

Presenting a Structural Relationship Model of Death Anxiety and Hypochondriacal Thoughts with Illness Perception in Older Adults: Examining the Mediating Role of Health-Promoting Behaviors

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ABSTRACT

This study was conducted with the aim of presenting a structural relationship model between death anxiety and hypochondriacal thoughts with illness perception in older adults, and examining the mediating role of health-promoting behaviors. The statistical population consisted of older adults in the city of Khoy, who were selected using a convenience sampling method. Data were collected using Templer's Death Anxiety Scale, Evans' Hypochondriacal Thoughts Questionnaire, Broadbent's Illness Perception Questionnaire, and Walker's Health-Promoting Lifestyle Profile, and were analyzed using structural equation modeling in SPSS-22 and Smart PLS software. The results indicated that death anxiety (path coefficient = 0.42, $p < 0.001$) and hypochondriacal thoughts (path coefficient = 0.38, $p < 0.01$) had a direct and significant effect on illness perception. Furthermore, health-promoting behaviors, as a mediating variable, moderated the relationship between death anxiety (indirect effect = 0.19, $p < 0.05$) and hypochondriacal thoughts (indirect effect = 0.22, $p < 0.01$) with illness perception. The proposed model demonstrated a good fit (NFI = 0.960 and SRMR = 0.058) and explained 65% of the variance in illness perception. The findings of this study emphasize the importance of considering psychological factors such as death anxiety and hypochondriacal thoughts in older adults and suggest that strengthening health-promoting behaviors can improve illness perception and quality of life in this population. The results of this study can provide a basis for designing psychological interventions and health promotion programs for older adults.

Keywords: Death anxiety, illness perception, health-promoting behaviors, hypochondriacal thoughts, older adults

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Introduction

Aging is a universal and inevitable developmental process accompanied by progressive biological, psychological, and social changes that significantly influence individuals' health status and quality of life. With increasing life expectancy worldwide, the proportion of older adults has risen dramatically, making aging-related health issues a major public health concern (1, 2). In this context, understanding the psychological determinants of health in older adulthood has become a critical research priority, particularly

given that aging is often associated with chronic conditions, functional decline, and increased vulnerability to psychological distress (3, 4). Among the key psychological constructs influencing health outcomes in this population, illness perception, death anxiety, and maladaptive cognitive patterns such as hypochondriacal thoughts have received growing scholarly attention due to their significant roles in shaping health-related behaviors and well-being.

Illness perception refers to individuals' cognitive and emotional representations of their illness, encompassing beliefs about its causes, consequences, controllability, and duration (5). These perceptions play a fundamental role in determining how individuals respond to illness, adhere to treatment, and engage in health-promoting behaviors. Research has demonstrated that maladaptive illness perceptions are associated with poorer psychological adjustment, lower quality of life, and reduced adherence to medical recommendations (6, 7). In older adults, illness perception becomes particularly salient due to the increased prevalence of chronic diseases and the need for ongoing self-management, making it a crucial factor in determining health outcomes and overall well-being.

Death anxiety, defined as the apprehension or fear related to death and the dying process, is another critical psychological variable in older adulthood. It is considered a transdiagnostic construct that underlies a wide range of psychological disorders and emotional difficulties (8, 9). The aging process often intensifies awareness of mortality, thereby increasing susceptibility to death-related fears and existential concerns (10). Empirical studies have consistently shown that higher levels of death anxiety are associated with increased psychological distress, reduced life satisfaction, and impaired well-being among older adults (11, 12). Furthermore, death anxiety has been found to influence individuals' perceptions of illness, leading to heightened symptom awareness and negative interpretations of health conditions (13, 14). This suggests that death anxiety may play a pivotal role in shaping how older adults perceive and respond to their health status.

In addition to emotional factors, cognitive processes such as hypochondriacal thoughts significantly contribute to health-related perceptions and behaviors. Hypochondriacal thoughts involve excessive preoccupation with having or developing a serious illness, often accompanied by misinterpretation of bodily sensations (9). These maladaptive cognitions can lead to increased health anxiety, frequent healthcare utilization, and reduced quality of life (15). In older adults, the presence of physical symptoms and chronic conditions may exacerbate these tendencies, resulting in distorted illness perceptions and maladaptive coping strategies. Previous research has highlighted the strong association between health anxiety and illness perception, indicating that individuals with higher levels of hypochondriacal thinking tend to perceive their illnesses as more severe and less controllable (7).

