Age, Disease Symptoms, and Depression are Associated with Body Image Dissatisfaction in Newly Diagnosed Pediatric Inflammatory Bowel Disease

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Abstract

Objectives: Body image refers to the subjective, mental representation one makes regarding their physical appearance. Children and adolescents with IBD may be prone to experiencing negative self-evaluations regarding their body image given disease-related symptoms and treatment side-effects. In this study, we aimed to examine demographic, medical, and psychosocial variables related to body image dissatisfaction (BID) in pediatric patients diagnosed with inflammatory bowel disease (IBD) and to determine which variables are most predictive of higher dissatisfaction.

Methods: A total of 52 youth newly diagnosed with IBD (Crohn's disease, ulcerative colitis, indeterminate colitis) aged 8–17 completed questionnaires regarding their psychosocial functioning (i.e., depression, anxiety, health-related quality of life, stress), disease symptoms, and BID. BID was assessed using the modified Adapted Satisfaction with Appearance questionnaire, yielding a total score and subscale scores assessing Perceived Social Impact and Subjective Dissatisfaction. Physician global assessment of disease activity and demographic and medical characteristics were abstracted from electronic chart review.

Results: Youth endorsed low overall BID concerns but noted the highest dissatisfaction with their abdomen, chest, and arms. Older child age, greater patient-reported disease symptoms, and

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worse depression symptoms were most strongly associated with overall body dissatisfaction when evaluated in a hierarchical regression model.

Conclusions: Demographic, disease-related, and psychosocial factors are associated with BID in youth newly diagnosed with IBD. Given associations between BID and adverse health outcomes in healthy youth, these findings highlight a unique opportunity to improve screening and interventions for BID in patients with IBD.

Keywords

physical appearance; psychosocial functioning; disease symptoms; depression; anxiety; health-related quality of life; stress

Introduction

Body image refers to the subjective, mental representation one makes regarding their physical appearance.[1] Body image dissatisfaction (BID) is characterized by dissatisfaction with certain parts of the body and how others perceive one's body.[2] BID may be particularly relevant for children and adolescents with inflammatory bowel disease (IBD) given weight loss and growth delays, including delayed puberty compared to peers, and symptoms of diarrhea, incontinence, and rectal bleeding.[3–6] Treatment side-effects including bloating, distention, acne, and rapid weight changes can impact youths' appearance and, in turn, enhance their risk for BID.[7,8] However, little research has examined the demographic, disease-related, and psychosocial factors that contribute to BID in pediatric IBD.

In healthy youth, higher BID has been associated with disordered eating behaviors and eating disorders, impairments in social and psychological functioning including depression, low self-esteem and suicidality, and negative health behaviors (e.g., smoking, dysfunctional exercise, decreased fruit and vegetable intake).[1,9,10] BID has been shown to increase from adolescence to young adulthood.[11]

Existing literature has predominately focused on BID in adult IBD samples, with one study indicating that 87% of adults with IBD reported at least one concern about their body image. [6] Female gender, greater disease activity and severity, increased body mass index (BMI), general and prolonged corticosteroid use, higher anxiety and depression, and lower health-related quality of life (HRQOL) are associated with greater BID among adults with IBD. [3,6,12–14] In pediatric IBD patients, older youth age and female gender, as well as psychosocial factors including worse mental health, higher stress, and lower HRQOL have been associated with higher BID.[15–19] While some studies have found no differences in BID between disease severity groups, others have found that those with more severe IBD activity endorse higher BID than those in clinical remission and those with mild disease severity. [17,19–21] Youth prescribed prednisone are generally more likely to endorse higher BID than those who are not.[17] These prior studies are limited, however, by the use of inadequately validated measures of BID with poor reliability, many of which only examined youths' perceptions of their height, weight, and overall appearance. The current study utilized a body image specific questionnaire that assesses concerns about specific areas of the body and the perceived social impact of appearance, both of which may be affected by symptoms of IBD.

The current study aimed to identify demographic, disease-related, and psychosocial factors associated with BID in pediatric patients newly diagnosed with IBD using a multi-faceted measure[13] specifically designed to assess body image concerns.

