



The Mediating Role of Generalized Anxiety Disorder (GAD) Symptoms in the Relationship between Stressful Life Events, Childhood Maltreatment, and Gastrointestinal Symptoms

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ABSTRACT

Psychosomatic disorders, particularly gastrointestinal complaints, are a major health concern among university students, as they can impair physical health, academic performance, psychological well-being, and social functioning. This study examined the mediating role of generalized anxiety disorder (GAD) symptoms in the relationship between stressful life events, childhood maltreatment, and gastrointestinal symptoms. This descriptive correlational study was conducted among undergraduate and graduate students of Islamic Azad University, Neyshabur Branch, during the 2024–2025 academic year. A total of 300 students were selected through convenience sampling. Data were collected using the Child Abuse Self-Report Scale, the GAD-7, the Stressful Life Events Screening Questionnaire, and the Gastrointestinal Symptom Rating Scale. Data were analyzed in SPSS 26 and AMOS using descriptive statistics, Pearson correlations, and structural equation modeling. The results showed significant associations among GAD symptoms, stressful life events, childhood maltreatment, and gastrointestinal symptoms. The structural model showed acceptable fit. Stressful life events positively predicted GAD symptoms ($\beta = 0.28$, $p < 0.001$) and gastrointestinal symptoms ($\beta = 0.24$, $p < 0.01$). Childhood maltreatment also positively predicted GAD symptoms ($\beta = 0.36$, $p < 0.001$) and gastrointestinal symptoms ($\beta = 0.37$, $p < 0.01$). GAD symptoms partially mediated these relationships.

Keywords: *childhood maltreatment; stressful life events; generalized anxiety disorder symptoms; gastrointestinal symptoms*

1. Introduction

Psychosomatic disorders among university students constitute a significant risk factor because of their multidimensional effects on physical, psychological, academic, and social aspects of student life. These disorders, characterized by physical symptoms arising from psychological stress, include a wide range of manifestations such as headaches, gastrointestinal disturbances, fatigue,

and chronic pain. The demanding nature of university life, including academic pressure, social adjustment, financial concerns, and the transition to independence, may intensify the emergence and severity of psychosomatic symptoms in students. The accumulation of stressors and challenges inherent in the university experience can create fertile ground for the development and persistence of psychosomatic disorders. Moreover, students' reluctance or inability to seek timely and appropriate help may further

intensify this cycle. Without intervention, these disorders may become chronic health problems that significantly reduce quality of life and increase healthcare use. Addressing psychosomatic disorders as a risk factor and implementing comprehensive mental health initiatives may therefore improve students' overall well-being and academic success (1-3). Understanding psychosomatic disorders requires recognition of the complex interaction between psychological and physiological factors. Stress, trauma, unresolved emotional conflicts, and maladaptive coping mechanisms commonly contribute to the development of these disorders. In addition, genetic predispositions, personality characteristics, and environmental factors may contribute to their onset and persistence. One of the most common psychosomatic complaints involves gastrointestinal problems and symptoms (4). Accordingly, the present study focused on gastrointestinal symptoms and some potentially related factors, including childhood maltreatment, stressful life events, and generalized anxiety disorder symptoms. Mental health in university students is a complex and multidimensional issue that requires serious attention to psychosomatic complaints. Among these, gastrointestinal symptoms are among the most common. Research suggests that many young adults experience at least one gastrointestinal symptom, including abdominal pain, reflux, diarrhea, constipation, and indigestion (5). Previous studies have examined associations between gastrointestinal symptoms and psychological problems, including post-traumatic stress disorder, autism spectrum disorders, depression, and anxiety (6). One important factor associated with gastrointestinal symptoms is childhood maltreatment. Adverse childhood experiences, especially different forms of maltreatment, may have profound effects on both psychological and physical health in adulthood. Childhood maltreatment includes abuse and neglect occurring before the age of 18 and may involve physical, emotional, psychological, and sexual abuse. Such adverse experiences can have serious consequences for children's health, development, and self-confidence. Recent studies suggest that childhood maltreatment is associated with multiple psychological problems in adulthood. In addition to its psychological effects, childhood maltreatment may also affect physical health, especially gastrointestinal

