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Explaining the Structural Model of Health Anxiety Based on Metacognitive Beliefs with the Mediating Role of Anxiety Sensitivity in Individuals with Obsessive–Compulsive Symptoms

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A B S T R A C T

Purpose: The present study aimed to clarify a structural equation model of health anxiety based on metacognitive beliefs, with anxiety sensitivity serving as a mediator among individuals with obsessive–compulsive symptoms.

Methods and Materials: This descriptive–correlational research utilized structural equation modeling. The statistical population consisted of all individuals exhibiting obsessive–compulsive symptoms who attended counseling centers, psychological clinics, and psychiatric clinics in Isfahan during 2024–2025. A convenience sample of 480 participants was selected. The research instruments included the Short Health Anxiety Inventory (SHAI) developed by Salkovskis and Warwick, the Metacognitions Questionnaire-30 (MCQ-30) by Wells and Cartwright-Hatton, and the Anxiety Sensitivity Index (ASI) by Floyd et al. Data analysis was performed using SPSS and AMOS software, and structural equation modeling with bootstrapping was applied to test the hypotheses.

Findings: The findings revealed that all direct paths among the study variables were statistically significant at $p < 0.05$. Anxiety sensitivity significantly mediated the relationship between metacognitive beliefs and health anxiety. The bootstrap analysis indicated that the indirect effect of metacognitive beliefs on health anxiety was 0.141, which was significant at the 0.05 level.

Conclusion: The results demonstrated that dysfunctional metacognitive beliefs contribute to the development of health anxiety by heightening anxiety sensitivity. Consequently, modifying maladaptive metacognitive beliefs and implementing interventions aimed at reducing anxiety sensitivity—such as interoceptive exposure and symptom reappraisal—can play a vital role in managing and alleviating health anxiety among individuals with obsessive–compulsive symptoms.

Keywords: *health anxiety; metacognitive beliefs; anxiety sensitivity; obsessive–compulsive symptoms*

1. Introduction

Health anxiety, defined as an excessive and persistent fear of having or acquiring a serious illness, represents a significant challenge in contemporary psychological and medical sciences. It often manifests through misinterpretation of benign bodily sensations and persistent health-related worries that can severely impair daily functioning and quality of life (Taylor, 2014). This construct, which exists along a continuum from mild health concerns to severe hypochondriasis, has gained increasing attention in both clinical and community populations. As empirical evidence accumulates, researchers have begun to conceptualize health anxiety not merely as a product of cognitive distortion but as a phenomenon deeply influenced by metacognitive processes and sensitivity to anxiety-related sensations (Bailey & Wells, 2013; Wells, 2011).

The persistence and intensity of health anxiety have been linked to maladaptive metacognitive beliefs that shape the way individuals monitor, interpret, and respond to their bodily sensations and intrusive health-related thoughts (Wells & Matthews, 2014). According to the metacognitive model, individuals with dysfunctional metacognitive beliefs develop a heightened focus on internal cues, leading to cycles of worry and rumination that sustain anxiety (Bailey & Wells, 2015; Kaur et al., 2011). These beliefs—such as the conviction that worrying helps prevent illness or that one's thoughts are uncontrollable and dangerous—form the foundation for sustained hypervigilance and fear responses to normal physiological experiences (Shirinzadeh Dastgiry et al., 2008; Wells & Cartwright-Hatton, 2004).

Health anxiety also frequently overlaps with obsessive–compulsive symptomatology, where repetitive checking behaviors, reassurance seeking, and intrusive illness-related obsessions mimic compulsive processes (Stein et al., 2019; Wootton & Tolin, 2016). Individuals experiencing obsessive–compulsive symptoms (OCS) often exhibit elevated anxiety sensitivity—the belief that anxiety sensations have harmful physical, cognitive, or social consequences—which may mediate the relationship between metacognitive dysfunction and health anxiety (Hovenkamp-Hermelink et al., 2019; Majidazar et al., 2023). This intersection highlights a critical pathway through which cognitive and metacognitive mechanisms converge to exacerbate health-related fears and behaviors.

Anxiety sensitivity, conceptualized as the fear of anxiety symptoms based on beliefs about their potential negative outcomes (Taylor, 2014), has been shown to play a crucial mediating role in anxiety-related disorders, including panic disorder, generalized anxiety disorder, and health anxiety (Floyd et al., 2005; Foroughi et al., 2019). Individuals with high anxiety sensitivity tend to misinterpret physiological arousal (e.g., increased heart rate or dizziness) as indicators of serious medical conditions, thereby amplifying health-related concerns and perpetuating avoidance or reassurance-seeking behavior (Chiu et al., 2024; Wright et al., 2016).

