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Research on the impact of empowerment on disability in older patients with chronic disease: based on chain mediating effect analysis

Tiemei Wang
Chengdu Third People's Hospital
Shiqing Huang
JINFENG Laboratory
Yan Liu
shiqingwc@sohu.com

Sichuan University

Article

Keywords: Older adults, chronic diseases, disability, empowerment, self-efficacy, self-management

Posted Date: August 3rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9592633/v1

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Additional Declarations: No competing interests reported.

Abstract

Objective:

This study investigates the mediating effect of self-efficacy and self-management on the relationship between empowerment and disability in older adults with chronic diseases.

Methods:

Using convenience sampling, this study enrolled 436 elderly patients with chronic diseases from eight tertiary hospitals across Sichuan Province. Patient characteristics were captured via a demographic questionnaire, and validated instruments were applied to assess disability, empowerment, self-efficacy, and self-management behaviors. All statistical analyses were performed using SPSS 26.0, and the PROCESS macro was utilized to test whether self-efficacy and self-management mediated the observed relationships.

Results:

The mean score for disability was 156.08 ± 28.41, for empowerment was 23.95 ± 7.49, for self-efficacy was 23.61 ± 5.10, and for self-management was 47.75 ± 9.88. Empowerment was positively correlated with self-efficacy ($r = 0.75$, $p < 0.001$) and self-management ($r = 0.69$, $p < 0.001$), while negatively correlated with disability ($r = -0.81$, $p < 0.001$). Self-management was positively correlated with self-efficacy ($r = 0.74$, $p < 0.001$), and negatively correlated with disability ($r = -0.78$, $p < 0.001$). Self-efficacy was negatively correlated with disability ($r = -0.87$, $p < 0.001$). Empowerment was found to significantly positively predict self-efficacy ($\beta = 0.279$, $P < 0.001$), both empowerment and self-efficacy significantly positively predicted self-management ($\beta = 0.158$ to 0.204, $P < 0.05$), and empowerment, self-efficacy, and self-management significantly negatively predicted disability ($\beta = -0.314$ to -0.123, $P < 0.05$). The direct impact of empowerment on disability is -0.123, accounting for 49.6% of the total effect. The total indirect effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases is -0.125, accounting for 50.4% of the total effect. The mediating effect value of self-efficacy in the relationship between the concept of empowerment and disability in elderly patients with chronic diseases is -0.057, accounting for 45.6% of the total indirect effect. The mediating effect value of self-management between empowerment and disability in elderly patients with chronic diseases is -0.050, accounting for 40.0% of the total indirect effect. The relationship between empowerment and disability is mediated by self-efficacy and self-management, which act as a chain mediator, with an indirect effect. The mediating effect value was found to be -0.018, accounting for 14.4% of the total indirect effect.

Conclusion:

Empowerment can directly affect the disability of elderly patients with chronic diseases, and it can also influence it indirectly through the self-efficacy and self-management. Self-efficacy and self-management play a mediating role between empowerment and disability. It is recommended that healthcare professionals implement strategies to enhance the empowerment of elderly patients suffering from chronic diseases, whilst concurrently strengthening their self-efficacy and self-management abilities. This approach is intended to improve the disability status of patients.

1 Introduction

The health crisis triggered by an ageing population has become a major public health issue on a global scale, which urgently requires attention. In China, surveys indicate that 20% of the population is elderly, 78% of whom suffer from chronic diseases, with the vast majority having two or more. Projections indicate that by the year 2030, the proportion of the Chinese population that is elderly will reach 27%, with the number of individuals afflicted with chronic diseases expected to increase threefold. It is anticipated that the prevalence of chronic diseases will rise by a minimum of 40% (1). It is imperative that effective measures are implemented by society to promote healthier ageing and reduce the burden of chronic diseases on individuals and the medical system (2). In the context of global ageing, disability among chronically ill elderly patients has become a significant public health concern. Patients who possess high levels of empowerment, self-efficacy and self-management are more likely to adopt positive coping strategies when confronted with diseases (3), which may result in enhanced self-care awareness and a reduced risk of disability over the course of the disease process. A number of studies have demonstrated an association between empowerment (4–6), self-efficacy (7–9), self-management (10–11) and disability in certain chronic conditions. However, how these mechanisms are articulated still needs further investigation. For example, it was hypothesized that self-efficacy and self-management would act as pivotal intermediary variables between empowerment and disability among patients with chronic diseases. This notion is supported by the Health Empowerment Theory (12), which asserts that an individual's health is influenced by a multitude of factors, including but not limited to the quality of healthcare services provided by the healthcare system. Furthermore, the psychological state of the individual, their lifestyle choices, and the social environment they inhabit play a significant role in determining their overall health status. It can thus be posited that individuals who are empowered with adequate disease coping capabilities (self-efficacy) are more likely to adopt positive self-management strategies when confronted with chronic diseases, thereby reducing the risk of disability. Additionally, We observed that self-efficacy may act as a pivotal intermediary variable between empowerment and disability among patients with chronic diseases. This notion is supported by Bandura’s Self-Efficacy Theory (7). Cheng et al. elucidated that self-efficacy and empowerment are mutually reinforcing processes (7). As individual capabilities, such as empowerment, are enhanced, self-efficacy is also increased. Furthermore, high self efficacy is vital for effective self-management, enabling the modification of unhealthy behaviors and outcomes, such as disability. In addition, The Information-Motivation-Behavioral Skills model (IMB) (13) posits that an individual's behavioral change is contingent on the acquisition of pertinent knowledge regarding disease prevention. This is followed by the establishment of an environment conducive to behavioral change, with the

