

Associations Between Confucian Coping and Psychological Symptoms in Chinese Patients with Crohn's Disease: A Sequential Explanatory Mixed-Methods Study

zhen wang

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Zhinian Shen

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Bowen Xue

Affiliated Mental Health Center & Hangzhou Seventh People's Hospital, Zhejiang University School of Medicine

Meihao Wei

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Linyan Yao

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Jinghan Liu

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Jinli Bu

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Xiao Han

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

Hong Luo

Affiliated Mental Health Center & Hangzhou Seventh People's Hospital, Zhejiang University School of Medicine

Yiyu Zhuang

zhuangyy@rrsh.com

Sir Run Run Shaw Hospital, Zhejiang University School of Medicine

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Abstract

Aim

To examine the associations between Confucian coping dimensions and psychological symptoms among Chinese patients with Crohn's disease (CD) and to explore how culturally embedded coping strategies shape patients' experiences of living with a chronic inflammatory condition.

Design

A sequential explanatory mixed-methods study was conducted.

Methods

The quantitative phase included 141 patients with CD recruited from a tertiary hospital in Zhejiang Province, China. Participants completed the Confucian Coping Scale (CCS), Patient Health Questionnaire-9 (PHQ-9), and Generalized Anxiety Disorder-7 (GAD-7). Associations between Confucian coping dimensions and psychological symptoms were examined using correlation and exploratory regression analyses. The qualitative phase involved semi-structured interviews with nine patients, and data were analysed using thematic analysis to provide contextual interpretation of quantitative findings.

Results

Responsibility-oriented coping was negatively associated with depressive symptoms and anxiety symptoms, while resilience-oriented coping was negatively associated with anxiety symptoms. Exploratory item-level analyses further identified specific associations between individual Confucian coping beliefs and psychological symptoms. Qualitative findings showed that Confucian values shaped patients' illness perceptions, emotional regulation, family roles, treatment decisions, and responses to stigma. Responsibility, acceptance, and perseverance could provide meaning and motivation; however, expectations related to endurance and fulfilling family obligations could also generate psychological burdens.

Conclusion

Confucian coping represents a multidimensional construct with both adaptive and potentially burdensome aspects among Chinese patients with CD. Integrating quantitative and qualitative findings suggests that culturally shaped coping strategies may influence psychological experiences through pathways involving personal meaning, family relationships, and illness-related stigma.

1. Introduction

Inflammatory bowel disease (IBD), including Crohn's disease (CD), is a chronic immune-mediated gastrointestinal disorder characterized by recurrent inflammation, unpredictable disease trajectories, and substantial effects on patients' physical, psychological, and social functioning^[1]. Although advances in pharmacological therapies have

improved disease control, many patients continue to experience persistent symptoms, uncertainty regarding disease progression, impaired quality of life, and psychosocial challenges throughout the illness trajectory [2, 3].

Psychological distress is increasingly recognized as an important component of comprehensive CD management. Previous studies have demonstrated that anxiety and depressive symptoms are common among patients with IBD and are associated with poorer quality of life, increased symptom burden, and complex interactions with disease outcomes [4, 5]. The bidirectional relationship between psychological processes and gastrointestinal inflammation further highlights the importance of addressing psychosocial factors within multidisciplinary IBD care [6, 7]. However, psychological assessment and supportive interventions in clinical practice often focus primarily on symptom reduction, while culturally shaped psychological resources and coping mechanisms remain insufficiently explored.

Coping strategies represent important psychological processes through which individuals interpret and manage stressful life events. According to transactional theories of stress and coping, coping responses are influenced by individual characteristics, social environments, and cultural contexts [8, 9]. Existing research has mainly examined general coping patterns among patients with chronic illnesses, while culturally specific coping frameworks have received comparatively limited attention.

In Chinese cultural contexts, Confucian values have historically influenced perceptions of responsibility, self-regulation, interpersonal relationships, and responses to adversity. Confucian coping refers to culturally embedded coping strategies associated with concepts such as acceptance of destiny, responsibility toward family, and resilience in hardship [10]. Previous studies suggest that Confucian values may influence health-related behaviours, illness interpretations, and psychological adaptation through culturally meaningful pathways [11].

Importantly, Confucian coping should not be considered uniformly beneficial or harmful. Values such as perseverance, acceptance, and responsibility may provide individuals with meaning, emotional stability, and motivation when confronting chronic illness. Conversely, strong expectations regarding endurance, family obligation, and emotional restraint may also contribute to psychological burden when individuals experience difficulties fulfilling culturally valued roles [12, 56]. Therefore, examining specific dimensions of Confucian coping may provide a more nuanced understanding of its relationship with psychological outcomes.

Illness stigma represents another important psychosocial factor affecting individuals living with chronic gastrointestinal diseases. Patients with CD may experience stigma related to unpredictable symptoms, bowel urgency, dietary restrictions, and concerns regarding social acceptance [14, 15]. In culturally influenced societies, stigma experiences may be further shaped by expectations regarding dignity, self-control, and maintaining interpersonal harmony. Recent studies have emphasized the importance of understanding cultural contexts when addressing barriers to care and psychosocial challenges among patients with gastrointestinal disorders [16].

Although previous research has examined psychological distress, coping strategies, and stigma among patients with IBD, limited attention has been paid to culturally specific coping patterns such as Confucian coping. Furthermore, quantitative approaches alone may not fully capture how patients interpret cultural beliefs and incorporate them into everyday illness management. Mixed-methods research provides an opportunity to integrate statistical associations with patients' lived experiences, thereby offering a more comprehensive understanding of culturally embedded coping processes.

Therefore, this study aimed to investigate the associations between Confucian coping dimensions and psychological symptoms among Chinese patients with Crohn's disease and to explore patients' lived experiences of culturally

influenced coping strategies. Specifically, this study addressed three research questions:

- (1) Are specific dimensions of Confucian coping associated with depressive and anxiety symptoms among patients with Crohn's disease?
- (2) How do patients with Crohn's disease describe the role of culturally embedded coping strategies in managing illness-related challenges?
- (3) How do qualitative findings help explain and contextualize quantitative associations between Confucian coping and psychological symptoms?

2. Methods

2.1 Study Design

A sequential explanatory mixed-methods design was employed, consisting of two consecutive phases: a quantitative cross-sectional survey followed by qualitative semi-structured interviews. The quantitative phase aimed to examine associations between Confucian coping dimensions and psychological symptoms among patients with Crohn's disease. The subsequent qualitative phase was conducted to explore patients' lived experiences of culturally influenced coping strategies and to provide contextual interpretation of quantitative findings.

The study was reported according to the Mixed Methods Appraisal Tool (MMAT) and relevant recommendations for mixed-methods research reporting. Integration occurred at the interpretation stage, where qualitative themes were used to explain, contextualize, and expand upon quantitative findings.

2.2 Setting and participants

This study was conducted at Sir Run Run Shaw Hospital, Zhejiang University School of Medicine, a tertiary academic hospital in Zhejiang Province, China. Patients with Crohn's disease receiving outpatient or inpatient care were recruited between April and May 2025.

Participants were eligible if they met the following criteria: (1) diagnosis of Crohn's disease confirmed according to established clinical, endoscopic, radiological, and histological criteria; (2) age ≥ 18 years; (3) ability to understand and complete the questionnaires; and (4) willingness to participate and provide informed consent.

Patients were excluded if they had severe cognitive impairment, communication difficulties, or other conditions that prevented completion of psychological assessments or participation in interviews.

2.3 Sample size consideration

The sample size was determined based on the available clinical population during the recruitment period and the exploratory nature of the study. As this study aimed to identify preliminary associations between culturally specific coping dimensions and psychological symptoms rather than establish causal relationships, the available sample was considered appropriate for exploratory analyses. Future multicentre studies with larger samples are required to validate the observed associations.

2.4 Quantitative measures and Qualitative interviews

Phase I - Quantitative study with questionnaires

Confucian coping was assessed using the Confucian Coping Scale (CCS), developed to evaluate culturally embedded coping patterns among Chinese individuals ^[10]. The scale consists of three dimensions: Destiny, Responsibility, and Resilience. In the present study, the adopted version included 12 items, with four items representing each dimension. Each item was rated on a five-point Likert scale, resulting in a score range of 4–20 for each subscale, with higher scores indicating stronger endorsement of the corresponding coping dimension.

Several items were negatively worded and were reverse-scored before calculating subscale scores. Specifically, Resilience items 1, 2, and 3 were reverse-scored according to the scoring instructions.

Depressive symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9), a nine-item self-report instrument widely used to evaluate depressive symptoms in clinical populations. Each item is rated from 0 (“not at all”) to 3 (“nearly every day”), with higher total scores indicating greater depressive symptom severity ^[17].