Recent research underscores that health anxiety is not static but is influenced by environmental, social, and situational stressors. For instance, global health crises such as the COVID-19 pandemic and the mpox outbreak have been associated with heightened health anxiety, particularly among vulnerable populations (Norbye et al., 2023; Otmar & Merolla, 2025). Such events not only magnify perceptions of bodily vulnerability but also interact with individual differences in metacognition and anxiety sensitivity, resulting in chronic maladaptive cognitive cycles (Haig-Ferguson et al., 2021). These findings underscore the necessity of integrative models that account for both cognitive structures (beliefs about illness) and metacognitive mechanisms (beliefs about thinking processes) (Keen et al., 2022; Lenzo et al., 2020).

In this context, metacognitive theory provides a valuable framework for understanding the mechanisms underlying health anxiety. Wells and Matthews's self-regulatory executive function (S-REF) model posits that dysfunctional metacognitive beliefs lead to cognitive attentional syndrome (CAS)—a maladaptive thinking style characterized by worry, threat monitoring, and rumination (Wells & Matthews, 2014). Within the CAS framework, individuals engage in repetitive health-related thought patterns that are resistant to reassurance, thereby maintaining anxiety through self-reinforcing loops (Bailey & Wells, 2015). Empirical research supports the mediating influence of metacognitive beliefs in health anxiety, showing that these beliefs amplify health worries independently of other cognitive distortions such as catastrophic misinterpretation or neuroticism (Bailey & Wells, 2013; Fergus, 2013).

The metacognitive approach also emphasizes that health anxiety is sustained by beliefs regarding the uncontrollability and danger of thoughts. For example, individuals may interpret the mere presence of illness-related thoughts as evidence of being unwell, creating a feedback loop between thought content and emotional distress (Kaur et al., 2011; Wells & Cartwright-Hatton, 2004). Shirinzadeh Dastgiry et al. (2008) demonstrated the robust psychometric properties of the Persian

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Metacognitions Questionnaire-30 (MCQ-30), further enabling the investigation of such beliefs in clinical and cultural contexts. This instrument assesses five key dimensions of metacognitive beliefs: positive beliefs about worry, negative beliefs about thoughts, cognitive confidence, cognitive self-consciousness, and beliefs about the need to control thoughts—dimensions all relevant to health anxiety.

Additionally, studies indicate that anxiety sensitivity serves as a bridge between metacognitive processes and health anxiety (Majidazar et al., 2023; Soleimani Babadi et al., 2022). High anxiety sensitivity can lead individuals to interpret benign bodily sensations as catastrophic, intensifying health concerns and fostering compulsive checking or avoidance behaviors (Cookson et al., 2020). This sensitivity reflects not only cognitive appraisal but also deeper metacognitive beliefs about the harmful nature of anxiety itself. Hovenkamp-Hermelink et al. (2019) found that anxiety sensitivity exhibits longitudinal stability and correlates strongly with the severity of anxiety symptoms over time, supporting its role as a key transdiagnostic construct.

The intricate association between metacognitive beliefs and anxiety sensitivity has been the subject of multiple systematic reviews and meta-analyses. Lenzo et al. (2020) revealed that dysfunctional metacognitions are prevalent across chronic medical conditions, suggesting that such beliefs contribute to maladaptive emotional regulation beyond psychiatric populations. Similarly, Keen et al. (2022) found that health-related metacognitive beliefs significantly predict health anxiety and somatic distress, providing strong evidence for the cognitive–metacognitive interaction model. Moreover, empirical research by Polat (2025) demonstrated that health anxiety coexists with constructs such as intolerance of uncertainty, rumination, and low self-compassion—factors that further interact with metacognitive processes in maintaining anxiety.

Health anxiety is not only maintained by internal cognitive processes but also by environmental and informational factors. Otmar and Merolla (2025) found that media exposure and social determinants significantly predict levels of health anxiety among marginalized groups. Similarly, Bulut et al. (2025) emphasized the predictive power of introspective awareness—an individual's ability to observe and reflect upon internal experiences—in the formation of health anxiety. Together, these findings highlight how personal introspection, social context, and metacognitive dysfunction jointly influence the onset and persistence of health-related fears.

Cross-cultural studies further reinforce the relevance of metacognition in health anxiety. The adaptation and validation of measurement tools, such as the Persian versions of the Health Anxiety Inventory (HAI) (Nargesi et al., 2016) and the Yale–Brown Obsessive–Compulsive Scale (Y-BOCS) (Rajezi Esfahani et al., 2012), have facilitated cross-national research on these constructs. Likewise, Foroughi et al. (2019) validated the Persian version of the Anxiety Sensitivity Index (ASI-3), demonstrating its reliability in assessing the fear of anxiety sensations. Such efforts enable culturally sensitive research that captures the nuances of how metacognition and anxiety sensitivity operate across different populations.

