



Structural Modeling of Functional Disability Severity Based on Health-Promoting Lifestyle and Distress Tolerance: The Mediating Role of Ego Strength in Patients with Functional Gastrointestinal Disorders

Maryam. Saeid¹, Mahboobe. Taher^{1*}, Hamid. Vahedi², Abbas Ali. Hosseinkhanzadeh³

¹ Department of Psychology, Sha.C., Islamic Azad University, Shahrood, Iran

² Associate Professor, Department of Gastroenterology, Faculty of Medicine, Shahrood University of Medical Sciences Shahrood, Iran

³ Professor, Faculty of Literature and Humanities, University of Guilan, Rasht, Iran

* Corresponding author email address: Mahboobe.Taher@iau.ac.ir

Article Info

Article type:

Original Research

How to cite this article:

Saeid, M., Taher, M., Vahedi, H., & Hosseinkhanzadeh, A. A. (2026). Structural Modeling of Functional Disability Severity Based on Health-Promoting Lifestyle and Distress Tolerance: The Mediating Role of Ego Strength in Patients with Functional Gastrointestinal Disorders. *Health Nexus*, 4(2), 1-15.

<https://doi.org/10.61838/kman.hn.5948>



© 2026 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

ABSTRACT

Functional gastrointestinal disorders are common, multifactorial conditions that, in addition to biological dimensions, are influenced by psychological and lifestyle factors. Therefore, examining individual and psychological factors associated with the severity of functional disability in these patients can play an important role in achieving a better understanding of these disorders and designing effective interventions. The present study aimed to examine the fit of a structural model of functional disability severity based on health-promoting lifestyle and distress tolerance, with the mediating role of ego strength, in patients with functional gastrointestinal disorders. This applied study employed a correlational design using structural equation modeling. The statistical population consisted of patients with functional gastrointestinal disorders in Tehran, from whom 350 participants were selected through convenience sampling. Data were collected using the World Health Organization Disability Assessment Schedule (2000), the Health-Promoting Lifestyle Profile developed by Walker et al. (1995), the Distress Tolerance Scale developed by Simons and Gaher (2005), and the Ego Strength Scale developed by Markstrom et al. (1997). Data were analyzed using SPSS version 27 and AMOS version 26. The structural equation modeling results indicated that the proposed model demonstrated an acceptable fit. The model fit indices were $\chi^2/df = 1.71$, RMSEA = 0.06, CFI = 0.94, NFI = 0.93, GFI = 0.94, and AGFI = 0.93, all of which indicated an adequate fit of the model to the data. Overall, the findings demonstrated that health-promoting lifestyle and distress tolerance, through the mediating role of ego strength, play important roles in explaining the severity of functional disability among patients with functional gastrointestinal disorders.

Keywords: functional disability severity, health-promoting lifestyle, distress tolerance, ego strength, functional gastrointestinal disorders.

1. Introduction

Functional gastrointestinal disorders (FGIDs) constitute a heterogeneous group of chronic conditions characterized by persistent or recurrent gastrointestinal symptoms that cannot be fully explained by identifiable structural or biochemical abnormalities. These disorders are increasingly conceptualized within a biopsychosocial framework in which gastrointestinal physiology, central nervous system processes, psychological functioning, behavioral patterns, and social context dynamically interact to influence symptom onset, persistence, and severity. Contemporary evidence indicates that abnormalities in gut–brain communication, visceral sensitivity, autonomic regulation, stress responsiveness, and cognitive-emotional processing can interact with lifestyle-related and psychosocial factors to shape the clinical manifestations of FGIDs (1). Accordingly, the burden experienced by patients cannot be understood solely in terms of gastrointestinal symptoms; rather, symptom perception, functional capacity, psychological adaptation, and health-related behaviors must also be considered. Biopsychosocial models of symptom perception further suggest that patients' cognitive interpretations of bodily sensations and their emotional responses to symptoms may amplify or attenuate perceived symptom severity and associated disability (2). The broad spectrum of physical vulnerabilities associated with FGIDs, including pain, altered bowel function, fatigue, sleep disturbance, and impaired physical functioning, further underscores the multidimensional nature of these disorders (3).

The clinical significance of FGIDs extends beyond symptom discomfort to substantial limitations in everyday functioning. Functional disability refers to the extent to which a health condition interferes with an individual's ability to perform physical, cognitive, interpersonal, occupational, and social activities. Patients with chronic gastrointestinal symptoms may experience difficulties in mobility, work performance, self-care, social participation, concentration, and interpersonal interactions, particularly when symptoms are unpredictable or accompanied by pain, urgency, fatigue, or fear of symptom exacerbation. Gastrointestinal disorders are also increasingly recognized as prevalent non-communicable conditions with consequences that extend to family functioning,

occupational productivity, social relationships, and healthcare utilization (4). Importantly, the degree of disability experienced by patients is not necessarily proportional to the objective severity of physical pathology. Research on chronic pain and related functional conditions indicates that psychological, behavioral, and contextual factors may explain substantial variation in disability beyond the extent of physical impairment itself (5). Therefore, identifying modifiable psychological and lifestyle-related determinants of functional disability is essential for developing more comprehensive approaches to the management of FGIDs.

One potentially important determinant of functional outcomes is a health-promoting lifestyle. A health-promoting lifestyle encompasses a multidimensional pattern of behaviors oriented toward maintaining and improving physical and psychological health, including adequate nutrition, regular physical activity, health responsibility, stress management, interpersonal support, and self-actualization. These behaviors are particularly important among individuals with chronic conditions because they may enhance physiological resilience, improve symptom management, strengthen perceived control, and reduce the disruptive effects of illness on daily functioning. Evidence suggests that various dimensions of a health-promoting lifestyle are associated with better functional health and more favorable health outcomes (6). Among individuals with chronic medical conditions, health-promoting behaviors have also been associated with greater psychological empowerment, suggesting that lifestyle practices may influence health not only through direct physiological mechanisms but also by strengthening personal resources and adaptive capacities (7). Thus, health-promoting lifestyle behaviors may constitute an important protective factor against progressive functional limitation.

The relevance of lifestyle behaviors may be especially pronounced in gastrointestinal disorders because many gastrointestinal symptoms are sensitive to dietary patterns, physical activity, sleep, stress exposure, and health-management practices. Lifestyle modifications can contribute to improved adaptation to chronic illness by enhancing patients' ability to regulate stress, maintain routines, and respond proactively to symptoms rather than adopting passive or avoidant coping strategies. Research has

shown that psychological distress and lifestyle modification are closely interconnected in patients with chronic illnesses, with healthier behavioral patterns potentially contributing to improved adjustment and reduced symptom-related burden (8). Health-promoting behaviors may also increase patients' perceived control over their condition, which is especially important in disorders characterized by fluctuating and unpredictable symptoms (9). Furthermore, physical activity, as one component of a health-promoting lifestyle, has been linked to subjective well-being and broader health outcomes in chronic-care populations, with structural modeling evidence suggesting that behavioral engagement may influence health through both direct and indirect pathways (10). These findings provide a basis for considering health-promoting lifestyle as a multidimensional predictor of functional disability in individuals with FGIDs.

