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Presenting a Model of the Effect of Cognitive Bias on Mental Health and Quality of Life in Elderly Women with the Mediating Role of Mindfulness

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A B S T R A C T

The present study aimed to investigate the effect of cognitive bias on mental health and quality of life in elderly women, with the mediating role of mindfulness. This research is applied in purpose, quantitative in approach, and descriptive-survey in design. The statistical population consisted of Iranian elderly women aged over 60 years. Based on G*Power software calculations and using convenience and purposive sampling methods, 129 participants were selected. Data collection instruments included the Mindfulness Questionnaire by Brown et al. (2007), the Quality of Life Questionnaire by Ware and Sherbourne (1992), the Cognitive Bias Questionnaire by Woody et al. (1997), and the General Health Questionnaire by Goldberg (1972). For data analysis, in addition to descriptive statistics, Kolmogorov–Smirnov tests, structural equation modeling, and the Sobel test were employed. All analyses were conducted using SPSS version 23 and SmartPLS version 3.1.1 at a significance level of 0.05. The results indicated that the research model demonstrated a good fit. Cognitive bias had a significant negative effect on mental health ($t = 4.698$, $p = 0.001$), quality of life ($t = 5.681$, $p = 0.001$), and mindfulness ($t = 11.016$, $p = 0.001$) among elderly women. Moreover, mindfulness had a significant positive effect on mental health ($t = 2.930$, $p = 0.004$) and quality of life ($t = 6.681$, $p = 0.001$). The findings also showed that mindfulness plays a significant mediating role in reducing the effect of cognitive bias on mental health ($z = -6.019$, $p = 0.001$) and quality of life ($z = -8.527$, $p = 0.001$). Therefore, mindfulness reduces the negative impact of cognitive bias on mental health and quality of life in elderly women.

Keywords: *Mental health, quality of life, mindfulness, cognitive bias, elderly women.*

1. Introduction

Aging has become one of the defining demographic transformations of contemporary societies, and its psychological implications are now central to both public health research and clinical practice. The rapid growth of the older adult population has created new challenges for healthcare systems, social support structures, and mental health services, particularly in relation to women, who often experience longer life expectancy alongside greater exposure to widowhood, chronic illness, social isolation, and cumulative life stressors (Khodamoradi et al., 2018; Van Gaans & Dent, 2018). In this context, elderly women represent a population whose mental health and quality of life warrant close scientific attention, not only because of age-related vulnerability but also because gendered social roles, caregiving burdens, reduced economic security, and health disparities may intensify psychological risk in later life (Aghajani et al., 2025; Samadi & Dalir, 2021). As a result, identifying the psychological mechanisms that undermine or protect well-being in older women is essential for designing more effective preventive and therapeutic interventions.

Mental health in later life is not limited to the absence of psychiatric symptoms; rather, it encompasses emotional balance, psychological resilience, functional adaptation, perceived meaning, and the capacity to cope with daily demands and age-related transitions (Nordqvist, 2017; Serrada-Tejeda et al., 2025). Among older adults, mental health is shaped by an interaction of biological, cognitive, emotional, social, and environmental factors. Recent evidence has shown that the psychological well-being of older people is associated with a range of influences, including healthcare access, living conditions, social support, physical activity, depressive symptoms, and environmental stressors (Aghajani et al., 2025; Ji et al., 2023; Shafaei et al., 2024; Van Gaans & Dent, 2018). In elderly populations, even subtle disruptions in emotional regulation or cognitive processing can have significant effects on life satisfaction, autonomy, functioning, and perceived health, making it necessary to examine not only external determinants but also internal cognitive-emotional processes.

One of the most important outcomes associated with successful aging is quality of life. Quality of life is a broad, multidimensional construct that includes subjective evaluations of physical health, psychological condition, functional ability, social participation, and satisfaction with life circumstances (Cai et al., 2021; Post, 2014). In older adults, quality of life has become a major index of health beyond survival, because longevity without psychological well-being or functional fulfillment cannot be considered a satisfactory outcome of aging policies and healthcare services (Jazayeri et al., 2023; Munawar et al., 2024). Research has shown that quality of life in older adulthood is associated with health behaviors, dependency level, environmental conditions, pain, cognitive functioning, emotional health, and social connectedness (Godos et al., 2023; Munawar et al., 2024; Rocamora-Pérez et al., 2025). More specifically, among elderly women, depression, reduced activity, chronic discomfort, and unmet psychosocial needs may lead to marked declines in perceived quality of life, highlighting the importance of understanding the mechanisms that contribute to this decline (Samadi & Dalir, 2021; Shafaei et al., 2024).

In recent years, there has been growing interest in the role of cognitive factors in shaping psychological functioning in older adults. Cognitive bias refers to systematic distortions in information processing, interpretation, attention, and judgment that can influence how individuals perceive themselves, others, and their environment (Ke et al., 2024; Richburg et al., 2023). Although cognitive bias is often studied in relation to decision-making or clinical disorders, it also has important implications for everyday emotional experience and well-being. Individuals with stronger maladaptive cognitive biases may selectively attend to threatening or negative stimuli, interpret ambiguous situations pessimistically, overfocus on internal distress, or misattribute events in ways that reinforce anxiety, depressive thinking, or reduced self-efficacy (Chen et al., 2023; Tarkhan & Ahmadi Lashki, 2015). In older adults, such biases may be particularly consequential because aging is often accompanied by major life transitions, including retirement, declining physical capacity, bereavement, and changing social roles, all of which can activate biased cognitive appraisals if adaptive coping resources are insufficient.