Health-promoting behaviors, defined as actions undertaken to maintain or enhance health and prevent disease, represent a crucial mediating mechanism in the relationship between psychological factors and health outcomes. These behaviors include physical activity, proper nutrition, stress management, and adherence to medical recommendations (16, 17). Engaging in health-promoting behaviors has been shown to improve physical health, enhance psychological well-being, and reduce the risk of chronic diseases (18, 19). Moreover, such behaviors can influence individuals' perceptions of their health, fostering a more positive and adaptive view of illness (20). In older adults, promoting healthy lifestyles is particularly important, as it can mitigate the effects of aging-related decline and improve quality of life (21).

The interplay between death anxiety, hypochondriacal thoughts, and health-promoting behaviors provides a comprehensive framework for understanding illness perception in older adults. Theoretical perspectives suggest that cognitive and emotional factors interact dynamically to influence health-related outcomes. For instance, individuals experiencing high levels of death anxiety may engage in either maladaptive avoidance behaviors or adaptive health-promoting actions, depending on their coping mechanisms and cognitive appraisals (22). Similarly, hypochondriacal thoughts may either hinder or facilitate engagement in health behaviors, depending on whether they lead to excessive worry or proactive health management (15). This highlights the importance of examining health-promoting behaviors as a potential mediator in the relationship between psychological factors and illness perception.

Empirical evidence supports the mediating role of health-promoting behaviors in various psychological models. Studies have shown that individuals with higher psychological well-being are more likely to engage in health-promoting behaviors, which in turn enhance their perception of health and reduce distress (23). Conversely, negative psychological states such as anxiety and depression can reduce motivation for healthy behaviors, leading to poorer health outcomes (24). In the context of aging, the promotion of healthy lifestyles has been identified as a key strategy for improving both physical and mental health outcomes (1). Therefore, understanding how health-promoting behaviors mediate the effects of death anxiety and hypochondriacal thoughts on illness perception is essential for developing effective interventions.

Furthermore, socio-cultural and environmental factors also influence these relationships. Access to healthcare services, social support, and lifestyle factors such as diet, sleep, and physical activity play significant roles in shaping health outcomes (25, 26). For example, inadequate sleep and poor nutrition have been linked to increased psychological distress and negative health perceptions (27, 28). Similarly, lack of physical activity and unhealthy environmental conditions can exacerbate health problems and reduce quality of life (17, 29). These findings underscore the importance of adopting a holistic approach to health promotion that addresses both psychological and environmental determinants.

In addition, the role of individual differences such as personality traits, coping strategies, and spiritual beliefs should not be overlooked. Research has shown that factors such as hope, social support, and spiritual well-being can buffer the effects of death anxiety and enhance psychological resilience in older adults (30, 31). These protective factors may also influence engagement in health-promoting behaviors and contribute to more adaptive illness perceptions. Therefore, incorporating these variables into theoretical models can provide a more comprehensive understanding of health-related processes in older adulthood.

Despite the growing body of research on these constructs, there remains a need for integrative models that simultaneously examine the relationships among death anxiety, hypochondriacal thoughts, health-promoting behaviors, and illness perception. Most existing studies have focused on these variables in isolation, limiting the ability to understand their complex interrelationships. Structural equation modeling provides a robust methodological approach for testing such comprehensive models and identifying both direct and indirect effects among variables.

Given the increasing prevalence of aging populations and the associated health challenges, identifying modifiable psychological and behavioral factors that influence illness perception is of paramount importance. By understanding these relationships, researchers and practitioners can develop targeted interventions aimed at reducing maladaptive cognitive and emotional responses while promoting healthy

behaviors. Such interventions have the potential to improve not only illness perception but also overall quality of life and well-being among older adults.

Therefore, the present study aims to develop a structural model examining the relationships between death anxiety and hypochondriacal thoughts with illness perception in older adults, with a particular focus on the mediating role of health-promoting behaviors.

