



The mediating role of coping styles in the relationship between COVID-19 anxiety and health anxiety

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Abstract

Objectives: This study aims to investigate the mediating effect of coping styles on the relationship between anxiety triggered by COVID-19 and health-related anxiety in the general population of Kashan city during the COVID-19 pandemic.

Methods: A cross-sectional online questionnaire was used to collect data from 390 participants in Kashan, Iran, between March and April 2020, during the peak of the pandemic. Participants were recruited through snowball sampling. The assessment tools included the Short Health Anxiety Inventory (SHAI), COVID-19 Anxiety Scale, Coping Responses Inventory (CRI), and Body Vigilance Scale (BVS). Descriptive and correlation analyses were performed using SPSS-22, and structural equation modeling (SEM) was conducted with Amos-22 software to analyze the mediating role of coping styles.

Results: The Pearson correlation results revealed that problem-solving, social support, and cognitive reappraisal were negatively associated with health anxiety, while emotion-focused and somatization coping strategies were positively associated with health anxiety symptoms ($p < .05$). The SEM analysis showed that cognitive reappraisal acted as a negative mediator in the relationship between COVID-19 anxiety and health anxiety.

Conclusions: Our findings support previous research indicating that emotion-focused coping strategies can exacerbate anxiety levels. Additionally, we found that cognitive reappraisal may serve as a protective factor in mitigating the transition from COVID-19 anxiety to health anxiety.

Keywords: COVID-19, Pandemic, Anxiety, Health Anxiety, Coping Styles.

Introduction

The World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic in 2020.^[1] Iran ranked among the countries most severely impacted by COVID-19.^[2] The pandemic has led to significant mental and physical distress, as well as a high mortality rate.^[3] Previous research on historical epidemics and pandemics has shown that concerns about health and safety are prevalent during such crises. Studies indicate that over 50% of individuals experience high levels of anxiety during pandemics.^[4] Numerous studies have explored COVID-19 anxiety, health anxiety, and other psychological implications during the current pandemic.^[5,6] One study found that more than 50% of the Chinese population expressed concerns or anxiety about the COVID-19 outbreak.^[7] Another survey revealed that over 30% of

participants reported elevated levels of mental stress and anxiety during the pandemic.^[6,8] Recent studies have also shown a long-lasting decline in quality of life even two years after major coronavirus outbreaks.^[9] A recent data synthesis highlighted the significant impact of the pandemic on the risk of major depressive disorder and anxiety disorders, with young women and parents of young children being particularly vulnerable.^[10] Research has also raised concerns about the socio-economic repercussions of COVID-19, persisting even two years after the pandemic's end.^[11] Additionally, a study reported that COVID-19 continues to affect not only patients but also their family members who engage in excessive health behaviors, even two years after the onset of the pandemic.^[12] Psychological factors play a crucial role in pandemic management strategies, underscoring the

importance of identifying individuals at risk for psychological distress.

The ongoing pandemic may trigger aversive mental images and fears of contracting COVID-19, potentially exacerbating health anxiety, as fearful imagery of contracting a life-threatening disease is linked to increased health anxiety.^[6] Despite existing research on anxiety and health anxiety, there is limited understanding of the underlying mechanisms of health anxiety, particularly in the context of the COVID-19 pandemic. Exploring potential determinants and mediators can enhance our understanding of the development and persistence of anxiety and aid in developing preventive measures and interventions.

Health anxiety refers to excessive concerns about one's health, ranging from low health consciousness to pathological health anxiety and hypochondriasis.^[13] According to cognitive-behavioral theory, heightened sensitivity to symptoms perceived as signs of health risks or serious illnesses can lead to health anxiety. This model suggests that health anxiety is characterized by catastrophic misinterpretations of bodily sensations, maladaptive beliefs about health, and dysfunctional coping behaviors.^[14]

