

Resilience-based Integrated IBD Care Is Associated With Reductions in Health Care Use and Opioids



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BACKGROUND & AIMS: Integrated inflammatory bowel disease (IBD) care is effective but not routinely implemented. Validated methods that simultaneously address mind and body targets such as resilience may improve access and outcomes. We describe the development and implementation of the GRITT method and its impact on resilience, health care utilization (HCU), and opioid use in IBD.

METHODS: Consecutive patients from an academic IBD center were evaluated for low resilience on the basis of provider referral. Low resilience patients were invited to participate in the GRITT program. Primary outcome was % reduction in HCU. Secondary outcomes were change in resilience and corticosteroid and opioid use. Patients were allocated into 2 groups for analysis: GRITT participants (GP) and non-participants (NP). Clinical data and HCU in the year before enrollment were collected at baseline and 12 months. One-way repeated measures multivariate analysis of covariance evaluated group $\times$ time interactions for the primary outcome. Effect size was calculated for changes in resilience over time.

RESULTS: Of 456 screened IBD patients 394 were eligible, 184 GP and 210 NP. GP had greater reduction in HCU than NP: 71% reduction in emergency department visits, 94% reduction in unplanned hospitalizations. There was 49% reduction in opioid use and 73% reduction in corticosteroid use in GP. Resilience increased by 27.3 points (59%), yielding a large effect size ($d = 2.4$).

CONCLUSIONS: Mind-body care that focuses on building resilience in the context of IBD care may be a novel approach to reduce unplanned HCU and opioid use, but large, multicenter, randomized controlled trials are needed.

Keywords: Emergency Department Use; Hospitalizations; Opioid Use; Crohn's Disease; Ulcerative Colitis; Depression; Positive Psychology; Mind-Body Intervention.

Inflammatory bowel diseases (IBDs) affect up to 13 million Americans, with incidence in Western regions (United States, United Kingdom, Canada) stabilizing around 1% and rising among young people and developing countries.¹ In addition to the management of stigmatizing, chronic physical symptoms including abdominal pain, urgent diarrhea, fatigue, and malnutrition, IBD is associated with significant emotional burden.^{2,3} The small subset of IBD patients who seek mental health care in the community are dissatisfied either because their counseling does not directly address specific concerns about IBD or because there is limited communication between mental and physical health providers.⁴

Our long-term goal is to understand how to better care for people living with IBD in the context of their day-to-day lives. We focus on the construct of resilience,

or one's innate ability to adapt and recover from physical or emotional adversity; this is highly relevant to IBD because of the strong contribution of the brain-gut axis to IBD symptoms.⁵ Indeed, there is a growing body of evidence from around the world that psychological resilience affects mental and physical outcomes in IBD.^{6–15}

Abbreviations used in this paper: CBT, cognitive behavioral therapy; CI, confidence interval; ED, emergency department; GP, GRITT participants; GRITT, Gaining Resilience through Transitions; HCU, health care utilization; IBD, inflammatory bowel disease; IQR, interquartile range; NP, non-participants; UC, ulcerative colitis.

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1542-3565

<https://doi.org/10.1016/j.cgh.2021.11.013>

In this study, we (1) describe the development and implementation of an integrated care methodology, the Gaining Resilience through Transitions (GRITT) method, focused on ensuring all patients with IBD are resilient and prepared to optimally manage their IBD, and (2) describe the impact of a resilience training methodology on health care utilization (HCU) and corticosteroid and opioid use in low resilient IBD patients.

Methods

Study Population

Consecutive patients seen in an academic IBD center were referred to GRITT by their IBD specialist and evaluated between August 2016 and March 2019. Providers were trained in the identification of low resilient patients and behavioral referral process to increase uptake.

Patients determined to have low resilience on the basis of the validated, clinician administered resilience tool were eligible for enrollment in the GRITT IBD program. Eligibility required that the patient was planning to continue receiving care at the IBD Center for the duration of the program. Patients who required higher level psychiatric care (eg, eating disorders, suicidality) were referred for services outside of the program. Patients continued medical care as usual. The study was approved by the institutional review board.