Methods

Participants

Participants included 52 pediatric patients with Crohn's disease (CD), ulcerative colitis (UC), or indeterminate colitis (IC). Inclusion criteria included: (1) diagnosis with biopsy-confirmed IBD within the last 45 days, (2) ages 8–17, (3) proficiency in English, and (4) accompanied by at least one parent/guardian. Exclusion criteria included a documented history or parent report of a pervasive developmental disorder, autism, or a non-verbal presentation that would impede the ability to complete questionnaires.

Procedures

The current study is part of a larger, longitudinal study in which youth were recruited from an inpatient hospital unit and outpatient pediatric gastroenterology clinic in the Southeastern U.S. Participants were identified by the clinic's medical team and pre-screened through chart review for initial eligibility. Research staff met families at their next outpatient clinic appointment to describe the study and obtain parental consent and child assent. Study data were collected and managed using REDCap electronic data capture tools hosted at the investigators' institution. REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies.[22,23] Parents and youth completed questionnaires independently on iPads, and research personnel were available to answer questions. Participants received a $25 gift card as compensation for their time.

Measures

Demographic and Medical Information

Demographic information (e.g., race, gender) for youth was collected using a standarddemographic questionnaire. Medical/disease information (e.g., diagnosis, medications prescribed) and BMI z-scores (i.e., youths' BMI relative to age/gender-matched peers) were obtained via electronic chart review corresponding to the medical visit on the day of study participation.

Body Image Dissatisfaction

Child-reported BID was assessed using the modified 15-item Adapted Satisfaction with Appearance scale (ASWAP).[13] The original ASWAP was modified for use with an IBD sample and measures patients' dissatisfaction with multiple parts of the body (e.g., face, arms, abdomen), as well as degree of comfort regarding their physical appearance in social situations.[13,24] Participants rated their agreement with statements from Strongly Disagree (0) to Strongly Agree (6). A Perceived Social Impact subscale (i.e., how their appearance affects their social interactions), Subjective Dissatisfaction subscale (i.e., how satisfied they are with certain areas of their body), and a total score were computed by summing items. Higher

scores indicate greater BID. The ASWAP was chosen for the current study as it is a BID-specific, non-weight based measure that has been used with adult IBD samples and provides a total score as well as two subscale scores.[13]

Clinical Disease Activity and Symptoms

Clinical disease activity was assessed using the Physician Global Assessment (PGA), which is a global measure of disease severity routinely completed by the treating pediatric gastroenterologist at each medical appointment as part of the recruitment site's participation in ImproveCareNow.[25] Participants were assigned a rating of quiescent/inactive, mild, moderate, or severe disease activity based on clinical symptoms, physical exam, and laboratory tests.

Given this study's focus on patient perceptions of body image, patient-reported clinical symptoms were measured using a project-developed measure, the Self-Report Disease Activity Questionnaire (L. Mackner, Personal communication) that has been used in previously published pediatric IBD research.[26] Patients reported on their pain frequency and intensity in the past week, number and consistency of bowel movements (i.e., solid, mushy, diarrhea), presence of nocturnal diarrhea, blood in stool, and impairment in daily activities. Higher scores indicate more clinical symptoms.

Health-Related Quality of Life (HRQOL)

HRQOL was assessed using the 35-item child-report IMPACT-III.[27] The IMPACT-III is an IBD-specific measure of HRQOL in children and adolescents. To gain a comprehensive representation of HRQOL, the present study utilized the total score, which was calculated by summing all 35 items, with higher scores representing better HRQOL.

Depressive Symptoms

Depressive symptoms were measured using the Children's Depression Inventory-2 (CDI-2).[28] The CDI-2 is a 28-item child-report measure of physiological, behavioral, and emotional symptoms of depression. Each item contains three statements and children were asked to endorse one statement from each group of sentences that best applied to them (e.g., I am sad once in awhile; I am sad many times; I am sad all the time). Items are summed together to yield a total symptom severity score using T-scores (M=50, SD=10).