Methods and Materials

Study Design and Participants

The present study was fundamental in terms of purpose and descriptive-correlational in terms of research design (structural equation modeling). The statistical population consisted of all older adults in Khoy County in 2025. The research sample was selected from older adults attended to medical clinics and counseling and psychotherapy centers in the city of Khoy. Since an accurate list and statistics of the number of older adults attending medical clinics in Khoy County were not available, a convenience sampling method was used, and the study was conducted with individuals who were willing to participate. The sample size in this study was determined using the Plant formula. Based on this formula, the sample size in correlational studies is calculated using $(N \leq 8M + 50)$ (Hair et al., 2010). Considering that the present study was descriptive-correlational, the sample size was determined to be 106 participants. In cases where older adults did not have sufficient literacy to respond to the questionnaires, the researcher read the questions to them in Turkish and provided explanations when necessary. Inclusion criteria included being aged 60 years or older (in accordance with the definition of the Secretariat of the National Council on Aging), willingness to participate in the study, having sufficient literacy to complete the questionnaires, and a history of attendees to a physician or psychologist during the past six months due to death anxiety or health-related issues. Older adults with severe cognitive or psychological disorders, those unwilling to cooperate, or those providing incomplete or invalid responses to the questionnaires were excluded from the study. Ethical principles were strictly observed throughout all stages of the research; participation was entirely voluntary, and individuals could withdraw at any stage. Participants were also assured that no physical or financial harm would occur, and all collected data would remain confidential and used solely for research purposes.

Data Collection

Illness Perception Questionnaire: The Illness Perception Questionnaire was developed and validated by Broadbent et al. (2006) and consists of 9 items. The items assess consequences, timeline, personal control, treatment control, identity, concern, illness coherence, emotional response, and causes of illness. The score range for the first 8 items is from 0 to 10. Item 9 is open-ended and assesses the three main perceived causes of illness. This questionnaire was validated in Iran by Barghi Irani (2013). Based on this approach, the obtained scores are summed and interpreted as follows: scores between 0–20 indicate a low level of the variable, scores between 20–60 indicate a moderate level, and scores above 60 indicate a high level. Various methods exist for determining reliability; in this study, Cronbach's alpha coefficient was used to assess internal consistency. This method is used to calculate the internal consistency of measurement tools such as questionnaires that assess different characteristics. In such instruments, responses can take various numerical values. According to Sarmad et al. (2008), "to calculate Cronbach's alpha, it is necessary

first to compute the variance of each subset of questionnaire items and the total variance, and then use the relevant formula to obtain the alpha coefficient” (p. 169). Cronbach’s alpha for this questionnaire was reported as 0.80, and the test–retest reliability over a 6-week interval ranged from 0.42 to 0.75 for different items (Broadbent et al., 2006). In the study by Barghi Irani (2013), reliability based on Cronbach’s alpha was reported as 0.87. Concurrent validity of the scale with the Revised Illness Perception Questionnaire in samples of patients with asthma, diabetes, and kidney disease showed correlations ranging from 0.32 to 0.63. Additionally, correlations between subscales and asthma-specific self-efficacy ranged from 0.47 to 0.53. Discriminant validity was confirmed by comparing scores among patients with diabetes, asthma, chest pain, and the common cold (Broadbent et al., 2006). In the study by Barghi Irani (2013), content validity was confirmed using expert opinions regarding the relevance, clarity, and comprehensibility of the items.

Death Anxiety Scale (DAS): This questionnaire was developed by Templer (1970) and consists of 15 items assessing individuals’ attitudes toward death. Respondents answer each item with “yes” or “no,” where a “yes” response indicates the presence of anxiety. Thus, scores range from 0 to 15, with higher scores indicating greater death anxiety. Studies examining the validity and reliability of the Death Anxiety Scale indicate that it has acceptable psychometric properties. In the original context, test–retest reliability was reported as 0.83, and concurrent validity was established through correlations with the Manifest Anxiety Scale (0.27) and the Depression Scale (0.40) (Rajabi & Bahrani, 2001). In Iran, Rajabi and Bahrani (2001) reported a split-half reliability coefficient of 0.60 and internal consistency of 0.73. To assess validity, correlations with the Death Concern Scale and the Manifest Anxiety Scale were examined, yielding coefficients of 0.04 and 0.34, respectively.