functioning. These findings indicate a complex relationship between adverse childhood experiences and later mental and physical health (7-9). Another important factor linked to gastrointestinal symptoms is the experience of stressful life events. Such events are often unpredictable and beyond the individual's control and may include job loss, serious illness, or financial problems. These events can lead to major life changes and affect both mental and physical health. Recent studies have shown associations between stressful life events and symptoms such as insomnia, depression, and suicidal ideation in students, as well as broader psychological vulnerability. Research has also shown that stressful life events may influence the association between symptom severity and health-related quality of life in patients with irritable bowel syndrome (10, 11). Recent work has increasingly emphasized the importance of mediating factors in understanding psychological disorders, especially anxiety disorders, which impose a substantial burden on public health. One such factor is generalized anxiety disorder, characterized by excessive worry and accompanying somatic symptoms (12). Anxiety has a close relationship with functional gastrointestinal disorders. Individuals who struggle with stress and anxiety often face difficulties adapting to stressful conditions, resulting in psychological distress and heightened arousal. Failure in emotion regulation and cognitive processing may intensify emotional disturbance in response to stressors. Emotional arousal is often accompanied by physiological and somatic symptoms, and difficulties in accurately identifying emotions may lead individuals to focus excessively on bodily sensations and amplify them. Such processes may intensify physical symptoms and interfere with treatment. Studies have shown associations between stressful experiences and GAD symptoms, as well as between anxiety and gastrointestinal symptom severity (13, 14). Given the above and the limited domestic research in this area, the present study sought to answer the following question: Do generalized anxiety disorder symptoms mediate the relationship of childhood maltreatment and stressful life events with gastrointestinal symptoms?

2. Methods and Materials

2.1. Study Design and Participants

This study was basic in purpose and descriptive-correlational in method. The statistical population consisted of all students of Islamic Azad University, Neyshabur Branch (N = 4,878), enrolled during the **2024–2025** academic year. Based on recommendations for structural modeling, a minimum sample size of 100 and preferably 200 is suggested, and at least 15 cases are recommended per predicted variable or indicator. Therefore, the study sample comprised 300 students selected through non-random convenience sampling. Questionnaires were distributed among students in classes whose members were willing to participate. The inclusion criteria were being a student of Islamic Azad University, Neyshabur Branch, and willingness to participate. The exclusion criterion was incomplete questionnaire responses. Ethical considerations included obtaining informed consent, emphasizing confidentiality, and avoiding harm to participants.

2.2. Measures

2.2.1. Generalized Anxiety Disorder Scale (GAD-7)

The short Generalized Anxiety Disorder Scale is a 7-item instrument designed by Spitzer et al. (2006) to assess the severity of generalized anxiety symptoms. Items are scored on a 4-point scale from 0 (“not at all”) to 3 (“nearly every day”), yielding a total score ranging from 0 to 21. Spitzer et al. (2006) reported excellent internal consistency (Cronbach’s $\alpha = 0.92$) and test-retest reliability (0.83), as well as good construct, criterion, factorial, and face validity.

2.2.2. Child Abuse Self-Report Scale

The Child Abuse Self-Report Scale was developed by Mohammadkhani et al. (2003) to assess child abuse and children’s perceptions of abuse perpetrated by family members and surrounding adults during childhood. The instrument originally included 54 items; after factor analysis, 38 items with the strongest correlations with the measured constructs were retained. The questionnaire includes four subscales: neglect, sexual abuse, physical abuse, and emotional abuse. Items are scored on a Likert

scale from 0 (“never”) to 3 (“always”), with several reverse-scored items. Reported reliability coefficients for the total score and subscales range from 0.82 to 0.95.

2.2.3. Stressful Life Events Screening Questionnaire

This questionnaire is designed to assess stressful life experiences and was originally developed by Goodman et al. (1998) and later revised by Green et al. (2006) (15, 16). It includes 13 items answered in a dichotomous yes/no format. Reported psychometric findings indicate acceptable reliability and convergent validity.