Anxiety symptoms were assessed using the Generalized Anxiety Disorder-7 (GAD-7), a seven-item self-report questionnaire measuring the severity of anxiety symptoms over the previous two weeks. Items are scored from 0 to 3, with higher scores representing greater anxiety symptom severity ^[18].

Demographic and clinical data (e.g., gender, age, education, disease duration, employment) were collected via a structured questionnaire. Surveys were administered in-person or online via a secure platform.

Phase II - Qualitative study with semi-structured interview

Following completion of the quantitative survey, participants were purposively selected for semi-structured interviews to explore culturally influenced coping experiences in greater depth. A purposive sampling strategy was adopted to achieve variation in demographic characteristics, disease experiences, and psychological symptom profiles.

Nine patients with Crohn’s disease participated in qualitative interviews. Interviews were conducted face-to-face by trained researchers using a semi-structured interview guide developed based on the quantitative findings and relevant literature.

The interview questions explored participants’ perceptions of illness, coping strategies, family responsibilities, cultural beliefs, emotional experiences, and challenges associated with living with Crohn’s disease.

Each interview lasted approximately 30–60 minutes and was audio-recorded with participants’ permission. Interviews continued until data saturation was achieved, defined as the point at which no substantially new concepts or themes emerged from additional interviews.

3. Data Analysis

Quantitative data were analyzed using R software (version 4.3.1). Descriptive statistics summarized participant characteristics. Continuous variables are presented as mean $\pm$ standard deviation or median with interquartile range, and categorical variables as frequencies and percentages.

The relationships between Confucian coping beliefs and mental health outcomes were examined in several steps. First, bivariate correlations were calculated. Subsequently, multiple linear regression analyses were conducted to identify specific predictors while controlling for covariance among belief items. Two modeling approaches were employed: a full model incorporating all 12 individual CCS items as predictors, and an AIC-based stepwise regression

model to derive a parsimonious set of predictors. Because the CCS dimensions (Destiny, Responsibility, and Resilience) were theoretically pre-specified whereas the relative salience of individual items in relation to mental health outcomes had not been previously established in patients with Crohn's disease, item-level analyses were considered exploratory but theory-informed. Model assumptions (linearity, homoscedasticity, normality of residuals, absence of multicollinearity and influential outliers) were rigorously checked using variance inflation factors (VIF), residual plots, Q-Q plots, and Cook's distance. The Breusch-Pagan test was used to assess heteroscedasticity.

Qualitative data were analyzed thematically following Braun and Clarke's framework, with two researchers independently coding transcripts and developing themes through iterative discussion, supported by NVivo software (version 14). Inter-rater reliability: Twenty percent of interview transcripts underwent blind coding by two independent researchers, randomly selected. Inter-coder agreement was assessed using Cohen's Kappa coefficient (Kappa = 0.86), demonstrating exceptional consistency. Discrepancies were meticulously reconciled through group discussion until full consensus was achieved. The research team included a cultural psychology expert specializing in Confucian studies, who provided crucial guidance for interpreting culturally specific expressions and beliefs, thereby minimizing interpretive bias. Regular team meetings were documented to actively reflect on potential subjective influences, such as personal cultural backgrounds, during thematic analysis. Adhering to Braun and Clarke's six-phase framework, the analysis proceeded as follows: (1) Familiarization: All coders independently read transcripts twice and took memos on initial observations; (2) Open coding: Each coder independently generated initial codes (87 total), with codebooks shared and standardized after weekly team meetings; (3) Axial coding: Coders collaboratively clustered initial codes into 12 sub-themes, resolving disagreements via discussion guided by the supervisor (no unresolved discrepancies remained after consensus); (4) Selective coding: Sub-themes were integrated into 4 core themes aligned with research questions; (5) Thematic saturation: Assessed via sequential analysis—no new themes emerged after the 7th interview, with the final 2 interviews confirming saturation (no additional codes or sub-themes identified); (6) Validation: Themes were member-checked with 3 participants to ensure alignment with their lived experiences.

All coding procedures and theme development were systematically managed using NVivo software (version 14), ensuring rigorous data organization.

4. Results

4.1 Quantitative Findings

4.1.1 Demographic and Clinical Characteristics of Participants

The study included 141 patients with Crohn's disease. The sample was predominantly male (80.1%), well-educated (88.6% having high school or above), and with a relatively long disease duration (66.0% diagnosed for more than 2 years). Detailed characteristics are presented in Table 1. The age of participants ranged from 18 to 58 years old. For marital status, a considerable number of participants were married. For current work status, a large number of participants were company staff.

Table 1
Demographic and clinical characteristics

Variable	Group division	Number of cases	Constituent ratio(%)
Age	≤ 30 years old	82	58.15
	31–40 years	43	30.49
	≥ 41	16	11.34
Gender	man	113	80.1
	woman	28	19.9
Degree of education	primary school	2	1.4
	junior middle school	14	9.9
	senior middle school	30	21.3
	College/Undergraduate	91	64.5
	Postgraduate and above	4	2.8
Marital status	Never-married	76	53.9
	Married	65	46.1
Work status			
Length of time since diagnosis	< 3 months	21	14.9
	3–6 months	8	5.7
	6–12 months	6	4.3
	1–2 years	13	9.2
	2–5 years	50	35.5
	> 5 years	43	30.5

To further analyze the distribution of patients' attitudes across different dimensions of Confucian coping, this study examined the response patterns for each item of the Confucian Coping Scale (CCS). As presented in Table 2, the scale consists of 12 items belonging to three dimensions: Destiny Acceptance, Resilience, and Responsibility. Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 2

Number of Respondents Distributed Across Each Option of Questionnaire items rated with a 5-point Likert scale of Confusion Scoping Scale(N = 141).

number	project	Complete agree	Slight agree	Neutral	Slight disagree	Complete disagree
Destiny-1.	The Good or Bad Result of the Event is Decided by the "Fate", Should Accept and Adhere to	22	31	29	31	28
2.	I often think that my success is predestined	17	32	37	30	25
3.	I always think that "life and death are fated, wealth and honor are in heaven"	16	31	35	36	23
4.	The outcome of a matter is determined by fate, which is predetermined from the very beginning.	16	34	26	38	27
Resilience-1.	Frustration is bad, I often avoid it	13	40	36	28	24
2.	I am afraid of failure or frustration.	14	36	34	31	26
3.	I hate setbacks and think they are bad things	15	41	27	38	20
4.	I often think that only those who have suffered many setbacks can achieve great things.	13	30	36	39	23
Responsibility-1	I will never forget the social responsibility I have assumed, no matter success or failure.	50	58	25	5	3
2.	I never forget the personal responsibility I bear, whether I succeed or fail.	66	54	17	3	1
3.	I never forget my family responsibilities, whether I succeed or fail	80	46	12	1	2
4.	When Im down, I still do what I should do	64	42	27	7	1

Table 2 displays the response distributions for each item among the 141 patients with Crohn's disease. Overall, items under the Responsibility item—such as “I never forget my family responsibilities”—received higher levels of agreement. Particularly for the item Responsibility-item-3, over 90% of patients indicated “strongly agree” or “agree,” reflecting a pronounced sense of familial duty. In contrast, items within the Destiny Acceptance dimension—for example, “The outcome of a matter is determined by fate”—showed a more dispersed response pattern, with some patients endorsing stronger fatalistic beliefs while others expressed disagreement or neutrality. Among the Resilience items, statements such as “Frustration is bad, I often avoid it” (Resilience-item-1) and “I am afraid of failure or frustration” (Resilience-item-2) revealed a tendency toward psychological avoidance in the face of illness.

As shown in Fig. 1 and Fig. 2, the distribution of confucian coping strategies among 141 patients with Crohn's disease revealed distinct patterns across the three dimensions (Destiny, Resilience, Responsibility; score range: 4–20, with 12 as the moderate threshold). Fatalistic coping (Destiny) was most frequently reported at a high level. In contrast, resilient coping (Resilience) was predominantly observed at a moderate level, while responsibility-based coping (Responsibility) was most commonly used at a low level, representing the least prevalent high-level strategy within the cohort. Scores for depression (PHQ-9) and anxiety (GAD-7) were in the mild-to-moderate range in Fig. 3.

Table 2

Number of Respondents Distributed Across Each Option of Questionnaire items rated with a 5-point Likert scale of Confucian Coping Scale(N = 141).