Health-Promoting Lifestyle Profile (HPLP): This questionnaire was developed by Walker et al. (1987) and includes 52 items across six dimensions: health responsibility (13 items; score range 13–52), physical activity (7 items; score range 7–28), nutrition (7 items; score range 7–28), interpersonal relations (8 items; score range 8–32), spiritual growth (10 items; score range 10–40), and stress management (7 items; score range 7–28). Each item is rated on a 4-point Likert scale (always, often, sometimes, never; scored 4 to 1). The sum of item scores for each dimension represents the total score for that lifestyle dimension. The items for each dimension are as follows: spiritual growth and self-actualization (items 1, 6, 7, 13, 19, 23, 29, 35, 41, 47); health responsibility (items 4, 10, 11, 14, 15, 16, 22, 25, 27, 32, 38, 44, 50); interpersonal relations (items 2, 8, 20, 24, 30, 36, 42, 48); stress management (items 12, 18, 28, 34, 40, 46, 52); physical activity (items 5, 17, 26, 33, 39, 45, 51); and nutrition (items 3, 9, 21, 31, 37, 43, 49). Validity and reliability of this questionnaire were confirmed in a study by Safabakhsh et al. (2004, cited in Safabakhsh & Nazemzadeh, 2013), with Cronbach’s alpha reported as 0.83. In another study, Mohammadi Zeidi et al. (2011) reported a Cronbach’s alpha of 0.84.

Hypochondriasis Questionnaire: The Hypochondriasis Questionnaire was developed by Evans (1980) to assess tendencies toward hypochondriacal thinking. This questionnaire includes 36 items based on a Likert scale and assesses hypochondriasis through items such as “To what extent do you think you are at risk of various diseases compared to your age group?” Based on total scores, individuals are classified into categories: healthy (0–20), borderline (21–30), mild (31–40), moderate (41–60), and severe (above 60). Validity refers to the extent to which an instrument measures what it is intended to measure (Sarmad et al., 2011). In the study by Arshadi (2007), content, face, and criterion validity of this questionnaire were

confirmed. Reliability refers to the degree of consistency in measuring a construct under similar conditions (Sarmad et al., 2011). Cronbach's alpha reported in the study by Talaei et al. (2009) was above 0.70.

Data Analysis

To collect the required data, psychological textbooks and valid scientific articles, both domestic and international, were utilized. For data collection and statistical analysis, the aforementioned questionnaires were administered to the study sample. Due to the specific conditions of the study and the possible illiteracy of participants, questionnaire items were read aloud and explained when necessary. Data analysis included descriptive statistics (frequency, percentage, mean, standard deviation, and standard error). In the inferential statistics section, Pearson correlation coefficient, multiple regression analysis, and structural equation modeling were used to test the research hypotheses. SPSS and Smart PLS software were employed for data analysis.

Findings and Results

In the present study, descriptive indices including gender, age, and marital status were examined to describe the demographic characteristics of the sample. The results presented in Table 1 indicate that the majority of participants were women, with a frequency of 69 individuals (approximately 65.09%), while men, with 37 individuals (34.90%), ranked next. This distribution may reflect more active participation of older women in research or their higher attendance to medical and psychological centers. In terms of age distribution, the largest group was within the 60–70-year range, comprising 73 individuals (68.86%), whereas 32 individuals (18.30%) were in the 70–80-year range, and only one individual (0.94%) was over 80 years old. This pattern indicates that the sample was primarily composed of younger older adults, which may be attributed to their greater ability to cooperate with the research process. Regarding marital status, the findings showed that the majority of participants, 80 individuals (75.47%), were married, while 24 individuals (22.64%) had lost their spouse and 2 individuals (1.88%) were divorced. These findings provide an overall picture of the demographic composition of the sample, which can play a decisive role in the analysis and interpretation of subsequent psychological and behavioral variables.

