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The relationships among positive coping style, psychological resilience, and fear of falling in older adults

Siqi Liu¹, Han Xiao¹, Peiyao Qi⁴, Mi Song², Yuan Gao^{2*}, Hongying Pi^{3*} and Qingqing Su^{2*}

Abstract

Objectives Fear of falling is a psychological issue that adversely impacts the health of elderly individuals. The purpose of this study was to investigate the correlation among positive coping styles, psychological resilience, and fear of falling in older adults. The mediating role of psychological resilience was also investigated.

Methods A cross-sectional study was carried out from July 2023 to December 2023. There are 202 older adults from a tertiary hospital in Beijing, China, participated in this study. The general information questionnaire, the Simplified Coping Style Questionnaire, the Chinese version of the Connor-Davidson Resilience Scale, and the Falls Efficacy Scale-International were utilized. Descriptive statistics, Pearson correlation, and structural equation modeling were used for data analysis.

Results The prevalence of fear of falling in the elderly was 53.00%. Older individuals with a history of falls or fractures had a significantly higher fear of falling (P < 0.05). Fear of falling was inversely connected with psychological resilience and positive coping styles (P < 0.05). Positive coping styles were positively connected with psychological resilience (r = 0.638, P < 0.01). Structural equation modeling showed that psychological resilience fully mediated the effect of positive coping styles on fear of falling (indirect effect estimate = -0.126, 95% CI -0.036 to-0.225; total effect estimate = -0.121, 95% CI -0.028to -0.005).

Conclusion Fear of falling was widespread among older adults and psychological resilience fully mediated the relationship between positive coping styles and fear of falling. Future interventions targeting the fear of falling should consider the enhancement of psychological resilience.

Keywords Positive coping style, Psychological resilience, Fear of falling, Fall efficacy, Older adults

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Introduction

Falls are a prevalent accidental injury event among older adults, representing the primary cause of injury-related death in older individuals [1]. The World Health Organization has reported that falls among people 65 and older occur at a rate of 28–35% [2]. More than a quarter of older individuals acknowledge experiencing a fall in the past year [3]. Approximately half of falls result in fractures, while a third leads to other consequences such as craniocerebral injuries [3, 4]. Such incidents impose a substantial economic burden on families and society, including medical costs and loss of productivity [5]. As global aging increases, preventing falls among older individuals has emerged as a crucial worldwide public health issue. The majority of falls result from a combination of intrinsic and extrinsic factors, commonly originating from gait imbalance, medication use, visual impairment, cognitive decline, environmental factors, and psychological disorders [6].

Fear of falling (FOF) is a psychological issue closely associated with falling, referring to the concern about a range of activities and consequences associated with falling [7]. The fear of falling is a prevalent concern among the elderly, with prevalence rates ranging from 20-85% [8, 9]. It leads to the avoidance of daily activities, diminished physical functioning, decreased social participation, and compromised mental health in older individuals, significantly diminishing their quality of life [8, 10, 11]. Fear of falling is not exclusive to older individuals who have previously encountered falls; self-reports of fear of falling are also present in individuals who have not experienced falls [12]. The causes of fear of falling have not yet been fully elucidated, and the main focus of current research is on physiological factors. Nonetheless, psychological variables also contribute to the fear of falling [13–15].

Coping styles normally consist of both positive and negative responses [16]. Positive coping involves actively searching for solutions to stressors through problemsolving and information-seeking. Negative coping styles typically include strategies such as avoidance, alienation, or the adoption of psychological defense mechanisms [16]. Positive coping styles can enhance the quality of life in stressful situations [17], provide a cushion against the emotional and physical effects of stress [18], and alleviate psychological distress [18]. Studies have indicated that positive coping is negatively associated with anxiety and depression [19], promoting positive coping styles can mitigate mental health issues. For example, cancer patients employing positive coping styles exhibit lower levels of fear of cancer recurrence [20]. Based on existing literature, we hypothesize that individuals with positive coping styles may experience reduced FOF.