Item number	project	Completely agree	Slightly agree	Neutral	Slight disagree	Complete disagree
Destiny-item-1	The Good or Bad Result of the Event is Decided by the "Fate", Should Accept and Adhere to	22	31	29	31	28
Destiny-item-2	I often think that my success is predestined	17	32	37	30	25
Destiny-item-3	I always think that "life and death are fated, wealth and honor are in heaven"	16	31	35	36	23
Destiny-item-4	The outcome of a matter is determined by fate, which is predetermined from the very beginning.	16	34	26	38	27
Resilience-item-1	Frustration is bad, I often avoid it	13	40	36	28	24
Resilience-item-2	I am afraid of failure or frustration.	14	36	34	31	26
Resilience-item-3	I hate setbacks and think they are bad things	15	41	27	38	20
Resilience-item-4	I often think that only those who have suffered many setbacks can achieve great things.	13	30	36	39	23
Responsibility-item-1	I will never forget the social responsibility I have assumed, no matter success or failure.	50	58	25	5	3
Responsibility-item-2	I never forget the personal responsibility I bear, whether I succeed or fail.	66	54	17	3	1
Responsibility-item-3	I never forget my family responsibilities, whether I succeed or fail	80	46	12	1	2
Responsibility-item-4	When I'm down, I still do what I should do	64	42	27	7	1

All items rated on a 5-point Likert scale ranging from 1 = completely disagree to 5 = completely agree (N = 141)

4.1.2 Bivariate Associations Among Study Variables

Table 3
Spearman's rank correlation coefficients

Variable 1	Variable 2	ρ	P-Value
PHQ-9	GAD-7	0.746	< 0.001
Destiny	PHQ-9	0.211	< 0.05
Responsibility	PHQ-9	-0.286	< 0.001
Responsibility	GAD-7	-0.219	< 0.01
Resilience	GAD-7	-0.258	< 0.01

The statistical analysis of correlations between the Confucian Coping Scale (CCS) dimensions (Destiny, Responsibility, Resilience) and mental health outcomes (depression measured by PHQ-9, anxiety measured by GAD-7) revealed distinct patterns of associations, with The findings are detailed in Table 3. First, regarding the association between CCS dimensions and depression (PHQ-9): A statistically significant positive correlation was identified between Destiny beliefs and PHQ-9 scores ($\rho = .211$, $p < 0.05$), indicating that higher endorsement of fatalistic beliefs (e.g., "life and death are fated") was associated with increased depressive symptoms. In contrast, Responsibility beliefs showed a significant negative correlation with PHQ-9 scores ($\rho = -.286$, $p < 0.001$), with stronger adherence to responsibilities (especially familial duties) corresponding to lower depression levels. PHQ-9 and GAD-7 scores were strongly correlated ($\rho = .75$, $p < 0.001$). Notably, the three core dimensions of the CCS (Destiny, Responsibility, Resilience) were largely independent of one another, with correlation coefficients between any two dimensions ranging from $|\rho| = 0.05$ to $|\rho| = 0.10$ (all $p > 0.05$), suggesting limited overlap among the CCS dimensions and a low likelihood of problematic multicollinearity in subsequent regression analyses.

No significant correlations were found between demographic variables (e.g., gender, age, education level) and CCS dimensions or mental health outcomes in bivariate analyses (all $p > 0.05$).

4.1.3 Group Comparisons

Independent t-tests and ANOVA analyses revealed no significant differences in PHQ-9, GAD-7, or belief scores based on gender, marital status, or employment status (all $p > 0.05$). Furthermore, no significant differences were found across education level or disease duration groups. The only significant finding was that Resilience scores differed by disease activity level at diagnosis ($F(3,137) = 4.53$, $p = 0.005$).

4.1.4 Multiple Regression Analyses Predicting Anxiety and Depression

To identify specific predictors of anxiety and depression while accounting for inter-item collinearity among Confucian coping beliefs, multiple linear regression analyses were conducted. Two modeling approaches were employed: a full model incorporating all 12 individual items of the Confucian Coping Scale (CCS) as predictors, and a stepwise regression model optimized via the Akaike Information Criterion (AIC) to derive a parsimonious set of predictors. Rigorous model diagnostics were performed to verify adherence to statistical assumptions: variance inflation factors (VIFs) were all < 2 , ruling out multicollinearity; residual plots and Breusch-Pagan tests confirmed homoscedasticity; Q-Q plots validated the normality of residuals; and Cook's distance identified no influential outliers (Figs. 6 and 7).

Multicollinearity was assessed via variance inflation factors (VIFs), with all values < 2 (range: 1.03–1.87), confirming no multicollinearity. Stepwise regression was chosen to identify parsimonious predictors while minimizing overfitting, with model fit evaluated via adjusted R² (GAD-7 model: adjusted R²=0.18; PHQ-9 model: adjusted R²=0.12) and Akaike Information Criterion (AIC) (GAD-7 model: AIC = 642.3; PHQ-9 model: AIC = 718.5).

For anxiety, measured by the Generalized Anxiety Disorder-7 (GAD-7) scale, the stepwise regression model retained five predictors (Destiny-item-2, Destiny-item-3, Resilience-item-2, Responsibility-item-1, Responsibility-item-3) and explained a significant proportion of variance in GAD-7 scores. As illustrated in Fig. 4 (Forest Plot of Regression Coefficients for GAD-7), Responsibility-3("I never forget my family responsibilities, whether I succeed or fail") emerged as a strong negative predictor ($\beta = -0.27$, 95% confidence interval [CI]: -0.42 to -0.13, $p < 0.001$), indicating that greater endorsement of familial responsibility was associated with lower anxiety levels. Conversely, Destiny-item-3 ("I always think that 'life and death are fated, wealth and honor are in heaven'") was a significant positive predictor ($\beta = 0.11$, 95% CI: 0.003 to 0.22, $p = 0.044$), suggesting that stronger fatalistic beliefs correlated with higher anxiety.

Figure 4–5. Forest Plot of Regression Coefficients (with 95% CIs) from the Stepwise Model Predicting GAD-7 and PHQ-9 Scores.

For depression, assessed by the Patient Health Questionnaire-9 (PHQ-9), the stepwise model similarly included key CCS items, with Responsibility-item-3 being the only statistically significant predictor (Fig. 5, Forest Plot of Regression Coefficients for PHQ-9). This item exhibited a negative association with PHQ-9 scores (full model: $\beta = -0.20$, 95% CI: -0.40 to -0.007, $p = 0.043$), confirming that a stronger sense of familial responsibility predicted lower depressive symptoms. Although Destiny-item-2 and Destiny-item-3 showed nominal positive associations with PHQ-9 scores (consistent with the bivariate correlation trend), these relationships did not meet the threshold for statistical significance (both $p > 0.05$) in the multivariate model.

Correlation analysis revealed positive associations between Destiny beliefs and PHQ-9, indicating that higher levels of Destiny beliefs were associated with increased depression. In exploratory regression analyses, Resilience-related items showed inverse associations with PHQ-9 scores ($\beta = -0.24$, $p = 0.02$), with stronger resilience beliefs predictive of reduced depressive symptoms.

A single, significant predictor emerged from the analysis: Responsibility-item-3("I never forget my family responsibilities, regardless of success or failure"). This item was negatively associated with PHQ-9 scores ($\beta = -0.205$, $p = 0.043$), indicating that a stronger sense of familial responsibility corresponded to lower levels of depressive symptoms

At the exploratory item level, two CCS items emerged as significant predictors of anxiety symptoms. Responsibility-item-3 ("never forgetting family responsibilities"), was a significant negative predictor of GAD-7 scores ($\beta = -0.27$, $p < 0.001$), with stronger familial responsibility associated with lower anxiety levels. Conversely, the item "believing in predestination" (Destiny-item-3) from the Destiny Acceptance dimension was inversely associated with GAD-7 scores($\beta = -0.11$, $p = 0.044$), indicating that stronger endorsement of predestination beliefs was associated with lower reported anxiety in this sample.

Among the Fig. 6, the residual-fitted plot shows that the standardized residuals are randomly and evenly distributed above and below the zero reference line, without showing any obvious trend or funnel shape, indicating that the model meets the linear assumption and has good homogeneity of residual variance. Secondly, in the normal Q-Q plot, the vast majority of standardized residual points are closely arranged around the theoretical normal distribution

line, with only acceptable minor deviations at the two tails, confirming that the residuals basically conform to the normal distribution and meet the prerequisite conditions for parameter estimation. The Cook's distance plot identified several potentially influential observations (e.g., cases 7, 69, 83, 105, and 116) exceeding or approaching the reference threshold. However, no single observation exhibited disproportionately large influence relative to the remaining sample. Therefore, these cases were retained in the final analysis, and the model results should be interpreted with appropriate caution. Based on these diagnostic plots, the PHQ-9 regression model appeared to reasonably satisfy the major assumptions of linear regression, including approximate linearity, homoscedasticity, and normality of residuals. Although several potentially influential observations were identified, no single observation appeared to dominate model estimation. Therefore, the findings may be interpreted with appropriate caution.