Anxiety Symptoms

Anxiety was examined using the child-report Screen for Child Anxiety Related Emotional Disorders (SCARED).[29] This 41-item measure consists of 5 domains: panic/somatic, generalized anxiety, separation anxiety, social anxiety, and school anxiety. All items are summed together to yield a total symptom severity score, with higher scores indicating greater anxiety.

Psychological Stress

Psychological stress was measured using the child-report version of the Patient-Reported Outcomes Measurement Information System (PROMIS)—Psychological Stress Experiences.[30] The PROMIS Psychological Stress Experiences consists of 8 items

examining stress-related thoughts and feelings over the past 7 days. All items are summed together to yield a total score, which is then converted to a T-score (M=50, SD=10).

Data Analyses

Internal consistency of all questionnaires was good to excellent (α >.85). Individual items on the ASWAP were examined to determine which items participants rated as most dissatisfying. Analyses revealed that the primary variable of interest, BID, was non-normally distributed. Therefore, a square root transformation was performed on the BID subscales and total score, which met assumptions for normality following transformation and were used in all following analyses. Pearson product-moment correlations were used for correlational analyses. T-tests were used to examine differences in BID for dichotomous variables (e.g., sex) and one-way ANOVAs were used to examine multi-group (i.e., PGA) differences.

A hierarchical linear regression was then performed to determine which demographic, medical, and psychosocial variables accounted for the most variance in total BID. Only variables that were significantly correlated with the BID total score were entered into the hierarchical regression. Demographic variables were entered first into the model, followed by medical variables and finally psychosocial variables. The order of entry was based on the theory that demographic variables precede medical and psychosocial variables in their relation to BID. Across all analyses, a p-value of <.05 was considered statistically significant.

Ethical Considerations

All study procedures were in compliance with the Health Information Portability Accountability Act and were reviewed and approved by the investigators' Institutional Review Board prior to study commencement. All participants provided informed consent for the study.

Results

Participants

Demographic and medical information for the 52 participants can be found in Table 1. Regarding surgical history, one participant had undergone surgical debridement of a perianal abscess with seton placement approximately 20 days prior to participation. No other participants had undergone surgical intervention for IBD at the time of participation. The average time since diagnosis was 26 days.

Descriptive Information of Study Variables

Means of individual items on the ASWAP were computed to determine which items participants rated as most distressing. The three items rated as most dissatisfying were all from the Subjective Dissatisfaction subscale. Participants endorsed the most dissatisfaction with their abdomen (M = 1.75), chest (M = 1.69), and arms (M = 1.65).

Means and observed ranges for study variables can be found in Table 2. Although a wide range of scores was obtained for the total and subscales of the ASWAP, participants on

average endorsed lower BID compared to previously published literature assessing adults with IBD.[13]

Relations Between Demographic, Medical, and Psychosocial Variables and BID

Correlational analyses indicated that older child age was associated with higher total BID and Subjective Dissatisfaction scores. A marginal relationship between gender and the Subjective Dissatisfaction subscale emerged, with females ($M = 3.32$, $SD = 2.07$) endorsing more BID with regards to specific body parts than males ($M = 2.23$, $SD = 1.90$; $t = 1.97$, $p = .05$, $d = 0.55$). Total BID and Perceived Social Impact scores did not differ based on gender.

Regarding medical variables, higher self-reported disease symptoms were associated with higher total BID and subscale scores. BID total and subscale scores did not differ by PGA groups or between youth prescribed Prednisone versus those who were not. BMI z-scores were not significantly associated with BID scores.

Analyses demonstrated that worse psychosocial functioning was related to greater BID. Specifically, higher psychological stress, anxiety, and depression were related to higher total and subscale BID scores. Lower HRQOL was also associated with higher total and subscale BID scores. See Table 2 for detailed correlational analyses information.