Concerns related to contracting COVID-19 have a psychological impact and can lead to an increased focus on bodily sensations, ultimately resulting in persistent negativity.^[4] This heightened attention to and interpretation of bodily sensations is associated with health anxiety^[13] and is likely to be a predictor of COVID-19 anxiety. For instance, individuals with a high sensitivity to anxiety may misinterpret benign or temporary symptoms like dizziness as potential indicators of COVID-19, triggering anxiety and potentially prompting excessive health-related behaviors such as seeking medical advice. Body vigilance, defined as the propensity to closely monitor bodily sensations,^[15] can also predict heightened COVID-19 anxiety. Individuals with high body vigilance tend to be more sensitive to bodily sensations, leading them to fixate on physical signs that could be misconstrued as signs of serious health conditions. This harmful cycle of physical sensations, cognitive processes, and intense worry can be triggered by specific factors that render a person susceptible to elevated health anxiety. This cycle may also be perpetuated by illness behaviors, such as seeking reassurance through negative reinforcement by consulting a healthcare professional.^[16] Individuals experiencing heightened levels of anxiety often exhibit various maladaptive behaviors,^[17] which during the COVID-19 pandemic could manifest as increased handwashing and

excessive attention to physical symptoms.

Moreover, recent research has delved into how individuals respond to anxiety,^[18] with an examination of coping responses expanding existing models of health anxiety and aiding in the identification of potential prevention and treatment strategies. Previous studies have established a connection between dysfunctional coping responses and health anxiety,^[18] with cognitive evaluation found to predict disease convictions in another investigation.^[19] Coping is described as changes in cognitive and behavioral efforts to manage internal or external stressors,^[20] with active coping linked to subjective well-being while avoidant coping is associated with psychological distress.^[21] A study conducted during the 2009 H1N1 pandemic revealed that rumination, avoidance, and acquiescence were the most commonly used coping mechanisms for dealing with H1N1 anxiety.^[22]

As highlighted by numerous recent studies, anxiety and psychological disorders continue to be prevalent even beyond the initial phase of the COVID-19 pandemic. The ongoing challenges posed by COVID-19 underscore the necessity for a deeper understanding of its effects on mental health.

Objectives

This study aimed to explore the relationships among COVID-19 anxiety, health anxiety, and various coping mechanisms employed by the general public. It was hypothesized that dysfunctional coping strategies (e.g., somatization) and body vigilance would positively correlate with COVID-19 anxiety and health anxiety, while adaptive coping strategies (e.g., problem-solving) would negatively correlate with these anxieties. The hypothesis posited that coping strategies and body vigilance would act as mediators in the relationship between COVID-19 anxiety and health anxiety.

Methods

This cross-sectional study was conducted online through Google Forms. Based on the proposed minimum sample size (n=100–500) for SEM, 400 individuals living in the city of Kashan, Iran, were selected using the snowball sampling method from March to April 2020. The inclusion criteria were as follows: age between 18 and 50 years, possession of internet connectivity, completion of at least primary education up to the fifth grade, and agreement to participate in the investigation. Exclusion criteria included a history of psychological disorders, current use of psychiatric medication (as reported by the individuals),

and blindness. Out of the 400 participants, 390 (285 female, 105 male) met the study criteria and completed the measurements:

1) The Short Health Anxiety Inventory (SHAI), which evaluates health anxiety and hypochondriasis based on the cognitive model. It consists of 18 self-report items with a multiple-choice format, each with four possible statements and coding between 0-3. The instrument has two subscales: (a) health anxiety and the likelihood of getting ill (14 items), and (b) the negative outcomes feared if the illness occurs (4 items). This study utilized a validated Persian version of the SHAI.^[23]

2) The COVID-19 Anxiety scale, consisting of 10 items covering various aspects such as COVID-19 prevalence, awareness of the possibility of contracting COVID-19, perceived severity of the infection, avoidance behaviors, adherence to safe practices, and level of knowledge. Participants rated their agreement with each item on a 5-point scale ranging from 0 ("very little") to 4 ("extremely"). The Persian version of the questionnaire used in this research demonstrated a Cronbach's alpha of 0.89.

3) The Coping Responses Inventory (CRI),^[24] developed by Moos, was employed to assess individual coping strategies. It comprises 32 phrases that evaluate five coping strategies: problem-focused coping (3 items), emotional-focused coping (11 items), cognitive-focused coping (5 items), somatization-focused coping (9 items), and social support-focused coping (4 items). Scoring was done using a multiple-choice Likert scale ranging from 1 to 4. The Persian version of the CRI showed test-retest reliability with reported values of 0.79 for total score, 0.90 for problem-focused coping, 0.65 for emotional-focused coping, 0.68 for cognitive-focused coping, 0.90 for somatization-focused coping, and 0.90 for social support-focused coping.^[25]

4) The Body Vigilance Scale (BVS) consists of 4 questions assessing an individual's attention to physical symptoms. An 11-point Likert scale (0=none to 10=extreme) was used in this questionnaire. The reliability of the BVS through internal consistency method was reported as 0.75.^[15] The Persian version of the three-item BVS was utilized in this study, with an alpha coefficient of 0.85.