For the regression model with the GAD-7 anxiety score as the outcome, the diagnostic plots (Fig. 7) supported the statistical basis of the model. In the residual-fitted plot, the residual distribution showed a random scatter pattern without obvious curvilinear trends or heteroscedastic structures, indicating that the linear relationship assumed in the model was valid and the residual variability was constant. The normal Q-Q plot further demonstrated that the observed quantiles of the standardized residuals were with the theoretical normal quantiles, with the points closely following the diagonal line. This result strongly supported the assumption that the residuals followed a normal distribution. Meanwhile, in the Cook's distance plot, the influence indicators of all observations were at a low level, with none exceeding the critical line of 0.0296, suggesting that there were no outliers in the data that could unduly influence the estimation of model parameters, and the model was highly stable. Therefore, the diagnostic results of the GAD-7 model confirmed the validity of its statistical assumptions, providing a an appropriate methodological basis for the analysis of the correlation between anxiety symptoms and cultural beliefs in the study.

Collectively, these results highlight the differential associational patterns of Confucian coping in shaping mental health outcomes. Responsibility-item-3 was inversely associated with both anxiety and depression, whereas Destiny-item-3 also showed an inverse association with anxiety in the exploratory item-level regression model. These findings should be interpreted cautiously given the exploratory nature of the item-level analyses.

4.2 Qualitative Findings

Qualitative data from 9 patient interviews revealed several cultural themes. "Fatalism delayed biomedical care" was a common phenomenon, as some patients believed that the disease was predestined and thus delayed seeking medical treatment. A notable theme that emerged was "familial responsibility increased psychological burden," with married participants in particular expressing a profound sense of responsibility to care for their families, a burden that correlated with their psychological distress. Additionally, chronic illness-related stigma was prevalent, leading patients to withdraw from social interactions. Many participants relied on traditional remedies due to cultural beliefs, and familial involvement in care was notable, with families playing both supportive and sometimes burdensome roles. Participants emphasized the importance of culturally tailored dietary advice and spiritual support.

Table 4
Key Themes and Representative Quotes from Qualitative Analysis

Theme	Participant Info	Representative Quotes
Destiny as Barrier	Male, 46,	"I believe my IBD is heaven's punishment... no use fighting it,I will die sooner or later."
	Male, 38,	"I thought my body could handle it... I didn't want to rely on medicine."
Responsibility: Dual Role	Female, 57	"Hiding my symptoms is my duty—I can't burden my children."
	Male, 42	"As the eldest son, I must work to support my family."
Resilience as Adaptation	Male, 28	"This disease taught me endurance—like Mencius said, adversity trains will."
	Female, 33	"I learned to cook my own meals, avoid triggers, and stay positive. I see it as a test."
Cultural Paradox	Male, 42 PHQ-9 = 17	"I must work and support my family [Responsibility], but I'm afraid my bleeding is a sign of fate [Destiny]."

4.2.1 Qualitative Sample Description

This study employed thematic analysis of semi-structured interviews and open-ended survey responses from 9 participants to explore the lived experiences of Chinese individuals with IBD, with a particular focus on the influence of Confucian cultural beliefs—Destiny, Responsibility, and Resilience—on psychological adaptation, coping behaviors, and treatment adherence. Four major themes emerged from the data: (1) Destiny beliefs delaying biomedical care, (2) Responsibility beliefs as a "dual-edged sword" (adherence motivation vs. psychological burden), (3) Resilience beliefs facilitating adaptive coping, and (4) Destiny-Responsibility cultural paradoxes exacerbating distress. Illustrative quotes supporting each theme are provided in Table 4.

4.2.2 Thematic Analysis Results

Theme 1

Destiny Beliefs Delaying Biomedical Care

Participants frequently attributed their illness to fate or heaven's will (Tian Ming in Confucian), which often led to passive coping strategies and avoidance of biomedical treatment. This belief was associated with a sense of inevitability and reduced agency, resulting in delays in seeking care, non-adherence to medication, and a preference for traditional remedies. For example, one participant stated:

"I believe my IBD is heaven's punishment... no use fighting it." (Male, 46)

Another participant expressed a reliance on innate physical strength rather than medical intervention:

"I thought my body could handle it... I've always been strong. I didn't want to rely on medicine." (Male, 38)

This theme was particularly pronounced in participants with less formal education and rural backgrounds.

Theme 2: Responsibility as a "Dual-edged Sword"

Confucian values of familial and social responsibility strongly influenced participants' illness experiences, functioning both as a source of motivation and a significant stressor. Various participants reported concealing their symptoms to avoid burdening their families or jeopardizing social roles, especially in employment and marriage. For example, one participant expressed:

"Hiding my symptoms is my duty—I can't burden my children." (Female, 57)

Conversely, responsibility also motivated some people to seek treatment to maintain their ability to work and provide for their families:

"As the eldest son, I must work to support my family. I need to get better to keep my job." (Male, 42)

This tension often led to psychological distress, especially when symptoms interfered with role fulfillment.

Theme 3: Resilience Facilitating Adaptive Coping

Resilience emerged as a protective cultural factor that enabled participants to reframe adversity as an opportunity for growth. Participants who embraced this mindset engaged in active self-management, dietary adjustments, and mindful practices. They often invoked Confucian maxims such as "天降大任" ("Heaven bestows great responsibilities upon someone") to contextualize their suffering.

"This disease taught me endurance—like Mencius said, adversity trains will." (Male, 28)

Another participant shared:

"I learned to cook my own meals, avoid triggers, and stay positive. I see it as a test." (Female, 33)

These individuals reported improved psychological adjustment and reduced scores on PHQ-9 and GAD-7.

Theme 4: Destiny-Responsibility Cultural Paradoxes Exacerbating Distress

The coexistence of conflicting beliefs (notably Destiny and Responsibility) gave rise to a prominent cultural paradox, a subtheme that intensified psychological distress and drove maladaptive behaviors.

"As the eldest son, I must work and support my family [Responsibility], but I'm afraid my bleeding is a sign of fate [Destiny]." (Male, 42, CD, PHQ-9 = 17)

Such participants often struggled between accepting their condition as fate and feeling compelled to fulfill social roles, resulting in hesitancy to engage fully with treatment regimens.

4.3 Thematic Integration with Quantitative Findings

Although quantitative analyses were restricted to CD patients and qualitative analyses included both CD and UC patients, the two strands of evidence were largely complementary rather than fully concordant, together offering a more nuanced understanding of how Confucian coping may shape mental health in IBD.

Destiny were quantitatively correlated with higher depression ($p = 0.211, p < 0.05$), and qualitatively associated with passive coping behaviors such as delayed biomedical care and refusal of standard treatment due to fatalistic perceptions. Resilience were quantitatively negatively correlated with anxiety ($p = -0.258, p < 0.01$), with this protective association was clearly observable in participants' qualitative descriptions of active coping and reframing

strategies, including dietary self-management, positive reframing of adversity and intentional adherence to treatment.

Responsibility showed a negative correlation with both depression ($\rho = -0.286$, $p < 0.001$) and anxiety ($\rho = -0.219$, $p < 0.01$) in qualitative analysis; this dual quantitative trend was with the qualitative finding that responsibility were linked to both adaptive motivation and (seeking treatment to fulfill family duties) and maladaptive concealment behaviors (hiding symptoms to avoid burdening families).

To intuitively present the structured association between quantitative data and qualitative results, this study employed a joint display table (Supplementary File 3) to achieve systematic integration of mixed methods.

5. Discussion

5.1 Cultural Mechanisms

Fatalism vs. Agency: The Dual Nature of Confucian Beliefs

Destiny were positively associated with symptoms of depression, aligning with qualitative reports documenting passive coping. Patients with more pronounced Destiny tended to view their illness as inevitable and were less prone to take active measures to manage it, thereby increasing their psychological distress. Given the cross-sectional design, reverse or bidirectional associations cannot be excluded—patients with greater distress may also be more likely to endorse fatalistic beliefs, rather than fatalistic beliefs causing distress. This finding resonates with cross-cultural research on fatalism and chronic illness, which has consistently linked external locus of control to poorer mental health outcomes and treatment adherence across East Asian populations^[11, 19]. Notably, due to the cross-sectional nature of this study, we cannot establish temporal order between Confucian coping styles and mental health outcomes. The observed positive association between Destiny and psychological distress could reflect reverse causality—for example, chronic anxiety or depression may reinforce fatalistic cognitions as a coping strategy for uncontrollable suffering. Additionally, unmeasured confounding variables (e.g., quality of social support, prior trauma, or disease severity fluctuations) may also modulate these relationships, as they were not fully accounted for in the regression models.

Destiny-oriented patients with CD frequently resort to traditional remedies or forgo biomedical interventions due to a belief that their illness is predestined. This internalized stigma fosters therapeutic passivity and diminishes treatment adherence^[20, 21]. In contrast, Resilience embodies the Confucian ideal of surmounting adversity to foster personal growth, thereby empowering patients to reclaim agency over their health trajectories^[22]. This duality underscores that Confucian coping are not monolithic—their impact depends on which facets are activated and how they interact with illness experiences^[11]. Resilience was associated with a protective effect consistent with the Confucian emphasis on endurance. Those with higher Resilience could better cope with the challenges of IBD, which was linked to decreased depression levels. Interestingly, in the exploratory item-level regression analysis, Destiny-item-3 showed an inverse association with anxiety scores. This finding differs from the overall positive correlation observed between the Destiny dimension and psychological distress and may reflect heterogeneity among specific Destiny-related beliefs. Given the exploratory nature of the item-level models, this result should be interpreted cautiously and requires replication in future studies.