Hierarchical Regression

A hierarchical linear regression model was tested to determine which demographic, medical, and psychosocial variables accounted for the most variance in total BID. Based on correlational analyses, child age was entered into Step 1, self-reported disease symptoms were entered into Step 2, and HRQOL, depression, anxiety, and stress were entered into Step 3. In Step 1, child age was a significant predictor ($p = .03$) and accounted for 9.4% of the variance in BID. In Step 2, self-reported disease symptoms was also a significant predictor ($p = .005$) and accounted for an additional 14.7% of the variance, and Step 3 demonstrated that psychosocial variables accounted for an additional 48.9% of the variance in BID ($p < .001$) with only depression being a significant predictor ($p < .001$). The overall model accounted for 73.0% of the variance in predicting total BID. See Table 3 for detailed results.

Discussion

The current study expands our understanding of factors associated with BID in youth diagnosed with IBD through an examination of demographic, disease-related, and psychosocial variables using a measure specifically designed to assess body image concerns. Collectively, patients endorsed the most dissatisfaction with their abdomen, chest, and arms. It is possible that abdominal concerns may be most relevant to those with IBD due to the gastrointestinal symptoms of the disorder and treatment-related side effects such as bloating or distention.[7] It is recommended that future research examine if and how body image concerns may differ in youth with IBD compared to healthy peers and whether dissatisfaction with certain areas is likely to lead to specific psychosocial difficulties.

Associations between BID and demographic, medical, and psychosocial variables were demonstrated. In this pediatric sample of youth between the ages of 8 and 17, older children reported more overall BID concerns than younger patients. Similar to findings in adults with IBD, higher self-reported disease symptoms were associated with higher BID although BID was unrelated to physician-reported disease activity (i.e., PGA), use of prednisone, and BMI. Greater overall BID as well as each of the subscales of the BID measure, greater perceived social impairment and subjective dissatisfaction with their own bodies, were associated with poorer HRQOL and higher levels of stress, anxiety, and depression.[6,13]

The results of the hierarchical linear regression demonstrated that a model including child age, self-reported disease symptoms, HRQOL, depression, anxiety, and stress accounted for 73% of the variance in predicting overall BID. An in-depth examination of uniquely associated factors identified age, self-reported disease symptoms, and depression as significantly associated with BID. As children approach puberty and adolescence, differences in physical appearance amongst peers can become more noticeable and body distortions tend to increase, which may explain the significance of child age.[31,32] Moreover, adolescents with IBD may be more vulnerable to noticing physical differences because they commonly experience growth delays during the already vulnerable time of pubertal change.[4] Therefore, it is likely that BID increases with age due to a combination of emerging adolescence as well as the additional stressor of a recent diagnosis with a chronic illness that may impact physical appearance.

Self-reported disease symptoms emerged as a significant disease-related variable contributing unique variance to BID. This suggests that youth's own perceptions of their illness and health status is associated with the degree of their body dissatisfaction, regardless of physician-rated disease activity or BMI. This corroborates previous literature indicating that patients' subjective reports of disease activity are more strongly related to psychosocial functioning compared to objective markers.[33] This provides important clinical information, as physicians and healthcare team members may want to assess patients' perception of their own disease activity and symptoms as a potential risk factor for BID.

Psychosocial variables accounted for approximately 49% of the variance in predicting BID, although depression was the only statistically significant and uniquely associated factor Given that anxiety, HRQOL, and stress could not contribute above and beyond depression, findings suggest that depressive symptoms may be of the utmost concern when evaluating and treating BID. It should be noted that the relationship between BID and depression is likely cyclical and bidirectional, such that dissatisfaction with physical appearance can contribute to depressive symptoms but depression can also predispose individuals to forming more negative self-evaluations, including physical judgments.[34,35] In patients who may have poorly controlled disease, efforts to modify body weight or aspects of one's appearance may be unsuccessful. Failure to change these features may lead to a perceived loss of control, which can be a primary component of depression.[36,37] This is of significant clinical concern considering that models of suicide risk indicate that BID contributes to depressive symptoms, which in turn can contribute to suicidal ideation.[34] Longitudinal research is needed to gather further information regarding directionality of these two variables in pediatric IBD samples.