At a broader level, the interplay between health anxiety, metacognitive beliefs, and anxiety sensitivity has profound implications for prevention and treatment. Metacognitive therapy (MCT), developed by Wells, focuses on modifying maladaptive metacognitive beliefs rather than directly challenging the content of anxious thoughts (Wells, 2011). Empirical findings show that interventions targeting metacognitive regulation effectively reduce worry, rumination, and health anxiety symptoms (Bailey & Wells, 2015; Cookson et al., 2020). Moreover, addressing anxiety sensitivity through interoceptive exposure or psychoeducation can reduce the fear of bodily sensations and disrupt the anxiety maintenance cycle (Chiu et al., 2024; Hovenkamp-Hermelink et al., 2019).

Despite substantial progress, gaps remain in understanding how metacognitive processes and anxiety sensitivity interact dynamically to influence health anxiety, particularly among individuals with obsessive–compulsive features. Pearcy et al. (2016) suggested that self-help therapeutic approaches may be less effective without sufficient therapeutic contact, implying that direct modification of metacognitive schemas might require structured interventions. Furthermore, emerging research advocates for integrating metacognitive frameworks with models of intolerance of uncertainty and distress tolerance to develop comprehensive predictive models of health anxiety (Majidazar et al., 2023; Polat, 2025).

In summary, the literature highlights that health anxiety is a multifaceted construct influenced by cognitive, metacognitive, and affective mechanisms. Dysfunctional metacognitive beliefs contribute to maladaptive patterns of thought monitoring and interpretation, while anxiety sensitivity amplifies the emotional and physiological

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components of these fears. As recent studies confirm the mediating role of anxiety sensitivity between metacognitive beliefs and health anxiety, it becomes evident that an integrated structural model is essential to understanding the interrelationships among these variables (Bulut et al., 2025; Soleimani Babadi et al., 2022). The present study thus seeks to clarify the structural model of health anxiety based on metacognitive beliefs with anxiety sensitivity as a mediator in individuals with obsessive–compulsive symptoms.

2. Methods and Materials

2.1. Study Design and Participants

This study adopted a descriptive–correlational design employing structural equation modeling (SEM). The statistical population included all individuals exhibiting obsessive–compulsive symptomatology in Isfahan who attended counseling centers, psychological clinics, and psychiatric hospitals during 2024–2025. A convenience sampling method was used to recruit volunteer participants. Considering the complexity of the proposed model—which incorporated multiple constructs such as health anxiety, metacognitive beliefs, and the mediating role of anxiety sensitivity among individuals with obsessive–compulsive symptoms—a sample size of 480 participants was determined to be adequate for statistical power and model estimation.

Step 1: After receiving ethical approval from Islamic Azad University, Khomeinishahr Branch, and obtaining the necessary institutional permissions, participants with obsessive–compulsive symptoms were identified and recruited through convenience sampling methods.

Step 2: Participants were informed about the study objectives, the confidentiality of their responses, and their right to withdraw at any stage without penalty. Written informed consent was obtained from all participants prior to data collection.

Step 3: The research instruments were administered to participants in both face-to-face and online formats. Detailed instructions were provided to ensure clarity and completeness in responding to the questionnaires.

Step 4: Upon completion, all data were collected, screened, and prepared for statistical analysis.

2.2. Data Collection Tool

Yale–Brown Obsessive–Compulsive Scale (Y-BOCS): The Yale–Brown Obsessive–Compulsive Scale was developed by Goodman et al. (1989). This instrument consists of 10 self-report items rated on a five-point Likert scale. It provides three scores: obsession severity (items 1–5), compulsion severity (items 6–10), and a total score combining all items. Goodman et al. (1989) reported high internal consistency ($\alpha = 0.96$) and test–retest reliability ($r = 0.98$). In the Iranian adaptation, Rajezi Esfahani et al. (2012) reported internal consistency of 0.95 and test–retest reliability of 0.99, indicating robust psychometric properties.

Health Anxiety Inventory (HAI-18): The short form of the Health Anxiety Inventory was developed by Salkovskis and Warwick (2002) and comprises 18 items. Each item contains four statements describing health- and illness-related self-perceptions; respondents select the statement that best represents their current thoughts or feelings. Each item is scored from 0 to 3 (A = 0, B = 1, C = 2, D = 3), with higher scores reflecting greater health anxiety. Total scores can range from 0 to 54. For men, scores below 26 indicate low health anxiety, 26–34 moderate, and above 41 high; for women, scores below 27 indicate low, 27–34 moderate, and above 41 high health anxiety (Salkovskis & Warwick, 2002). The scale includes three factors: general health concern, fear of illness, and perceived negative consequences. The HAI was translated into Persian by Nargesi (2016) and reviewed by subject matter experts. The translation was refined through multiple iterations and piloted with students to ensure clarity. In the validation phase, the Persian HAI was administered alongside the Ahvaz Self-Perception of Illness Test. Test–retest reliability was 0.90, and Cronbach's alpha ranged between 0.70 and 0.82 (Nargesi et al., 2016). In a separate study involving 375 teachers in Andimeshk (2011), Cronbach's alpha was 0.87, confirming good internal consistency. Convergent validity assessed via the Illness Attitudes Scale (IAS) yielded a validity coefficient of 0.63 for the HAI, while Abramowitz and Moore (2007) reported 0.94. The correlation between the HAI and the Ahvaz Self-Perception Test was 0.75 ($p < 0.001$), supporting satisfactory convergent validity.