Nevertheless, the relationship between lifestyle and disability is unlikely to be purely behavioral or linear. The social consequences of functional symptoms may influence patients' willingness and ability to maintain adaptive lifestyles. Individuals with gastrointestinal symptoms may restrict activities because of embarrassment, fear of urgent symptoms, concern about access to facilities, or anticipation of negative social evaluation. Lifestyle adjustments made in response to functional disability may therefore become maladaptive when they involve excessive avoidance, social withdrawal, or abandonment of valued activities (11). Such patterns can establish a reciprocal process in which disability leads to restricted engagement in health-promoting behaviors, while reduced engagement subsequently contributes to greater functional impairment. Psychological resources may help interrupt this process. Indeed, evidence indicates that personal psychological resources can moderate the relationship between health behaviors and chronic illness outcomes, highlighting the importance of considering internal capacities alongside lifestyle factors (12).

Distress tolerance is another psychological factor that may be critically involved in functional disability. Distress tolerance refers to an individual's perceived or actual capacity to withstand and manage aversive emotional states without resorting to maladaptive behavioral responses. Chronic gastrointestinal symptoms can generate persistent uncertainty, discomfort, anxiety, frustration, and

anticipatory fear, making the ability to tolerate distress particularly relevant. Individuals with low distress tolerance may perceive emotional and physical discomfort as intolerable, respond with avoidance, catastrophizing, excessive symptom monitoring, or withdrawal from activities, and consequently experience greater interference in daily life. In contrast, higher distress tolerance may facilitate continued engagement in necessary or valued activities despite discomfort. Empirical findings among patients with chronic gastrointestinal symptoms have demonstrated meaningful associations between distress tolerance and psychological well-being (13). Distress tolerance has also been identified as an important factor in the treatment and adaptation processes associated with chronic diseases (14), suggesting that it may influence not only psychological symptoms but also functional outcomes.

The mechanisms through which distress tolerance influences disability may involve emotion regulation, cognitive appraisal, and coping. Individuals who can remain psychologically engaged in the presence of discomfort are more likely to regulate negative affect effectively and less likely to engage in rigid avoidance. Research in chronic pain populations has shown that emotion regulation and distress tolerance are central to managing persistent symptoms and their functional consequences (15). In gastrointestinal distress specifically, cognitive appraisals and coping styles have been linked to patients' responses to symptoms, suggesting that interpretation of gastrointestinal sensations can influence subsequent behavioral and emotional reactions (16). When symptoms are interpreted as threatening, uncontrollable, or intolerable, patients may increase monitoring and avoidance, thereby magnifying disability. Similarly, health anxiety and avoidant coping have been implicated in functional somatic syndromes and may contribute to persistent functional impairment by reinforcing fear-driven behavioral restriction (17). Consistent with this perspective, distress tolerance has been reported to mediate the relationship between cognitive appraisal and functional disability, indicating that individuals' capacity to tolerate distress may serve as a psychological pathway linking their interpretation of symptoms to the degree of functional limitation they experience (18).

Emotional competencies are therefore highly relevant to chronic functional conditions. The capacity to identify,

regulate, and tolerate difficult emotional experiences can protect mental health under sustained stress and may help patients preserve functioning in the presence of chronic symptoms (19). However, distress tolerance is unlikely to operate independently of broader personality resources. A patient may possess some capacity to tolerate discomfort yet still experience significant disability if he or she lacks a stable sense of competence, purpose, agency, and psychological strength. Conversely, individuals who perceive themselves as capable of coping with adversity may transform distress tolerance into more effective behavioral adaptation. This consideration highlights the potential importance of ego strength as a psychological resource that can connect lifestyle behaviors and distress tolerance to functional outcomes.

Ego strength is a multidimensional construct referring to the internal psychological capacities that support coherent identity, adaptive functioning, self-regulation, persistence, and effective coping. Within the Eriksonian tradition, ego strengths are reflected in qualities such as hope, will, purpose, competence, fidelity, love, care, and wisdom. In the context of chronic illness, ego strength can be understood as the ability to maintain a stable sense of agency and psychological organization despite persistent symptoms and environmental demands. Conceptually, this construct overlaps with, but is broader than, self-efficacy and self-competence, both of which have received substantial empirical attention in chronic illness research. Self-competence has been shown to predict successful coping in chronic medical conditions, suggesting that individuals who perceive themselves as capable and effective are more likely to respond adaptively to health-related challenges (20). Likewise, evidence from meta-analytic research demonstrates a consistent relationship between self-efficacy and functional disability in chronic illness, with stronger efficacy beliefs generally associated with lower levels of disability (21).

Self-efficacy-related resources may influence disability through several mechanisms. Individuals who believe in their ability to manage illness-related demands may be more persistent in maintaining health-promoting behaviors, more willing to remain engaged in daily activities despite symptoms, and more likely to use active coping strategies. A systematic review of chronic illness management has

highlighted self-efficacy as a central factor in adaptive coping and self-management (22). Similarly, self-efficacy has been found to mediate the relationship between illness perceptions and quality of life in chronic functional disorders, suggesting that patients' beliefs about their own capabilities can transform the impact of symptom-related cognitions on broader health outcomes (23). In gastrointestinal disorders, self-efficacy and self-management behaviors have also been identified as mediators between disease-related factors and health-related quality of life (24). Together, these findings suggest that ego strength, as a broader psychological capacity incorporating competence, purposeful action, and adaptive persistence, may similarly function as an intermediary mechanism through which other protective factors affect functional disability.

A health-promoting lifestyle may contribute to the development or reinforcement of ego strength. Engaging consistently in health-enhancing behaviors can provide repeated experiences of mastery, behavioral control, self-care, and successful goal attainment. Such experiences may strengthen perceptions of competence and reinforce a sense of agency in managing chronic illness. Health-promoting behaviors have been associated with psychological empowerment in adults with chronic conditions (7), while perceived control has been identified as an important correlate of health-promoting behavior among individuals experiencing chronic pain and digestive disorders (9). From this perspective, lifestyle behaviors may influence disability partly by cultivating psychological resources that enable patients to manage symptoms more effectively. Rather than conceptualizing lifestyle solely as a collection of behavioral practices, it may therefore be more appropriate to consider it as a behavioral context within which personal efficacy, resilience, and ego strength can be developed and expressed.

Distress tolerance may likewise contribute to ego strength. Successfully remaining engaged in the presence of discomfort can reinforce an individual's belief that difficult internal experiences are manageable and temporary. Repeatedly coping with distress without excessive avoidance may strengthen persistence, perceived competence, and emotional self-regulation. Recent findings specifically addressing gastrointestinal patients have suggested that distress tolerance and ego strength are closely

related in explaining functional disability (25). Such findings are consistent with the broader proposition that chronic illness outcomes are shaped by interactions between emotional regulatory capacities and psychological resources. Patients with greater distress tolerance may be better able to interpret symptoms without catastrophic escalation, tolerate uncertainty, and preserve a sense of control, thereby strengthening ego functioning and reducing disability.