Resilience-based Methodology

The GRITT method was developed as a consistent and efficient way to identify, classify, and intervene when patients presented with psychosocial complexity and disease-interfering behaviors in the context of their IBD. The methodology provides a framework through which a multidisciplinary team with different roles (nutrition, behavioral, nursing, pharmacy) can understand a patient's IBD in the context of resilience and life circumstances, prioritize the patient's needs and preferences, and communicate progress among the team members in qualitative and quantitative ways. All team members, regardless of professional background or role, are trained in the GRITT methodology, which is theoretically based in positive health psychology and social-cognitive theory of behavior change. Care is personalized on the basis of 5 therapeutic targets: disease acceptance, optimism/hope and future orientation, self-confidence, social support, and self-regulatory skills.

The Digital Resilience Scoring Tool

The GRITT score is a 22-item, digital, clinician administered assessment tool that captures the presence of disease-interfering attitudes, beliefs, or behaviors, collectively referred to as resilience across 5 domains:

What You Need to Know

Background

Integrated care for IBD is associated with positive outcomes. There is a need for earlier access to mind-body interventions that can support all patients in context of their IBD; resilience may be a key target because of its physical and emotional implications on lifelong health and well-being.

Findings

The study presents a validated methodology for incorporating resilience evaluation and intervention into routine IBD care and demonstrates that improvement in resilience is associated with reductions in unplanned care.

Implications for patient care

Psychological resilience could be an earlier, more inclusive target for intervention as part of true mind-body care in IBD.

general medical barriers affecting resilience, nutritional barriers affecting resilience, psychological barriers affecting resilience, lack of independent self-management skills affecting resilience, and trouble with the health care system/access to care/social determinants affecting resilience.¹⁶ Higher scores are associated with less complexity, less disability, higher quality of life and well-being, and higher resilience/psychological function. The GRITT score ranges from 0 (no resilience, severe biopsychosocial complexity) to 100 (high resilience, no biopsychosocial complexity). We have shown in a preliminary study that the resilience assessment is well-correlated with patients' self-report of resilience, psychological concerns, perceived disability and quality of life and reliably predicts high health care utilizers, with positive predictive value for engagement in unplanned care of 90% and 88% negative predictive value for engagement in unplanned care at a score <70.¹⁷ The digital resilience assessment leverages a weighted algorithm that is based on the 22 items and domains that generates the personalized care plan. This output is adopted and tracked by the multidisciplinary care team. The resilience score was preliminarily shown to be sensitive to change with intervention.¹⁷ The digital score produces a visual depiction of a patient's strengths and limitations (Figure 1).

Core Resilience Playbooks

Behavioral care. Cognitive behavior therapy (CBT) was provided by 1 of 3 behavioral health specialists, personalized to the patient, and included some combination of (1) remediation of catastrophic cognitions around abdominal pain, urgent diarrhea, and other gastrointestinal concerns that often drive emergency