Metacognitions Questionnaire (MCQ-30): The Metacognitions Questionnaire (MCQ-30), developed by Wells and Cartwright-Hatton (2004), is a 30-item self-report scale that assesses beliefs about one's own thinking processes. Items are rated on a four-point Likert scale (1 = strongly disagree to 4 = strongly agree). The instrument comprises five subscales: (a) positive beliefs about worry, (b) beliefs about uncontrollability and danger of worry, (c) cognitive confidence, (d) negative beliefs about thoughts (including responsibility and superstition), and (e) cognitive

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self-consciousness. The Persian version was translated and validated by Shirinzadeh Dastgiry et al. (2008). The internal consistency coefficient (Cronbach's alpha) for the total scale was 0.91. Subscale reliabilities were as follows: uncontrollability (0.87), positive beliefs (0.86), cognitive self-consciousness (0.81), cognitive confidence (0.80), and need to control thoughts (0.71). Construct validity was confirmed through factor analysis, with internal consistency coefficients ranging between 0.76 and 0.93. Content validity was established by expert review (two clinical psychologists and one psychiatrist). Split-half reliability and Cronbach's alpha were 0.79, and test–retest reliability over a two-week interval with 52 participants was 0.88, indicating strong stability.

Anxiety Sensitivity Index (ASI): The Anxiety Sensitivity Index was originally developed by Reiss, Peterson, Gursky, and McNally, and later revised by Floyd et al. (2005) into the 16-item ASI-16. This scale includes 16 items grouped into three components: (1) fear of somatic sensations, (2) fear of loss of cognitive control, and (3) fear of publicly observable anxiety. Responses are scored on a five-point Likert scale ranging from 0 (very little) to 4 (very much). Example items include statements such as, "When I cannot keep my attention on a task, I worry that I might go crazy," which assess sensitivity to anxiety-related sensations. Cronbach's alpha for the ASI has been reported between 0.80 and 0.90 internationally, while Foroughi et al. (2019) reported $\alpha = 0.90$ for the Persian version, confirming high internal consistency.

2.3. Data Analysis

In the descriptive phase, indices such as the mean and standard deviation were computed to summarize study variables. Frequency tables, charts, and graphs were used to present demographic information obtained from participants.

In the inferential phase, the Kolmogorov–Smirnov test was employed to examine data normality. Since the data met the assumption of normal distribution, structural equation modeling (SEM) was conducted using AMOS version 23 to test the hypothesized relationships among variables. The bootstrap method was also applied to estimate the significance of mediating effects at a 95% confidence interval.

3. Findings and Results

The demographic characteristics of the study sample are presented in the table below. Slightly more than half of the participants were female, while slightly fewer were male. Married participants comprised a clear majority compared to single participants. In terms of occupational status, unemployed individuals represented the largest group. Over 30% of the respondents held at least a bachelor's degree. The mean age of participants was 37.00 years (SD = 6.22); the youngest participant was 20 years old and the oldest was 50 years old.

Table 1

Demographic Characteristics

Variable	Frequency	Percentage (%)
Gender		
Male	207	43.1
Female	273	56.9
Marital Status		
Single	186	38.8
Married	294	61.3
Employment Status		
Employed	238	50.47
Unemployed	242	50.52
Education Level		
High school diploma or below	97	20.2
Associate degree	109	22.7
Bachelor's degree	171	35.6
Master's degree and above	103	21.5

The descriptive statistics for the main study variables are shown below.

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Table 2

Descriptive Statistics of Study Variables

Variable	Mean	SD	Minimum	Maximum
Health anxiety	27.052	14.993	0	54
Illness occurrence	9.017	5.339	0	18
Consequences of illness	7.492	4.491	0	15
Overall health worry	10.544	5.824	0	21
Anxiety sensitivity	48.015	15.262	16	80
Fear of bodily sensations	23.975	8.787	8	40
Fear of loss of cognitive control	11.969	4.694	4	20
Fear of anxiety being observed by others	12.071	4.613	4	20
Metacognitive beliefs	89.752	31.913	30	150
Cognitive conflict	17.998	6.468	6	30
Positive beliefs about worry	17.890	6.582	6	30
Cognitive self-consciousness	17.913	6.922	6	30
Uncontrollability and danger of thoughts	17.963	6.860	6	30
Need to control thoughts	17.990	6.654	6	30

The means and standard deviations of the main study variables were as follows: Health Anxiety (HAI-18) = 27.052 ± 14.993, Anxiety Sensitivity (ASI) = 48.015 ± 15.262, and Metacognitive Beliefs (MCQ-30) = 89.752 ± 31.913.