Table 1. Descriptive Characteristics of the Research Sample

Variable	Category	Frequency	Percentage
Gender	Male	37	34.90%
	Female	69	65.09%
Age	60–70	73	68.86%
	70–80	32	18.30%
	Above 80	1	0.94%
Marital Status	Married	80	75.47%
	Divorced	2	1.88%
	Widowed	24	22.64%

In the present study, prior to conducting the main analyses, statistical assumptions were carefully evaluated. The results of the Kolmogorov–Smirnov test indicated that the distribution of scores for hypochondriacal thoughts, health-promoting behaviors, death anxiety, and illness perception demonstrated acceptable normality, as the significance level for all variables was greater than 0.05. This result confirms

that the data follow a normal distribution, and therefore the use of parametric tests in subsequent analyses is statistically justified.

In examining the assumption of multicollinearity, the values of Tolerance and Variance Inflation Factor (VIF) for all predictor variables were within acceptable ranges (Tolerance > 0.10 and VIF < 5). This finding indicates that there is no serious multicollinearity problem in the model and that the variables have sufficient statistical independence. Furthermore, to evaluate the quality of the measurement model, fit and reliability indices were assessed. The results showed that all constructs demonstrated satisfactory reliability, with Cronbach’s alpha coefficients exceeding 0.70, confirming the internal consistency of the instruments. Composite Reliability (CR) and Rho values were also above the threshold of 0.70, indicating adequate composite reliability. In addition, the Average Variance Extracted (AVE) for all variables exceeded 0.50, suggesting acceptable convergent validity and the ability of the items to adequately explain their respective constructs. Overall, these results indicate that the measurement model has adequate quality and fit for subsequent structural analyses.