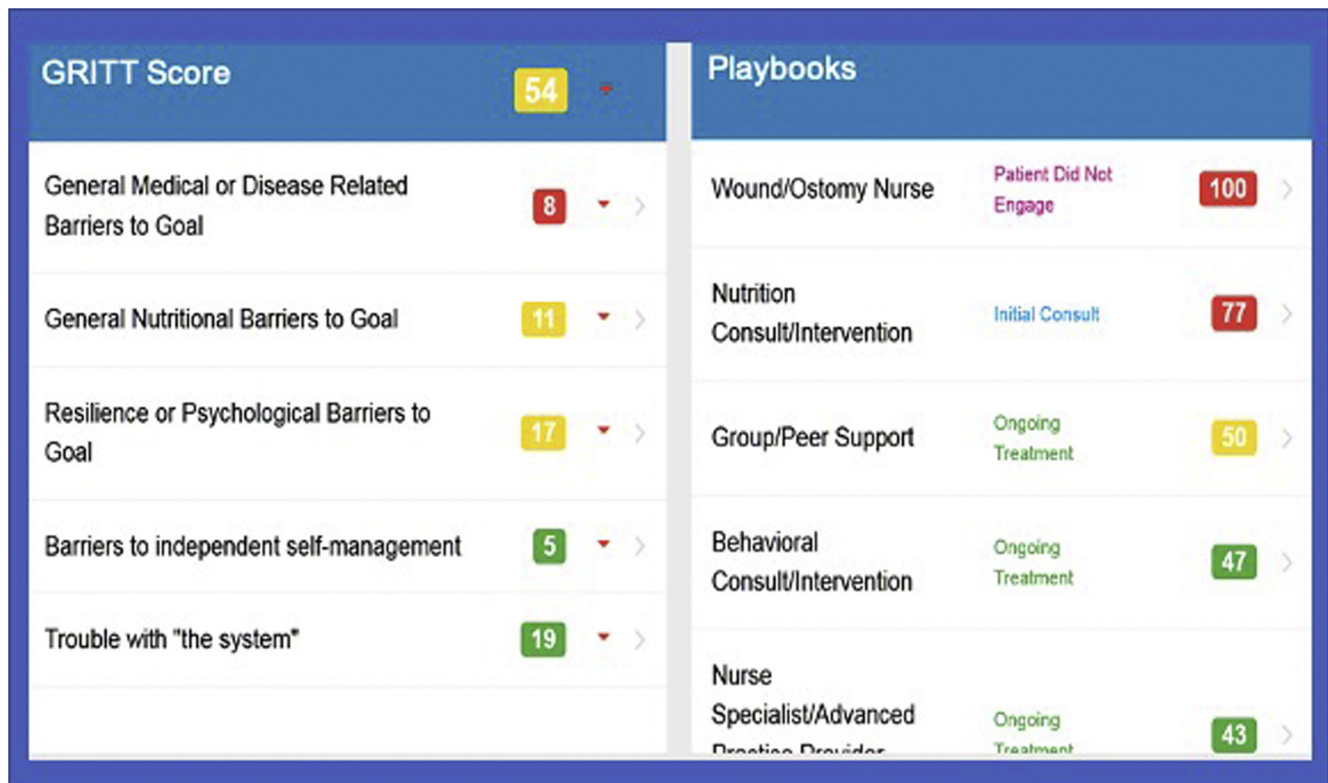


Figure 1. Digital resilience tool guides participant care plan. The GRITT score is a 22-item, digital, clinician administered assessment tool that ranges from 0 (low) to 100 (high).

department (ED) use, (2) exposure exercises around avoidance behaviors (eg, eating out, attending work when not feeling well), and (3) mindfulness and cognitive defusion-based strategies to increase psychological flexibility, promote disease acceptance, and build self-efficacy. CBT and acceptance and mindfulness-based approaches have been widely referred to as brain-gut behavior therapies, with high support for their use in disorders of gut-brain interaction¹⁸; these behavioral treatments have evidence of impact on stress, mood, sleep, and quality of life.^{19–22} Gut-directed hypnotherapy was adapted by the assigned therapist from the standardized protocol of Keefer et al, which was previously shown to maintain remission and reduce clinical symptoms such as abdominal pain and diarrhea in ulcerative colitis (UC).²³

Nutritional care. Nutrition services were provided by 1 of 2 gastroenterology specialist registered dietitians and were personalized and evidence-based,²⁴ prioritizing (1) remediation of malnutrition, including macro and micro nutrient deficiencies, (2) increasing diversity of diet and reducing food avoidance, (3) promoting bowel frequency and stool form consistency through diet manipulation, and (4) guidance on the implementation of diets with evidence for improved symptom management in IBD and/or irritable bowel syndrome (eg, low FODMAPS, Mediterranean diet).

Medication counseling. Clinical pharmacy services were provided by an IBD specialist pharmacist who offered counseling on biologic medications, use of

supplements and complementary/alternative medications, and supported shared decision-making between patients and providers. The pharmacist monitored and counseled patients who were smoking, tapering steroids, or using opioids.

Data Collection

Demographics (age, sex, race/ethnic background, insurance type), IBD type, biologic use (yes/no), current disease activity (Harvey-Bradshaw Index, most recent Mayo score) were collected from the electronic medical record at baseline. Reasons for non-participation were collected where possible. HCU, as defined by total number of IBD-related emergency department (ED) visits and non-planned, non-surgical IBD-related hospitalizations, were collected from the electronic medical record for the year before enrollment and then again 12 months after enrollment.

Eligible patients were allocated into 2 groups: GRITT participants (GP), individuals who engaged with the care team for at least 2 visits, and non-participants (NP), individuals who were eligible but never engaged with the care team. GRITT scores were calculated on all patients at baseline (entry into program) and again on GP group at 6-month follow-up. Raters were blinded to patient's baseline GRITT scores at the time of reassessment. Data on >6 months of opioid use (yes/no) and >6 months steroid use (yes/no) in the year before enrollment were

collected at baseline and then again at 12 months after enrollment for GP group. Data extraction from NP group was limited to baseline clinical information and 12 months before and after HCU because of ethics requirements.