Psychological resilience is a powerful trait that enables effective adaptation to stress, adversity, and setbacks [21]. It serves as a protective factor for human well-being. Influenced by both cognitive and behavioral factors, psychological resilience is evoked by positive cognitive appraisals and is quantifiable as an indicator of one's stress coping capacity [22-24]. Studies on stress-related mental health issues have identified psychological resilience as a mediator in stress management. For instance, during the pandemic, Park et al. [25] observed reduced distress levels and restored well-being among U.S. residents compared to the initial lockdown phase, highlighting the adaptive role of psychological resilience. Among older adults, higher levels of psychological resilience have been associated with attenuated fall-related anxiety and depression [26]. However, the correlation between psychological resilience and FOF has not been extensively explored.

The mediational role of psychological resilience in our model is supported by the stress-coping model [27] and empirical evidence from various fields. Resilience theory posits that individuals can exhibit differential responses to stressors, with resilient individuals demonstrating more adaptive coping strategies [28]. This concept has been supported by numerous studies showing that resilience buffers against the negative effects of stress on mental health [29-31]. In the context of falls, resilience may moderate the relationship between positive coping styles and FOF by enhancing the individual's capacity to cope with the emotional and physical consequences of falls, thereby reducing fear and associated negative outcomes [32-34]. This buffering effect aligns with the broader literature on resilience and health [33, 35], where resilience is consistently linked to better mental health outcomes and more effective stress management.

According to the stress-coping model [36], there are two ways of coping with stress: actively seeking solutions or taking emotional regulation measures. Stress coping resources originate from three main sources: the individual's identity resources, social support, and material resources. Based on this theoretical framework and previous research, we hypothesize that psychological resilience serves as a mediator of positive coping styles and fear of falling. Our hypotheses were as follows: (1) Positive coping styles and psychological resilience exhibit significant correlations with fear of falling; (2) Psychological resilience acts as a mediator in the connection between positive coping styles and fear of falling. Figure 1 displays the model.

Method

Study design and sample

The cross-sectional survey was carried out from July 2023 to December 2023 in outpatient clinics in a tertiary



Fig. 1 The proposed model of fear of falling with psychological resilience and coping styles. **a**, the effect of active coping on psychological resilience; **b**, the effect of psychological resilience on fear of falling; **c**, the total effect of active coping on fear of falling; and **c**', the effect of active coping on fear of falling via resilience

hospital in Beijing, China. A convenience sample technique was employed to collect one-to-one questionnaires from older adults over 60. In accordance with the specified sample count criteria for the structural equation model, the common standard is 5 to 10 times the measured variables. A sample size of >200 is generally required to ensure the model's stability [37]. For this study, it is anticipated that >200 questionnaires will be distributed. The criteria for inclusion and exclusion in this study were as follows: (1) The inclusion criteria for this study were individuals who were at least 60 years old, had clear consciousness, had no linguistic communication problems, provided informed consent, and willingly participated in the study. (2) Criteria for exclusion comprised a combination of other serious diseases, such as malignant tumors, severe trauma, respiratory failure, cardiac, hepatic, and renal insufficiency, etc. Additionally, those in the acute stage of the disease and those with psychiatric disorders were excluded from the study. This study was reviewed by the Ethics Committee of the General Hospital of the Chinese PLA before beginning(S2024-201-01). It also underwent written and verbal consent from the participants.

Data collection

Before starting the questionnaire collection, three specialized researchers were trained to instruct participants using consistent scoring principles. Face-to-face data collection was carried out at the falls clinic and geriatric clinic, involving older individuals who volunteered to take part in the study and who satisfied the inclusionexclusion criteria. Each respondent signed an informed consent letter before proceeding to complete the questionnaire. To ensure the objectivity of the data as much as possible and to avoid the subjective interference of the researcher, those elderly people who could complete the questionnaire independently were allowed to complete the questionnaire on their own after the researcher introduced the points to note. For individuals with reduced vision or low literacy levels, the researcher read the questionnaire aloud to help them understand it and recorded their responses to complete the data collection. It took about 15–20 min to complete the questionnaire. After completing the questionnaire, the researcher checked the data to avoid omissions and double-checked them in Excel.