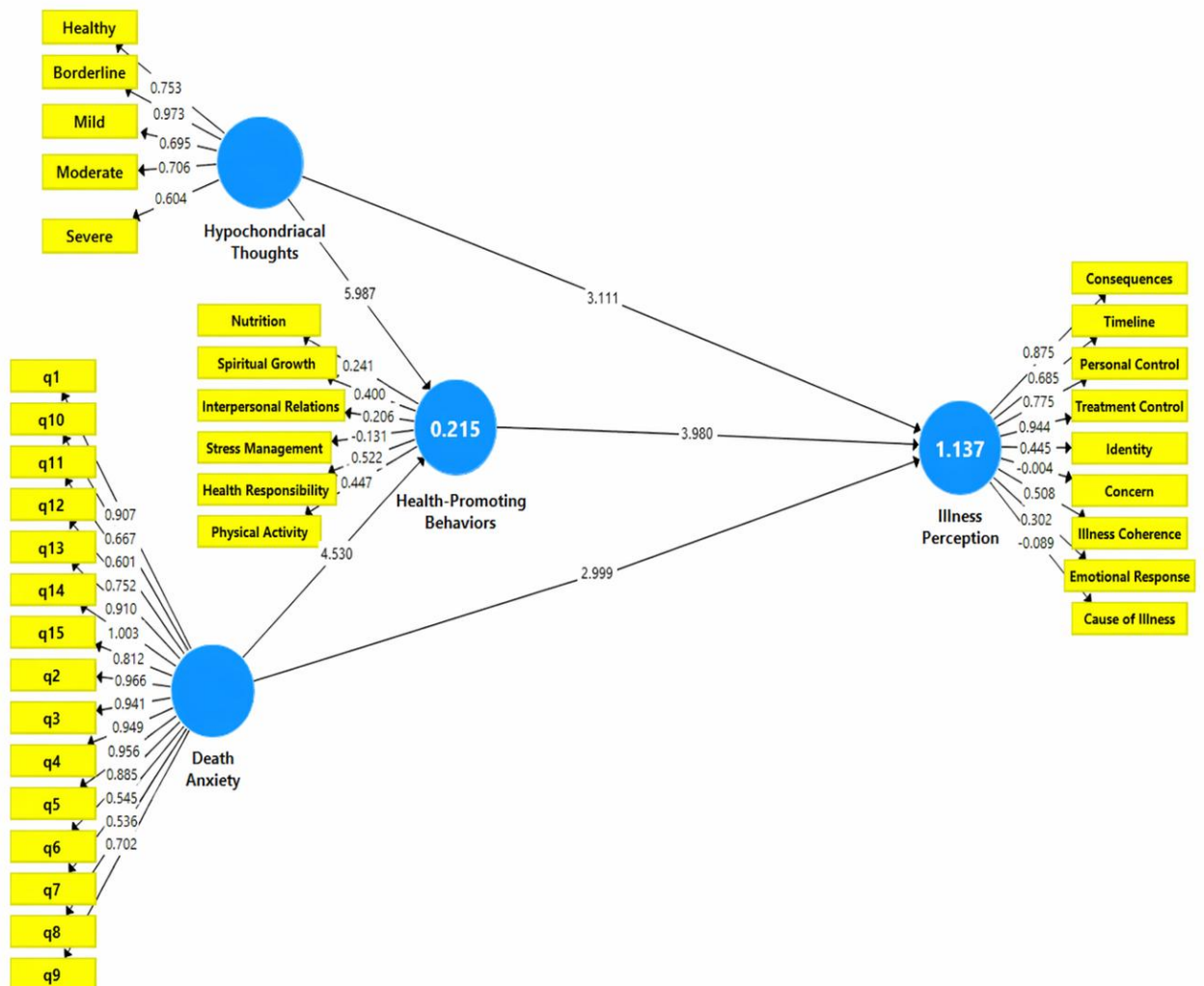


Figure 1. Structural Model of the Mediating Role of Health-Promoting Behaviors in the Relationship Between Hypochondriacal Thoughts and Death Anxiety with Illness Perception

In the presented structural model, the relationships among hypochondriacal thoughts, death anxiety, health-promoting behaviors, and illness perception were examined. As shown in the figure, the t-values of the paths indicate that all main relationships are statistically significant, as the t-values for all paths exceed the critical value of 1.96.

The results show that the path from hypochondriacal thoughts to health-promoting behaviors ($t = 5.978$) and the path from death anxiety to health-promoting behaviors ($t = 4.450$) are significant, indicating that these two predictor variables play a significant role in shaping health-promoting behaviors among older adults. Furthermore, the paths from hypochondriacal thoughts to illness perception ($t = 3.111$), death anxiety to illness perception ($t = 3.980$), and health-promoting behaviors to illness perception ($t = 2.999$) are also significant, indicating that all three variables can directly influence individuals' illness perception.

This pattern emphasizes that cognitive and emotional factors such as hypochondriacal thoughts and death anxiety, in addition to their direct effects on illness perception, can also indirectly influence older adults' perceptions of illness through changes in health-promoting behaviors. Overall, the good fit of the model and the significance of the paths indicate that the conceptual model of the study is well aligned with the empirical data and can serve as a valid framework for explaining the relationships among these variables in the older adult population.

Table 2. Direct and Indirect Path Coefficients Among Study Variables

Variables	Path Coefficient (β)	t-value	p-value	Significance	f ²
Hypochondriacal Thoughts → Health-Promoting Behaviors	0.536	5.947	0.000	Significant	0.67
Hypochondriacal Thoughts → Illness Perception	0.296	3.111	0.020	Significant	0.08
Death Anxiety → Illness Perception	0.334	2.999	0.006	Significant	0.01
Death Anxiety → Health-Promoting Behaviors	0.439	4.530	0.003	Significant	0.00
Health-Promoting Behaviors → Illness Perception	0.264	3.940	0.000	Significant	0.21
Hypochondriacal Thoughts → Health-Promoting Behaviors → Illness Perception	0.151	2.942	0.045	Significant	0.06
Death Anxiety → Health-Promoting Behaviors → Illness Perception	0.110	2.423	0.049	Significant	0.04

The results presented in Table 2 indicate that hypochondriacal thoughts have a direct and significant effect on health-promoting behaviors, with a relatively high coefficient ($\beta = 0.536$), reflecting the prominent role of these thoughts in shaping health-related behaviors. These thoughts also directly influence illness perception, and although the coefficient is lower ($\beta = 0.296$), it remains statistically significant. Death anxiety also has a significant positive effect on both illness perception ($\beta = 0.334$) and health-promoting behaviors ($\beta = 0.439$), indicating the role of negative emotions in motivating health-related behaviors and influencing individuals' perception of illness. Health-promoting behaviors, in turn, contribute to increased illness perception ($\beta = 0.264$), highlighting their mediating role in the model. Additionally, indirect paths were found to be significant, indicating that hypochondriacal thoughts and death anxiety indirectly enhance illness perception through increased health-promoting behaviors, thereby clarifying the psychological mechanisms underlying illness perception.