Outcome Measures and Statistical Analysis

The primary outcome was change in HCU or % reduction in ED and hospitalizations between GP and NP at 1-year follow-up. Secondary outcomes were change in (% reduction) in resilience (GRITT score), corticosteroid use, and opioid use over time among GP. We describe program features and evaluated factors associated with program engagement when possible.

All demographic, clinical, and resilience data were entered into SPSSv26 (Chicago, IL) for analyses.

Descriptive statistics, including frequency, percentages, mean and standard deviation, and median (interquartile range [IQR]), for non-normally distributed data were calculated. One-way analysis of variance with follow-up independent sample *t* tests, along with χ^2 (Fisher exact test) for categorical variables, were conducted to determine differences between patients and controls on clinical and demographic variables as well as outcome. Repeated measures multivariate analysis of covariance (group $\times$ time) was conducted to determine change in HCU (ED and hospitalizations) over time between GP and NP groups, controlling for baseline utilization and disease activity. We conducted matching based on propensity score to determine the impact of the intervention on outcome, considering baseline differences between GP and NP on HCU and payor type. An intent-to-treat protocol was followed. An effect size (Cohen's *d*) was calculated for change in resilience score over time. Statistical *P* value was set at .01.

Results

Study Population

In total, 456 IBD patients were referred by an IBD provider and evaluated for low resilience, and 394 patients met eligibility criteria for enrollment on the basis of a resilience score <70 . The remaining 66 patients (14%) were not eligible because they had a resilience score >70 ($N = 45$, 68%) or they required more intensive psychological services ($N = 11$, 17%). Of the 394 patients with low resilience, 184 engaged and participated in the program (GP), and the remaining 210 were considered controls (NP). Primary reasons for non-engagement were geographic barriers ($N = 89$, 42%), limited insurance coverage/high deductible ($N = 63$, 30%), and not interested ($N = 50$, 24%), and 8% (17) were lost to follow-up.

The 2 groups did not differ with respect to demographics, clinical characteristics, disease activity, or

baseline mental health diagnoses (Table 1). Only 32% (GP) and 34% (NP) of the patients had mental health comorbidity according to electronic medical record diagnosis code. Baseline resilience did not differ between groups (54.2 [10.1] vs 46.3 [16.7]; $P = \text{NS}$). Baseline total number of ED visits and hospitalizations in the 12 months preceding enrollment were significantly (138 vs 89 and 72 vs 23; $P < .05$) lower in the control group. Baseline GRITT score was significantly and inversely correlated with number of ED visits ($r = -0.40$; $P = .000$) and hospitalizations ($r = -0.37$; $P = .000$). Both Crohn's disease and UC patients' disease activity fell within the mild (UC) and mild-to-moderate (Crohn's disease) range.

GRITT participants spent a median number of 200 days (IQR = 164 [75%], 100 [25%]) in the program and received a median of 8 sessions (range 2–12) with the multidisciplinary care team, the majority of which (80%) were completed in the first 100 days of enrollment. The most common services used were behavioral health (median, 5 sessions) and nutrition (median, 1 session). Within the behavioral health services, 50% of patients received CBT, 20% received gut-directed hypnotherapy, and 30% received a combination of the 2 interventions. Forty-five percent of services were conducted via telehealth.

A subset of GP did not complete the program (had less than 2 visits) and/or were lost to follow-up after initially engaging ($N = 23$). They spent a median number of 95 days in the program (IQR = 125 [75%], 86 [25%]). There were no differences between completers and non-completers with respect to age, disease type, race or ethnicity, mental health diagnosis, or baseline health care use. GRITT completers were more likely than non-completers to be commercially insured (χ^2 (12) = 36.1; $P = .02$).

Outcomes

Resilience. Mean 6-month follow-up GRITT score in the participant group was 73.6 (10.6), an increase of 2 standard deviations, 27.3 points (59% improvement) ($P < .000$; 95% confidence interval [CI], 29.3–25.2), with a large effect size (Cohen's *d* = 2.4; $P < .000$; 95% CI, 2.7–2.0).