Measures

Demographic and fall-related questionnaire

A self-designed general demographic information and fall history questionnaire was used for the survey. The general demographics included gender, age, education, living situation, and monthly retirement income. The fall history included the record of falls occurring over the last year, as well as any fractures resulting from such falls.

Positive coping style

The Simple Coping Styles Scale (SCSQ), developed by Xie in 1998 [38], was employed to assess the coping styles among the elderly population. It comprises 12 items for the positive coping scale and 8 items for the negative coping scale. The scale is assessed using a 4-point Likert scale from "0 = not taken" to "3 = often taken" for each entry. A higher score on the scale suggests a greater congruence with the coping strategies typical of the assessed dimension. The scale was employed to evaluate Chinese older individuals and showed good reliability, as indicated by a Cronbach's alpha coefficient of 0.801 [39]. The Cronbach's alpha coefficient in this research was 0.713.

Psychological resilience

The psychological resilience level of older individuals was measured using the Connor-Davidson Resilience Scale (CD-RISC), which measures three perspectives: optimism, self-improvement, and psychological resilience. The scale is assessed using a 5-point Likert scale, with "0" as "not at all", and "4" corresponding to "almost always". The score ranges from 25 to 125, with higher scores indicating better psychological resilience. Previous research has indicated that the scale had strong validity and reliability, as evidenced by a Cronbach's alpha coefficient of 0.935 [40]. The Chinese versions of the CD-RISC obtained a Cronbach's alpha value of 0.923 in this investigation.

Fear of falling

The measurement tool to assess the fear of falling in older individuals is the Falls Efficacy Scale International (FES-I). The scale consists of 2 dimensions, indoor activities (10 items) and outdoor activities (6 items), resulting in a total of 16 items. The rating for each question was assessed using a 4-point Likert scale, ranging from "not at all worried" to "very worried", with the total score ranging from 16 to 64. Scoring ranges indicate: that 16 to 19 represents mild fear, 20 to 27 represents moderate fear, and 28 to 64 represents severe fear. The range of 16 to 19 indicates a level of fear that may be classified as mild, while the range of 20 to 27 signifies a moderate level of fear. A score falling within the range of 28 to 64 indicates a severe level of fear. The Cronbach's alpha coefficient in our study was 0.964.

Data analysis

The data was analyzed using the statistical software SPSS version 27.0 and AMOS version 23.0. Descriptive statistics were employed to assess the demographic data. Categorical data (gender, marriage, marital status, literacy, form of residence, living environment, type of caregiver, retirement income, and falls in the last year) were analyzed using frequencies and percentages. Continuous information was summarized using means and standard deviations. Pearson correlation analyses were used to describe relationships between variables. Structural equation modeling using AMOS23.0 was used to analyze relationships between variables. The independent variable in this study was coping style, whereas the dependent variable was fear of falling. Psychological resilience was considered as the mediating variable. The root means square of the error of approximation (RMSEA), standard root mean-square residual (SRMR), comparative fit index (CFI), and incremental fit index (IFI) were selected to evaluate model fit. Bootstrap analysis with 5,000 repetitions was used to test for mediating effects. The mediating effects were tested using a bootstrap technique with 5,000 repeats. Statistical significance was determined for differences at a P-value of less than 0.05.