Despite growing interest in biopsychosocial explanations of FGIDs, several gaps remain. Much of the existing research has examined lifestyle, distress tolerance, self-efficacy, symptom appraisal, or functional outcomes separately rather than integrating these variables within a single explanatory model. Studies focusing on lifestyle have emphasized its direct association with health and functioning, whereas studies of distress tolerance have primarily examined psychological distress, coping, or emotion regulation. Research on self-efficacy and competence has demonstrated their protective effects, but less attention has been devoted to ego strength as a broader mediating construct linking behavioral and emotional resources to functional disability. Moreover, the specific interplay between health-promoting lifestyle, distress tolerance, and ego strength may be particularly relevant in FGIDs, where symptom severity alone often fails to explain differences in patients' functional outcomes. Contemporary biopsychosocial perspectives increasingly emphasize the need for multivariable models capable of capturing these interdependent pathways (1).

Developing and testing such a model has both theoretical and clinical value. From a theoretical standpoint, structural modeling can clarify whether health-promoting lifestyle and distress tolerance exert primarily direct effects on disability or whether part of their influence operates through internal psychological capacities such as ego strength. From a clinical standpoint, identifying mediating processes can help refine intervention targets. If ego strength significantly transmits the effects of lifestyle and distress tolerance to functional disability, interventions may be more effective when they combine behavioral lifestyle modification, distress-tolerance enhancement, and strategies designed to strengthen personal competence, agency, and adaptive coping. Such a model could also contribute to more

individualized psychological care for patients with FGIDs by identifying modifiable protective factors rather than focusing exclusively on symptom suppression.

Therefore, the present study aimed to examine the fit of a structural model of functional disability severity based on health-promoting lifestyle and distress tolerance, with the mediating role of ego strength, among patients with functional gastrointestinal disorders.

2. Methods and Materials

2.1. Study Design and Participants

The present study was quantitative in terms of research paradigm, fundamental in terms of purpose, and correlational in terms of data collection and analysis, using structural equation modeling. The statistical population consisted of patients attending a private clinic and office of a gastroenterology and hepatology subspecialist in northwestern Tehran, patients attending the Masoud Specialized and Subspecialized Gastroenterology and Hepatology Clinic in western Tehran, and patients attending the Specialized Gastroenterology and Hepatology Clinic of Imam Khomeini Hospital in Tehran. Participants were recruited between September 23, 2025, and March 20, 2026, from individuals attending these three centers who had been diagnosed by a gastroenterologist with one or more functional gastrointestinal disorders.

Considering recommendations regarding sample size in structural equation modeling, the complexity of the model, the number of study variables, and the possibility of participant attrition, 350 individuals were selected using nonprobability convenience sampling. Data were collected using both library-based and field methods. After coordination with the healthcare centers and obtaining informed consent, the questionnaires were administered to eligible participants.

2.2. Data Collection Tools

World Health Organization Disability Assessment Schedule: In the present study, functional disability was assessed using the questionnaire described by Stone et al. (2010), which was developed to assess functional disability in patients with chronic pain. The questionnaire consists of 36 items covering six domains: cognition (Items 1–6),

mobility (Items 7–11), self-care (Items 12–15), getting along with others (Items 16–20), life activities (Items 21–28), and participation (Items 29–36). Responses are scored on a 5-point Likert scale: none = 0, mild = 1, moderate = 2, severe = 3, and extreme = 4. The questionnaire contains no reverse-scored items, and higher scores indicate greater disability. In an Iranian study, Cronbach's alpha was reported as .96 for the total scale and .90, .88, .84, .88, .96, and .87 for the cognition, mobility, self-care, getting along, life activities, and participation domains, respectively (Rouhi et al., 2019).

Health-Promoting Lifestyle Profile: This questionnaire was developed by Walker, Sechrist, and Pender (1995) based on Pender's Health Promotion Model (1982). It comprises 54 items and six subscales: nutrition (Items 1–11), exercise (Items 12–24), health responsibility (Items 25–32), stress management (Items 33–38), interpersonal support (Items 39–46), and self-actualization (Items 47–54). Items are scored on a 4-point Likert scale as follows: never = 1, sometimes = 2, often = 3, and routinely = 4. The minimum, midpoint, and maximum questionnaire scores are 54, 135, and 216, respectively. Scores ranging from 54 to 81 indicate an unfavorable health-promoting lifestyle, scores from 81 to 135 indicate a moderate health-promoting lifestyle, and scores above 135 indicate a favorable health-promoting lifestyle. The developers evaluated the reliability of the questionnaire using Cronbach's alpha and reported a coefficient of .94 for the total scale. Reliability coefficients for the six subscales were .86 for health responsibility, .85 for exercise, .80 for nutrition, .86 for self-actualization, .87 for interpersonal relations, and .79 for stress management. In an Iranian study, Cronbach's alpha was .92 for the total questionnaire and .82, .84, .64, .84, .81, and .65 for health responsibility, exercise, nutrition, self-actualization, interpersonal relations, and stress management, respectively.

Ego Strength Scale: In the present study, participants' ego strength was assessed using the 32-item questionnaire developed by Markstrom, Sabino, Turner, and Berman (1997). This instrument has both 64-item and 32-item versions; the 32-item version was used in the present study. The questionnaire comprises eight subscales: hope (Items 8, 15, 26, and 32), will (Items 2, 4, 19, and 27), purpose (Items 16, 24, 25, and 28), competence (Items 3, 11, 13, and 29), fidelity (Items 6, 10, 18, and 20), love (Items 1, 7, 14, and 23), care (Items 9, 17, 21, and 30), and wisdom (Items 5, 12,

22, and 31). Items are scored on a 5-point Likert scale ranging from strongly disagree = 1, disagree = 2, neither agree nor disagree = 3, agree = 4, to strongly agree = 5. Higher scores indicate greater ego strength. The developers reported satisfactory face, content, and construct validity for the 32-item Ego Strength Scale. Cronbach's alpha was reported as .94 for the total questionnaire and .81, .69, .68, .78, .62, .63, and .84 for the hope, will, purpose, competence, fidelity, love, and care subscales, respectively. In an Iranian study, the reliability of the questionnaire was reported to be .81 based on Cronbach's alpha.

Distress Tolerance Scale: This questionnaire was developed by Simons and Gaher (2005) and consists of 15 items and four subscales: tolerance (Items 1, 3, and 15), absorption (Items 2, 4, and 5), appraisal (Items 6, 7, 9, 10, 11, and 12), and regulation (Items 8, 13, and 14). Items are scored on a 5-point Likert scale ranging from strongly agree = 1 to strongly disagree = 5. Total scores range from 15 to 75, with higher scores indicating greater distress tolerance. The developers reported Cronbach's alpha coefficients of .72, .82, .78, and .70 for the tolerance, absorption, appraisal, and regulation subscales, respectively, and .82 for the total scale. In an Iranian study, Cronbach's alpha for the total instrument was .78, indicating satisfactory reliability.