objective of enhancing motivation. Ultimately, the provision of behavioral skills that the individual finds acceptable is essential. Once information, motivation, and behavioral skills have been adequately addressed, the objective of behavioral change and health promotion can be realized. It can thus be inferred that health information (empowerment) serves as a prerequisite, interacting through motivation (self-efficacy) and behavioral skills (self-management), ultimately leading to behavioral changes and thus generating positive health outcomes (reduced disability). The extant theoretical foundation serves as the basis for the present study's hypothesis, which posits that self-efficacy and self-management ability act as mediating factors between the concepts of empowerment and disability in elderly patients afflicted with chronic diseases. The establishment of this hypothesis will provide further theoretical support for the deep-seated relationships and mechanisms of action among these variables, thereby enriching the existing theoretical basis.

The empowerment described in this article is a multi-dimensional concept. The definition under scrutiny herein focuses on four aspects: psychological empowerment, information empowerment, decision-making empowerment, and community empowerment (12). The term “psychological empowerment” is employed to denote the process of enhancing an individual's sense of self-efficacy, autonomy, and responsibility, thereby enabling them to acquire the ability to solve problems at the psychological level (14). Information authorization can be defined as the process of providing individuals with the necessary information, knowledge or resources to enable them to make more informed decisions (15–16). Decision-making authorization is defined as the process of granting individuals the right to participate in decision-making(17–18). Community empowerment is defined as the process of enhancing an individual's influence and resource acquisition ability within the community through community organizations or collective activities (19–20).

To the best of our knowledge, a paucity of studies has been identified in the extant literature concerning the relationship between empowerment and disability in elderly patients with chronic diseases (4), with the majority of studies concentrating on the exploration of a single factor, whilst eschewing in-depth analysis of its internal mechanism of action (6). Moreover, there is a paucity of research on the relationship between disability, empowerment, self-efficacy and self-management. To the best of our knowledge, no research has investigated the relationship between these variables among elderly patients with chronic diseases in Southwest China so far. In view of the limitations of the extant research referenced above, as well as the high prevalence of chronic diseases and the significant burden they impose on individuals and the medical system in this population, there is an urgent need to conduct new research to address the current research deficiencies and clarify the deep-seated relationships among the above variables. The objective of this study is to establish a reference point for the formulation of appropriate intervention measures, with the aim of reducing the risk of disability in elderly patients suffering from chronic diseases. The present study aims to explore the mediating role of self-efficacy and self-management in the relationship between empowerment and disability in elderly patients with chronic diseases, with the expectation of filling this literature gap.

2 Materials and Methods

2.1 Study Participants

From January to November 2023, a convenience sampling method was used to recruit patients aged 60 years or older who were hospitalized in the internal medicine departments of eight tertiary hospitals in Sichuan Province. For elderly participants who owned smartphones, an on-site online survey was conducted via a questionnaire distributed through the WeChat platform. In contrast, for those without access to smartphones or mobile phones, paper-based questionnaires were administered on site. The eligibility criteria for study participation were as follows: (1) age ≥ 60 years; (2) diagnosis of at least one chronic disease; (3) adequate reading comprehension ability; and (4) provision of informed consent and willingness to participate voluntarily. Participants were excluded if they experienced communication difficulties due to hearing impairment or speech disorders.

2.2 Study methods

2.2.1 Research instruments

2.2.1.1 General demographic questionnaire

A self-developed questionnaire was used to collect information on patients’ gender, age, marital status, residence, educational level, monthly personal income, monthly per capita household income, living arrangement, comorbidity, and number of hospitalizations.