The impact of cognitive bias extends beyond psychiatric symptomatology and may also influence broader perceptions of health and life quality. When older individuals interpret physical sensations catastrophically, exaggerate interpersonal rejection, or become preoccupied with self-focused negative evaluations, they may experience lower psychological well-being, reduced motivation, and poorer engagement with health-promoting behaviors (Munawar et al., 2024; Richburg et al., 2023). Negative

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cognitive patterns can shape not only emotional reactions but also perceived quality of life by altering how older adults evaluate bodily discomfort, social participation, competence, and future prospects. This issue is especially salient for elderly women, who may face cumulative psychological burdens from lifelong caregiving roles, social marginalization, widowhood, or economic dependency. In such contexts, cognitive bias can become an important vulnerability factor that connects external stressors to internal distress and diminished well-being.

At the same time, not all elderly individuals exposed to life stress or negative cognitions experience poor mental health outcomes, which suggests the presence of protective psychological mechanisms. One of the most widely studied protective factors in contemporary psychology is mindfulness. Mindfulness has been conceptualized as a receptive, nonjudgmental awareness of present-moment experiences, involving attention regulation, acceptance, and a reduction in automatic reactive patterns (Brown et al., 2007). Rather than eliminating unpleasant thoughts or emotions, mindfulness changes the individual's relationship with internal experience by promoting observation without overidentification. This process is especially relevant to cognitive bias because biased interpretations often operate automatically and become psychologically harmful when they are accepted as objective truth rather than recognized as transient mental events.

The growing literature on mindfulness suggests that it can play a substantial role in enhancing psychological adaptation in later life. Mindfulness-based approaches have been associated with reduced depression, better emotional regulation, improved sleep, lower stress, and greater well-being among older adults (Bandyopadhyay et al., 2023; Hsiung et al., 2023; Javadzade et al., 2024; Talebisiavashani & Mohammadi-Sartang, 2024). Randomized and review-based evidence indicates that mindfulness interventions can improve both psychological outcomes and broader life quality indicators in older populations, supporting the view that mindfulness is not merely a therapeutic technique but also a resilience-enhancing psychological capacity (Mapurunga et al., 2025; Talebisiavashani & Mohammadi-Sartang, 2024). Community-based training studies have similarly emphasized the practical value of mindfulness for promoting mental health among elderly groups (Herdian et al., 2024). These findings are important because they suggest that mindfulness may serve both as a direct predictor of better functioning and as a mediator that buffers the harmful effects of maladaptive cognitive-emotional processes.

The theoretical relevance of mindfulness to cognitive bias is increasingly supported by empirical studies. Mindfulness appears to reduce habitual reactivity, enhance metacognitive awareness, and weaken the emotional impact of distorted thoughts, thereby disrupting the pathway through which cognitive bias contributes to distress (Brown et al., 2007; Chen et al., 2023). In neurotic individuals, mindfulness has been identified as a potential mechanism linking cognitive bias and emotion regulation, indicating that greater mindfulness may lessen the harmful consequences of biased cognition on emotional functioning (Chen et al., 2023). Similarly, studies on stress, self-efficacy, and emotional intelligence have shown that mindfulness is meaningfully associated with adaptive psychological regulation and lower distress (Heidari et al., 2017). These findings imply that mindfulness may not only improve mental health directly but also weaken the negative influence of dysfunctional cognitive processing on key outcomes such as well-being and quality of life.

The mental health of older adults has also been shown to be responsive to a diverse set of behavioral and contextual interventions, ranging from physical activity and environmental exposure to digital technologies and social care innovations. Forest walking, for example, has been associated with better physical and mental health in elderly populations, while mobile health applications and AI-supported care systems have been proposed as tools for improving independence and psychological well-being in old age (Chou et al., 2023; Padhan et al., 2023; Piva et al., 2024). Nutritional lifestyle patterns such as adherence to the Mediterranean diet have likewise been linked with mental health, cognitive status, and successful aging (Godos et al., 2023). Although these findings underscore the multidetermined nature of elderly well-being, they also reveal that interventions are most effective when they address the subjective psychological processes through which older adults interpret and manage life challenges. From this perspective, cognitive bias and mindfulness occupy a particularly important position because they influence the internal processing of experience that underlies many other health outcomes.

Several recent studies have also documented the interdependence of mental health and quality of life in later adulthood. Community-based evidence suggests that quality of life among older people is strongly associated with psychosocial and health-related variables (Jazayeri et al., 2023). Depression, anxiety, poor sleep, physical pain, dependency, and impaired social functioning can all reduce

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the subjective quality of life of older adults, while positive emotional states, better coping, and supportive environments enhance it (Munawar et al., 2024; Rocamora-Pérez et al., 2025; Serrada-Tejeda et al., 2025). Among elderly women specifically, physical activity has been associated with better quality of life, greater happiness, and lower depression, further illustrating the connection between psychological state and life evaluation (Shafaei et al., 2024). Similarly, social support has been shown to positively affect the mental health of older adults, reinforcing the idea that internal and external resources jointly shape aging outcomes (Aghajani et al., 2025). Yet despite this growing evidence, fewer studies have simultaneously modeled maladaptive cognitive factors, protective mindfulness processes, and dual outcomes such as mental health and quality of life within a single explanatory framework.