Although the cross-sectional design of this study limits conclusions about causality, it is clear that psychosocial burden, particularly depression, is strongly related to BID. Older child age and self-reported disease symptoms are also notable predictors of BID and can easily and efficiently be assessed in fast-paced, clinical settings. Findings suggest that regular screening for depressive symptoms is critical not only for identifying children who are experiencing depression, but also for recognizing comorbid concerns such as dissatisfaction with physical appearance.[38] Early detection and intervention is necessary as BID has the potential to continue or worsen as adolescents progress into young adulthood.[11] Fortunately, evidence-based screening and treatment for depression in adolescents has been well-established and recommendations have been made specifically for pediatric IBD.[39] Cognitive-behavioral therapies (CBT) have demonstrated efficacy for reducing depressive symptoms at clinical and sub-clinical thresholds in pediatric patients with IBD.[37,40] A particular benefit of CBT is the ability to tailor and individualize treatment plans, which lends itself to addressing concerns with BID within short-term treatment.[37] In addition, a randomized clinical trial of interventions specifically focused on increasing body satisfaction found that incorporating acceptance-based skills yielded positive effects on body satisfaction, which may be particularly relevant for patients with IBD facing little control over changing aspects of their physical appearance.[41] As such, incorporating body image-specific components in psychotherapy treatment may be relevant for ameliorating overall psychosocial distress in pediatric IBD.[3]

Although these findings provide important implications for clinical practice and preliminary results for pediatric research in BID, this study does present limitations. While the range of BID scores was large, average scores for the total and subscales indicated low BID symptoms compared to previous studies of adult patients with IBD[13]. It is possible this may be a factor of the sample being newly diagnosed. Scores for measures of anxiety, depression, stress, and HRQOL were largely within normal ranges and information about previous diagnoses within the current sample is unknown, so it is unclear how findings may generalize to youth with clinically impairing psychosocial difficulties. Recruiting newly diagnosed patients may also limit generalizability to patients diagnosed with IBD for longer durations. Data were collected from a single site and utilized a small sample size that was fairly homogenous by race and socio-economic status. Furthermore, only children and adolescents with IBD were included in the study so comparisons with healthy controls could not be made. As this study was cross-sectional, future research should examine BID in longitudinal designs to determine temporal predictors of BID and if BID is predictive of other health outcomes, such as adherence to medical regimens or disordered eating.

This study was novel and unique in using a BID-specific measure to examine factors that contribute to body image concerns in a pediatric sample newly diagnosed with IBD. Similar to the adult literature, there are demographic, medical, and psychosocial variables that are related to BID, with child age, self-reported disease symptoms, and depression being the most prominent in this pediatric sample. These findings support the importance of utilizing psychology services within pediatric IBD clinics to identify and treat individuals who may be vulnerable to poor psychosocial outcomes. Efforts to adequately screen for, assess, and treat depression may also be effective in aiding youth who are struggling with acceptance of their physical appearance. The psychological and functional risks associated with BID

underscore the importance of early identification and intervention within pediatric patients with IBD.

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What is Known:

- Body image dissatisfaction (BID) is highly prevalent in adults with inflammatory bowel disease (IBD) and is associated with worse disease activity, greater symptoms of anxiety and depression, and poorer quality of life.

- Understanding of BID in pediatric samples is limited by use of non-BID specific measures and inconsistencies of findings in previous literature.

What is New:

- Demographic, disease-related, and psychosocial factors were all related to higher BID in a newly diagnosed sample with IBD.

- Older age, greater self-reported disease symptoms, and higher depressive symptoms contributed most to higher BID.

- Recommendations are provided with regards to screening for and treating BID in youth with IBD within fast-paced, medical clinics.

Table 1.

Participant Demographic and Disease Information (N=52)

Factor	M (SD)[1]	n (%)
Child Age	14.17 (2.29)	
Child Gender		
Female		29 (55.8%)
Male		23 (44.2%)
Child Race		
White/Caucasian		38 (73.1%)
Black/African American		8 (15.4%)
Asian		2 (3.8%)
More than one race/Other		4 (7.7%)
Diagnosis Type		
Crohn's disease		40 (77.0%)
Ulcerative colitis		10 (19.2%)
Indeterminate colitis		2 (3.8%)
Disease severity (PGA)[2]		
Quiescent		20 (38.5%)
Mild		22 (42.3%)
Moderate		10 (19.2%)
BMI Z-Score[3]		
Thinness		2 (3.8%)
Normal		47 (90.4%)
Overweight		3 (5.8%)
Currently prescribed prednisone		24 (46.2%)
Currently prescribed anti-TNF[4]		25 (48.1%)

[1] M = mean, SD = standard deviation,

[2] PGA= Physician Global Assessment,

[3] BMI Z-score categories based on World Health Organization classifications,

[4] Anti-TNF = anti-tumor necrosis factor (e.g., infliximab, adalimumab)

Table 2.