2.2.1.2 Elderly disability assessment scale

The Elderly Disability Assessment Scale (EDAS), developed by Yang et al. (21), consists of 28 items distributed across seven dimensions: mental function (items 1–4), organ function (items 5–7), communication (items 8–9), activity (items 10–15), self-care (items 16–23), family life (items 24–25), and economic and social life (items 26–28). Each item is rated on a 7-point scale ranging from 1 to 7, and the total score is the sum of all item scores, ranging from 28 to 196. A lower total score indicates a higher level of disability. A score below 196 indicates the presence of disability, with scores of 168–195 indicating mild disability, 140–167 moderate disability, 84–139 severe disability, and 28–83 extremely severe disability. The Chinese version of this scale has been widely used in various settings and has demonstrated strong psychometric properties (22, 23). The present study focuses on a comprehensive assessment of disability and dysfunction among elderly patients with chronic diseases; therefore, the EDAS was selected as the appropriate research tool.

2.2.1.3 Simplified elders health empowerment scale

The Simplified Elders Health Empowerment Scale (SEHES) was originally developed by Gagnon et al. (24) and later translated into Chinese by Yang et al. (25). This scale comprises eight items designed to measure health empowerment in older adults with chronic illnesses. Each item is rated on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The total score is the sum of the eight items, ranging from 8 to 40, with higher scores indicating greater levels of empowerment. The Chinese version of this scale has been extensively applied across various contexts and has shown robust psychometric properties.

2.2.1.4 General self-efficacy scale

The General Self-Efficacy Scale (GSES) was originally developed by Caruso et al. (26) and subsequently translated into Chinese by Zhang (27). This scale contains 10 items that assess an individual's confidence in overcoming setbacks and difficulties. Each item is rated on a 4-point Likert scale ranging from 1 ("completely incorrect") to 4 ("completely correct"). The total score is the sum of the 10 items, ranging from 10 to 40, with higher scores reflecting greater self-efficacy. The Chinese version of this scale has been widely used in diverse settings and has demonstrated strong psychometric properties.

2.2.1.5 Chronic Disease Self-management Behavior Measuring Scale

The Chronic Disease Self-management Behavior Measuring Scale (CDSMBMS) was originally developed by Lorig et al. (28) and later translated into Chinese by Cui (29). This scale includes three dimensions: Exercise (items 1–6), Cognitive symptom management (items 7–12), and Communication with doctors (items 13–15). It aims to evaluate the self-management capacity of elderly individuals with chronic diseases. Each item is scored on a 5-point Likert scale ranging from 1 ("never") to 5 ("always"). The total score is the sum of the 15 items, ranging from 15 to 75, with higher scores indicating better self-management. The Chinese version of this scale has been extensively employed across various contexts and has demonstrated robust psychometric properties.

2.2.2 Data collection and quality control procedures

Data were collected between January and November 2023. Initially, the researcher contacted the nursing directors of the eight participating tertiary hospitals to explain the study's objectives. The research team members were responsible for distributing and collecting the questionnaires. Two survey teams were formed, each consisting of four research team members from different hospital departments or units and four trained nurses. Each team was assigned to collect data within its designated department or unit. Using standardized instructions, the investigators explained the purpose, content, requirements, and confidentiality of the survey to the patients. After obtaining informed consent, the questionnaires were distributed to the patients. Completed questionnaires were reviewed on site by the investigators, organized, and each participant received a small gift as a token of appreciation. Two individuals were responsible for organizing, verifying, and entering the data, and any invalid questionnaires were excluded. To ensure the representativeness and comprehensiveness of the sample, and to more accurately and objectively reflect the conditions of elderly patients with various chronic diseases, the survey was conducted in all internal medicine departments of the eight tertiary hospitals. These internal medicine departments comprised a total of 56 departments and 168 wards, including those specializing in gastroenterology, cardiology, neurology, and respiratory medicine. In addition, although the study was conducted in eight tertiary hospitals, the questionnaire design aimed to recruit participants from both urban and rural areas, thereby enhancing the diversity and representativeness of the sample. A total of 450 questionnaires were distributed, and 436 completed questionnaires were returned, yielding a response rate of 96.89%. During the study, 14 questionnaires were excluded due to incomplete data.

2.2.3 Statistical analysis

All statistical analyses were carried out using SPSS version 26.0. To assess whether the data followed a normal distribution, the Kolmogorov–Smirnov test, PP plot, QQ plot, as well as skewness and kurtosis coefficients, were applied. For data that approximately met the normality assumption, the t-test was used to compare mean differences between two sample groups. For comparisons involving three or more groups, analysis of variance (ANOVA) was employed. Continuous variables were summarized as means and standard deviations, while categorical data were expressed as frequencies and composition ratios. The Harman single-factor test was conducted to check for common method bias. When the dimensions being analyzed contained different numbers of items, the scores were normalized prior to comparison. Spearman's rank correlation analysis was then used to explore the relationships among the various variables. A chain mediation model was tested using Model 6 of Hayes' SPSS PROCESS macro (version 3.5), with 5,000 bootstrap samples drawn. The significance level was set at $\alpha = 0.05$.