2.3. Interventions

The Emotion-Focused Therapy intervention was delivered in ten 90-minute sessions and was designed to increase participants' emotional awareness, facilitate adaptive emotional processing, reduce maladaptive emotional avoidance, and strengthen emotion-regulation capacities relevant to recovery from substance use disorder. The first session focused on introducing group members, explaining the goals and structure of therapy, establishing group rules, developing the therapeutic alliance, and providing psychoeducation concerning the nature and functions of emotions. The second session addressed the distinction between primary and secondary emotions and helped participants examine how different emotional experiences were related to substance use behaviors. In the third session, emphasis was placed on enhancing emotional awareness, improving the ability to identify and label emotional states, and recognizing situations and experiences that could trigger substance use. The fourth session focused

on helping participants remain in contact with and accept difficult emotional experiences rather than engaging in avoidance or suppression through substance use. During the fifth session, unresolved emotional experiences and potentially traumatic or distressing personal events associated with maladaptive emotional responses were explored within a supportive therapeutic context. The sixth session was devoted to transforming maladaptive emotional responses and facilitating the development of healthier and more adaptive emotional experiences and responses. The seventh session emphasized self-empathy and self-compassion and addressed shame, guilt, and harsh self-criticism, which are frequently associated with substance-related problems and may undermine recovery efforts. In the eighth session, participants practiced emotion-regulation skills applicable to high-risk situations, including circumstances involving craving, interpersonal distress, negative affect, and urges to use substances. The ninth session integrated previously learned skills with problem-solving strategies and individualized planning for managing high-risk situations and preventing relapse. Finally, the tenth session included a comprehensive review of therapeutic skills, evaluation of participants' progress, identification of remaining emotional vulnerabilities, and development of an individualized plan for maintaining therapeutic gains after the conclusion of treatment. Throughout the intervention, experiential techniques were emphasized to help participants recognize, tolerate, process, and transform difficult emotional states rather than responding to them through substance use.

The Acceptance and Commitment Therapy intervention was also implemented in ten 90-minute sessions and was structured around the central ACT processes of acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action. The first session introduced the participants to the treatment framework, established the therapeutic alliance, explained the basic principles of ACT, and presented the psychological flexibility model and its relevance to substance use and recovery. The second session focused on experiential avoidance and helped participants recognize how attempts to escape, suppress, or control unwanted thoughts, emotions, and bodily sensations could contribute to the maintenance of substance use. Acceptance-based exercises were introduced

to increase willingness to experience uncomfortable internal states without engaging in substance use as an avoidance strategy. In the third session, cognitive defusion techniques were taught to help participants distance themselves from craving-related thoughts and other problematic cognitions rather than treating them as literal commands that required behavioral action. The fourth session introduced mindfulness and present-moment awareness exercises, with an emphasis on observing thoughts, emotions, physical sensations, and urges to use substances without judgment or automatic reaction. The fifth session focused on the ACT concept of self-as-context and encouraged participants to develop an observing perspective toward their internal experiences, thereby reducing overidentification with substance-related thoughts, emotions, and self-evaluations. During the sixth session, participants identified personally meaningful values across important life domains and examined the discrepancy between those values and patterns associated with substance use. The seventh session translated identified values into specific goals and value-consistent actions and emphasized strengthening commitment to recovery and enhancing motivation for sustained behavioral change. The eighth session focused specifically on managing craving and substance-use urges through acceptance, mindfulness, urge observation, and cognitive defusion strategies. In the ninth session, participants practiced applying ACT skills to high-risk situations, learned to distinguish a temporary lapse from a full relapse, and developed flexible strategies for responding constructively to setbacks without abandoning recovery-oriented behavior. The final session involved a review and integration of the ACT skills, preparation of an individualized recovery-maintenance plan, reinforcement of commitment to personally important values, anticipation of future barriers, and therapeutic termination. Across sessions, the intervention emphasized increasing psychological flexibility so that participants could make recovery-consistent behavioral choices even in the presence of cravings, distressing emotions, or difficult thoughts.

2.4. Data Analysis

Data were analyzed at both descriptive and inferential levels. At the descriptive level, means and standard deviations were used to describe the study variables. At the

inferential level, Pearson's correlation coefficient and structural equation modeling (path analysis) were used to examine relationships among the variables. SPSS and AMOS version 24 were used for statistical data analysis.

3. Findings and Results

The descriptive findings indicated that, among the 350 participants, 29.56% were men and 43.71% were women. The highest frequency in terms of age was observed in the

46–55-year age group (48.86%), and the mean age of the participants was approximately 44.9 years. Furthermore, the highest educational frequency was observed among participants with a high school diploma or associate degree (40.29%), the largest occupational group consisted of employed participants (54.57%), and the most frequent marital status was married (80.57%). Table 1 presents the descriptive findings for the study variables and their components.

Table 1

Descriptive Statistics for the Study Subscales

Scale/Subscale	Mean	SD	Skewness	Kurtosis	Minimum	Maximum
Tolerance	15.38	3.44	0.66	-0.17	11	26
Absorption	15.48	5.13	0.08	-0.92	7	25
Appraisal	9.49	2.41	-0.16	-0.58	5	15
Regulation	11.63	1.78	-0.13	-0.25	7	15
Total distress tolerance	51.99	9.57	0.16	-0.49	31	76
Nutrition	29.53	11.46	0.98	-0.29	4	56
Exercise	32.77	12.06	0.46	-1.22	12	56
Health responsibility	33.37	12.67	0.47	-1.30	16	56
Stress management	19.99	6.43	-0.30	-1.36	8	30
Interpersonal support	34.49	13.01	0.32	-1.41	14	60
Self-actualization	35.24	12.92	0.22	-1.42	12	58
Total health-promoting lifestyle	185.39	38.15	0.26	-0.67	117	287
Hope	13.00	5.26	0.20	-1.59	5	20
Will	13.35	5.07	0.14	-1.56	4	20
Purpose	13.00	5.24	0.21	-1.60	5	20
Competence	13.37	5.43	0.09	-1.70	5	20
Fidelity	9.96	4.20	1.41	0.91	4	20
Love	11.65	4.96	0.71	-1.00	4	20
Care	11.17	4.79	0.84	-0.74	4	20
Wisdom	11.68	5.08	0.67	-1.15	4	20
Total ego strength	97.18	22.77	0.53	-0.41	51	160
Communication difficulties	10.33	4.00	0.25	-1.54	6	18
Mobility	12.21	3.98	-0.46	-1.10	6	19
Self-care	12.31	3.90	-0.51	-1.09	6	19
Getting along with people	11.24	4.17	-0.29	-1.37	6	19
Life activities	10.19	2.58	-0.01	-1.58	7	14
Participation in society	10.06	2.70	0.08	-1.63	8	14
Functional disability	66.34	6.76	0.34	-0.03	49	87

The descriptive findings presented in the table indicate that most variables had skewness values close to zero, suggesting relatively symmetrical distributions of the data, although some scales, such as fidelity (1.41), demonstrated positive deviation from symmetry. Moreover, the kurtosis values for most variables were negative, indicating distributions that were flatter than the normal distribution. Overall, the dispersion of scores, as reflected by the standard deviations, was relatively high for scales such as health

responsibility and self-actualization, indicating considerable variability in participants' responses in these domains.

