassification is possible. Still, a validation study in a sample of the adult IBD Partners cohort demonstrated >97% accuracy of IBD diagnosis on comparison with medical records.<sup>10</sup> Finally, the small numbers of respondents reporting pouches and ostomies underpowered our analyses of these subgroups, despite their possible clinical import.

Future directions for our cohort include longitudinal analysis of the features of body image dissatisfaction among patients with IBD over time and more specific analysis among patients aged 15-17 years, who may have the greatest rates of body image dissatisfaction in the general American population, as our participants continue to track their HRQoL and disease outcomes via survey. Early and frequent clinical assessment of unmet psychiatric needs, initiation of steroid-sparing therapies, nutritional counseling, and physical activity are potential interventions to prevent or improve body image dissatisfaction among pediatric patients with IBD.

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**Table III.** Presence of body image dissatisfaction according to type of extraintestinal manifestation

<b>Characteristics</b>	<b>Body image dissatisfaction present (n = 57), %</b>	<b>No body image dissatisfaction (n = 451), %</b>	<b>P value</b>
Arthralgias	45.6	34.6	.10
Erythema nodosum	7.0	2.9	.10
Pyoderma gangrenosum	0	0.4	.614
Ocular	10.5	6	.19
Aphthous ulcers	19.3	8.9	.014
Primary sclerosing cholangitis	0	1.6	.34