This gap is meaningful because an integrated model can provide a more precise explanation of how psychological vulnerability and resilience mechanisms operate together in elderly women. If cognitive bias exerts a direct negative effect on both mental health and quality of life, and mindfulness reduces this effect, then interventions that cultivate mindfulness may be especially valuable for women in late adulthood who are vulnerable to rigid, negatively filtered, or self-focused patterns of cognition. Such an approach is consistent with findings showing that mindfulness-based stress reduction improves depression, emotion regulation, and sleep in depressed elderly populations (Javadzade et al., 2024), and that mindfulness-oriented care programs can alleviate anxiety and depression in institutionalized seniors (Hsiung et al., 2023). It is also compatible with review evidence indicating significant benefits of mindfulness-based interventions for both mental health and cognitive function in older adults (Talebisiavashani & Mohammadi-Sartang, 2024). By extending these insights into a mediation framework, it becomes possible to clarify not only whether mindfulness is beneficial, but how it operates within the broader network of cognitive and well-being variables.

From a methodological standpoint, examining these relationships in elderly women is particularly important in Iranian and comparable sociocultural contexts, where aging may intersect with gendered norms, healthcare inequalities, changes in family structure, and differential access to psychological services (Khodamoradi et al., 2018; Van Gaans & Dent, 2018). Older women may experience significant challenges related to loneliness, dependency, sexual health, emotional neglect, reduced autonomy, or chronic disease, all of which can influence both mental health and quality of life (Rocamora-Pérez et al., 2025; Samadi & Dalir, 2021). If these experiences are filtered through maladaptive cognitive biases, their psychological burden may intensify. Conversely, if mindfulness facilitates a more balanced and accepting mode of awareness, it may reduce vulnerability and improve adaptation even in the presence of unavoidable age-related difficulties.

The existing literature therefore provides strong grounds for investigating a model in which cognitive bias predicts mental health and quality of life, while mindfulness functions as a mediating mechanism. Studies on cognitive bias, mindfulness, emotional regulation, aging-related well-being, and elderly mental health collectively suggest that biased cognitive processing can undermine functioning, whereas mindfulness can promote more adaptive emotional and cognitive responses (Chen et al., 2023; Mapurunga et al., 2025; Richburg et al., 2023; Tarkhan & Ahmadi Lashki, 2015). At the same time, research on elderly populations has highlighted the central role of mental health and quality of life as core indicators of successful aging and as outcomes influenced by multiple psychosocial conditions (Cai et al., 2021; Jazayeri et al., 2023; Post, 2014). Bringing these strands together in one structural model can make both theoretical and practical contributions by identifying whether mindfulness serves as a key psychological pathway through which harmful cognition affects later-life well-being.

The aim of the present study was to model the effect of cognitive bias on mental health and quality of life in elderly women, with mindfulness as a mediating variable.

2. Methods and Materials

2.1. Study Design and Participants

This study is applied in terms of purpose, quantitative in terms of data type, and descriptive-survey in terms of data collection method. The statistical population consisted of Iranian elderly women aged over 60 years. The required sample size was determined using G*Power software. Based on the parameters entered into the software, including an error level of 0.01, statistical power of 0.99, a medium effect size (0.15), and four predictor variables, the appropriate sample size for the present study was calculated as 129 participants. It should be noted that the sampling method was convenience and purposive sampling.

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2.2. Measures

Mindfulness Questionnaire: In the present study, data related to the mindfulness variable were collected using the Mindfulness Questionnaire developed by Brown et al. (2007). This questionnaire consists of 15 items, and its reliability and validity have been reported by Brown et al. (2007) with Cronbach's alpha coefficients ranging from 0.80 to 0.87. The scoring of this questionnaire is based on a five-point Likert scale ranging from "never" (1) to "always" (5). This instrument was also used in the study by Heidari et al. (2017), where its validity and reliability were confirmed.

Quality of Life Questionnaire (SF-36): The instrument used to assess quality of life in the present study was the SF-36 Quality of Life Questionnaire developed by Ware and Sherbourne (1992). The purpose of this questionnaire is to evaluate an individual's health status from both physical and psychological perspectives, obtained through the combined scores of eight health-related domains. This questionnaire consists of 36 items assessing eight dimensions of health, including general health, physical functioning, role limitations due to physical problems, role limitations due to emotional problems, bodily pain, social functioning, energy and vitality, and mental health. The lowest possible score is 0 and the highest is 100, with each dimension scored based on the items within that domain. Veismoradi et al. (2023) used this questionnaire in their study and confirmed its validity and reliability.

Cognitive Bias Questionnaire: In the present study, the Cognitive Bias Questionnaire developed by Woody et al. (1997) was used to measure cognitive bias. This questionnaire includes 10 items and two components: self-focused bias and externally focused bias, and it measures cognitive bias using a five-point Likert scale. This instrument was used in the study by Tarkhan and Ahmadi Lashki (2015), where its validity and reliability were confirmed.