Health Care Utilization

There was a significant group $\times$ time interaction such that GP had significantly greater reduction in HCU than NP ($F_{1,391} = 421.6$; $P = .0001$). For the GP group, in the year before enrollment, there were a total of 138 ED visits and 72 IBD-related hospitalizations (Figure 2). On the individual level, mean number of baseline ED visits was 1.4 (9.0), and mean number of baseline hospitalizations was 0.81 (5.35) ($P < .001$). At 12-month follow up, there were a total of 40 ED visits (71% reduction) and 4 hospitalizations (94% reduction) ($P < .001$) (Figure 2). On the

Table 1. Comparison of Eligible Low Resilience Patients Based on Participation in GRITT: On the Basis of Propensity Analysis

Characteristics	GRITT graduates (N = 184)	Controls (N = 210)	P value
Sex at birth is female	106 (58%)	113 (54)	NS
Median age, y, range)	35 (18–71)	36 (18–74)	NS
% White, non-Hispanic ^a	131 (71)	143 (68)	NS
% Commercially insured ^a	138 (75)	181 (86)	NS
% Crohn's disease	119 (65)	124 (59)	NS
% Baseline biologic use	130 (71)	143 (68)	NS
Median years of disease duration [IQR]	8 [3–12]	8 [2–17]	NS
% Previous surgery	57 (31)	63 (30)	NS
% Baseline opioid use >3 months	39 (20)	42 (20)	NS
% Baseline current prednisone use	48 (26)	63 (30)	NS
Median baseline Harvey-Bradshaw Index	7 (0–27)	8 (0–24)	NS
Median baseline Mayo score	4 (0–12)	3 (0–10)	NS
Mean no. of baseline emergency department visits ^a	0.67 (1.2)	0.14 (0.53)	.000
Mean no. of baseline hospitalizations ^a	0.40 (0.89)	0.09 (0.39)	.000
Baseline GRITT score	46.3 (10.1)	54.2 (16.7)	NS
% With a mental health diagnosis [F] code in electronic medical record	59 (32)	71 (34)	NS

GRITT, Gaining Resilience through Transitions; IQR, interquartile range.

^aLimitations in electronic healthcare documentation precluded the opportunity to provide more details on the cohort, such as type of biologic, duration of prednisone use, that could have contributed to outcomes. A prospective study would be helpful to better characterize the impact of GRITT on this patient population, controlling for some of these variables. A propensity score was calculated and used to match groups on social determinants of health including race/ethnicity, commercial insurance, and baseline health care utilization; see results section for more details.

individual level, mean number of ED visits dropped to 0.48 (3.23), and mean hospitalizations dropped to 0.05 (0.35) ($P < .001$). The sample was matched on the basis of propensity score that included baseline HCU, race (white, non-Hispanic yes or no), and insurance carrier (commercial vs non-commercial), after which the repeated measures analysis of variance was re-run. There was significant group $\times$ time interaction for both ED and hospitalizations, with a moderate effect size for ED visits ($F_{1,2} = 96.76$, $P = .000$, $\eta^2 = .32$) and a smaller effect size for hospitalizations ($F_{1,2} = 45.8$, $P = .00$, $\eta^2 = .18$).

For the NP group in the year before enrollment, there were a total of 99 ED visits and 23 IBD-related hospitalizations. On the individual level, mean number of baseline ED visits was 1.5 (0.5), and mean number of hospitalizations was 0.9 (0.30) ($P = \text{NS}$). At 12-month follow-up, there were 95 ED visits (4% reduction) and 38 hospitalizations (65% increase) ($P < .05$) (Figure 2). On the individual level, mean number of ED visits remained similar at 1.10 (0.44), as did hospitalizations, up to a mean of 1.0 (.22) ($P = \text{NS}$).

Opioid and Corticosteroid Use

Among GP, 39 patients were currently using opioids for more than 3 months at time of enrollment in GRITT, and 20

at 12 months had used an opioid within the past 3 months (49% decrease). There were 48 patients using prednisone at baseline and 13 who had used prednisone in the last 3 months by 12-month follow-up (73% decrease); both decreases were statistically significant ($P < .001$) (Figure 3).