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Familial Responsibility: A Double-Edged Sword Rooted in Confucian Ethics

Responsibility increases hidden burdens, particularly in women (30.6% of the sample), echoing collectivist stigma studies. In collectivist cultures, women often bear more family responsibilities, and the combination of illness and family responsibilities can lead to increased psychological pressure.

A key mixed-methods finding is that familial Responsibility exhibits a paradoxical, double-edged role rather than a unidirectional protective effect. Quantitative analyses showed Responsibility was inversely associated with depression and anxiety, indicating it acts as a source of meaning, motivation, and social anchoring that stabilizes mental health. However, qualitative data revealed critical tension: Confucian familial norms also created normative pressure and role expectations that led patients to hide symptoms, overperform social/familial roles, and endure unspoken psychological burden to avoid disappointing family members. This mixed-methods complementarity and tension clarify that Responsibility is not purely protective but a culturally rooted construct with simultaneous adaptive and distressing components. This result aligns with the core tenets of Confucianism placing immense importance on the family unit and the fulfillment of familial roles^[22, 56]. The sense of purpose, belonging, and structured social support derived from maintaining these responsibilities may provide a crucial psychological buffer against distress and demoralization, even in the face of personal health challenges like disease activity.

Fulfilling familial duties provides a clear sense of purpose, structured social support, and existential meaning, which buffer against stress and uncertainty^[23]. However, as highlighted in our qualitative data, this responsibility also imposes hidden burdens, particularly on women and eldest sons. Female participants frequently concealed symptoms to avoid imposing burdens on their children, whereas male participants felt obligated to retain employment despite severe symptoms to fulfill familial responsibilities. This aligns with scholarly findings on Confucian gender roles and chronic illness, which observe that women in East Asian collectivist societies frequently shoulder disproportionate caregiving responsibilities while concurrently managing their own health conditions^[44, 25]. Corroborating this pattern, an investigation of Chinese women with autoimmune diseases demonstrated that their familial care obligations exacerbated psychological distress levels while simultaneously improving treatment adherence^[25], thus aligning with our dual-edged sword concept.

It is important to note that “Confucian-influenced values” are not monolithic across China. Our sample, drawn from an urban tertiary hospital in Zhejiang Province, primarily includes well-educated (88.6% with high school or above) and economically active patients. Rural populations, older generations, or those with lower socioeconomic status may hold more traditional Confucian values (e.g., stronger Destiny beliefs) or different manifestations of responsibility, which could alter the observed associations^[11, 26].

In contrast, no significant effects are found for the Destiny Acceptance and Resilience dimensions, suggesting that their associations with depression in this clinical cohort may be more nuanced or neutral. For Destiny Acceptance, potentially adaptive aspects may be counter-balanced by maladaptive ones. Non-significant outcomes for Resilience items may indicate that in chronic condition management, the ability to reframe setbacks lacks the status may be linked to better relative to the tangible motivational anchor afforded by family duty.

Stigma as a Cultural Amplifier of Psychological Distress

Consistent with our qualitative results, we found that illness stigma, rooted in Confucian values of "mianzi" (face/social standing influenced by peer perception), provides further insight into the cultural mechanisms involved. As explicitly articulated in participant narratives, individuals with CD reported concealing symptoms (e.g., avoiding social gatherings, eating alone) to avoid violation of dignity for themselves or their families—a behavioral pattern differing substantively from the stigma-related avoidance observed among Western patients, which is often driven by workplace discrimination (McCleary-Gaddy & James, 2023). Placement remains correct at the end of the sentence it supports. Format unchanged. This Confucian-shaped stigma, uniquely captured through our qualitative exploration, is amplified by the taboo nature of digestive symptoms in East Asian cultures, where bodily incontinence is perceived as a failure of self-cultivation and a disruption of social harmony^[19, 26]. Notably, our qualitative data also revealed that stigma exacerbates the psychological burden of Destiny-Responsibility paradoxes, a observation supported by a recent study on Chinese CD patients which confirmed that stigma mediates the relationship between cultural beliefs and social alienation^[21].

5.2 Clinical Implications

Culturally Adaptive Psychological Education

Reconceptualize "Destiny" as non-punitive intervention targets to address patient experiences of powerlessness and passivity. Fortify "Resilience" through culturally resonant narratives to augment patients' capacity for disease coping. Interventions may proactively identify and address patients' Confucian belief systems to optimize engagement. For patients endorsing strong Destiny beliefs, cognitive reframing techniques should facilitate redefining "fate" as "manageable uncertainty"—a strategy empirically validated in cultural adaptations of Cognitive Behavioral Therapy (CBT) for East Asian chronic illness populations^[57]. A randomized controlled trial involving Chinese diabetes patients demonstrated that reframing fatalistic cognitions ("I cannot change my condition") into adaptive beliefs ("I can control my symptoms through self-management") significantly reduced anxiety levels and enhanced treatment adherence^[57]. For responsibility-oriented patients, educational interventions should emphasize self-efficacy within ethical frameworks. affirm their familial roles while normalizing self-care—emphasizing that "supporting one's family includes maintaining one's own health"—to reduce caregiver burden and emotional burnout^[23].

Given the cultural heterogeneity within China (e.g., generational differences in Confucian value expression), interventions should not assume uniform "Chinese cultural beliefs." For instance, younger patients with strong responsibility may respond better to resilience-building framed as self-development (aligning with modern individualistic tendencies while retaining Confucian self-cultivation ideals), whereas older patients may prefer family-centered approaches that explicitly align with traditional notions of familial duty and responsibility. This tailored approach ensures that interventions respect both the core Confucian values of responsibility and the diverse manifestations of these values across different groups, thereby enhancing acceptability and effectiveness. Beyond belief-based tailoring, acknowledging cultural heterogeneity (e.g., generational, regional differences) is critical for intervention success^[26]. As noted earlier, younger patients may favor self-development-focused resilience training,

while older patients lean toward family-centered approaches—reflecting the diverse expressions of Confucian values in contemporary China.

Integrating Family Support Systems

Confucianism's emphasis on family interdependence highlights the need to involve families in IBD management. Rather than focusing solely on individual patients, interventions should include family meetings or caregiver support groups to distribute care responsibilities and reduce patients' sense of isolation^[24]. A study on Korean IBD patients found that family-centered psychoeducation improved both patients' mental health and caregivers' burden^[24], while a Chinese study reported that shared familial responsibility was associated with lower depressive symptoms and higher medication adherence^[29]. Such approaches align with the Confucian value of "jia ting he xie" (family harmony) and address the hidden burden of sole responsibility reported in our qualitative data.

Cultural-Sensitive Stigma Reduction

To address Confucian-shaped stigma, interventions should prioritize privacy-protective care environments and peer support programs. Inviting recovered patients to share experiences of "living well with IBD" can challenge the taboo of digestive illness and foster a sense of community^[20]. Additionally, culturally tailored educational materials should frame IBD as a "chronic condition requiring management" rather than a "shameful impairment," as demonstrated in a stigma reduction program for Chinese Crohn's patients that reduced self-stigma and improved social participation^[20]. This aligns with research showing that cultural congruence in stigma interventions enhances their effectiveness among East Asian populations^[42].

Developing Confucian-Aligned Self-Management Tools

Self-management resources could integrate Confucian values to improve acceptability. For example, dietary advice can reference "nourishing the body to fulfill family duties" (linking nutrition to responsibility) rather than solely focusing on clinical outcomes^[29, 28]. Stress management modules can incorporate Confucian mindfulness practices (e.g., "reflective self-discipline") alongside conventional techniques, as these have been shown to enhance adherence among Chinese patients^[32]. A recent RCT on cultural-adapted IBD self-management programs found that integrating collectivist values (e.g., "managing illness for family") improved long-term adherence compared to Western-style individualistic programs^[33].

Employment and education modulated cultural impacts, with low socioeconomic status (SES) groups being particularly vulnerable. Unemployed patients had higher anxiety levels, possibly due to economic pressure and social isolation—consistent with research linking financial strain to amplified cultural risk factors in chronic illness^[42]. Higher educational attainment was associated with lower Destiny and higher Resilience, indicating that education may play a role in shaping adaptive cultural coping. This supports prior findings that education enhances critical thinking about fatalistic beliefs while reinforcing constructive Confucian values like resilience^[11, 22].