Mental Health Questionnaire: In the present study, the General Health Questionnaire developed by Goldberg (1972) was used to measure mental health. This questionnaire consists of 28 items covering four subscales, each containing 7 items. The subscales include somatic symptoms and general health status, anxiety, social dysfunction, and depression. All items are scored on a five-point Likert scale, and the validity and reliability of this questionnaire were examined and confirmed in the study by Fakhar et al. (2008).

2.3. Data analysis

In the present study, the research questionnaires were distributed among participants, and after completion and collection, the data were entered into SPSS version 23 and SmartPLS version 3.1.1 for analysis. In the data analysis phase, descriptive statistical methods such as frequency distribution tables and means were used to examine and describe the general characteristics of the respondents. Additionally, inferential statistical methods including the Kolmogorov–Smirnov test were used to assess the normality of data distribution, and structural equation modeling along with the Sobel test were applied for data analysis. All statistical analyses in the present study were conducted at a significance level of 0.05.

3. Findings and Results

The descriptive results of the participants' demographic information are presented in Table 1.

Table 1

Descriptive results of participants' demographic information

Variable	Category	Frequency	Percentage of frequency
Age (years)	60 to 65	41	31.8
	65 to 70 years old	45	34.9
	Over 70 years old	43	33.3
	Total	129	100
Educational level	Associate degree and below	29	22.5
	Bachelor's degree	79	61.2
	Additional education	21	16.3
	Total	129	100
Employment status	Housewife	45	34.9
	Employed	23	17.8
	Retired	61	47.3
	Total	129	100

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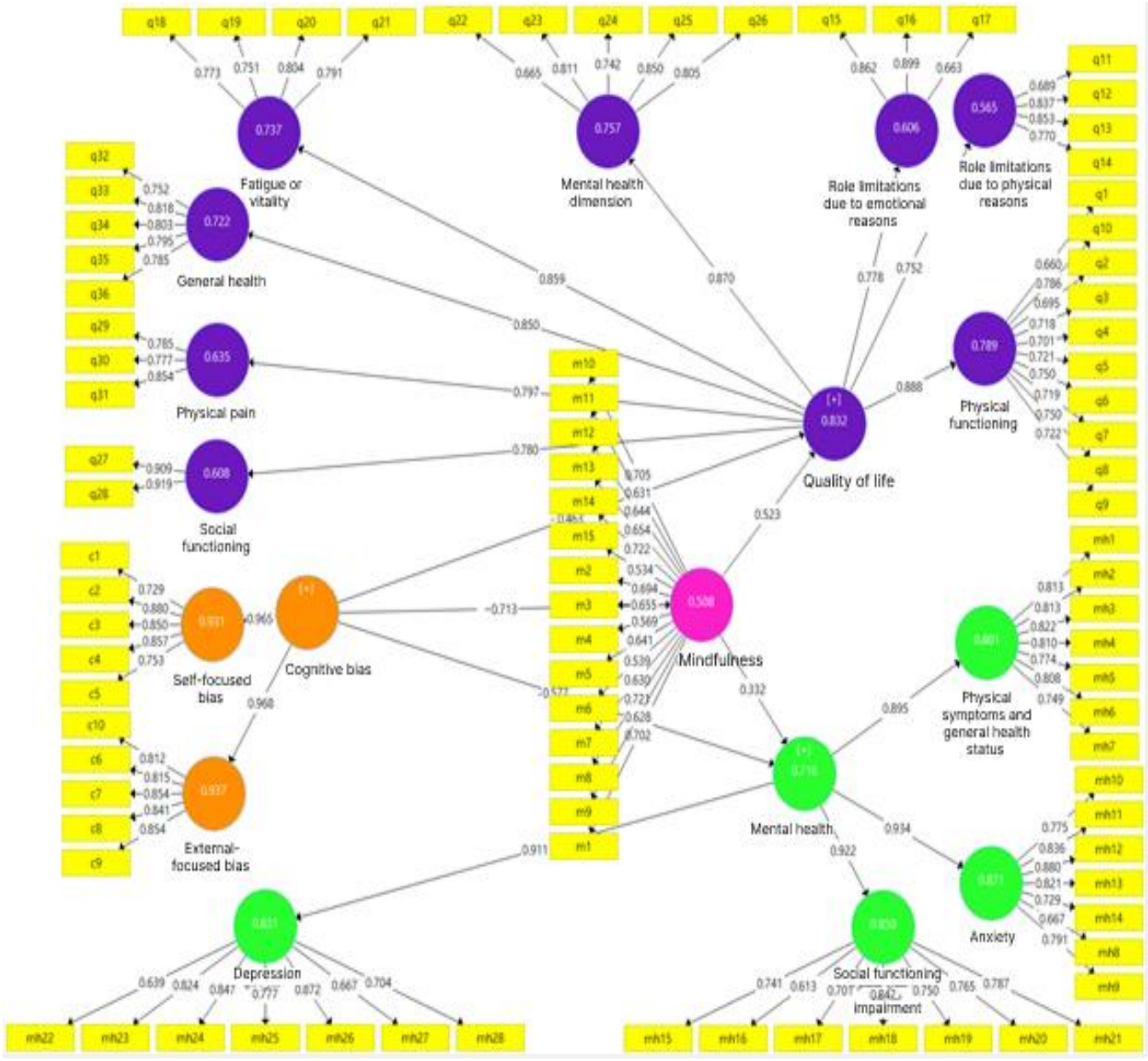
To analyze the data in this section, structural equation modeling (SEM) and its specific form, confirmatory factor analysis using the partial least squares (PLS) approach, were applied using SmartPLS version 3.1.1. To evaluate the fit of the reflective measurement model in PLS, three criteria were used: indicator reliability, convergent validity, and discriminant validity. Indicator reliability was assessed using three indices: factor loadings, Cronbach's alpha, and composite reliability. Figure 1 presents the results related to factor loadings.