Skewness and kurtosis indices were calculated to assess the normality of the data. All variables exhibited skewness and kurtosis values within the range of −2 to +2, indicating approximate normality. Therefore, the assumptions for parametric analysis were met, allowing for the use of structural equation modeling.

As shown in the table below, the correlation coefficients among the main study variables were positive and statistically significant ($p < 0.05$).

Table 3

Correlation Coefficients Between Main Study Variables

Variable	Health anxiety	Anxiety sensitivity	Metacognitive beliefs
Health anxiety	1		
Anxiety sensitivity	0.834**	1	
Metacognitive beliefs	0.656**	0.688**	1

**$p < 0.0001$

According to the results presented in the table below, the model's comparative and incremental fit indices (TLI, NFI, CFI, RFI, IFI), parsimony and relative fit indices (PRATIO, PGFI, PCFI, PNFI), and the overall fit ratio (CMIN/DF) all fall within desirable ranges. The RMSEA and GFI values are also within acceptable limits. Collectively, these indices indicate an excellent overall fit of the proposed model. This suggests that the specified structural model of health anxiety in individuals with obsessive–compulsive symptoms is well supported by the data, confirming that metacognitive beliefs significantly explain health anxiety, with anxiety sensitivity serving as a mediating variable.

Table 4

Overall Fit Indices for Path Analysis

Index	Good Model Fit	Acceptable Model Fit	Observed Model Fit Values
Absolute Fit Indices			
Chi-square (χ^2)	Close to 0 (0 = perfect fit)	Smaller is better	1.463
p-value	> 0.05	> 0.05	0.0001
GFI	> 0.95	0.90–0.95	0.917
AGFI	> 0.95	0.90–0.95	0.896
Comparative Fit Indices			

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TLI	> 0.95	0.90–0.95	0.981
NFI	> 0.95	0.90–0.95	0.971
CFI	> 0.95	0.90–0.95	0.983
RFI	> 0.90	0.85–0.90	0.967
IFI	> 0.95	0.90–0.95	0.983
Parsimonious Fit Indices			
RMSEA	< 0.05	0.05–0.10	0.052
CMIN/DF	1–3	3–5	2.293
PRATIO	> 0.60	0.50–0.60	0.874
PGFI	> 0.55	0.50–0.55	0.732
PCFI	> 0.60	0.50–0.60	0.860
PNFI	> 0.60	0.50–0.60	0.849

According to Table 5, the *t*-statistic for the relationship between metacognitive beliefs and health anxiety is $t = 17.653$, with a significance level of $p = 0.0001$.

Since $t > 1.96$ and $p < 0.05$, the relationship between metacognitive beliefs and health anxiety is statistically significant at the 5% level.

The positive regression coefficient indicates a direct positive association, meaning that as metacognitive beliefs increase, levels of health anxiety also rise.

Therefore, there exists a positive and significant relationship between metacognitive beliefs and health anxiety among individuals with obsessive–compulsive symptomatology.

Table 5

Results of the Third Sub-Hypothesis Test

Unstandardized Regression Coefficient	Standard Error	Standardized Regression Coefficient	*t*-Statistic	Significance Level
0.55	0.03	0.68	13.65	0.0001

According to Table 6, the *t*-statistic for the relationship between anxiety sensitivity and health anxiety is $t = 27.941$, with a significance level of $p = 0.0001$.

Since $t > 1.96$ and $p < 0.05$, anxiety sensitivity is statistically significantly associated with health anxiety at the 5% significance level.

The positive regression coefficient indicates a direct positive relationship, showing that as anxiety sensitivity increases, health anxiety also increases.

Therefore, there is a positive and significant relationship between anxiety sensitivity and health anxiety among individuals with obsessive–compulsive symptomatology.

Table 6

Results of the Fourth Sub-Hypothesis Test

Unstandardized Regression Coefficient	Standard Error	Standardized Regression Coefficient	*t*-Statistic	Significance Level
0.53	0.02	0.88	27.94	0.0001

Bootstrap analyses (see Tables 7 and 8) revealed a statistically significant indirect effect of metacognitive beliefs on health anxiety through anxiety sensitivity, with a standardized indirect estimate of 0.475 ($p < 0.05$).

Thus, anxiety sensitivity plays a significant mediating role in the relationship between metacognitive beliefs and health anxiety in individuals with obsessive–compulsive symptomatology.

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Figure 1

Unstandardized coefficients for the mediating role of anxiety sensitivity in predicting health anxiety based on metacognitive beliefs.