Results

The valid sample for this study included 202 older persons residing in the community, with a mean age of 68.27 ± 6.57 . 108 of them were males (53.50%) and 94 were females (46.50%). 37 elderly (18.3%) had fallen in the past year, 21 elderly (10.40%) had a history of fracture from falling, and 107 elderly self-reported fear of falling (53.0%). The univariate analysis revealed that gender, falls in the last year, and fractures resulting from falls were significant variables impacting the fear of falls in older individuals (P < 0.05). Table 1 displays additional demographic information about the participants.

Table 2 displays the average, variability, and relationship between the variables. The average score of the participants' fear of falling was 22.01 ± 7.45 , the mean overall score for coping style was 47.58 ± 6.86 , whereas the mean score for psychological resilience was 86.06 ± 11.11 . Pearson's correlation study revealed a negative link between fear of falling and positive coping styles (*r*=-0.180, *P*<0.05), as well as a significantly negative association with psychological resilience (*r*=-0.270, *P*<0.01). Conversely, there was a favorable correlation between psychological resilience and coping style. (*r*=0.638, *P*<0.01).

After incorporating covariate variables, the results demonstrated a well-fitted model fit: RMSEA = 0.000, SRMR = 0.016, CFI = 1.000, and IFI = 1.003, with RMSEA < 0.08, and all other metrics > 0.9, these findings indicate a good model fit.

We employed a bootstrap method to compensate for deviation and determine the confidence ranges of the intermediate effect, therefore conducting a rigorous assessment of its statistical significance. We conducted 5000 samples using a self-weighting method, and the outcomes are presented in Table 3. The 95% confidence range for the path coefficient was -0.036 to 0.225. Since the interval does not contain 0, it indicates that psychological resilience did indeed act as a mediator in the association between positive coping style and fear of falling. The direct impact of a positive coping style on fear of falling was shown to be statistically insignificant (p > 0.05). The impact of fear of falling was influenced by positive coping styles, which were mediated by psychological resilience ($\beta = -0.126$, p = 0.011), and the total effect of coping style on fear of falling was -0.121 (p = 0.040). The relationship between the three variables is illustrated in Fig. 2.

Discussion

Our investigation revealed a high prevalence of fear of falling among older adults over 60 years of age, with 53.00% self-reporting fear of falling. This is close to Birhanie's [41] findings of 59.90%. Additionally, fear of falling varied across genders, with elderly women reporting significantly higher levels than men (p < 0.05). This

Table 1	The general information	of subjects and the resu	Its of statistical analysis of	predictors for older individuals $(n = 202)$
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Variables		n(%)	FOF (mean, SD)	t/F	р
Gender	Male	108(53.50)	20.94 (6.60)	4.923	0.028*
	Female	94(46.50)	23.24 (8.18)		
Marriage	Married	190(94.10)	22.02 (7.54)	0.007	0.933
	Unmarried/divorced/ widowed	12(5.90)	21.83 (6.18)		
Education	Primary or below	49(24.30)	21.92 (7.00)	0.688	0.56
	Junior high school	47(23.30)	22.49 (8.51)		
	Senior high school	35(17.30)	23.23 (8.19)		
	Graduate or above	71(35.10)	21.15 (6.63)		
Household	With others	182(90.10)	22.01 (7.57)	0	0.995
	Alone	20(9.90)	22.00 (6.39)		
Type of property	Landed single-story house	62(30.70)	22.53 (6.63)	0.438	0.509
	Landed multi-story house	140(69.30)	21.78 (7.80)		
Monthly income(CNY)	<3000	78(38.60)	21.99 (6.80)	1.023	0.383
	3000–5999	63(31.20)	23.02 (9.23)		
	6000–9999	30(14.90)	20.13 (5.53)		
	≥ 10,000	31(15.30)	21.84 (6.49)		
Falls during the last year	No	165(81.70)	21.24 (7.08)	5.172	0.006*
	Yes	37(18.30)	25.46 (8.16)		
Fractures due to falls	No	181(89.60)	21.31 (6.99)	16.302	< 0.01
	Yes	21(10.40)	28.00 (8.75)		
Having a fear of falling	No	95(47.00)	17.37 (2.75)		
	Yes	107(53.00)	26.13 (7.88)		