Table 3. Structural Model Fit Indices

Indices	Value	Interpretation
Standardized Root Mean Square Residual (SRMR)	0.058	Acceptable (< 0.08)
Normed Fit Index (NFI)	0.960	Acceptable (> 0.90)

Based on the results presented in Table 3, the Standardized Root Mean Square Residual (SRMR) was calculated as 0.058. Since this value is below the acceptable threshold of 0.08, the model fit can be considered satisfactory according to this index. Additionally, the Normed Fit Index (NFI) was reported as 0.960, which exceeds the acceptable threshold of 0.90 and confirms the good fit of the structural model. Overall, the SRMR and NFI indices indicate that the examined structural model demonstrates an adequate fit and that the model's hypotheses are consistent with the observed data.

Discussion and Conclusion

The present study aimed to examine the structural relationships among death anxiety, hypochondriacal thoughts, health-promoting behaviors, and illness perception in older adults, with a particular focus on the mediating role of health-promoting behaviors. The findings revealed that both death anxiety and hypochondriacal thoughts had direct and significant effects on illness perception, and that health-promoting behaviors partially mediated these relationships. In addition, both psychological variables significantly predicted health-promoting behaviors, and the overall model demonstrated an acceptable fit, explaining a substantial proportion of the variance in illness perception. These results provide empirical support for the integrative role of cognitive and emotional factors in shaping how older adults perceive and interpret their health status.

The direct positive relationship between hypochondriacal thoughts and illness perception suggests that individuals who experience heightened concern about their health tend to interpret their bodily sensations and symptoms more negatively and with greater severity. This finding is consistent with cognitive models of health anxiety, which emphasize the role of maladaptive beliefs and misinterpretations in amplifying perceived illness severity (9). Previous research has similarly shown that individuals with higher levels of health anxiety report more negative illness perceptions and greater symptom burden (7, 15). In older adults, who are more likely to experience physical symptoms due to aging and chronic conditions, these cognitive distortions may become more pronounced, leading to exaggerated perceptions of illness and increased psychological distress. The findings of the present study therefore reinforce the importance of addressing maladaptive cognitive patterns in interventions aimed at improving illness perception.

The significant direct effect of death anxiety on illness perception further highlights the role of existential concerns in shaping health-related cognitions. Older adults often face increased awareness of mortality, which can intensify emotional responses to illness and contribute to negative health appraisals (8, 10). The positive association observed in this study is in line with previous findings indicating that higher levels of death anxiety are associated with poorer psychological adjustment and more negative perceptions of health (13, 14). Moreover, studies have shown that death anxiety can heighten sensitivity to physical symptoms and increase concern about illness progression, thereby influencing illness perception (12, 32). These results suggest that death anxiety may act as a key emotional mechanism through which older adults interpret their health experiences.

Another important finding of the present study is the significant effect of both hypochondriacal thoughts and death anxiety on health-promoting behaviors. Interestingly, the direction of these relationships indicates that higher levels of psychological concern are associated with increased engagement in health-promoting behaviors. This may reflect a compensatory mechanism, whereby individuals who are more

concerned about their health or mortality are more motivated to adopt behaviors aimed at preserving health and preventing illness. This interpretation is supported by research demonstrating that perceived health risks can motivate individuals to engage in preventive health behaviors (16, 20). However, it is also possible that excessive concern may lead to maladaptive forms of health behavior, such as overutilization of healthcare services or reliance on ineffective strategies, particularly when driven by anxiety rather than informed decision-making (24). Therefore, while the observed relationships highlight the motivational role of psychological factors, they also underscore the need for balanced and evidence-based health promotion strategies.

The mediating role of health-promoting behaviors in the relationship between psychological variables and illness perception represents a key contribution of this study. The findings indicate that hypochondriacal thoughts and death anxiety influence illness perception not only directly but also indirectly through their impact on health behaviors. This suggests that engaging in health-promoting behaviors can modify the way individuals perceive their illness, potentially leading to more adaptive interpretations. This result aligns with previous research demonstrating that healthy lifestyle behaviors are associated with improved physical and psychological outcomes, including more positive health perceptions (18, 19). Furthermore, qualitative studies have shown that older adults who adopt health-promoting lifestyles report greater control over their health and more optimistic views of aging (21). The mediating effect observed in this study therefore supports the theoretical proposition that behavioral factors serve as a bridge between psychological processes and health outcomes.