In the present study, the maximum likelihood estimation method was used to estimate the path coefficients and model fit indices. Normality of the data is one of the most important assumptions underlying this estimation method. Linearity of relationships and the absence of multicollinearity among predictor variables are also important assumptions. Therefore, to assess the assumption of normality, the

skewness and kurtosis coefficients of the variables were calculated, all of which fell within the ± 2 range. Mardia's multivariate kurtosis coefficient was also 2.72, which was below the critical value of 5 and indicated multivariate normality of the data. To assess multicollinearity, tolerance indices and variance inflation factors (VIFs) were calculated. Tolerance values were greater than .01 and VIF values were

below 5, indicating the absence of problematic multicollinearity among the predictor variables. In addition, the Durbin–Watson statistic was 1.95, indicating independence of errors. Thus, the assumptions required for the application of the maximum likelihood estimation method were satisfied. The model fit indices are presented in Table 2.

Table 2

Model Fit Indices

Fit Index	Obtained Value	Acceptable Criterion
χ^2/df	1.71	< 3
RMSEA (Root Mean Square Error of Approximation)	0.06	< 0.10
CFI (Comparative Fit Index)	0.94	> 0.90
NFI (Normed Fit Index)	0.93	> 0.90
GFI (Goodness-of-Fit Index)	0.94	> 0.90
AGFI (Adjusted Goodness-of-Fit Index)	0.93	> 0.90

The results presented in Table 2 showed that the chi-square to degrees-of-freedom ratio (χ^2/df) was 1.71, which was below the recommended value of 3 and indicated an adequate model fit. The RMSEA value was 0.06, which was below 0.08 and indicated an acceptable estimation error and satisfactory model fit. The comparative fit index (CFI = 0.94), normed fit index (NFI = 0.93), goodness-of-fit index (GFI = 0.94), and adjusted goodness-of-fit index (AGFI = 0.93) were all above the criterion value of 0.90, confirming an adequate fit of the model to the empirical data. Based on

these indices, it can be concluded that the proposed research model was statistically consistent with the collected data and that the hypothesized causal structure for explaining functional disability severity among patients with functional gastrointestinal disorders was supported. Accordingly, the main hypothesis concerning the fit of the causal model of functional disability severity based on the specified variables was supported. Table 3 presents a summary of the direct, indirect, and total effects in the structural model.

Table 3

Summary of Direct, Indirect, and Total Effects in the Structural Model

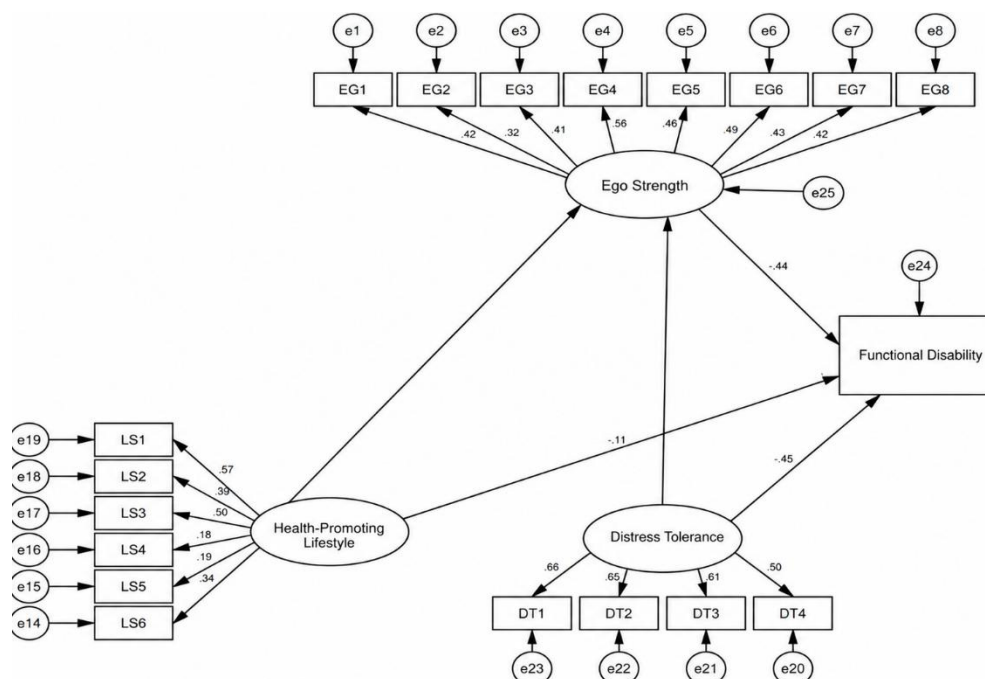
Relationship Path	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)
Health-promoting lifestyle → Functional disability severity	-0.11	-0.32***	-0.43
Distress tolerance → Functional disability severity	-0.45***	-0.17**	-0.62
Ego strength → Functional disability severity	-0.44***	—	-0.44
Health-promoting lifestyle → Ego strength	+0.73***	—	+0.73
Distress tolerance → Ego strength	+0.39***	—	+0.39

The path coefficient results indicated that ego strength ($\beta = -0.44$) and distress tolerance ($\beta = -0.45$) had significant direct effects on functional disability severity, such that higher levels of these variables were associated with lower functional disability severity. Furthermore, the results of the Sobel test indicated that ego strength played a significant

mediating role in the relationships of distress tolerance and health-promoting lifestyle with functional disability severity ($Z = 2.84$, $p < .01$). Figure 1 illustrates the research model and the direct and indirect pathways among the study variables.

Figure 1

Research model and the direct and indirect pathways among the study variables.



4. Discussion and Conclusion

The present study aimed to examine a structural model of functional disability severity based on health-promoting lifestyle and distress tolerance, with the mediating role of ego strength, among patients with functional gastrointestinal disorders. The findings demonstrated that the proposed structural model had an acceptable fit with the empirical data, as indicated by $\chi^2/df = 1.71$, RMSEA = 0.06, CFI = 0.94, NFI = 0.93, GFI = 0.94, and AGFI = 0.93. The path analysis further showed that ego strength had a significant negative direct effect on functional disability severity ($\beta = -0.44$), indicating that higher ego strength was associated with lower levels of functional disability. Distress tolerance also had a significant negative direct effect on functional disability severity ($\beta = -0.45$) and demonstrated the largest total effect on disability ($\beta = -0.62$). Health-promoting lifestyle had a comparatively small direct effect on functional disability ($\beta = -0.11$) but showed a substantial indirect effect through ego strength ($\beta = -0.32$), resulting in a total effect of $\beta = -0.43$. In addition, health-promoting lifestyle strongly and positively predicted ego strength ($\beta = 0.73$), while distress tolerance positively predicted ego strength ($\beta = 0.39$). The Sobel test further confirmed that ego

strength significantly mediated the relationships of health-promoting lifestyle and distress tolerance with functional disability severity. Collectively, these findings support a biopsychosocial conceptualization in which behavioral and psychological resources interact to determine the extent to which gastrointestinal symptoms interfere with patients' daily functioning.