2.2.4 Common method bias test and collinearity test

In order to control for the possibility of common method bias, the present study utilized anonymous surveys with reverse item settings and items presented in different contexts (30). A confirmatory factor analysis was also conducted using AMOS 26.0 software. The model fit indices were as follows: The model fit indices indicated an inadequate fit, with a χ^2/df ratio of 4.17, an RMSEA of 0.09, a CFI of 0.85, and an NFI of 0.79. Furthermore, The Harman single-factor test was utilized to examine the common method bias. The results demonstrated that a total of 18 factors exhibited eigenvalues greater than 1, and the maximum common factor's variance interpretation rate was 17.36%, which was lower than the critical value of 40% (31). Consequently, the likelihood of substantial common method bias was effectively eliminated in this study. The collinearity test was conducted on the data, and the results showed that the tolerance range was 0.139 to 0.746, and the variance inflation factor was 1.343 to 7.142, indicating that there was no serious collinearity problem among the variables (31).

3 Results

3.1 Characteristics of Participants

Table 1 summarizes participants' demographic characteristics. The sample was predominantly male, married, and aged 60–75 years. Among the respondents, 237 were from towns, 118 lived with spouse and children, and 161 had completed primary school or less. Monthly personal income of 2,001–3,000 yuan accounted for 35.78% of the sample, while monthly per capita household income of 4,001–5,000 yuan accounted for 38.07%. Significant differences in disability scores were found across gender, age, residence, and comorbidity groups, but not for the other variables. Regarding survey mode, 205 participants (47.02%) responded via WeChat and 231 (52.98%) via paper questionnaires, with no significant differences between the two groups.

Table 1
Univariate analysis of scores on the disability assessment scale for elderly patients with chronic diseases (n = 436)

Variable	Group	Frequency	Score (Mean ± SD)	*t/F value*	*p* -value
Gender	Male	226	142.67 ± 12.35	195.023[a]	0.038
	Female	210	138.75 ± 13.64		
Age	60 ~ 75	185	152.41 ± 18.57	5.156[b]	0.002
	76 ~ 85	161	141.27 ± 17.45		
	86 ~ 95	83	140.26 ± 15.52		
	> 95	7	139.78 ± 14.54		
Marital status	Unmarried	9	142.45 ± 16.42	3.009[b]	0.478
	Married	189	135.95 ± 17.45		
	Divorced	149	142.35 ± 15.47		
	Widowed	89	138.74 ± 20.59		
residence	Town	237	144.68 ± 18.54	4.317[a]	0.001
	Rural areas	199	156.54 ± 17.85		
Education level	Primary school and below	161	133.57 ± 14.68	3.224[b]	0.371
	Junior high school	107	136.95 ± 13.21		
	High school or technical school	93	139.87 ± 13.78		
	College or undergraduate	62	135.58 ± 12.97		
	Postgraduate and above	13	144.12 ± 15.53		
Monthly personal income	Below 2,000	84	147.65 ± 14.75	0.615[b]	0.309
	2,001–3,000	156	150.24 ± 16.03		
	3,001–4,000	114	132.52 ± 12.42		
	Above 4,000	82	141.77 ± 14.52		
Monthly per capita household income	Below 3,000	95	135.32 ± 12.52	0.712[b]	0.567
	3,001–4,000	122	141.57 ± 14.11		
	4,001–5,000	166	136.58 ± 17.62		
	Above 5,000	53	130.14 ± 15.09		
Living arrangement	Spouse and children	118	125.45 ± 12.58	4.225[b]	0.056
	Spouse	109	131.70 ± 13.17		
	Children	86	142.50 ± 12.78		
	Living alone	73	140.55 ± 12.11		
	Other	50	138.27 ± 14.66		
Comorbidity	Yes	280	129.53 ± 11.74	6.257[a]	0.001
	No	156	131.88 ± 12.19		
Hospitalization times	Once	94	142.46 ± 13.37	537.050[b]	0.063
	Twice	201	144.14 ± 12.50		
	More than three times	141	139.37 ± 13.13		

[a] Univariate analysis performed using *t*-test.

[b] Univariate analysis performed using analysis of variance.

3.2 Factor analysis and internal consistency

Factor analysis was used to test scale validity. The sample was split into two halves: one for exploratory factor analysis (EFA) and the other for confirmatory factor analysis (CFA), with CFA verifying the factor structures from EFA. Model fit was assessed using $\chi^2/df < 5$, RMSEA < 0.08, CFI > 0.9, and NFI > 0.9 (29, 30). Cronbach's alpha measured reliability. For the EDAS, the sample was divided into EDAS 1 (n = 218) and EDAS 2 (n = 218), with no significant differences between groups (all $p > 0.05$). Principal component analysis with varimax rotation on EDAS 1 extracted seven components explaining 66.751% of variance (KMO = 0.865, Bartlett's $\chi^2 = 1{,}415.663$, $p < 0.001$). CFA on EDAS 2 confirmed the seven-factor structure with acceptable fit ($\chi^2/df = 3.52$, RMSEA = 0.06, CFI = 0.94, NFI = 0.93).