Discussion

In this article, we describe our approach to the development and implementation of a resilience-based care program for IBD patients. Our hypothesis that targeting a mind-body construct such as resilience as a way to improve outcomes was supported with respect to a large effect size for improved resilience across multiple life domains (medical, nutritional, psychological). There were positive effects on HCU, our primary outcome, specifically a significant reduction in ED visits and hospitalizations, which remained, albeit slightly more moderate, after propensity score matching between groups on commercial insurance, race/ethnicity, and baseline HCU. Resilience is not only applicable to every person's well-being, morbidity, and mortality; it also increases with successful navigation of adverse life experiences, including one's health journey.²⁵

We demonstrated significant engagement in the GRITT program, with only 13% dropout rate among the

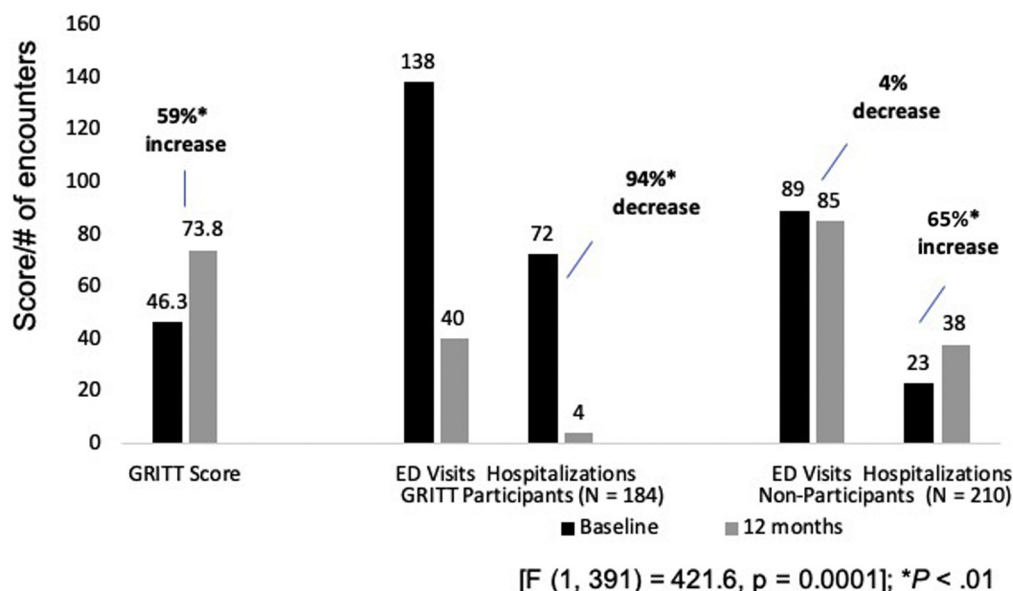


Figure 2. Participation in GRITT program improved resilience and reduced HCU. There was a significant group $\times$ time interaction such that GP had a significantly greater reduction in HCU than NP ($F_{1,391} = 421.6$; $P = .0001$). ED, emergency department; GP, GRITT participant; HCU, health care utilization; NP, non-participant.

participant group. This is not entirely surprising; engagement is almost always higher when behavioral care is provided in context of medical care.²⁶ When patients receive all of their care in the same setting and trust that their providers are communicating about their IBD care needs through the same lens, care can be better personalized and reinforced by the entire IBD Center and not an individual provider. The GRITT method provides a standardized approach to implementing mind-body IBD care; it not only facilitates communication and personalization of care plans through its digital tool and scoring algorithm, but it also reduces variability between providers with respect to which behaviors are prioritized for intervention. Although providers still need to be trained upfront on the methodology, one advantage of

standardizing patient selection and care planning methods is that it ultimately can be replicated, adapted for different populations, and potentially scaled.

Another factor influencing engagement may be our patient population. Interestingly, only 32% of our participants had a mental health diagnosis code; this may reflect our program's unique emphasis on selecting patients with low resilience across multiple domains rather than psychological comorbidity. For example, the UPMC Total Care Program was offered within a single-payor model and focused on providing psychiatric consultation and behavioral support to patients with a documented comorbid psychiatric condition and high utilization.²⁷ In an Australian IBD Center, outcomes were improved when the subset of IBD patients screening positive for depression or anxiety were identified and provided mental health support services within the IBD center.²⁸ It is possible that our patients, who were less psychologically disabled at the time they were offered integrated care, were better able to implement and adhere to recommended medical, behavioral, lifestyle, and dietary changes. Another unique feature of our program is that although we do manage a high-risk population of IBD patients and, although not payor-specific, we operate within a value-based health system (Mount Sinai), not all patients are eligible for integrated services. Eligibility requirements, along with restriction as to the duration of services (eg, graduation), allow for sustainability of funding from our hospital.