6. Conclusion

Family responsibility was associated with protective effect against anxiety aligns with Confucian principles that emphasize the family as society's cornerstone and a primary source of existential meaning. Fulfilling familial duties can provide individuals with a clear sense of purpose, structured routines, and robust social support, all of which can effectively buffer against stress and uncertainty, thereby mitigating anxiety^[23]. The relationship between Destiny-

related beliefs and anxiety appeared more nuanced. While the overall Destiny dimension was positively associated with psychological distress, exploratory item-level analyses suggested that specific Destiny-related beliefs may not operate uniformly across mental health outcomes. This highlights the multidimensional and intricate relationship between Confucian ideology and mental health, indicating that it contains adaptive components such as family responsibility alongside maladaptive ones like passive fatalism.

In practical terms, preliminary associational findings suggest that future mental health interventions for Chinese CD patients may explore whether leveraging adaptive facets of familial Responsibility and reframing maladaptive Destiny beliefs could support psychological adjustment, as these cultural factors show consistent links to distress.

Culturally adapted interventions hold considerable promise for improving CD management^[29]. Confucian values are double-edged: Destiny were associated with increased psychological distress, while Resilience was linked to better adaptation. Addressing cultural norms and stigma is critical to enhancing care equity. Culturally adapted CBT could integrate philosophical reframing of adversity. Future intervention studies may examine whether culturally adapted CBT approaches that incorporate culturally salient beliefs and illness narratives can improve psychological adjustment among Chinese patients with CD^[34, 35, 36].

7. Limitations

Several limitations should be considered when interpreting the findings. First, the cross-sectional design limits causal inference and prevents determination of temporal relationships between Confucian coping and mental health outcomes. Although associations between coping dimensions and psychological symptoms were identified, reverse causality cannot be excluded. For example, pre-existing psychological distress may influence patients' adoption of particular coping strategies. Future longitudinal studies should examine the dynamic relationships between cultural coping patterns and psychological outcomes over time.

Second, psychological symptoms were assessed using self-reported questionnaires, which may be influenced by recall bias and social desirability effects. Future research combining self-reported measures with objective indicators or clinician-rated assessments may provide a more comprehensive understanding of psychological distress among patients with IBD.

Third, quantitative analyses were restricted to patients with Crohn's disease because of the substantial imbalance between CD and UC participants in the initial cohort (141 CD vs. 16 UC). Although this decision improved statistical robustness, it limits the generalizability of quantitative findings to other IBD subtypes, particularly ulcerative colitis. Future multicentre studies with balanced CD and UC samples are needed to examine whether the associations between Confucian coping and mental health outcomes vary across different IBD populations.

Fourth, this study was conducted at a single tertiary hospital in Zhejiang Province, which may limit the transferability of findings to patients from different geographic regions, socioeconomic backgrounds, and cultural contexts. Future studies should recruit more diverse populations to further explore culturally embedded coping mechanisms in IBD.

Fifth, illness stigma emerged as an important theme in the qualitative interviews; however, stigma was not quantitatively assessed in the larger CD cohort. Therefore, conclusions regarding stigma as a potential mechanism linking cultural coping and psychological distress should be interpreted cautiously. Future studies should incorporate validated stigma assessment instruments to quantitatively examine the mediating role of stigma.

Sixth, several potentially important clinical variables, including disease activity, symptom burden, treatment status, pain, fatigue, and previous surgery, were not incorporated into the regression models. These factors may confound the observed associations between Confucian coping and mental health outcomes. Therefore, the findings should be interpreted as exploratory associations rather than independent effects. Future research should integrate comprehensive clinical and psychosocial variables to clarify the underlying pathways.

Declarations

Ethics Approval

This study was approved by the Ethics Committee of Sir Run Run Shaw Hospital, Zhejiang University School of Medicine (Approval No. 2025-2209-01). All procedures involving human participants were conducted in accordance with the Declaration of Helsinki and relevant ethical guidelines. Written informed consent was obtained from all participants before questionnaire completion or participation in interviews. For online surveys, electronic informed consent was obtained and securely recorded. Verbal consent was audio-recorded before qualitative interviews. All identifiable information was removed during data processing to ensure participant confidentiality.

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Conflict of Interest

The authors declare that there are no conflicts of interest.

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Patient or Public Contribution

Patients contributed to this study by sharing their lived experiences during semi-structured interviews. Their perspectives informed the interpretation of qualitative findings. Patients were not involved in study design, data analysis, manuscript preparation, or dissemination planning.

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Figures

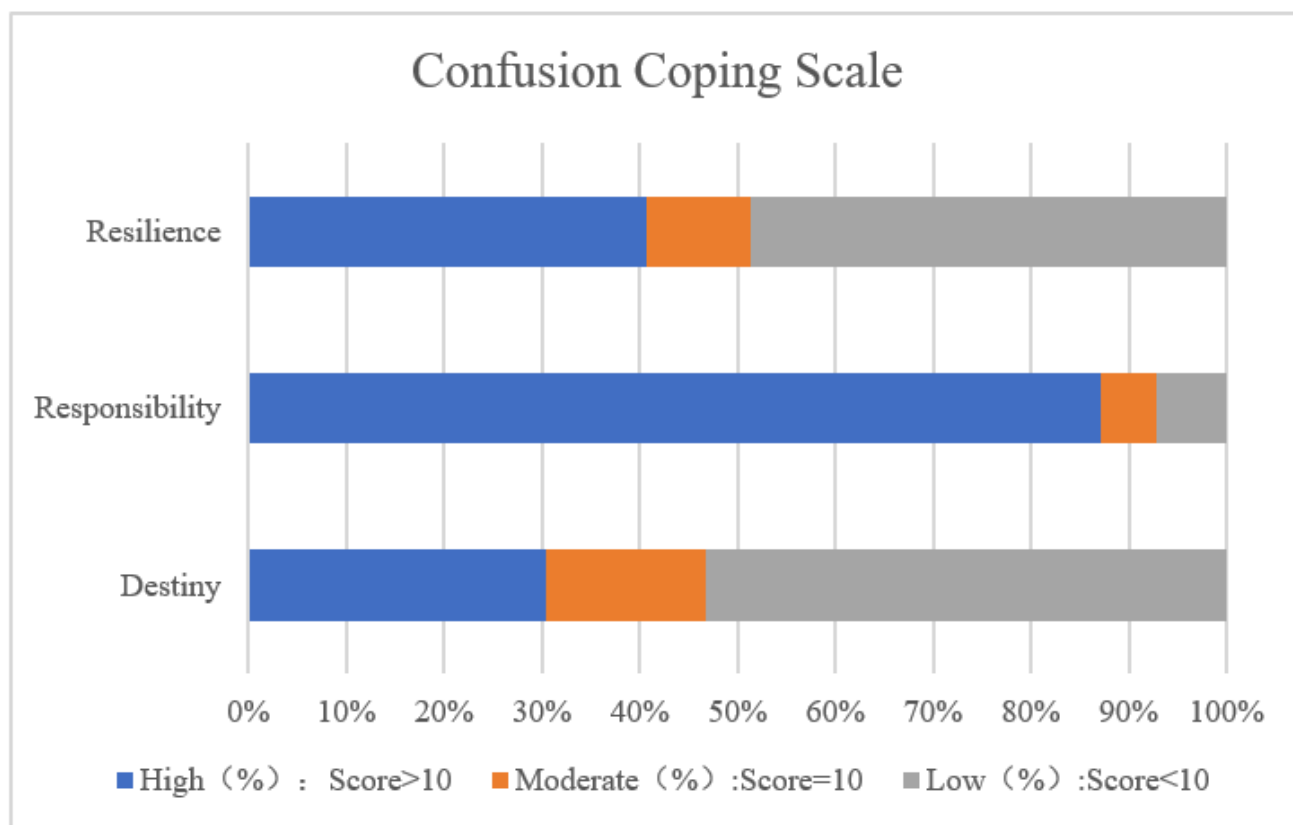


Figure 1

Distribution of Level of Confucian Coping Scale among Patients with Crohn's Disease (N=141)

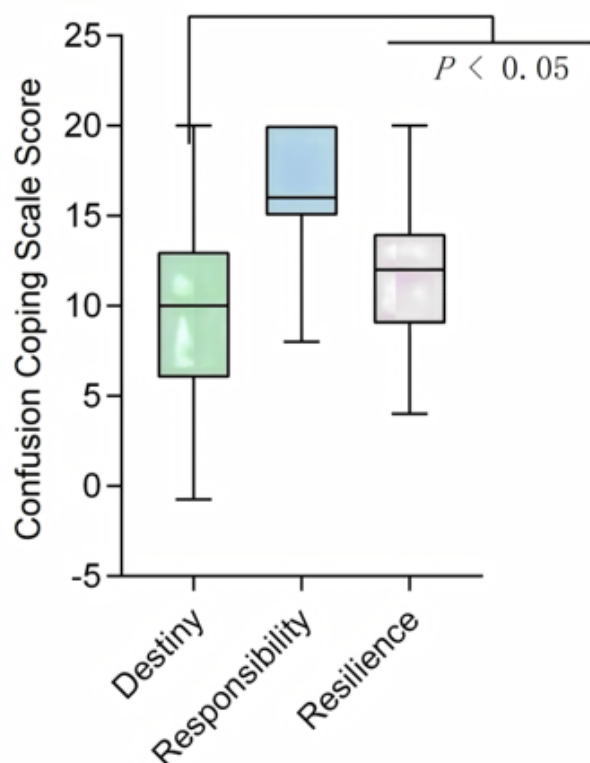


Figure 2

Distribution of score of Confucian Coping Scale among Patients with Crohn's Disease (N=141)