Abbreviation: FOF, Fear of Falling

Note: * *p* < 0.05

 Table 2
 Means, standard deviations, and relationships among the variables

	Mean(SD)	1	2	3	4	5	6
Fear of falling	22.01(7.45)	1					
Positive coping styles	31.64(5.85)	-0.180*	1				
Psychological resilience	86.06(11.11)	-0.270**	0.638**	1			
Tenacity	44.07(5.46)	-0.256**	0.562**	0.948**	1		
Strength	28.32(4.70)	-0.248**	0.640**	0.949**	0.825**	1	
Optimism	13.67(1.90)	-0.234**	0.537**	0.782**	0.633**	0.710**	1

Note: *N* = 202

** p < 0.01

* p < 0.05

Table 3 Effects of the SEM mode

			95% CI		
Model pathways	Standardized effect(β)	SE	LL	UL	р
Direct effect	0.006	0.066	-0.131	0.135	0.962
positive coping style→fear of falling					
Indirect effect	-0.126	0.047	-0.225	-0.036	0.011
positive coping style \rightarrow psychological resilience \rightarrow fear of falling					
Total effect	-0.121	0.056	-0.228	-0.005	0.040
positive coping style \rightarrow fear of falling					

Abbreviations: LL, lower limit; SE, standardized error; UL, upper limit

aligns with numerous prior studies [9, 41–43] and suggests greater attention and tailored interventions should be given to the fear of falling in older women. Additionally, 18.30% participants reported having suffered a fall during the previous year. Individuals who had previously fallen exhibited significantly greater levels of fear of falling in comparison to those who had not (p < 0.05). As we previously suspected, in our study, older adults with a fracture due to falls had a more significant fear of falling, surpassing the established cut-off score of 23.00 for high fear of falling [44]. These findings underscore the



Fig. 2 The structural equation model of positive coping style and psychological resilience on fear of falling

imperative for proactive fall prevention strategies to mitigate physical and psychological consequences for older adults.

In addition, this study discovered a negative association between both positive coping styles and psychological resilience with fear of falling. And psychological resilience was positively associated with positive coping styles. According to the stress and coping theory [45], adopting positive coping styles can reduce negative emotional experiences, which can lead to individual adaptation to stress. Previous research has demonstrated that positive coping styles among Chinese people during the COVID-19 pandemic can be related to the mitigation of negative emotional impacts caused by stress in individuals [46]. In addition, investigations have indicated that higher scores on positive coping styles and psychological resilience were associated with lower levels of fear of falling [47, 48]. It is worth mentioning that older persons are more likely to experience a decrease in depression and anxiety by adopting positive coping styles [40]. There is an obvious association between fear of falling and the occurrence of depression among the elderly population [10, 14]. Depressive symptoms in older individuals living in the community were found to be predictive of fear of falling [49]. While little research exists to understand the link connecting positive coping styles and fear of falling, this study adds to the existing evidence. Psychological resilience applies to an individual's capacity to sustain their well-adjusted behaviors when facing stress and is a positive protective factor [50]. In previous studies, psychological resilience has been strongly linked to anxiety and depression and is a protective factor that moderates anxiety and depression [40, 51]. Lai et al. [52] discovered that both fear of falling and psychological resilience are influential factors that affect the effectiveness of fall interventions, however, there is currently an interaction between the two. Our investigation revealed a correlation

between elevated levels of psychological resilience and reduced levels of fear of falling among elderly individuals. It is suggested that in the future, enhancing psychological resilience may successfully decrease the fear of falling in older persons.