Data analysis was performed using SPSS (version 22.0, SPSS Inc, Chicago, IL, USA) and Amos-22 softwares. The continuous variables were expressed as the mean \pm SD, and the categorical variables were presented as a percentage and frequency. Because the data showed a non-normal distribution, the Mann-Whitney test was used to compare the parameters between patients and health groups. The relations between parameters were evaluated

using the Pearson correlation coefficient. A "P-value" less than 0.05 was considered significant.

We utilized Amos-22 software to conduct Structural Equation Modeling (SEM) and examine the proposed model. To validate the model, we employed various fit indices, including the relative χ^2 (χ^2/df), Goodness-of-Fit Index (GFI), Tucker-Lewis Index (TLI), Adjusted Goodness-of-Fit Index (AGFI), and benchmarks. The Cut-Off values for AGFI, GFI, TLI, and CFI range from 0 to 1, with values above 0.90 indicating a good model fit. Additionally, RMSEA values below 0.05 are considered ideal. A model is considered good if it meets these criteria. We tested the significance of the indirect effect using the bootstrap method with 1000 bootstrap samples. An indirect effect was deemed significant if the 95% confidence interval did not include zero.

The study was conducted in accordance with the Declaration of Helsinki. The study received approval from the ethical committee at Kashan University of Medical Science (Ethical ID: IR.KAUMS.MUHEPM.REC.1399.030).

Results

The mean age of the subjects was 32 (SD=7.71). The majority of participants (73.07%) were women with a bachelor's degree, and a significant number (56.41%) were married.

Pearson correlation findings revealed that health anxiety had a negative correlation with problem-solving, social support, and cognitive reappraisal, while emotion-focused and somatization coping mechanisms had a positive correlation with health anxiety symptoms. There was also a significant positive correlation between COVID-19 anxiety and health anxiety ($r=0.343$, $P<0.05$). However, no significant association was found between body vigilance and health anxiety or COVID-19 anxiety. Body vigilance showed a positive correlation with emotion-focused, somatization, and attracting social support coping styles. Based on these results, only coping strategies were considered as mediators and examined in the model to determine their impact on the relationship between COVID-19 anxiety and health anxiety [Table 1].

The initial SEM model showed poor fit based on fit indexes such as X^2/df index above 3, RMSEA above 0.05, and GFI, CFI, and TLI indexes below 0.90. Non-significant variables (problem-solving and attract social support) were removed from the model, resulting in the final model (model 2) which showed a good fit based on fit indexes [Table 2]. COVID-19 anxiety indirectly affects health anxiety through cognitive reappraisal, emotion-focused,

and somatization coping strategies [Figure 1]. Specifically, cognitive reappraisal negatively mediated the relationship between COVID-19 anxiety and health anxiety, confirmed

by the bootstrapping method [CI (95%)=0.31–0.56]. Additionally, there was a positive direct effect from COVID-19 anxiety to health anxiety ($\beta=0.27$, $p<0.05$).

Table 1. Pearson correlations among variables (n=390)

Variables	Mean (SD)	1	2	3	4	5	6	7
Health anxiety	14.60 (6.81)	1						
Covid-19 anxiety	36.60 (5.22)	0.343 *	1					
Problem focused	6.00 (1.78)	-0.242*	-0.02	1				
Cognitive focused	8.44 (2.61)	-0.348*	-0.05	0.728 *	1			
Emotional focused	15.23 (4.56)	0.345 *	0.17 *	0.045	0.003	1		
Somatization	6.31 (2.04)	0.500 *	0.212 *	-0.125 *	-0.124 *	0.596 *	1	
Social support	5.13 (2.32)	-0.113 *	-0.046	0.391 *	0.39 *	0.168 *	0.09	1
Body vigilance	66.57 (24.52)	0.069	-0.050	-0.018	-0.05	0.215*	0.277*	0.169*