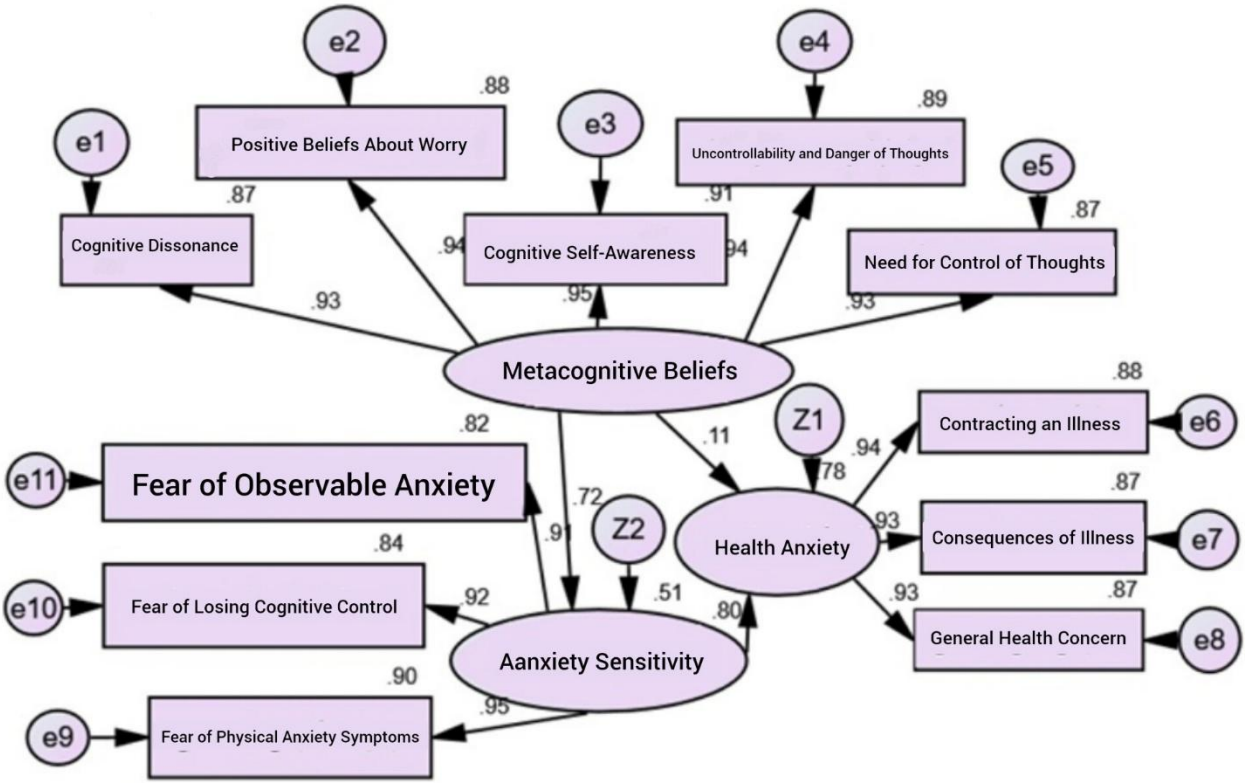

Table 7

Bootstrap Results for Indirect Relationships

Path	Indirect Effect (Value)	Significance Level	95% Confidence Interval (Lower–Upper)
Metacognitive beliefs → Anxiety sensitivity → Health anxiety	0.48	0.001	0.42 – 0.54

4. Discussion and Conclusion

The present study aimed to explain the structural model of health anxiety based on metacognitive beliefs, with the mediating role of anxiety sensitivity in individuals exhibiting obsessive–compulsive symptoms. The results confirmed that metacognitive beliefs had a significant and positive relationship with health anxiety, and that anxiety sensitivity significantly mediated this relationship. These findings provide strong empirical support for the proposed conceptual model, demonstrating that maladaptive metacognitive beliefs contribute to heightened anxiety sensitivity, which in turn amplifies health anxiety. In essence, individuals who hold rigid or dysfunctional beliefs about their thinking processes—such as believing that worrying helps prevent illness or that thoughts are uncontrollable—tend to interpret physiological sensations as threatening, leading to excessive preoccupation with health.

This relationship is consistent with the theoretical framework of Wells's self-regulatory executive function (S-REF) model, which posits that maladaptive metacognitions activate a "cognitive–attentional syndrome" (CAS) characterized by worry, rumination, and threat monitoring (Wells, 2011; Wells & Matthews, 2014). The current findings align with empirical evidence that higher levels of maladaptive metacognitive beliefs predict stronger health anxiety symptoms (Bailey & Wells, 2013, 2015). The significant direct path between metacognitive beliefs and health anxiety observed in this study suggests that the way individuals appraise their own thoughts may be more influential than the specific content of those thoughts. This is consistent with the conclusions of (Keen et al., 2022), who found that health-related metacognitive beliefs

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independently predict somatic distress beyond general anxiety or illness cognition.