2.2.4. Gastrointestinal Symptom Rating Scale

The Gastrointestinal Symptom Rating Scale is a symptom assessment tool developed based on gastrointestinal complaints and clinical experience (5). The questionnaire contains 15 items rated on a 7-point Likert scale from no discomfort (0) to severe discomfort (7). It includes five subscales: abdominal pain, reflux, diarrhea, constipation, and indigestion. The total score is calculated from the sum of the mean scores of each subscale, with higher scores indicating greater symptom severity.

2.3. Procedure

To conduct the study in 2024, after obtaining permission from the Graduate Studies Office of Islamic Azad University, Neyshabur, and receiving an official introduction letter, the questionnaires were administered to participants. After complete explanations regarding how to complete each questionnaire, students who expressed willingness were asked to respond carefully and patiently. To preserve confidentiality, participants were informed that there was no need to provide personal identifying information and that their responses would remain completely confidential. After collecting the questionnaires, the data were analyzed statistically. This study was approved by the Ethics Committee of Islamic Azad University, Neyshabur Branch, under ethics code IR.IAU.NEYSHABUR.REC.1404.056.

2.4. Data Analysis

Data were analyzed using SPSS version 26 and AMOS. Descriptive statistics included frequency, mean, and

standard deviation. Inferential analyses included Pearson correlation coefficients and structural equation modeling.

3. Findings and Results

Table 1 presents the descriptive statistics for the categorical demographic characteristics of the sample.

Table 1

Descriptive statistics of categorical demographic characteristics in the research sample

Variable	Category	Frequency	Percent
Gender	Male	111	36.6
	Female	192	63.4
Marital status	Single	239	78.9
	Married	57	18.9
	Divorced	7	2.3
Religion	Shi'a	291	96.0
	Non-Shi'a	12	4.0
University	Azad	301	99.3
	State/non-Azad	2	0.7
Faculty	Humanities	193	63.7
	Basic Sciences	51	16.8
	Engineering	59	19.5
Degree level	Associate	17	5.6
	Bachelor's	224	73.9
	Master's	58	19.1
	PhD	4	1.3
Economic status	Low (very weak)	14	4.6
	Lower-middle (weak)	36	11.9
	Middle	167	55.1
	Upper-middle (relatively good)	78	25.7
	High (very good)	8	2.6
Living arrangement	With original family	267	88.1
	Dormitory	19	5.3
	Rented with friends	6	2.0
	Rented alone	11	3.6

According to the reported data, the majority of participants were female (63.4%), single (78.9%), Shi'a (96.0%), and students of Islamic Azad University (99.3%). Most were studying in the humanities faculty (63.7%) and at the bachelor's level (73.9%). The sample age range was 19 to 44 years, with a mean age of 23.33 years (SD = 5.63).

Using SmartPLS 4, the psychometric properties of the study measures were assessed in terms of reliability (Cronbach's alpha, rho_A, and composite reliability), construct validity using average variance extracted (AVE), and discriminant validity using the Fornell-Larcker criterion.

Table 2

Summary of reliability and validity indices of the research instruments

Construct	Cronbach's alpha	rho_A	Composite reliability	AVE
Generalized anxiety	0.89	0.89	0.95	0.90
Gastrointestinal problems	0.80	0.81	0.88	0.71
Trauma (childhood maltreatment)	0.84	0.88	0.89	0.68
Stressful life events	0.65	0.67	0.81	0.59

Except for stressful life events, all measures demonstrated good and acceptable reliability across the reported indices. Although Cronbach's alpha and rho_A for

stressful life events were slightly below 0.70, its composite reliability was acceptable, supporting its use for research purposes. All AVE values exceeded 0.50, indicating

acceptable construct validity. Discriminant validity based on the Fornell-Larcker criterion was also supported.

To ensure the absence of multivariate outliers, Mahalanobis distance was computed and multivariate

outliers were removed (7 cases)(2%). Skewness and kurtosis indices were examined to test normality, and variance inflation factor (VIF) values were computed to assess multicollinearity.