Based on structural equation modeling, psychological resilience negatively affects the fear of falling. In the current research, positive coping styles primarily acted through psychological resilience, and psychological resilience fully mediated the relationship. Similar to our study, Han et al. [53]found psychological resilience independently mediated between coping styles and psychological well-being levels. According to stress coping theory, psychological resilience is coping resources derived from individual traits. This may explain how individuals utilize stress-coping resources. Individuals use positive coping styles to face stressful events like falls, facilitating cognitive reappraisal processes. This strengthens psychological resilience and reduces fear of falling. Thus, measures to increase older people's psychological resilience should be actively implemented, such as organizing socially participatory activities and improving social support [54]. Developing interventions for fear of falling should consider psychological resilience. Potential interventions could include mindfulness practices [55] or resilience training programs [56] that could help older individuals better cope with the fear of falling and improve their overall quality of life.

While our study has shown that psychological resilience fully mediates the relationship between positive coping styles and fear of falling, it is also important to consider the potential reverse causality. For instance, fear of falling might influence an individual's coping styles or resilience levels, which in turn could affect their overall well-being. Future research should explore this bidirectional relationship to provide a more comprehensive understanding of these dynamics. Besides, the cultural context of our study is crucial to consider. Coping styles and resilience are likely influenced by cultural factors, and it is plausible that the findings might differ in other cultural contexts. For example, empirical evidence has indicated that individuals from the United States exhibit greater resilience compared to their counterparts in Hong Kong and Mainland China [57]. In China, cultural norms may shape the coping strategies and resilience of older adults in unique ways. Further research is needed to explore these cultural nuances and their implications for intervention design.

It is important to acknowledge that there are some limitations when evaluating the outcomes of this study. Firstly, our data collection was conducted at a fall clinic for the elderly and a geriatric polyclinic, which may introduce a convenience sampling bias. This approach potentially excludes community-dwelling older adults who do not frequent such clinics, thus limiting the generalizability of our findings to a broader population. Future research should endeavor to include a more diverse and representative sample, encompassing older adults across various community settings to capture a wider spectrum of experiences and perspectives related to fear of falling. Additionally, our survey was carried out in a single city, which further narrows the representativeness of the sample. Subsequent studies should aim to expand the geographical scope of data collection to enhance the external validity of the findings. In addition, as the study employed a cross-sectional survey design, it restricts our ability to establish causal relationships between variables. We advocate for future longitudinal studies or experimental designs that can elucidate the causal pathways and dynamics between fear of falling, coping styles, and psychological resilience over time. Finally, reliance on verbal reports from some patients may introduce bias. While we implemented rigorous quality control measures, we acknowledge the potential for subjective influences and suggest that future research explore strategies to reduce the impact of self-report biases, such as utilizing wearable technology for fall detection or employing standardized psychological assessments.

Conclusion

The results of our study indicate that older persons who possess positive coping styles and psychological resilience tend to experience lower levels of fear of falling. Notably, psychological resilience fully mediated the impact of positive coping styles on the fear of falling. Thus, the level of psychological resilience in older individuals should be fully considered when developing interventions for fear of falling. Targeting interventions toward enhancing psychological resilience holds promise for effectively mitigating fall-related symptoms, including fear of falling. Future studies should explore additional variables to comprehensively analyze whether other factors influence fear of falling.

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Author contributions

S.L. contributed to the conceptualization and design of the paper, as well as the collection, analysis, and interpretation of data. S.L. also had a role in drafting and revising the manuscript. H.X., P.Q., and M.S. participated in the process of gathering and organizing data. *Q.S. played a role in the design, planning, coordination, and revision of the text. *Y.G. and *H.P. contributed to the research paper investigation, methodology, project management, supervision, and editing. The article has been reviewed and endorsed by all authors.

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Data availability

The corresponding authors can provide the data supporting the outcomes of this study upon a reasonable request.

Declarations

Ethics approval and consent to participate

The Ethics Committee of the Chinese PLA General Hospital approved this study. All procedures for this study were conducted by the Declaration of Helsinki. Written informed consent was obtained from each participant before participation in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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