The findings also highlight the complex interplay between cognitive, emotional, and behavioral factors in determining illness perception. Rather than operating in isolation, these variables interact dynamically to shape individuals' experiences of health and illness. For example, while hypochondriacal thoughts may increase vigilance toward bodily symptoms, engagement in health-promoting behaviors may provide a sense of control and efficacy, thereby mitigating negative perceptions. Similarly, although death anxiety may heighten emotional distress, it may also motivate individuals to take proactive steps toward maintaining their health. This dual role of psychological factors underscores the importance of considering both their adaptive and maladaptive aspects in research and practice.

In addition, the overall fit of the structural model and the substantial variance explained in illness perception indicate that the proposed framework provides a robust explanation of the relationships among the studied variables. This finding is consistent with previous studies that have emphasized the importance of integrating multiple psychological and behavioral factors in understanding health outcomes in older adults (11, 23). The use of structural equation modeling in this study allowed for the simultaneous examination of direct and indirect effects, providing a more comprehensive understanding of the underlying mechanisms.

The results of this study also have important implications for mental health and healthcare interventions targeting older adults. Given the significant role of hypochondriacal thoughts and death anxiety in shaping illness perception, interventions aimed at reducing maladaptive cognitions and managing anxiety may be effective in improving health outcomes. Cognitive-behavioral approaches, for example, can help individuals reframe negative beliefs and develop more adaptive coping strategies. At the same time, promoting healthy lifestyle behaviors such as physical activity, balanced nutrition, and stress management can enhance both

physical health and psychological well-being (17, 33). The integration of psychological and behavioral interventions may therefore provide a comprehensive approach to improving illness perception and quality of life in older adults.

Furthermore, the findings underscore the importance of considering contextual and environmental factors in health promotion efforts. Access to healthcare services, social support, and community resources can significantly influence individuals' ability to engage in health-promoting behaviors and manage psychological distress (25). In this regard, public health initiatives aimed at improving the accessibility and quality of healthcare services for older adults may play a crucial role in enhancing health outcomes. Additionally, educational programs that increase awareness of healthy lifestyles and coping strategies may empower older adults to take an active role in managing their health.

The role of individual differences, such as personality traits, coping styles, and spiritual beliefs, also warrants consideration in interpreting the findings. Previous research has shown that factors such as hope, social support, and spiritual well-being can buffer the effects of death anxiety and enhance resilience (30, 31). These factors may influence both engagement in health-promoting behaviors and the interpretation of illness, suggesting that a personalized approach to intervention may be particularly effective. Future studies may benefit from incorporating these variables into more comprehensive models to better understand their moderating effects.

Despite the strengths of the present study, several limitations should be acknowledged. The use of a convenience sampling method may limit the generalizability of the findings to the broader population of older adults. Additionally, the cross-sectional design of the study precludes causal inferences, as the relationships among variables were examined at a single point in time. Self-report measures were used to assess all variables, which may introduce bias due to social desirability or inaccurate recall. Furthermore, the study did not account for potential confounding variables such as socioeconomic status, comorbid conditions, or cultural factors that may influence illness perception and health behaviors.

Future research should address these limitations by employing longitudinal designs to examine causal relationships and changes over time. Expanding the sample to include more diverse populations from different CULTURAL and socioeconomic backgrounds would enhance the generalizability of the findings. Additionally, incorporating objective measures of health behavior and clinical indicators may provide a more comprehensive assessment of the relationships among variables. Future studies could also explore the role of moderating variables such as social support, coping strategies, and personality traits in shaping the observed relationships.

From a practical perspective, the findings of this study highlight the importance of integrating psychological and behavioral approaches in interventions for older adults. Healthcare providers should consider assessing death anxiety and hypochondriacal thoughts as part of routine evaluations, as these factors can significantly influence patients' perceptions and behaviors. Educational programs that promote healthy lifestyles and provide coping strategies for managing anxiety may be particularly beneficial. Moreover, community-based interventions that enhance social support and access to healthcare resources can further support the well-being of older adults and improve their overall quality of life.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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