The results also demonstrated that anxiety sensitivity functions as a mediator in the relationship between metacognitive beliefs and health anxiety. This finding supports the proposition that maladaptive metacognitive processes enhance the fear of anxiety sensations by heightening vigilance toward bodily cues and misinterpreting them as signs of disease. This mechanism is consistent with the model of (Taylor, 2014), who conceptualized anxiety sensitivity as the fear of anxiety sensations due to beliefs about their harmful physical, cognitive, or social consequences. Individuals with high anxiety sensitivity interpret normal bodily sensations such as palpitations or dizziness as catastrophic, fueling health-related worry and avoidance behaviors (Floyd et al., 2005; Wright et al., 2016). The present study's results parallel findings by (Majidazar et al., 2023), who demonstrated that anxiety sensitivity not only correlates with health anxiety but also mediates the relationship between cognitive and emotional factors, such as distress tolerance and intolerance of uncertainty.

The positive and significant path between metacognitive beliefs and health anxiety found here aligns with (Kaur et al., 2011), who observed that maladaptive metacognitions predict attentional bias toward illness-related cues. Similarly, (Bailey & Wells, 2015) reported that metacognitive beliefs moderate the association between catastrophic misinterpretation of bodily sensations and health anxiety, implying that metacognitions amplify the impact of cognitive distortions on anxiety levels. The findings of the present study extend this body of work by identifying anxiety sensitivity as an intermediary process that channels the effects of metacognitions on health anxiety.

The mediating role of anxiety sensitivity is further supported by longitudinal research. (Hovenkamp-Hermelink et al., 2019) found that anxiety sensitivity exhibits temporal stability and predicts anxiety severity over time, suggesting its persistence as a dispositional risk factor. Likewise, (Foroughi et al., 2019) validated the psychometric robustness of the Anxiety Sensitivity Index (ASI) in Iranian samples, confirming its predictive association with anxiety disorders. Together, these findings highlight anxiety sensitivity as a crucial transdiagnostic construct through which maladaptive metacognitive beliefs manifest as heightened health concerns and avoidance patterns.

The results also confirm the relevance of metacognitive mechanisms to obsessive–compulsive symptomatology. Individuals with obsessive–compulsive symptoms frequently experience intrusive thoughts about contamination, illness, or bodily harm, leading to compulsive reassurance seeking and checking behaviors (Stein et al., 2019; Wootton & Tolin, 2016). These compulsive tendencies share functional similarities with health anxiety, particularly in the role of metacognition. The belief that intrusive thoughts are uncontrollable or dangerous may intensify both obsessional and health-related anxiety (Shirinzadeh Dastgiry et al., 2008; Wells & Cartwright-Hatton, 2004). The present findings indicate that such beliefs increase anxiety sensitivity, thereby heightening vigilance to physiological sensations and triggering health-related worry cycles.

The mediational pathway supported in this study aligns with emerging empirical evidence emphasizing the interplay between cognitive, emotional, and physiological processes in anxiety-related disorders. For instance, (Chiu et al., 2024) demonstrated through meta-analysis that anxiety sensitivity is a robust predictor of post-traumatic stress symptoms in trauma-exposed adults. Similarly, (Cookson et al., 2020) found that cognitive fusion and experiential avoidance significantly predict anxiety and depression, underscoring the importance of maladaptive self-regulatory processes. The convergence of these findings reinforces the conceptualization of anxiety sensitivity as a mechanism through which metacognitive dysregulation perpetuates emotional distress.

The model fit indices obtained in this research indicated an excellent fit, confirming that the hypothesized structural model accurately represents the observed data. This provides empirical validation for integrative frameworks linking metacognition and anxiety sensitivity in explaining health anxiety. Comparable results have been observed in (Soleimani Babadi et al., 2022), where health-related metacognitive beliefs, anxiety sensitivity, and intolerance of uncertainty jointly predicted health anxiety, suggesting that these constructs form an interconnected system rather than independent predictors. The present study corroborates this interaction, highlighting the mediating role of anxiety sensitivity as a bridge between cognitive appraisal and affective response.

The findings also hold relevance in the context of recent global health crises. The escalation of health anxiety during pandemics has been documented across multiple studies. (Norbye et al., 2023) reported elevated health anxiety levels during the COVID-19 pandemic compared with pre-pandemic conditions, and (Haig-Ferguson et al., 2021)

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observed similar patterns among children and adolescents. Furthermore, (Otmar & Merolla, 2025) identified that social determinants and health-related media exposure significantly contributed to health anxiety among young sexual minority men during the 2022 mpox outbreak. These studies collectively affirm that environmental stressors can amplify preexisting metacognitive vulnerabilities and anxiety sensitivity, exacerbating health anxiety symptoms.

Moreover, the present findings resonate with the growing evidence that introspective awareness and metacognitive monitoring are critical to health anxiety development. (Bulut et al., 2025) found that individuals with heightened introspective awareness exhibit stronger health anxiety tendencies, as their ability to detect bodily sensations is accompanied by negative interpretations fueled by maladaptive metacognitions. This supports the notion that awareness of internal states, when coupled with dysfunctional metacognitive evaluation, leads to excessive vigilance and worry about health.