The acceptable fit of the proposed model is consistent with contemporary biopsychosocial perspectives on functional gastrointestinal disorders, according to which functional impairment cannot be adequately explained by biological abnormalities or gastrointestinal symptoms alone. Rather, functional outcomes emerge through reciprocal interactions among physiological vulnerability, psychological processes, coping resources, behavioral patterns, and social experiences (1). Similar perspectives have emphasized that the perception and functional consequences of gastrointestinal symptoms depend on cognitive-emotional interpretation and behavioral responses to bodily sensations (2). The present model extends this approach by showing that patients' lifestyle patterns and their ability to tolerate emotional distress are associated with disability both directly and through a broader personal resource, namely ego strength. This finding is also

compatible with evidence indicating that individuals with functional gastrointestinal disorders experience a broad range of physical vulnerabilities whose consequences extend beyond gastrointestinal symptoms to general physical and psychosocial functioning (3). Thus, the satisfactory fit of the model supports the view that functional disability in these patients represents a multidimensional outcome requiring an integrated rather than exclusively biomedical explanation.

One of the principal findings was the significant negative effect of ego strength on functional disability severity. Patients with higher ego strength experienced less functional disability, suggesting that psychological resources such as hope, will, purpose, competence, fidelity, love, care, and wisdom may facilitate adaptation to chronic and unpredictable physical symptoms. This finding is consistent with research demonstrating that self-competence is an important predictor of successful adaptation to chronic medical conditions (20). Individuals who perceive themselves as competent and psychologically capable may be more likely to interpret illness-related challenges as manageable, persist in daily activities despite discomfort, and mobilize adaptive coping responses. Meta-analytic evidence has similarly demonstrated an inverse relationship between self-efficacy and functional disability across chronic illness populations, indicating that stronger beliefs in personal capability are associated with better functional outcomes (21). Although ego strength is broader than self-efficacy, both constructs reflect an individual's capacity to maintain effective functioning when confronted with stress, uncertainty, and health-related demands.

The negative association between ego strength and disability can also be explained from a self-management perspective. Chronic gastrointestinal disorders often require patients to cope with symptoms that fluctuate over time and may be difficult to predict or fully control. Under such circumstances, patients with stronger internal psychological resources may be better able to maintain behavioral organization, tolerate temporary symptom exacerbations, and avoid interpreting discomfort as evidence of helplessness. Systematic evidence indicates that self-efficacy plays a central role in coping with chronic illness by supporting active coping strategies, behavioral persistence, and effective self-management (22). Similarly, self-efficacy has been shown to mediate the relationship between illness

perceptions and quality of life in chronic functional disorders (23). In gastrointestinal populations specifically, self-efficacy and self-management behaviors have also emerged as mediating mechanisms connecting disease-related factors with health-related quality of life (24). Accordingly, the present finding may indicate that ego strength enables patients to transform illness-related challenges into manageable demands rather than experiences that automatically result in functional restriction.

Another major finding was that distress tolerance had a significant and relatively strong negative direct effect on functional disability severity. Higher distress tolerance was associated with lower disability, and distress tolerance produced the strongest total effect among the predictor variables. This result is consistent with previous findings demonstrating that distress tolerance is positively associated with psychological well-being among individuals with chronic gastrointestinal symptoms (13). Distress tolerance allows individuals to experience unpleasant emotions and bodily sensations without immediately engaging in avoidance, behavioral withdrawal, or excessive attempts to escape discomfort. Patients with functional gastrointestinal disorders frequently encounter abdominal pain, changes in bowel habits, uncertainty regarding symptom occurrence, social embarrassment, and anticipatory anxiety. When such experiences are perceived as intolerable, individuals may increasingly restrict occupational, interpersonal, recreational, or social activities. In contrast, greater distress tolerance may allow continued participation in everyday activities despite temporary discomfort, thereby reducing the functional consequences of the disorder.

This interpretation is also supported by literature emphasizing the role of distress tolerance in chronic disease management. Greater ability to withstand negative affect may facilitate engagement in treatment, adherence to behavioral recommendations, and sustained coping despite the persistence of symptoms (14). Research on chronic pain has similarly demonstrated that distress tolerance and emotion regulation are important in determining patients' responses to persistent physical symptoms and their capacity to maintain functioning (15). Functional disability may therefore be influenced not only by how much discomfort a patient experiences but also by how that discomfort is psychologically processed. When distress is interpreted as

unbearable, symptoms may more readily trigger avoidance and activity restriction; when distress can be tolerated, the same level of symptom burden may result in substantially less disruption to daily functioning. This interpretation is consistent with findings showing that psychological factors can predict functional disability beyond the degree of physical impairment itself (5).

Cognitive appraisal and coping processes may further explain the relationship between distress tolerance and functional disability. Previous research has demonstrated that gastrointestinal distress is associated with characteristic cognitive appraisals and coping styles, indicating that patients' interpretations of symptoms influence their subsequent emotional and behavioral reactions (16). Individuals with low distress tolerance may be particularly prone to evaluating gastrointestinal sensations as threatening, uncontrollable, or disruptive, thereby increasing anxiety and avoidance. Health anxiety and avoidant coping have likewise been associated with functional somatic syndromes, suggesting that fear-based coping may contribute to the persistence of functional impairment (17). Furthermore, distress tolerance has been identified as a mediator between cognitive appraisal and functional disability (18). The present findings extend this body of research by demonstrating that distress tolerance may influence functional disability through more than one pathway: it directly predicts lower disability while simultaneously strengthening ego strength, which in turn contributes to better functioning.

The significant positive path from distress tolerance to ego strength provides an additional explanation for the protective role of distress tolerance. In the present study, distress tolerance positively predicted ego strength ($\beta = 0.39$), and its indirect effect on functional disability through ego strength was significant ($\beta = -0.17$). This finding suggests that repeatedly tolerating difficult emotional and somatic experiences without becoming behaviorally disorganized may help preserve or strengthen an individual's sense of psychological competence and agency. This interpretation is directly compatible with findings reporting meaningful relationships among distress tolerance, ego strength, and functional disability in gastrointestinal patients (25). Individuals capable of tolerating distress may become more confident in their ability to handle symptom episodes,

preserve valued roles, and respond flexibly to illness-related demands. Emotional skills may similarly protect psychological functioning under chronic stress by preventing temporary emotional distress from developing into persistent impairment (19). Consequently, distress tolerance appears to function not merely as a mechanism for enduring unpleasant affect but also as a foundation upon which broader psychological strength may be sustained.