Figure 1

Model with factor loading coefficients



Examination of the factor loading coefficients of each questionnaire item based on Figure 1 indicates that all factor loadings are greater than 0.40; therefore, all items can be retained in the research model. To assess reliability, which reflects internal consistency and measurement precision, Cronbach's alpha and composite reliability coefficients were used. The values for these indices for all variables are reported in Table 2.

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Table 2

Values for Cronbach's alpha, composite reliability coefficient, AVE, and VIF

Variable	Cronbach's alpha	Composite reliability	AVE	VIF
Mindfulness	0.764	0.809	0.563	1.361
Quality of life	0.794	0.834	0.638	1.051
General health	0.813	0.847	0.579	1.033
Physical functioning	0.794	0.833	0.698	1.681
Role limitations due to physical reasons	0.811	0.859	0.843	1.461
Role limitations due to emotional reasons	0.768	0.807	0.772	1.680
Physical pain	0.845	0.882	0.615	1.814
Social functioning	0.794	0.839	0.594	1.367
Fatigue or vitality	0.833	0.881	0.697	1.589
Mental health dimension	0.738	0.771	0.566	1.056
Cognitive bias	0.822	0.864	0.584	1.461
Self-focused bias	0.837	0.879	0.632	1.097
External-focused bias	0.719	0.758	0.594	1.568
Mental health	0.806	0.845	0.634	1.566
Physical symptoms and general health status	0.788	0.826	0.598	1.047
Anxiety	0.769	0.811	0.746	1.657
Social functioning impairment	0.819	0.856	0.709	1.943
Depression	0.833	0.864	0.591	1.468

According to the results in Table 2, since both Cronbach's alpha and composite reliability values for all variables exceed 0.70, the research instruments demonstrate adequate reliability and the model shows satisfactory fit. Additionally, Table 2 reports the results for convergent validity (AVE) and variance inflation factor (VIF). All AVE values exceed 0.50 and all VIF values are below 5, indicating acceptable convergent validity and absence of multicollinearity, thus supporting the adequacy of the model fit.

Discriminant validity is another criterion used to evaluate measurement model fit. The Fornell–Larcker matrix was employed to assess discriminant validity. In this method, the correlation of each construct with its indicators is compared with its correlations with other constructs. The Fornell–Larcker matrix for the present study is presented in Table 3.

Table 3

Results of the Fornell–Larcker matrix

Variable	Mindfulness	Quality of life	Cognitive bias	Mental health
Mindfulness	0.853			
Quality of life	0.651	0.827		
Cognitive bias	0.559	0.633	0.806	
Mental health	0.539	0.539	0.559	0.873

Based on the above matrix, the square root of AVE for all first-order constructs is greater than their inter-construct correlations, indicating adequate discriminant validity and good measurement model fit. Subsequently, after confirming the adequacy of the measurement models and considering the significance values of t and p, as well as the results reported in Table 4, the structural paths of the research model and the study hypotheses were examined.