The findings also align with systematic reviews showing that metacognitive dysfunctions contribute to emotional maladaptation across medical and psychiatric populations. (Lenzo et al., 2020) demonstrated that metacognitive beliefs are consistently implicated in adjustment difficulties among patients with chronic illnesses. The authors suggested that addressing maladaptive metacognitive beliefs could improve coping and reduce anxiety. Similarly, (Keen et al., 2022) emphasized that metacognitive beliefs are stronger predictors of health anxiety than traditional illness cognition models. The current study reinforces these conclusions by empirically showing that individuals with stronger maladaptive metacognitive beliefs experience greater anxiety sensitivity and health anxiety.

These results have significant clinical implications. The finding that anxiety sensitivity mediates the relationship between metacognitive beliefs and health anxiety suggests that interventions should target both metacognitive and interoceptive processes. Metacognitive therapy (MCT), which focuses on modifying beliefs about worry and cognitive control, may be particularly effective for such populations (Wells, 2011). In parallel, interoceptive exposure techniques that reduce anxiety sensitivity could help individuals reinterpret bodily sensations in less threatening ways (Taylor, 2014). Combining these approaches could disrupt the reinforcing cycle of maladaptive metacognition, anxiety sensitivity, and health anxiety.

In addition, the results support the notion that metacognitive factors play a transdiagnostic role across anxiety-related disorders. As (Fergus, 2013) highlighted, repetitive negative thinking and health anxiety share a common cognitive–emotional framework involving overestimation of threat and misinterpretation of bodily signals. The current findings extend this by confirming that such patterns are mediated by heightened anxiety sensitivity. Integrating cognitive-behavioral and metacognitive interventions could therefore improve treatment outcomes in both health anxiety and obsessive–compulsive spectrum disorders.

Furthermore, this study underscores the importance of culturally validated assessment tools in advancing cross-cultural mental health research. Instruments such as the Persian versions of the Health Anxiety Inventory (Nargesi et al., 2016), the Yale–Brown Obsessive–Compulsive Scale (Rajezi Esfahani et al., 2012), and the Anxiety Sensitivity Index (Foroughi et al., 2019) have proven reliable for evaluating these constructs in non-Western populations. The use of validated tools enhances the generalizability of findings and ensures that cultural nuances are captured in interpreting cognitive and metacognitive phenomena.

Taken together, the results contribute to a growing body of evidence supporting an integrative model of health anxiety that bridges metacognitive theory and affective neuroscience. They underscore that maladaptive metacognitive beliefs amplify anxiety sensitivity, which subsequently fuels health anxiety symptoms. By clarifying these pathways, the study advances theoretical understanding and informs the design of more targeted psychological interventions for individuals with health-related anxiety and obsessive–compulsive traits.

Despite its contributions, this study is subject to several limitations. The cross-sectional design precludes causal inference, limiting the ability to determine the temporal sequence between metacognitive beliefs, anxiety sensitivity, and health anxiety. Longitudinal data would be necessary to establish directionality and explore potential bidirectional effects. Additionally, reliance on self-report instruments may introduce response bias, as participants might underreport or overreport symptoms due to social desirability or limited introspective accuracy. The convenience sampling method, restricted to individuals in Isfahan, also limits the generalizability of findings to broader or more diverse populations. Finally, the study did not control for comorbid psychological conditions such as

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depression or generalized anxiety, which may confound the observed associations.

Future research should employ longitudinal or experimental designs to clarify causal relationships among metacognitive beliefs, anxiety sensitivity, and health anxiety. Expanding samples to include clinical populations across different cultural and demographic contexts would enhance the generalizability of results. Future studies may also examine potential moderating variables—such as intolerance of uncertainty, distress tolerance, or mindfulness—to identify additional pathways influencing health anxiety. Integrating physiological measures, such as heart rate variability or interoceptive accuracy, could provide objective insights into how anxiety sensitivity operates at the biological level. Furthermore, future research should assess the efficacy of combined metacognitive and interoceptive exposure therapies in reducing both metacognitive dysfunction and health anxiety.

Clinicians should integrate metacognitive and anxiety sensitivity–based approaches in the assessment and treatment of health anxiety. Interventions should aim to help clients recognize and modify maladaptive metacognitive beliefs, reduce hypervigilance toward bodily sensations, and reframe catastrophic interpretations of anxiety symptoms. Psychoeducation about the benign nature of most physiological sensations can further reduce anxiety sensitivity. Implementing preventive interventions in primary care or workplace settings could also mitigate the escalation of health anxiety symptoms. Ultimately, training mental health professionals in metacognitive therapeutic principles can enhance treatment effectiveness and promote long-term emotional resilience in individuals vulnerable to health anxiety.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

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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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent. (Ethics Code: IR.IAU.KHSH.REC.1404.198)

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