A further important finding concerned the role of health-promoting lifestyle. Although the direct path from health-promoting lifestyle to functional disability was relatively modest ($\beta = -0.11$), its indirect effect through ego strength was substantial ($\beta = -0.32$), and its total effect was negative ($\beta = -0.43$). Moreover, health-promoting lifestyle was the strongest predictor of ego strength in the model ($\beta = 0.73$). These findings suggest that healthy lifestyle behaviors may influence functional outcomes principally by strengthening psychological resources rather than through an exclusively direct behavioral pathway. This result aligns with evidence demonstrating that dimensions of a health-promoting lifestyle are associated with improved functional health (6). Health-promoting behaviors, including regular physical activity, health responsibility, adequate nutrition, stress management, interpersonal relationships, and self-development, can provide individuals with repeated experiences of behavioral control and mastery. In turn, these experiences may enhance their perceived competence, purposefulness, and ability to manage chronic illness.

The strong association between health-promoting lifestyle and ego strength is also consistent with studies linking health behaviors with psychological empowerment. Adults with chronic health conditions who engage more consistently in health-promoting behaviors have been shown to report greater psychological empowerment (7). Health-promoting behaviors may enhance a patient's sense that he or she can take meaningful action despite the presence of chronic symptoms. Similarly, health-promoting behaviors and perceived control have been found to be interconnected among individuals with chronic pain and digestive disorders (9). In the context of the present findings, maintaining healthy behaviors may foster ego strength because patients repeatedly experience themselves as active agents in the management of their health rather than passive recipients of symptoms. This stronger psychological position may then

enable them to remain engaged in daily activities and experience less disability.

The findings concerning lifestyle can also be interpreted in light of evidence showing relationships between psychological distress and lifestyle modification in chronic illness (8). Health-promoting practices may improve functional adaptation by simultaneously reducing physiological vulnerability, facilitating stress regulation, and reinforcing adaptive beliefs about personal capability. Physical activity, in particular, has been associated with subjective well-being and favorable health outcomes in chronic-care populations, and structural equation modeling has demonstrated the possibility of indirect pathways linking health behavior to broader health outcomes (10). The present results similarly indicate that the influence of lifestyle on disability may operate through psychological mechanisms. Consequently, encouraging health-promoting behaviors may be insufficient if patients do not simultaneously develop the psychological resources needed to maintain these behaviors under conditions of pain, fatigue, uncertainty, or emotional distress.

The relatively weak direct effect of health-promoting lifestyle on functional disability also deserves consideration. Functional gastrointestinal disorders are characterized by symptom unpredictability and sensitivity to psychological and social circumstances, meaning that healthy behavior alone may not immediately eliminate functional limitations. Some patients may adhere to dietary recommendations, exercise, or stress-management practices while continuing to experience substantial gastrointestinal symptoms. Moreover, functional limitations themselves may make health-promoting behavior more difficult. Patients may reduce physical activity, avoid social situations, or modify daily routines because of fear of symptom occurrence or embarrassment. Previous findings have shown that social embarrassment associated with functional disability can contribute to lifestyle adjustment and activity restriction (11). Thus, the relationship between lifestyle and disability may be reciprocal and psychologically mediated. Ego strength may determine whether lifestyle changes represent adaptive self-management or become restrictive avoidance.

The broader pattern of findings is also consistent with the proposition that psychological resources modify the impact of health behaviors on chronic illness outcomes (12). The

present structural model suggests that health-promoting lifestyle and distress tolerance should not be regarded as independent protective factors. Rather, both are associated with ego strength, which serves as a common psychological mechanism linking adaptive behavior and emotional regulation with functional outcomes. This integrated interpretation may explain why individuals with seemingly similar gastrointestinal symptom profiles can exhibit markedly different levels of disability. One individual may possess strong distress tolerance, adaptive lifestyle habits, and a robust sense of competence and therefore continue working, maintaining relationships, and participating socially despite symptoms. Another patient with comparable physical symptoms may experience low psychological strength, heightened distress intolerance, avoidance, and lifestyle disruption, resulting in greater disability. Such variability is consistent with biopsychosocial accounts of functional gastrointestinal conditions (1) and with evidence that gastrointestinal disorders may exert substantial family and social consequences extending beyond physical symptoms (4).

Taken together, the findings support an integrated model in which functional disability among patients with functional gastrointestinal disorders is shaped by the interaction of behavioral resources, emotional capacities, and broader ego strength. Distress tolerance appears to represent a particularly influential protective factor because it was associated with functional disability both directly and indirectly, whereas health-promoting lifestyle appears to exert much of its influence through the strengthening of ego resources. The results therefore suggest that functional disability is not simply the inevitable consequence of gastrointestinal symptom severity. Rather, it may be partly determined by whether patients can tolerate distress, maintain adaptive health behaviors, and preserve a coherent sense of competence, agency, purpose, and psychological strength in the face of persistent symptoms.

The findings of the present study should be interpreted in light of several limitations. First, the correlational and cross-sectional nature of the study prevents definitive causal conclusions regarding the proposed directional relationships among health-promoting lifestyle, distress tolerance, ego strength, and functional disability. Although structural equation modeling permits the simultaneous examination of

theoretically specified pathways, it does not by itself establish temporal causality. Second, participants were recruited through convenience sampling from selected gastroenterology and hepatology clinics in Tehran, which may restrict the generalizability of the findings to patients in other geographic regions, cultural contexts, healthcare settings, or individuals with less severe symptoms who do not seek specialized medical care. Third, all principal variables were assessed using self-report questionnaires; consequently, responses may have been influenced by recall bias, social desirability, current mood, or differences in participants' interpretation of questionnaire items. Fourth, different types of functional gastrointestinal disorders were considered within a broad clinical population, although distinct diagnostic subgroups may differ in symptom pattern, illness duration, psychological burden, and functional consequences. Finally, potentially relevant clinical variables, including symptom severity, duration of illness, comorbid psychiatric symptoms, medication use, sleep quality, pain intensity, and socioeconomic factors, were not incorporated into the structural model.

Future studies are recommended to replicate the proposed model using longitudinal designs in order to determine the temporal sequence of changes in lifestyle, distress tolerance, ego strength, and functional disability and to provide stronger evidence regarding mediation processes. Researchers could also employ prospective cohort or intervention designs to examine whether deliberate enhancement of distress tolerance, ego strength, or health-promoting behaviors produces subsequent reductions in functional disability. Replication with larger probability-based samples drawn from different cities, healthcare systems, and cultural groups would improve external validity. It would also be valuable to test the structural model separately across specific diagnostic groups, such as irritable bowel syndrome, functional dyspepsia, functional constipation, and other disorders of gut–brain interaction, and to investigate possible differences according to sex, age, illness duration, and symptom severity. Future models could incorporate additional psychological mechanisms such as illness perception, catastrophizing, experiential avoidance, emotion regulation, health anxiety, resilience, perceived social support, and self-efficacy. Combining self-report data with clinical assessments, objective indicators of physical

activity, physician-rated symptom severity, or ecological momentary assessment could further reduce common-method bias and provide a more comprehensive understanding of functional disability.