Intercorrelations, Means, and SDs of Key Study Variables (N=52)

	M (SD)[6]	Observed Range	2	3	4	5	6	7	8	9	10
1. Total BID[1]	18.40 (18.08)	0–64	.84 ***	.95 ***	.31 *	.35 *	.19	.72 ***	.60 ***	.59 ***	−.62 ***
2. PSI Scale[2]	6.21 (8.24)	0–32	--	.65 ***	.15	.43 **	.23	.71 ***	.68 ***	.59 ***	−.68 ***
3. SD Scale[3]	12.19 (11.46)	0–35	--	--	.33 *	.28 *	.13	.66 ***	.48 ***	.54 ***	−.53 ***
4. Age in Years	14.18 (2.29)	8–17	--	--	--	−.10	.00	.14	.03	.13	.07
5. Disease Symptoms[4]	5.96 (8.11)	0–35	--	--	--	--	.07	.55 ***	.42 **	.37 **	−.63 ***
6. BMI z-score	−0.39 (1.06)	−3.06–1.47	--	--	--	--	--	.24	.23	.23	−.10
7. Depression	53.35 (11.70)	40–87	--	--	--	--	--	--	.74 ***	.64 ***	−.75 ***
8. Anxiety	21.75 (17.30)	0–70	--	--	--	--	--	--	--	.54 ***	−.67 ***
9. Stress	53.30 (10.47)	37–73	--	--	--	--	--	--	--	--	.71 ***
10. HRQOL[5]	133.83 (19.16)	78–165	--	--	--	--	--	--	--	--	--

[1] BID = body image dissatisfaction raw scores,

[2] PSI Subscale = perceived social impact raw scores,

[3] SD Subscale = subjective dissatisfaction subscale raw scores,

[4] Self-reported disease symptoms,

[5] HRQOL= health-related quality of life,

[6] M = mean, SD = standard deviation. Possible range of BID total score is 0–90, PSI scale is 0–42, and SD scale is 0–48, with higher scores indicating more dissatisfaction. Depression scores are displayed as T-scores (M = 50, SD = 10); T-scores between 40–59 are considered "average," between 60–64 "high average," between 65–69 "elevated," and 70 "very elevated". 17% of the sample had elevated or very elevated depression scores. Stress scores are displayed as T-scores (M = 50, SD = 10); ranges of T-scores include Low (T-score 30–40), Average (T-score 40–60), High (T-score 60–70), and Very High (T-score 70–80). 26% of the sample had high or very high stress scores. Possible range of anxiety scores is 0–82 and scores 25 may indicate the presence of an anxiety disorder. 30% of the sample indicated scores that may indicate the presence of an anxiety disorder. Self-report disease symptoms is 0–50, with higher scores on both indicating more severity. Possible range of HRQOL scores is 35–175 and higher scores represent better HRQOL. *p < .05; **p < .01; ***p < .001

[1] HRQOL = health-related quality of life,

*
p < .05,

**
p < .01,

***
p < .001

Table 3.

Predicting Overall BID from Demographic, Medical, and Psychosocial Variable

	B	SE B	β	t	F	R²	R²
Demographics					4.895*	.094	
Child Age	2.437	1.101	.307*	2.213*			
Medical Variables					7.299**	.241	.147
Disease Symptoms	.919	.308	.383**	2.980**			
Psychosocial Variables					18.903***	.730	.489
Depression	.886	.231	.553***	3.832***			
Anxiety	.083	.131	.080	.636			
Stress	.274	.205	.159	1.336			
HRQOL[1]	−.129	.146	−.128	−.883			