Cronbach's alpha was 0.85. Results for other scales are shown in Table 2.

Table 2
Factor analysis and internal consistency of scales in this study

Items	Cronbach's alpha	Groups n = 218	T-test	EFA[a]					CFA			
				Principal components	Initial variance(%)	KMO	Bartlett's χ^2	*p*-value	χ^2/df	RMSEA	CFI	NFI
EDAS	0.85	EDAS1	p > 0.05	Seven	66.751	0.865	1,415.663	< 0.001				
		EDAS2							3.52	0.06	0.94	0.93
SEHES	0.82	SEHES1	p > 0.05	One	67.114	0.802	1,462.216	< 0.001				
		SEHES2							3.69	0.07	0.93	0.91
GSES	0.83	GSES1	p > 0.05	One	69.016	0.798	1,523.446	< 0.001				
		GSES2							3.52	0.07	0.93	0.93
CDSMBMS	0.79	CDSMBMS1	p > 0.05	Three	70.496	0.808	1,524.317	< 0.001				
		CDSMBMS2							3.65	0.06	0.92	0.91

[a] The analysis was conducted using a principal component analysis with varimax rotation.

3.3 Subgroup analysis

To evaluate the effectiveness of cross-group comparisons, the sample was divided by gender into a male subgroup (n = 226) and a female subgroup (n = 210), with the corresponding results shown in Tables 7 and 8. The total effect of empowerment on disability was − 0.248 (95% CI: −0.656 to − 0.291) for males and − 0.247 (95% CI: −0.652 to − 0.237) for females. Although minor differences were observed between the two gender groups, the overall interpretation of the findings remained largely unchanged.

Table 7
Analysis of the mediating effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases for the male group (n = 226)

Effect type	Effect value	Boot *SE*	Bootstrap 95%*CI*	Effect proportion(%)
Total effect	-0.248	0.101	-0.656 ~ -0.291	-
Direct effect	-0.123	0.094	-0.441 ~ -0.056	49.6
Total indirect effect	-0.125	0.032	-0.147 ~ -0.068	50.4
Indirect effect 1[a]	-0.057	0.018	-0.085 ~ -0.030	23.0
Indirect effect 2[b]	-0.050	0.022	-0.087 ~ -0.017	20.2
Indirect effect 3[c]	-0.018	0.008	-0.026 ~ -0.010	7.2

[a] The mediating effect of self-efficacy in the relationship between empowerment and disability in elderly patients with chronic diseases.

[b] The mediating effect of self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

[C] The mediating effect of self-efficacy and self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

Table 8
Analysis of the mediating effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases for the female group (n = 210)

Effect type	Effect value	Boot *SE*	Bootstrap 95%*CI*	Effect proportion(%)
Total effect	-0.247	0.103	-0.652 ~ -0.237	-
Direct effect	-0.123	0.092	-0.420 ~ -0.055	49.8
Total indirect effect	-0.124	0.030	-0.171 ~ -0.063	50.2
Indirect effect 1[a]	-0.057	0.017	-0.092 ~ -0.024	23.1
Indirect effect 2[b]	-0.049	0.021	-0.089 ~ -0.017	19.8
Indirect effect 3[c]	-0.018	0.009	-0.027 ~ -0.009	7.3

[a] The mediating effect of self-efficacy in the relationship between empowerment and disability in elderly patients with chronic diseases.

[b] The mediating effect of self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

[C] The mediating effect of self-efficacy and self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

In addition, model testing was performed according to disease subgroup classification. The sample was split into a group with comorbidities (n = 280) and a group without comorbidities (n = 156). The results are presented in Tables 9 and 10. The total effect of empowerment on disability was − 0.247 (95% CI: −0.612 to − 0.286) for the comorbidities group and − 0.248 (95% CI: −0.647 to − 0.241) for the non-comorbidities group. Minor differences were noted between these two groups; nevertheless, the interpretation of the results was largely unaffected.

Table 9
Analysis of the mediating effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases for the comorbidities group (n = 280)

Effect type	Effect value	Boot *SE*	Bootstrap 95%*CI*	Effect proportion(%)
Total effect	-0.247	0.100	-0.612 ~ -0.286	-
Direct effect	-0.124	0.092	-0.438 ~ -0.055	50.2
Total indirect effect	-0.123	0.034	-0.144 ~ -0.065	49.8
Indirect effect 1[a]	-0.056	0.017	-0.080 ~ -0.032	22.7
Indirect effect 2[b]	-0.049	0.020	-0.084 ~ -0.018	19.8
Indirect effect 3[c]	-0.018	0.008	-0.022 ~ -0.013	7.3

[a] The mediating effect of self-efficacy in the relationship between empowerment and disability in elderly patients with chronic diseases.