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Figure 2

Model with t-values and path coefficients

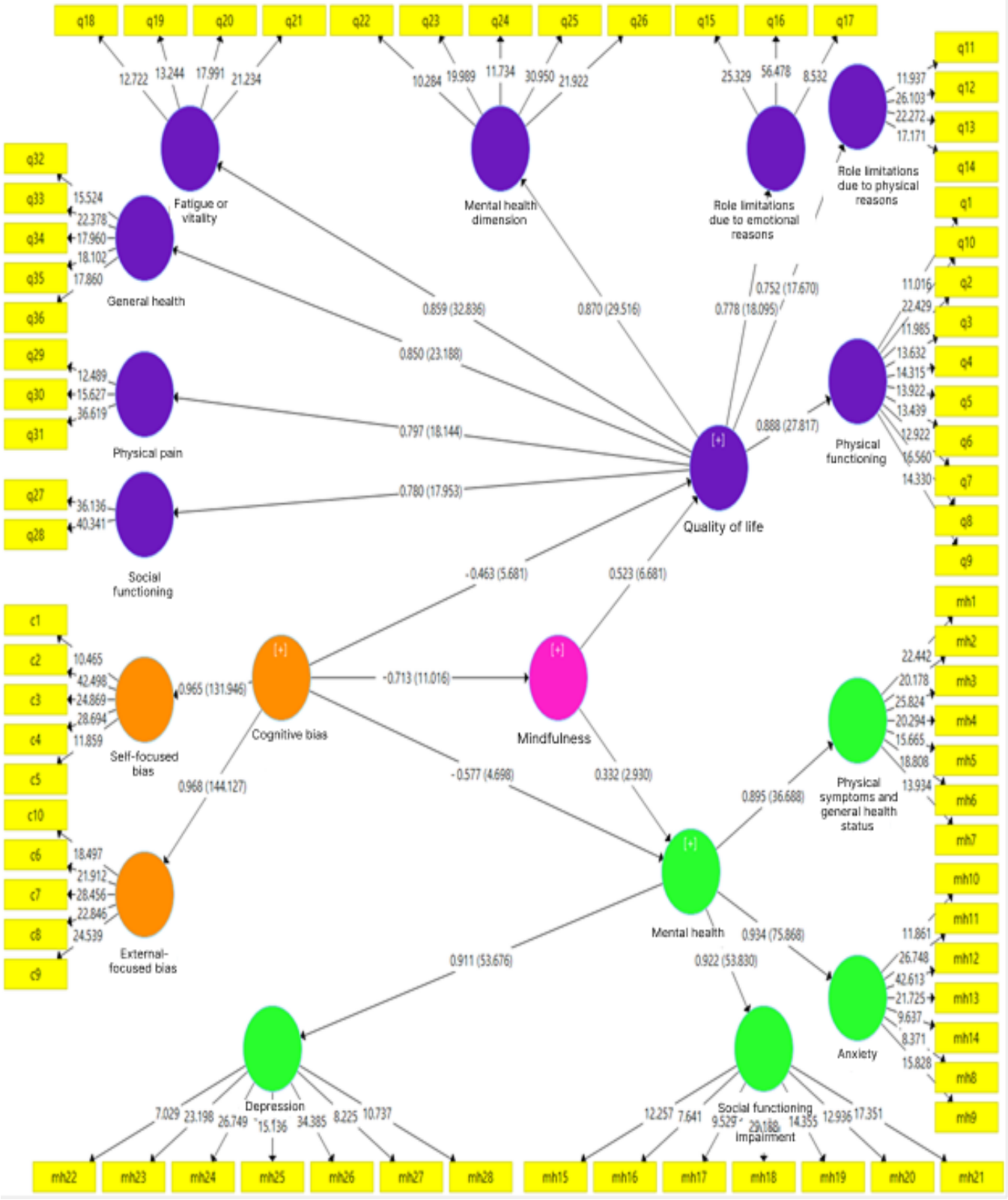

Table 4

Examination of different paths of the research model

Path	Path coefficient	t	p	Result
Cognitive bias → Self-focused bias	0.965	131.946	0.001	Confirmed
Cognitive bias → External-focused bias	0.968	144.127	0.001	Confirmed
Cognitive bias → Quality of life	-0.463	5.681	0.001	Confirmed
Cognitive bias → Mindfulness	-0.713	11.016	0.001	Confirmed
Cognitive bias → Mental health	-0.577	4.698	0.001	Confirmed
Mindfulness → Quality of life	0.523	6.681	0.001	Confirmed
Mindfulness → Mental health	0.332	2.930	0.004	Confirmed
Quality of life → General health	0.850	23.188	0.001	Confirmed
Quality of life → Physical functioning	0.888	27.817	0.001	Confirmed
Quality of life → Role limitations due to physical reasons	0.752	17.670	0.001	Confirmed
Quality of life → Role limitations due to emotional reasons	0.778	18.095	0.001	Confirmed
Quality of life → Physical pain	0.797	18.144	0.001	Confirmed
Quality of life → Social functioning	0.780	17.953	0.001	Confirmed
Quality of life → Fatigue or vitality	0.859	32.836	0.001	Confirmed
Quality of life → Mental health dimension	0.870	29.516	0.001	Confirmed
Mental health → Physical symptoms and general health status	0.895	36.688	0.001	Confirmed
Mental health → Anxiety	0.934	75.868	0.001	Confirmed
Mental health → Social functioning impairment	0.922	53.830	0.001	Confirmed
Mental health → Depression	0.911	53.676	0.001	Confirmed

At the 95% confidence level, based on the results in Table 4, since the t-values for all paths exceed 1.96 and their significance levels are below 0.05 (p = 0.001), it can be concluded that the research model is appropriate and all hypothesized paths are confirmed. The results further indicated that cognitive bias has a significant negative effect on mental health (t = 4.698, p = 0.001), quality of life (t = 5.681, p = 0.001), and mindfulness (t = 11.016, p = 0.001) in elderly women. Moreover, mindfulness has a significant positive effect on mental health (t = 2.930, p = 0.004) and quality of life (t = 6.681, p = 0.001).

To examine the mediating role of mindfulness in the relationship between cognitive bias and both mental health and quality of life, the Sobel test was used based on the following formula.

In this formula, *a* represents the path coefficient between the independent variable and the mediator, *b* represents the path coefficient between the mediator and the dependent variable, *Sa* is the standard error of the relationship between the independent variable and the mediator, and *Sb* is the standard error of the relationship between the mediator and the dependent variable. After substituting the relevant values into the Sobel formula, the results were obtained and are reported in Table 5.