*: $p<0.05$

Table 2. Model fitness examination indexes

Model	χ^2/df	GFI	CFI	TLI	RMSEA (0.90% CI)
1	4.16	0.78	0.63	0.60	0.08 (0.08- 0.09)
2	1/84	0/90	0/91	0/91	0/04 (0/04-0/05)

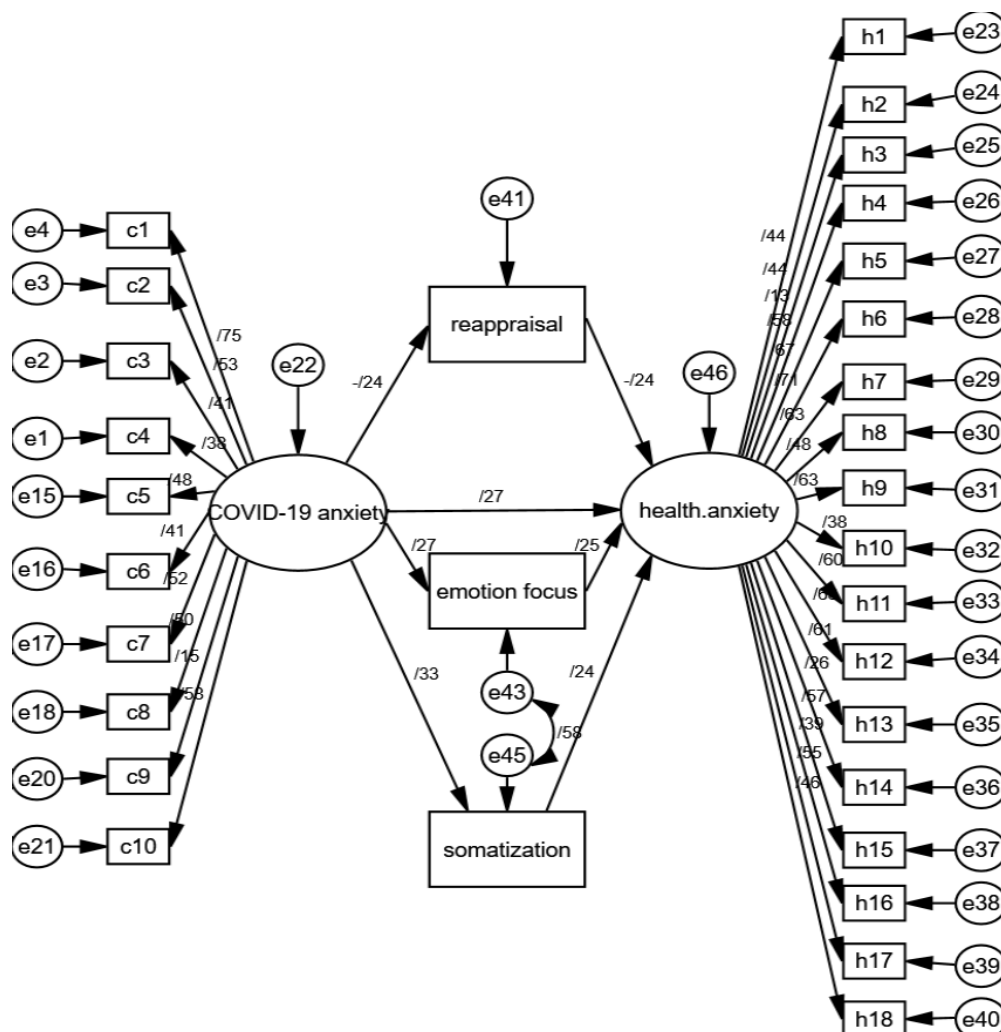


Figure 1. The outcomes of the analysis conducted using structural equation modeling to examine the indirect and direct consequences of COVID-19 anxiety and health anxiety, with coping strategies (emotion focus, cognitive reappraisal, and somatization) playing a mediating role in influencing health anxiety.

Discussion

The aim of this study was to explore the mediating role of coping mechanisms in the relationship between COVID-19-related anxiety and health anxiety during the COVID-19 pandemic. We specifically examined the potential impact of coping strategies related to body vigilance, problem-solving, emotional regulation, cognitive processing, somatic expressions, and social support.