Participants had relatively mild to moderate symptoms on Harvey-Bradshaw Index and Mayo score; however, they were considered to have low resilience because of high symptom reporting despite relatively low disease activity, further highlighting the importance of integrated care in IBD settings and the need for an approach that accounts for brain-gut interactions affecting symptom experience and behaviors that lead to unplanned emergency care.

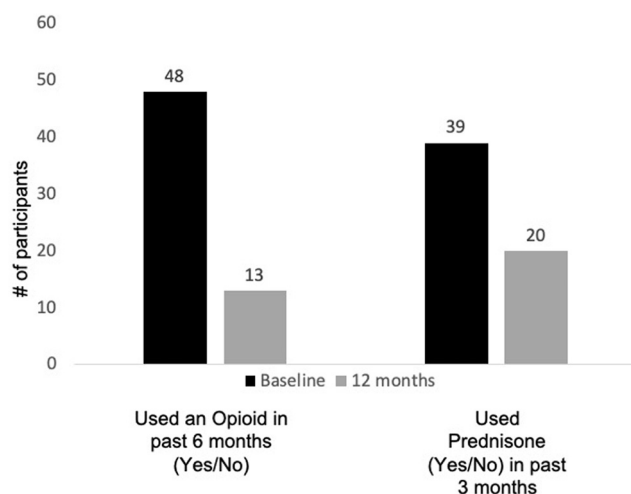


Figure 3. Participation in GRITT program reduced use of opioids and prednisone. Thirty-nine GPs were using opioids at baseline; 20 at 12 months had used an opioid within the past 3 months (49% decrease). Forty-eight patients used prednisone at baseline, and 13 had used prednisone in the last 3 months by 12-month follow-up (73% decrease) ($P < .001$).

Limitations

Lack of randomization and a comparison to non-randomized controls is not sufficient to prove that GRITT method was superior to routine care. Generalizability is limited by the modest subset of patients who were eligible for the program but did not participate or engage; although this seemed to be primarily related to either high deductibles or co-pays or geographic limitations, this is an important caveat. The study was conducted before the coronavirus disease 2019 pandemic; relaxation of telemedicine/licensing regulations may improve access. Patients were from an urban, academic IBD center, which may have biased the sample toward lower resilience and higher health care use; replication in community care settings is needed. Lack of objective assessment of disease activity is a limitation. Finally, patients in both groups continued to receive medical care; improved outcomes could be due to advances in treatment, particularly with respect to corticosteroid use.

This study builds on the growing importance of integrated care for the management of chronic conditions. It provides a validated methodology that applies to the full range of IBD patients by focusing on a modifiable personal characteristic that has relevance to the mind-body health of every patient, resilience.

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Conflicts of interest

These authors disclose the following: LK: Consultant to AbbVie, Lilly, Takeda and Trellus Health; advisory board member for Reckitt Health; research funding

from PCORI and NIH; co-founder and equity ownership Trellus Health, Inc. RCU: Advisory board member or consultant for AbbVie, Bristol Myers Squibb, Eli Lilly, Janssen, Pfizer, and Takeda; research support from AbbVie, Boehringer Ingelheim, and Pfizer. BLC: Advisory boards and consultant for AbbVie, Celgene-Bristol Myers Squibb, Pfizer, Sublimity Therapeutics, Takeda, TARGET RWE; speaker: AbbVie. MCD: Consultant and advisory Board Member: AbbVie, Arena, BMS, Celgene, Gilead, Janssen, Pfizer, Prometheus Labs, Takeda, Target RWE; co-founder, board of director, and equity ownership Trellus Health Inc. The remaining authors disclose no conflicts.

Funding

Mount Sinai Innovation Partners (MSIP) supported the development of the digital resilience scoring tool through its I3 Accelerator Fund. RCU is funded by an NIH Career Development Award (K23KD111995-01A1).