Table 5

Sobel test results

Path	Sobel statistic	Standard error	p
Cognitive bias × Mindfulness → Mental health	-6.019	0.041	0.001
Cognitive bias × Mindfulness → Quality of life	-8.527	0.032	0.001

The results in Table 5 indicate that mindfulness plays a significant mediating role in reducing the effect of cognitive bias on mental health (z = −6.019, p = 0.001) and quality of life (z = −8.527, p = 0.001). This means that mindfulness mitigates the negative impact of cognitive bias on mental health and quality of life.

4. Discussion

The present study aimed to examine the structural relationships between cognitive bias, mindfulness, mental health, and quality of life among elderly women, with a particular emphasis on the mediating role of mindfulness. The findings demonstrated that cognitive bias has a

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significant negative effect on mental health, quality of life, and mindfulness, while mindfulness exerts a significant positive effect on both mental health and quality of life. Furthermore, the results confirmed that mindfulness plays a significant mediating role in reducing the negative impact of cognitive bias on both mental health and quality of life. Overall, the proposed structural model exhibited satisfactory fit, indicating that the conceptual framework of the study is empirically supported and provides a coherent explanation of the interrelationships among the studied variables.

The finding that cognitive bias negatively affects mental health is consistent with theoretical and empirical perspectives emphasizing the role of maladaptive cognitive processing in the development and maintenance of psychological distress. Cognitive biases, such as selective attention to negative stimuli, distorted interpretation of events, and excessive self-focus, can amplify emotional distress and contribute to symptoms of anxiety and depression (Richburg et al., 2023; Tarkhan & Ahmadi Lashki, 2015). In elderly populations, these cognitive distortions may become more salient due to age-related stressors, including physical decline, social isolation, and loss experiences, thereby increasing vulnerability to mental health problems. The present findings are also aligned with research indicating that cognitive and emotional regulation mechanisms are closely interconnected, and that maladaptive cognitive patterns can impair emotional stability and psychological resilience (Chen et al., 2023). Thus, the observed negative association between cognitive bias and mental health in elderly women reflects the broader literature emphasizing the centrality of cognition in shaping emotional well-being.

In addition to its impact on mental health, cognitive bias was found to significantly reduce quality of life. This result is theoretically plausible, as quality of life is a subjective construct that depends heavily on individuals' perceptions, evaluations, and interpretations of their experiences (Cai et al., 2021; Post, 2014). When cognitive biases lead individuals to perceive their circumstances more negatively, exaggerate difficulties, or underestimate personal resources, their overall life satisfaction and perceived well-being are likely to decline. Empirical studies have similarly shown that cognitive functioning and dependency are closely linked to quality of life in older adults, highlighting the role of internal cognitive processes in shaping life evaluation (Munawar et al., 2024). Moreover, research on aging populations has demonstrated that emotional distress, pessimistic outlooks, and maladaptive cognitive styles are associated with poorer quality of life outcomes (Godos et al., 2023; Jazayeri et al., 2023). Therefore, the present finding underscores the importance of addressing cognitive distortions as a pathway for improving life quality in elderly women.

The study also revealed that cognitive bias negatively affects mindfulness, suggesting that individuals with stronger maladaptive cognitive tendencies are less likely to engage in present-moment awareness and nonjudgmental observation. This finding can be interpreted in light of the conceptualization of mindfulness as an alternative mode of processing that contrasts with automatic, biased cognition (Brown et al., 2007). Cognitive biases often involve habitual and rigid thought patterns, whereas mindfulness involves openness, flexibility, and awareness. Consequently, individuals who are dominated by cognitive distortions may have difficulty disengaging from automatic thought processes and adopting a mindful stance. This interpretation is supported by research indicating that mindfulness is inversely related to maladaptive cognitive-emotional processes and plays a role in enhancing adaptive regulation (Chen et al., 2023; Heidari et al., 2017).

Another key finding of the study is the positive effect of mindfulness on mental health. This result is consistent with a large body of literature demonstrating the beneficial effects of mindfulness on psychological well-being. Mindfulness has been shown to reduce symptoms of depression, anxiety, and stress, while enhancing emotional regulation, self-awareness, and resilience (Bandyopadhyay et al., 2023; Talebisiavashani & Mohammadi-Sartang, 2024). In elderly populations, mindfulness-based interventions have been particularly effective in improving mental health outcomes, as they help individuals cope with age-related challenges and reduce maladaptive emotional responses (Hsiung et al., 2023; Javadzade et al., 2024). Community-based studies have also highlighted the potential of mindfulness training to enhance mental health among older adults, further supporting its role as a protective factor (Herdian et al., 2024). The present findings extend this evidence by demonstrating that mindfulness is not only beneficial in intervention contexts but also functions as a key variable within a structural model of psychological well-being in elderly women.

Similarly, the positive relationship between mindfulness and quality of life observed in this study aligns with previous research. Mindfulness enhances individuals' ability to engage with their experiences in a nonjudgmental and accepting manner, which can increase satisfaction with life and improve overall well-being. Empirical studies have

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shown that mindfulness training can significantly improve quality of life in older adults, including aspects related to physical health, emotional well-being, and social functioning (Mapurunga et al., 2025). Furthermore, the relationship between mindfulness and quality of life may be mediated by improvements in emotional regulation, reduced stress, and greater psychological flexibility. Given that quality of life is influenced by subjective evaluations of life circumstances, the capacity to observe experiences without excessive judgment or rumination can play a crucial role in enhancing well-being.