[b] The mediating effect of self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

[C] The mediating effect of self-efficacy and self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

Table 10
Analysis of the mediating effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases for the non -comorbidities group (n = 156)

Effect type	Effect value	Boot *SE*	Bootstrap 95%*CI*	Effect proportion(%)
Total effect	-0.248	0.101	-0.647 ~ -0.241	-
Direct effect	-0.123	0.095	-0.417 ~ -0.052	49.6
Total indirect effect	-0.125	0.033	-0.170 ~ -0.062	50.4
Indirect effect 1[a]	-0.057	0.015	-0.087 ~ -0.026	23
Indirect effect 2[b]	-0.050	0.023	-0.082 ~ -0.021	20.2
Indirect effect 3[c]	-0.018	0.009	-0.024 ~ -0.009	7.2

[a] The mediating effect of self-efficacy in the relationship between empowerment and disability in elderly patients with chronic diseases.

[b] The mediating effect of self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

[C] The mediating effect of self-efficacy and self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

3.4 Scale scores

Table 3 summarizes the scores for disability, empowerment, self-efficacy, and self-management among the participants. For older adults with chronic diseases, the mean disability score was 156.08 (SD = 28.41), with observed scores ranging from 28 to 196. The mean empowerment score was 23.95 (SD = 7.49), ranging from 8 to 40. Self-efficacy had a mean of 23.61 (SD = 5.10), with a range of 10 to 40, while self-management yielded a mean of 47.75 (SD = 9.88), ranging from 15 to 75. All four domain scores—disability, empowerment, self-efficacy, and self-management of elderly patients with chronic diseases were all found to be at a medium level.

Table 3
Disability, empowerment, self-efficacy and self-management scores (n = 436)

Scale and dimension	Score (Mean ± SD)	Z-scores
Disability	156.08 ± 28.41	
Mental function	20.89 ± 5.64	0.75
Organ function	15.52 ± 6.24	0.62
Communication	9.27 ± 4.58	0.51
Activity	36.84 ± 5.97	0.78
Self-care	48.43 ± 6.02	0.72
Family life	9.88 ± 5.79	0.54
Economic and social life	15.25 ± 8.67	0.71
Empowerment	23.95 ± 7.49	
Self-efficacy	23.61 ± 5.10	
Self-management	47.75 ± 9.88	
Exercise	18.28 ± 5.12	0.71
Cognitive symptom management	21.02 ± 8.14	0.77
Communication with doctors	8.45 ± 3.17	0.52

3.5 Bivariate analysis

As shown in Table 4, empowerment exhibited a positive correlation with both self-efficacy ($r = 0.75$, $p < 0.001$) and self-management ($r = 0.69$, $p < 0.001$), whereas its correlation with disability was negative ($r = -0.81$, $p < 0.001$). Self-management was positively associated with self-efficacy ($r = 0.74$, $p < 0.001$) and negatively associated with disability ($r = -0.78$, $p < 0.001$). Additionally, self-efficacy demonstrated a negative correlation with disability ($r = -0.87$, $p < 0.001$).

Table 4
Correlation analysis of disability, empowerment, self-efficacy and self-management (n = 436)

Item	Disability	Mental function	Organ function	Communication	Activity	Self-care	Family life	Economic and social life	Empowerment	Self-efficacy	Self-manag
Disability	1.00	-0.77[a]	-0.67[a]	-0.66[a]	-0.69[a]	-0.72[a]	-0.80[a]	-0.65[a]	-0.81[a]	-0.87[a]	-0.78[a]
Mental function	-0.77[a]	1.00	0.85[a]	0.81[a]	0.73[a]	0.66[a]	0.81[a]	0.05	0.07	0.15	0.13
Organ function	-0.67[a]	0.85[a]	1.00	0.78[a]	0.67[a]	0.75[a]	0.16	0.22	0.16	0.24	0.06
Communication	-0.66[a]	0.81[a]	0.78[a]	1.00	0.72[a]	0.74[a]	0.08	0.06	0.13	0.22	0.14
Activity	-0.69[a]	0.73[a]	0.67[a]	0.72[a]	1.00	0.79[a]	0.04	0.08	0.10	0.13	0.24
Self-care	-0.72[a]	0.66[a]	0.75[a]	0.74[a]	0.79[a]	1.00	0.09	0.06	0.04	0.06	0.12
Family life	-0.80[a]	0.81[a]	0.16	0.08	0.04	0.09	1.00	0.76[a]	0.68[a]	0.63[a]	0.81[a]
Economic and social life	-0.65[a]	0.05	0.22	0.06	0.08	0.06	0.76[a]	1.00	0.62[a]	0.73[a]	0.59[a]
Empowerment	-0.81[a]	0.07	0.16	0.13	0.10	0.04	0.68[a]	0.62[a]	1.00	0.75[a]	0.69[a]
Self-efficacy	-0.87[a]	0.15	0.24	0.22	0.13	0.06	0.63[a]	0.73[a]	0.75[a]	1.00	0.74[a]
Self-management	-0.78[a]	0.13	0.06	0.14	0.24	0.12	0.81[a]	0.59[a]	0.69[a]	0.74[a]	1.00
Exercise	-0.15	0.21	0.19	0.26	0.16	0.15	0.75[a]	0.64[a]	0.62[a]	0.71[a]	0.80[a]
Cognitive symptom management	-0.33	0.07	0.31	0.20	0.06	0.24	0.72[a]	0.69[a]	0.71[a]	0.69[a]	0.74[a]
Communication with doctors	-0.62[a]	0.28	0.40	0.29	0.52	0.31	0.53	0.60[a]	0.63[a]	0.65[a]	0.70[a]