The sample in this study exhibited a slightly elevated level of health anxiety based on the characteristics of the participants. Similarly, previous studies with non-clinical samples have reported heightened health concerns among Iranian hospital staff during the current pandemic.^[28] Recent evidence indicates that individuals in quarantine experience significant levels of anxiety, anger, confusion, and stress.^[29]

Our findings revealed a positive association between the level of COVID-19 anxiety and reported health anxiety in the general population, aligning with similar results observed during the outbreak in Iran.^[30]

When considering the Coping Response Inventory (CRI) subscales, cognitive, emotional, and somatization-focused coping mechanisms emerged as mediators between COVID-19 anxiety and health anxiety. Specifically, cognitive-focused coping played a negative mediating role between COVID-19 anxiety and health anxiety, indicating that cognitive reappraisal may act as a protective factor against the development of health anxiety in individuals experiencing COVID-19-related distress. Conversely, somatization and emotion-focused coping strategies were found to positively mediate the relationship, suggesting that these coping mechanisms may contribute to increased levels of health anxiety following COVID-19 anxiety. This contrasts with the inverse correlation observed between cognitive coping and health anxiety, supported by previous findings indicating that individuals who possess accurate health knowledge tend to experience lower levels of anxiety.^[5]

In light of these positive mediators such as emotion and somatization, it is anticipated that anxiety levels would rise, while the negative cognitive coping strategy would lead to a decrease in anxiety.^[18,19] Cognitive restructuring has been shown to effectively reduce anxiety,^[21] emphasizing the importance of adopting realistic and fact-based cognitive responses. Given the prolonged nature of the COVID-19 pandemic, it is essential to address and cope with daily stressors. While it may be easy to catastrophize in crisis situations, this mindset can generate unnecessary stress and distress according to Seligman's

theory. Shifting from worst-case scenarios to more balanced thinking can facilitate adaptive coping and reduce irrational thoughts. These findings are consistent with prior research investigating the correlation between COVID-19 anxiety and coping styles among frontline nurses in Iran, which highlighted a significant positive relationship between COVID-19-related health anxiety and emotion-oriented coping styles.^[31] Studies have also indicated that individuals employing emotion-oriented coping styles are more likely to experience heightened anxiety compared to those utilizing problem-oriented coping styles. Furthermore, research underscores the importance of coping styles in moderating the relationship between factors such as social support,^[18,19,21,32] personality traits,^[33] general health,^[34] and COVID-19-related anxiety. To mitigate anxiety effectively, it is recommended to promote adaptive coping strategies through education and intervention programs tailored to individuals' specific needs. Considering the beneficial impact of emotion-focused coping, educators and administrators should encourage trust in professional authorities and the government to enhance emotional responses. Additionally, in cases where psychological intervention is necessary, individuals should be guided to utilize online resources or seek advice through hotlines.^[35]

Like all studies, this research had several limitations. Firstly, it was a cross-sectional study, limiting the ability to draw causal conclusions. Secondly, all instruments were self-reported, and the online administration of questionnaires made it challenging to control all factors. Thirdly, due to the pandemic circumstances, random sampling was not feasible. Lastly, the unequal distribution of women and men in the study, with a majority of female participants, may restrict the generalizability of the findings to men.

Conclusions

The study demonstrated that coping strategies emphasizing emotions are associated with increased levels of health-related anxiety. Conversely, coping strategies focusing on cognition can act as a protective factor against the transition from COVID-19 anxiety to health-related anxiety. Regarding the potential protective role of emotion-focused coping strategies in relation to health anxiety, the research identified a positive link between these strategies and health anxiety. These results can serve as a basis for implementing interventions during viral outbreaks, providing accurate information about pandemics, effectively communicating messages through the media, and promoting adaptive coping strategies.

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Competing interests

The authors declare that they have no competing interests.

Abbreviations

Coronavirus disease 2019: COVID-19;

World Health Organization: WHO

Authors' contributions

All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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None.

Availability of data and materials

The data used in this study are available from the corresponding author on request.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. The study received approval from the ethical committee at Kashan University of Medical Science (Ethical ID: IR.KAUMS.MUHEPM.REC.1399.030).

Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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