The findings suggest that psychological assessment and treatment in patients with functional gastrointestinal disorders should extend beyond symptom severity and include evaluation of distress tolerance, ego strength, and health-promoting lifestyle behaviors. Gastroenterology clinics may benefit from multidisciplinary care models in which physicians, psychologists, nurses, dietitians, and other healthcare professionals collaborate to address both physical symptoms and psychological-functional adaptation. Psychological interventions can incorporate distress-tolerance skills, emotion-regulation strategies, gradual reduction of avoidance, strengthening of personal competence and agency, and development of realistic health-management goals. At the same time, practitioners can encourage sustainable improvements in nutrition, physical activity, stress management, health responsibility, interpersonal engagement, and self-development rather than prescribing rigid lifestyle changes that may be difficult to maintain. Screening patients with particularly low distress tolerance or ego strength may help identify individuals at greater risk for functional impairment and facilitate earlier psychological intervention. Overall, treatment programs that simultaneously strengthen internal psychological resources and practical health behaviors may be better positioned to reduce disability and support continued occupational, interpersonal, and social functioning among patients with functional gastrointestinal disorders.

Authors' Contributions

All authors contributed substantially to the study and to manuscript development, and all approved the final version.

Declaration

The authors declare that artificial intelligence tools were used only to assist with language editing, translation, and improvement of the manuscript's readability. All conceptualization, study design, data collection, data analysis, interpretation of findings, and final approval of the manuscript were performed by the authors. The authors take

full responsibility for the accuracy, integrity, and originality of the content.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

The authors thank the participating centers, clinicians, adolescents, and guardians who made the study possible.

Declaration of Interest

The authors report no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethics Considerations

The study placed a high emphasis on ethical considerations. Informed consent obtained from all participants, ensuring they are fully aware of the nature of the study and their role in it. Confidentiality strictly maintained, with data anonymized to protect individual privacy. The study adhered to the ethical guidelines for research with human subjects as outlined in the Declaration of Helsinki.

References

1. Becker L, Schmidt K, Müller H. A Biopsychosocial Approach to Understanding Functional Gastrointestinal Disorders: Recent Advancements. *Gastroenterology Review*. 2026;41(2):88-104. [DOI]
2. Perry R, Adams T, Jenkins C. Biopsychosocial Models of Symptom Perception in Functional Gastrointestinal Disorders. *Psychosomatic Medicine*. 2022;84(7):812-20. [DOI]
3. Huang Y, Chen Z, Li X. The Spectrum of Physical Vulnerabilities in Functional Gastrointestinal Disorders: A Comprehensive Review. *Gastroenterology Research and Practice*. 2023;2023:987654. [DOI]
4. Timmer A. Gastrointestinal Disorders as Prevalent Non-Communicable Diseases: Family and Social Consequences. *Public Health Reviews*. 2023;44:160555. [DOI]
5. Yao L, Zhang H, Wang Q. Beyond Physical Damage: Predictors of Functional Disability in Chronic Pain Patients. *Pain Medicine*. 2022;23(8):1450-62. [DOI]
6. Kaminski M, Kowalska J, Nowak P. Dimensions of a Health-Promoting Lifestyle and Their Impact on Functional Health. *Preventive Medicine Reports*. 2022;28:101850. [DOI]
7. Asio JMR. Health-Promoting Lifestyle Behaviors and Psychological Empowerment Among Adults with Chronic Conditions. *Health Education Research*. 2024;39(2):145-58. [DOI]
8. Farahani A, Shirazi M, Karimi Y. Psychological Distress and Lifestyle Modifications in Patients with Chronic Illness. *Journal of Health Psychology*. 2023;28(4):512-24. [DOI]
9. Lipman S, Cohen J, Davis M. Health-Promoting Behaviors and Perceived Control in Patients with Chronic Pain and Digestive Disorders. *Annals of Behavioral Medicine*. 2024;58(6):405-16. [DOI]
10. Yu H, Chen X, Wang Y. Physical Activity, Subjective Well-Being, and Health Outcomes in Chronic Care: A Structural Equation Modeling Approach. *Quality of Life Research*. 2026;35(2):345-58. [DOI]
11. Taghiloo S, Moradi A, Hassani F. Lifestyle Adjustments and Social Embarrassment in Functional Disabilities. *Social Science & Medicine*. 2025;310:115200. [DOI]
12. Singh P, Sharma R, Gupta K. Psychological Resources and Health Behaviors: Moderating Effects on Chronic Illness Outcomes. *Behavioral Medicine*. 2023;49(3):210-22. [DOI]
13. Akbari M, Spada MM, Roshanfekr S, Ghasemi F. Distress Tolerance and Psychological Well-Being in Patients with Chronic Gastrointestinal Symptoms. *Journal of Clinical Psychology in Medical Settings*. 2022;29(3):415-24. [DOI]
14. Mohammadi S, Zare H, Ahmadi M. The Role of Distress Tolerance in the Treatment Process of Chronic Diseases. *Iranian Journal of Health Psychology*. 2022;5(1):34-45.
15. McDonald S, Young A, Lancaster J. Emotion Regulation and Distress Tolerance in the Management of Chronic Pain. *Pain Management Nursing*. 2022;23(1):54-61. [DOI]
16. Tang Y, Teh C, Lee K. Cognitive Appraisals and Coping Styles in Gastrointestinal Distress: A Cross-Sectional Study. *Digestive Diseases and Sciences*. 2023;68(5):1845-55. [DOI]
17. Tarar MA, Khan S, Ali Z. Health Anxiety and Avoidant Coping in Functional Somatic Syndromes. *Journal of Psychosomatic Research*. 2023;165:111142. [DOI]
18. Rafiepour A, Moradi B, Zare M. The Mediating Role of Distress Tolerance in the Relationship Between Cognitive Appraisal and Functional Disability. *Iranian Journal of Psychiatry and Behavioral Sciences*. 2025;19(1):e135402.
19. Wilcox G. Emotional Skills and Mental Health Preservation in Chronic Stress. *Journal of Affective Disorders*. 2023;320:112-20. [DOI]
20. Razzaghpour M, Ghasemi N, Shafiei Z. Self-Competence as a Predictor of Successful Coping in Chronic Medical Conditions. *Journal of Psychosomatic Research*. 2025;170:111300. [DOI]
21. Živković M, Petrović J, Ilić N. Self-Efficacy and Functional Disability in Chronic Illness: A Meta-Analysis. *Health Psychology Review*. 2023;17(4):512-30. [DOI]
22. Amayreh A, Al-Qudah A, Bani-Issa W. Self-Efficacy and Coping Strategies in Managing Chronic Illness: A Systematic Review. *Journal of Health Psychology*. 2025;30(1):112-28. [DOI]
23. Baidhoui M, Sghaier A, Lamine S. The Role of Self-Efficacy in Mediating the Relationship Between Illness Perception and Quality of Life in Chronic Functional Disorders. *Psychology, Health & Medicine*. 2024;29(4):670-82. [DOI]
24. Zhu L, Zhang Y, Liu H. Self-Efficacy and Self-Management Behaviors as Mediators Between Disease Activity and Health-Related Quality of Life in GI Disorders. *Gastroenterology Nursing*. 2025;48(1):45-54. [DOI]
25. Volaric M, Kovac P, Horvat L. Distress Tolerance and Ego Strength in Functional Disability of Gastrointestinal Patients. *Digestive Diseases and Sciences*. 2026;71(3):890-902. [DOI]