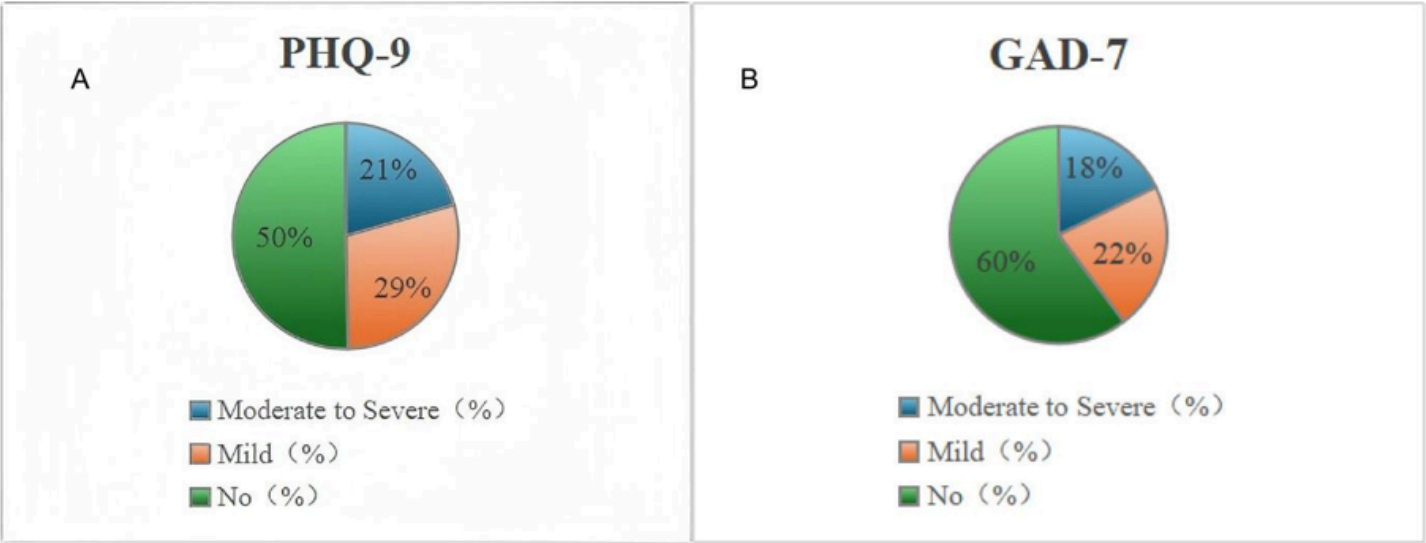


Figure 3

Patient outcomes: Depression(A) and Anxiety(B)

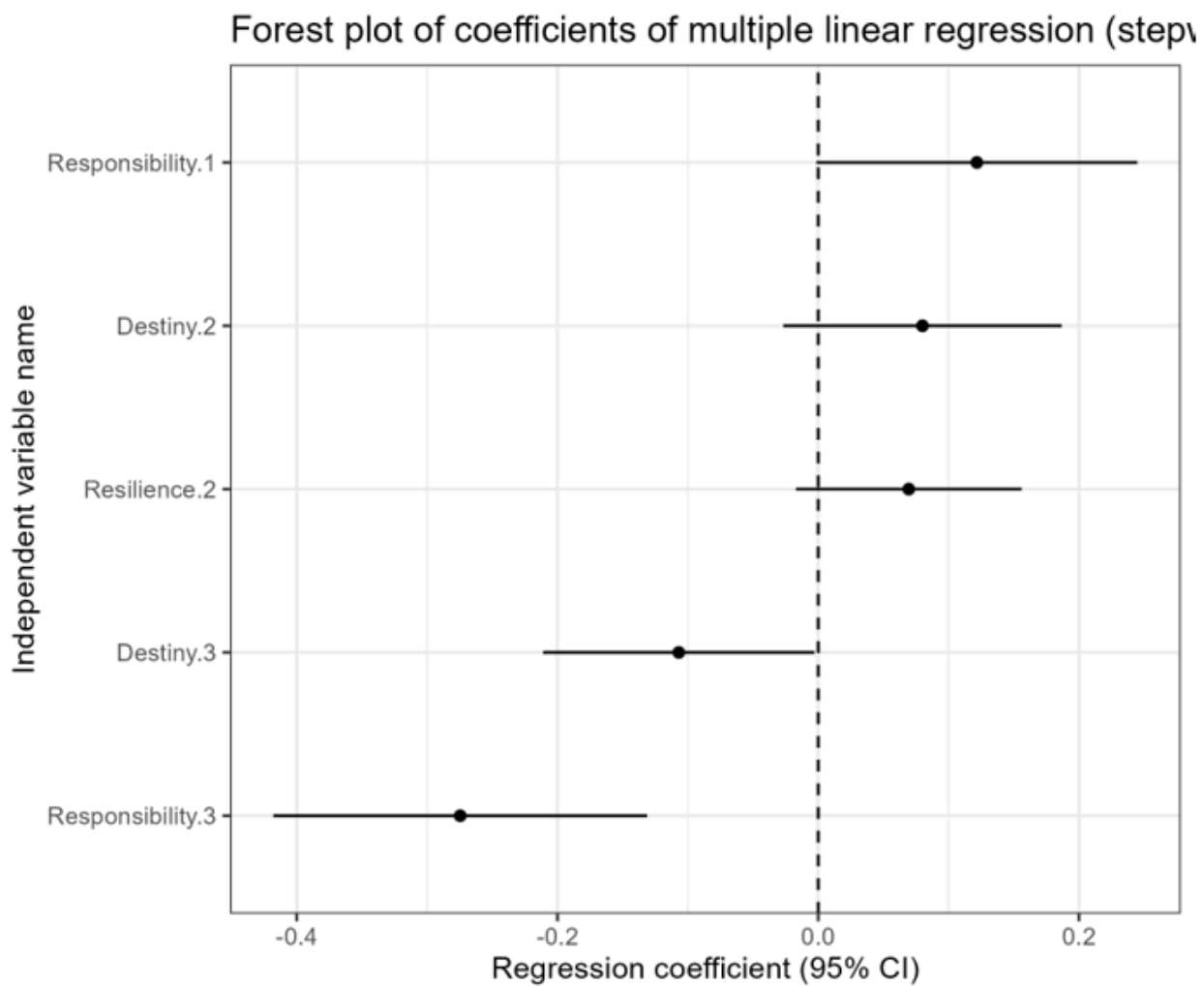


Figure 4

Forest Plot of Regression Coefficients (with 95% CIs) from the Stepwise Model Predicting GAD-7 and PHQ-9 Scores.