Table 3

Results of normality and multicollinearity tests for the study variables

Variable	Skewness (critical ratio)	Kurtosis (critical ratio)	VIF
Childhood maltreatment	0.64 (4.56)	0.02 (0.06)	1.34
Generalized anxiety	0.39 (2.81)	-0.40 (-1.42)	1.19
Stressful life events	0.94 (6.69)	0.25 (0.89)	1.43
Gastrointestinal problems	1.26 (9.02)	1.01 (3.63)	—

Some variables showed relatively high skewness, particularly gastrointestinal problems. Therefore, the gastrointestinal score was transformed using the formula recommended by Tabachnick and Fidell, and stressful life events scores were also transformed. After transformation,

skewness values fell within acceptable normality ranges. All VIF values were below 4, indicating no problematic multicollinearity. Before testing the full structural model, bivariate relationships among the variables were examined using Pearson correlation coefficients.

Table 4

Descriptive statistics and correlation matrix for stressful life events, childhood maltreatment, generalized anxiety, and gastrointestinal symptoms

Variable	Mean (SD)	1	2	3	4
1. Trauma (childhood maltreatment)	1.16 (0.39)	1.00			
2. Generalized anxiety	1.29 (0.72)	0.49***	1.00		
3. Stressful life events	2.81 (2.58)	0.57***	0.43***	1.00	
4. Gastrointestinal problems	0.96 (0.93)	0.57***	0.46***	0.48***	1.00

***p < 0.001

As shown in Table 4, childhood maltreatment was positively and significantly associated with generalized anxiety ($r = 0.49, p < 0.001$), stressful life events ($r = 0.57, p < 0.001$), and gastrointestinal problems ($r = 0.57, p < 0.001$). Stressful life events were also positively and significantly associated with generalized anxiety ($r = 0.43, p < 0.001$) and gastrointestinal problems ($r = 0.48, p < 0.001$). Generalized anxiety was positively and significantly associated with gastrointestinal problems ($r = 0.46, p < 0.001$).

Path analysis was used to test the study hypothesis. Because of the need for a robust method to evaluate

indirect effects and the observed skewness in some variables, bias-corrected bootstrap confidence intervals at the 95% level were computed with 10,000 resamples using maximum likelihood estimation in AMOS. The results showed that stressful life events had significant positive effects on generalized anxiety ($\beta = 0.28, p < 0.001$) and gastrointestinal problems ($\beta = 0.24, p < 0.01$). Childhood maltreatment also had significant positive effects on generalized anxiety ($\beta = 0.36, p < 0.001$) and gastrointestinal problems ($\beta = 0.37, p < 0.01$). The model explained 36% of the variance in generalized anxiety and 51% of the variance in gastrointestinal problems.

Table 5

Bootstrap results (95% confidence interval) for the effects in the conceptual model

Path	β	SE	95% CI	p
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Childhood maltreatment → Anxiety	0.16	0.06	0.05, 0.28	0.006
Stressful life events → Anxiety	0.29	0.056	0.17, 0.39	<0.001
Anxiety → Gastrointestinal problems	0.27	0.052	0.17, 0.37	<0.001
Childhood maltreatment → Gastrointestinal problems	0.17	0.056	0.06, 0.28	0.002
Stressful life events → Gastrointestinal problems	0.26	0.055	0.15, 0.37	<0.001

All paths in the conceptual model were statistically significant.

Table 6

Direct, indirect, and total effects among childhood maltreatment, stressful life events, generalized anxiety, and gastrointestinal problems