[a]$p < 0.001$.

3.6 Mediation effect analysis

3.6.1 Multivariate hierarchical regression analysis of the chain mediation model involving self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases

The study employed an analytical framework in which empowerment served as the independent variable, disability as the dependent variable, and self-efficacy and self-management as the mediating variables. The analysis controlled for the four variables that showed statistical significance in the univariate analysis, thereby establishing a standardized analytical framework. The chain mediating roles of self-efficacy and self-management in the relationship between empowerment and disability were examined using Model 6 of the PROCESS macro. The results of the multivariate hierarchical regression analysis are presented in Table 5, and the path diagram is displayed in Fig. 1. First, with empowerment as the predictor and self-efficacy as the outcome variable, empowerment significantly and positively predicted self-efficacy ($\beta = 0.279$, $p < 0.001$). Second, with empowerment and self-efficacy as predictors and self-management as the outcome variable, both empowerment and self-efficacy significantly and positively predicted self-management ($\beta = 0.158$ to 0.204, $p < 0.05$). Third, with empowerment, self-efficacy, and self-management as predictors and disability as the outcome variable, all three variables significantly and negatively predicted disability ($\beta = -0.314$ to -0.123, $p < 0.05$). These results support a chain mediating role of self-efficacy and self-management between empowerment and disability.

Table 5
Multivariate hierarchical regression analysis of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases (n = 436)

Variable	Self-efficacy			Self-management			Disability		
	β	*t*	*P*	*β*	*t*	*P*	*β*	*t*	*P*
Empowerment	0.279	4.652	< 0.001	0.158	2.694	0.011	-0.123	-2.526	0.013
Self-efficacy	-	-	-	0.204	3.578	< 0.001	-0.206	-4.716	< 0.001
Self-management	-	-	-	-	-	-	-0.314	-7.153	< 0.001
Gender	-0.312	-5.828	< 0.001	0.030	0.432	0.660	0.125	2.296	0.025
Age	-0.070	-1.625	0.114	-0.058	-1.322	0.184	0.151	4.235	< 0.001
Residence	-0.042	-0.745	0.453	-0.052	-1.246	0.217	0.010	0.245	0.806
Comorbidity	-0.050	-0.692	0.482	0.152	2.137	0.016	-0.108	-1.852	0.045
R^2		0.442			0.468			0.662	
F	30.854		< 0.001	31.128		< 0.001	59.671		< 0.001

3.6.2 Testing the chain mediating effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases

The mediation model was tested following the approach described by Igartua (32). The bootstrap method was applied with 5,000 resamples to estimate 95% confidence intervals. The mediation analysis results are shown in Table 6. The direct effect of empowerment on disability was − 0.123, accounting for 49.6% of the total effect. The total indirect effect via self-efficacy and self-management was − 0.125, representing 50.4% of the total effect. First, self-efficacy mediated the relationship between empowerment and disability, with a mediation effect value of − 0.057, which accounted for 45.6% of the total indirect effect. This value was calculated as 0.279 × (− 0.206) = − 0.057. Second, self-management also mediated the relationship between empowerment and disability, with a mediation effect value of − 0.050, accounting for 40.0% of the total indirect effect, calculated as 0.158 × (− 0.314) = − 0.050. Third, a chain mediation effect involving both self-efficacy and self-management was observed, with a mediation effect value of − 0.018, representing 14.4% of the total indirect effect, calculated as 0.279 × 0.204 × (− 0.314) = − 0.018.