One of the most important contributions of the present study is the identification of mindfulness as a mediating variable in the relationship between cognitive bias and both mental health and quality of life. The results of the Sobel test indicated that mindfulness significantly reduces the negative effects of cognitive bias on these outcomes. This finding provides empirical support for theoretical models suggesting that mindfulness can disrupt the pathway through which maladaptive cognition leads to psychological distress. By promoting awareness and acceptance, mindfulness reduces the automaticity and emotional impact of biased thoughts, thereby mitigating their harmful consequences (Brown et al., 2007; Chen et al., 2023). In this sense, mindfulness functions as a buffer that weakens the link between cognitive vulnerability and adverse outcomes.

The mediating role of mindfulness is also consistent with research on emotion regulation mechanisms. Studies have shown that mindfulness facilitates adaptive regulation strategies, reduces rumination, and enhances cognitive flexibility, all of which contribute to improved mental health and well-being (Chen et al., 2023). In elderly populations, where individuals may face multiple stressors and limited coping resources, the ability to regulate emotions effectively is particularly important. The findings of the present study suggest that mindfulness can serve as a key mechanism through which elderly women manage the effects of cognitive bias and maintain psychological health and life satisfaction.

From a broader perspective, the findings of this study can be interpreted within the context of aging research emphasizing multidimensional determinants of well-being. Mental health and quality of life in older adults are influenced by a wide range of factors, including social support, physical activity, environmental conditions, and healthcare access (Aghajani et al., 2025; Ji et al., 2023; Shafaei et al., 2024). While these external factors are undoubtedly important, the present study highlights the critical role of internal psychological processes, particularly cognitive bias and mindfulness. By focusing on these variables, the study contributes to a more comprehensive understanding of how subjective experiences and cognitive-emotional mechanisms shape aging outcomes.

5. Conclusion

The implications of these findings are particularly relevant for interventions aimed at improving the well-being of elderly women. Given the negative impact of cognitive bias and the protective role of mindfulness, interventions that target cognitive restructuring and mindfulness training may be especially effective. For example, mindfulness-based stress reduction programs have been shown to improve mental health, emotion regulation, and sleep in elderly populations (Javadzade et al., 2024), while systematic reviews have confirmed the overall effectiveness of mindfulness interventions in enhancing psychological outcomes in older adults (Talebisiavashani & Mohammadi-Sartang, 2024). Integrating such approaches into community health programs and elderly care services could significantly improve both mental health and quality of life among elderly women. Another important implication relates to the integration of psychological interventions with broader healthcare and technological innovations. Recent studies have explored the use of mobile health applications and artificial intelligence in supporting elderly care and improving well-being (Chou et al., 2023; Padhan et al., 2023). These tools could be adapted to deliver mindfulness-based interventions or cognitive bias modification programs, thereby increasing accessibility and scalability. Additionally, lifestyle interventions such as physical activity and exposure to natural environments have been shown to enhance mental health and quality of life, suggesting that a comprehensive approach combining psychological, behavioral, and environmental strategies may be most effective (Godos et al., 2023; Piva et al., 2024).

Despite the strengths of the present study, several limitations should be acknowledged. First, the cross-sectional design of the study limits the ability to draw causal inferences about the relationships among the variables. Although structural equation modeling provides a robust framework for examining associations, longitudinal or experimental designs are needed to establish causal pathways. Second, the use of self-report questionnaires may introduce response biases, including social desirability and recall bias, which could affect the accuracy of the data.

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Third, the sample was limited to elderly women within a specific cultural context, which may restrict the generalizability of the findings to other populations or settings. Additionally, other potentially relevant variables, such as personality traits, coping strategies, or physical health conditions, were not included in the model and could influence the observed relationships.

Future research should address these limitations by employing longitudinal and experimental designs to examine the causal relationships among cognitive bias, mindfulness, mental health, and quality of life. Studies could also explore the effectiveness of specific interventions, such as mindfulness-based training or cognitive bias modification programs, in improving these outcomes among elderly populations. Furthermore, expanding the research to include diverse populations, including elderly men and individuals from different cultural and socioeconomic backgrounds, would enhance the generalizability of the findings. It would also be valuable to investigate additional mediating and moderating variables, such as social support, resilience, or physical health, to develop a more comprehensive understanding of the factors influencing well-being in older adults.

From a practical perspective, the findings of this study highlight the importance of incorporating psychological interventions into elderly care programs. Healthcare providers, social workers, and policymakers should consider integrating mindfulness-based approaches and cognitive training programs into services for older adults, particularly women. Community centers, healthcare institutions, and digital platforms can serve as effective venues for delivering such interventions. Training programs that enhance mindfulness skills and reduce cognitive bias may help elderly individuals better manage stress, improve emotional regulation, and enhance their overall quality of life. Moreover, promoting awareness about the role of cognitive processes in mental health can empower elderly individuals to adopt more adaptive coping strategies and improve their well-being.

Authors' Contributions

Authors equally contributed to this article.

Declaration

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

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

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

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