Effect	Direct effect β	SE	95% CI	p	Indirect effect β	SE	95% CI	p	Total effect β	SE	95% CI	p
Stressful life events → Anxiety	0.29	0.056	0.17, 0.39	<0.001	—	—	—	—	0.29	0.056	0.17, 0.39	<0.001
Stressful life events → Gastrointestinal problems	0.26	0.055	0.15, 0.37	<0.001	0.09	0.020	0.04, 0.13	0.001	0.33	0.055	0.23, 0.44	<0.001
Childhood maltreatment → Anxiety	0.16	0.060	0.05, 0.28	0.006	—	—	—	—	0.16	0.060	0.05, 0.28	0.006
Childhood maltreatment → Gastrointestinal problems	0.17	0.056	0.06, 0.28	0.002	0.05	0.023	0.01, 0.06	0.004	0.22	0.058	0.10, 0.33	<0.001
Anxiety → Gastrointestinal problems	0.27	0.052	0.17, 0.37	<0.001	—	—	—	—	0.27	0.052	0.17, 0.37	<0.001

These findings indicate that generalized anxiety partially mediated the effect of childhood maltreatment on gastrointestinal problems and also partially mediated the effect of stressful life events on gastrointestinal problems.

4. Discussion

The present study aimed to examine the mediating role of generalized anxiety disorder symptoms in the relationship of stressful life events and childhood maltreatment with gastrointestinal symptoms among students. The findings showed that all direct paths among the variables were significant and that generalized anxiety symptoms significantly mediated the associations of stressful life events and childhood maltreatment with gastrointestinal symptoms. These findings are consistent with previous studies (9, 11, 13). The findings showed that stressful life events had a positive and significant relationship with generalized anxiety symptoms, such that greater exposure to these events was associated with a higher likelihood of GAD symptoms. This result is consistent with prior literature and can be understood from a cognitive perspective: anxious individuals may tend to interpret events catastrophically, overestimate threat, and show low tolerance for uncertainty.

The results also showed that childhood maltreatment had a significant relationship with generalized anxiety symptoms. This finding can be explained through psycho-

biological perspectives emphasizing the impact of early traumatic experiences on nervous system sensitivity and stress responses, as well as psychological perspectives suggesting that early maltreatment may alter beliefs, activate negative emotional schemas, and increase chronic worry (7, 9). Another finding of the study was that generalized anxiety symptoms had a positive and significant relationship with gastrointestinal symptoms. This is consistent with several studies supporting the role of anxiety and stress in intensifying functional gastrointestinal disorders, especially irritable bowel syndrome (4, 13, 14, 17-19). According to the biopsychosocial model and the brain-gut axis framework, chronic anxiety may lead to changes in bowel motility, increased visceral sensitivity, and altered gastrointestinal secretions through ongoing activation of the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis.

5. Conclusion

Overall, the findings indicate that generalized anxiety symptoms play an important mediating role in the association of stressful life events and childhood maltreatment with gastrointestinal symptoms. These results highlight the importance of simultaneously considering early adverse experiences and anxiety symptoms in explaining and treating gastrointestinal problems, and they support the study hypothesis. The present study had several

limitations, including its cross-sectional design, the use of convenience sampling, reliance on self-report measures, and its correlational nature. Future studies are therefore recommended to use longitudinal designs, random sampling, and multi-source methods. From an applied perspective, early screening for anxiety, integrated interventions focused on anxiety and early trauma, and training in coping and resilience skills in university settings may play important roles in improving students' mental and physical health.

Authors' Contributions

The first author was responsible for conceptualization, literature review, study design, data collection, statistical analysis, and preparation of the initial draft. The second author supervised the research process throughout the study and conducted the final review of the manuscript.

Declaration

The authors declare that no artificial intelligence (AI) tools were used in the conceptualization of the study, methodology, data collection, data analysis, interpretation of results, or generation of scientific content. Any language polishing, if applied, did not affect the intellectual content of the manuscript. The authors take full responsibility for the final text.

Transparency Statement

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

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

This study was conducted fully in accordance with the ethical principles of human psychological research. The study received ethical approval from the Ethics Committee of Islamic Azad University, Neyshabur Branch, with code IR.IAU.NEYSHABUR.REC.1404.056. This article was derived from the first author's MA thesis in Clinical Psychology at the Faculty of Humanities, Islamic Azad University, Neyshabur Branch. To ensure adherence to ethical principles, data collection was conducted only after obtaining participants' consent. Participants were informed about confidentiality, the aims of the study, and their right to withdraw from participation at any stage.

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