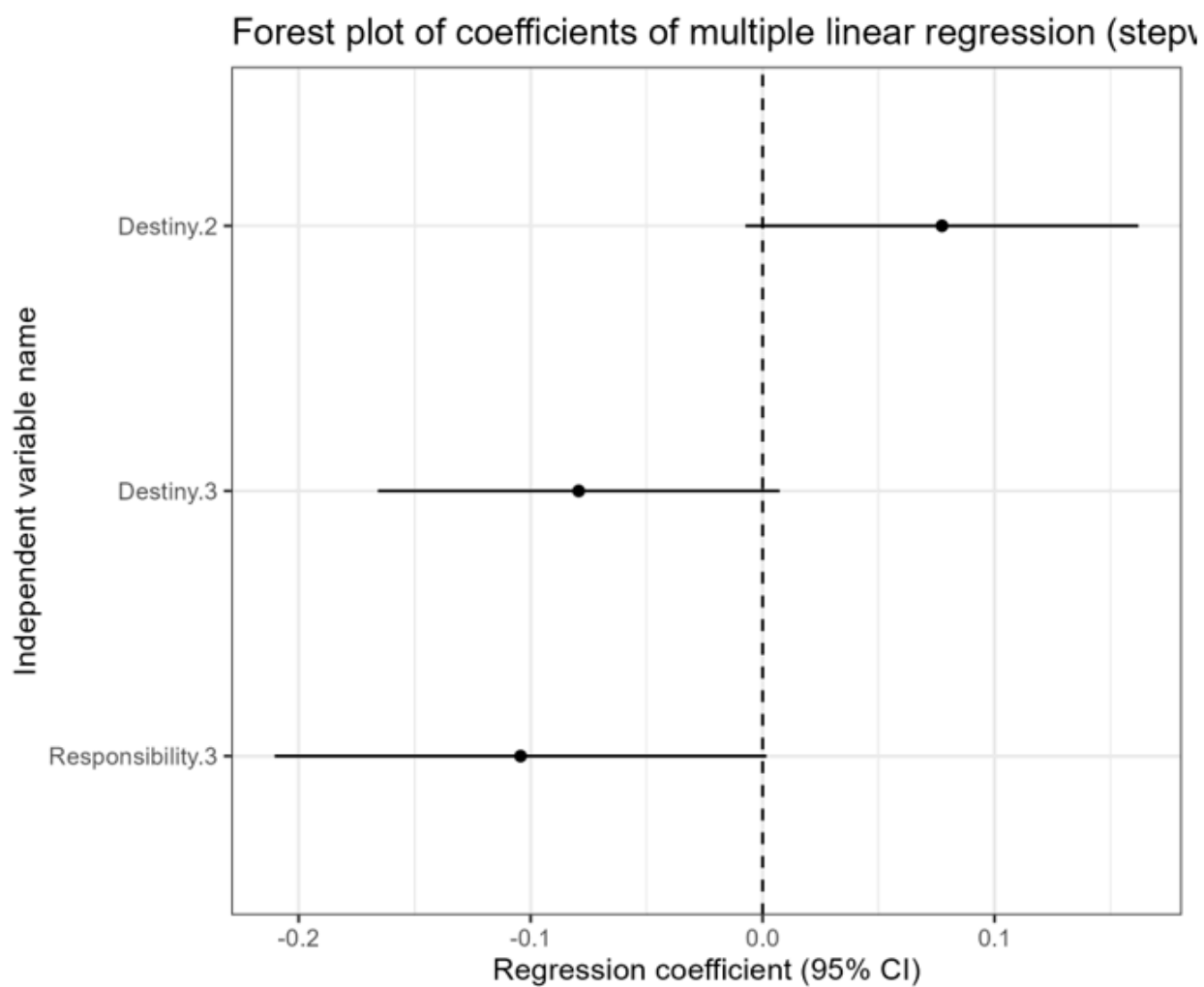


Figure 5

Forest Plot of Regression Coefficients (with 95% CIs) from the Stepwise Model Predicting GAD-7 and PHQ-9 Scores.

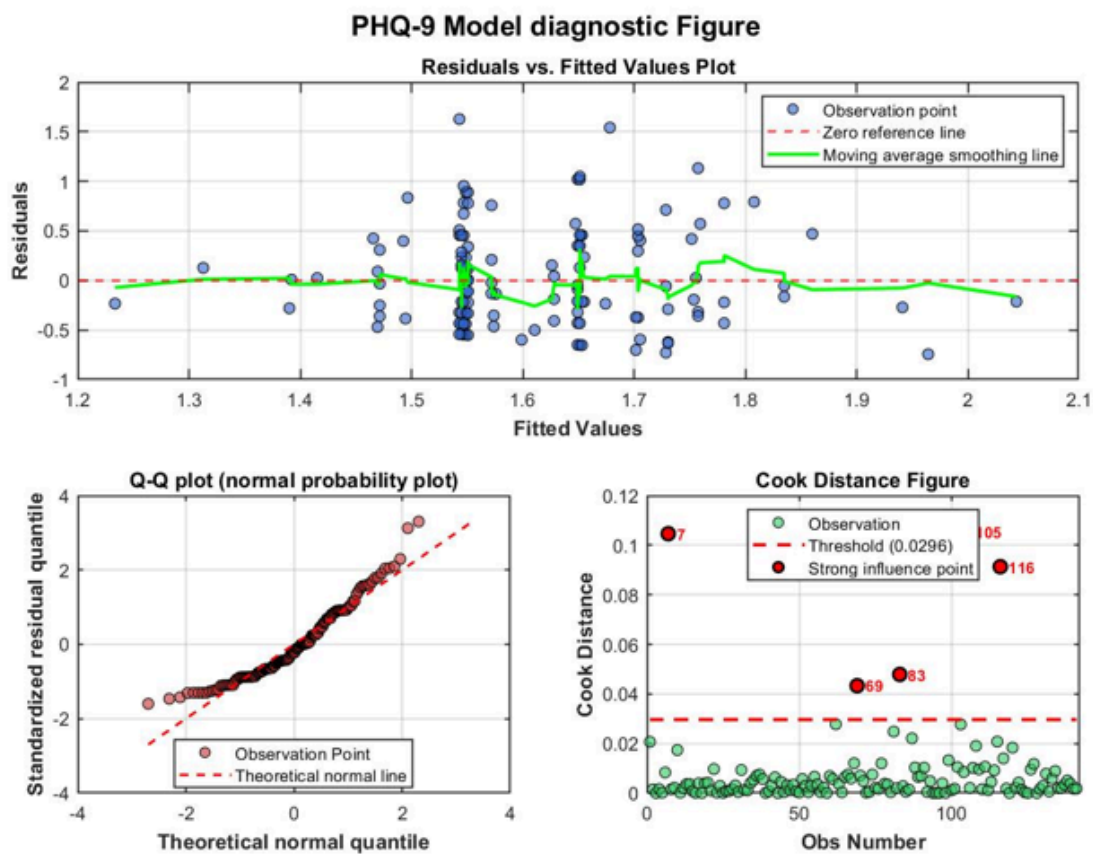


Figure 6

PHQ-9 diagnostic Figure

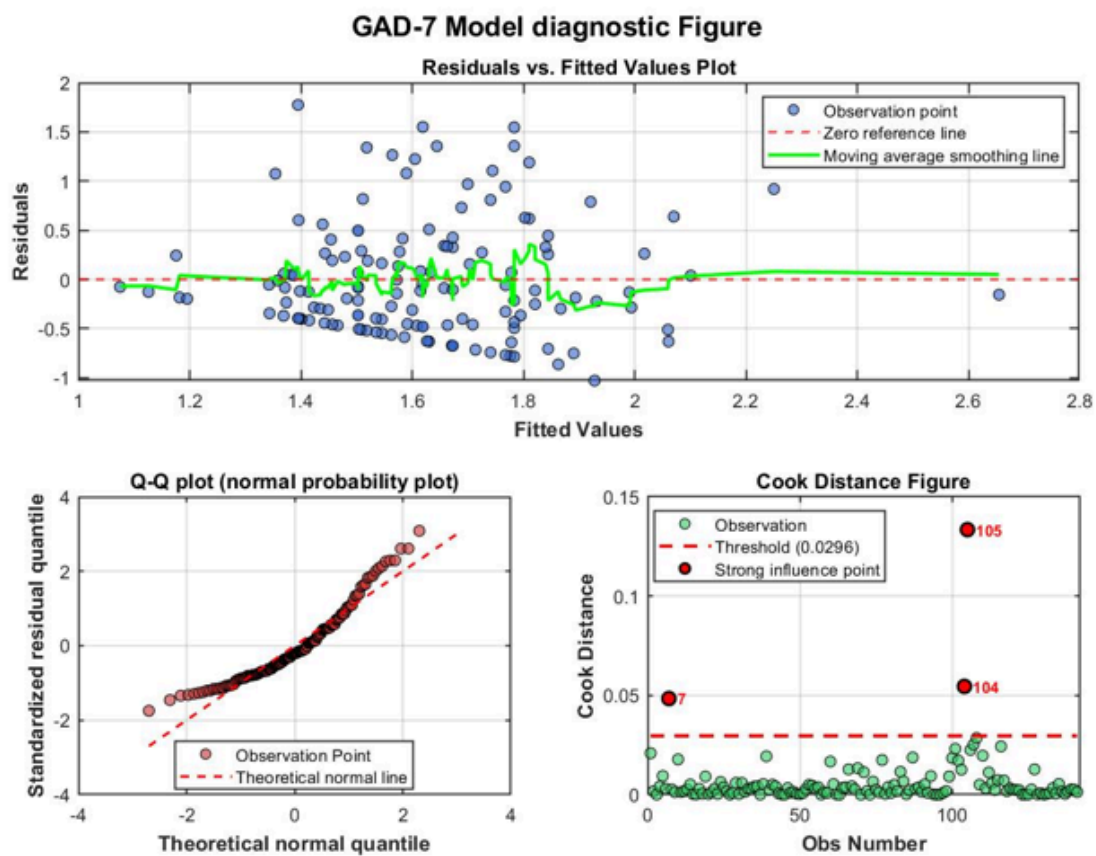


Figure 7

GAD-7 diagnostic Figure

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