Table 6
Analysis of the mediating effect of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases (n = 436)

Effect type	Effect value	Boot *SE*	Bootstrap 95%*CI*	Effect proportion(%)
Total effect	-0.248	0.102	-0.687 ~ -0.283	-
Direct effect	-0.123	0.094	-0.427 ~ -0.053	49.6
Total indirect effect	-0.125	0.031	-0.185 ~ -0.071	50.4
Indirect effect 1[a]	-0.057	0.018	-0.096 ~ -0.025	23.0
Indirect effect 2[b]	-0.050	0.021	-0.091 ~ -0.015	20.2
Indirect effect 3[c]	-0.018	0.008	-0.032 ~ -0.008	7.2

[a] The mediating effect of self-efficacy in the relationship between empowerment and disability in elderly patients with chronic diseases.

[b] The mediating effect of self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

[C] The mediating effect of self-efficacy and self-management in the relationship between empowerment and disability in elderly patients with chronic diseases.

4 Discussion

To the best of our knowledge, this study is the first to investigate the relationships among disability, empowerment, self-efficacy, and self-management in elderly patients with chronic diseases residing in the southwestern region of China. The findings confirm the mediating roles of self-efficacy and self-management in the link between empowerment and disability within this population. Compared with previous research, the present work advances the current understanding of this topic and fills an important gap in the literature. In addition, several key findings emerged from this study, as summarized below.

4.1 Disability, empowerment, self-efficacy, and self-management in older adults with chronic diseases

Disability refers to a state in which an individual's capacity to perform daily activities or participate in social roles is restricted (33). Prolonged disability has been shown to adversely affect patients' psychological well-being, often leading to psychological distress, role dysfunction, suboptimal treatment outcomes,

and impaired recovery (34). Among the older population, disability is directly linked to care practices and associated costs, thereby imposing a substantial long-term care burden (35). The present survey revealed a moderate level of disability among elderly patients with chronic diseases, with a mean score of 156.08 (SD = 28.41). This finding aligns with previous reports by Wu (36), Zhang (37), and others. In this study, the lowest scores were observed in the communication and family life dimensions, which is consistent with the findings of Wang (38). Compared with earlier research, the current study extends the exploration of potential underlying causes. Several factors may contribute to this pattern: cognitive decline, physiological aging, shrinking social networks, and rapid changes in economic conditions and social roles, among others. Taken together, these elements pose significant challenges for older adults with chronic conditions, who must learn and accept new concepts. Influenced by traditional Chinese culture and the stigma associated with illness, the thoughts and behaviors of these individuals tend to become relatively closed. Many refrain from interacting or communicating with others due to fear of potential discrimination. This lack of social interaction and support impairs their ability to adapt and to receive assistance from family members, friends, and social groups, which in turn adversely affects intimacy and reciprocity within the family unit. It has been well documented that chronically ill older adults who are unable to care for themselves often choose to live with their adult children (39). Loneliness has been shown to generate long-term and severe social and psychological stress, thereby reducing access to social and emotional support (40). Compared with previous studies, the present research may provide support for the observation that, amid rapid social and economic development, the migration of adult children negatively affects older adults, resulting in insufficient support and care from family, friends, and society. This situation is detrimental to the stability of intimate family relationships and mutual support, and can lead to adverse outcomes such as social isolation and significant social and psychological pressures. Therefore, it is recommended that the social support system be strengthened for disabled older adults with chronic diseases, with the goal of enhancing social integration and encouraging adult children to understand their parents' needs. Such efforts would help ensure a good quality of life for older adults and foster a harmonious and healthy family atmosphere, thereby promoting stable family dynamics (41). Key areas of focus include the standardization of long-term care programs for disabled older adults (42) and the exploration of service models suitable for long-term care of older adults with chronic conditions. Consequently, it is essential to enhance their empowerment, self-efficacy, and self-management skills, leading to improvements in their physical and mental health and overall quality of life.

As noted above, empowerment is a multidimensional concept. The definition used in this article focuses on four aspects: psychological empowerment, information empowerment, decision-making empowerment, and community empowerment (12). It represents a multifaceted approach to enhancing individuals' awareness of autonomous behavior, along with a range of social processes aimed at creating an environment conducive to healthy living (43). Individuals who actively engage in their own healthcare tend to achieve better health outcomes, including improved chronic disease management, better mental health, and delayed disease progression (44). Moreover, empowering individuals to manage their own health can increase their involvement in disease management, enhance communication with healthcare providers, improve adherence to treatment plans, and ultimately increase patient satisfaction (45). A study on health empowerment among individuals at risk of kidney disease indicated that improving patients' health perception and social support is beneficial for achieving better health outcomes (46). The current study found a moderate empowerment score among elderly patients with chronic diseases (23.95 ± 7.49), which is consistent with the results of several other studies (47, 48). This phenomenon may be attributable to the supportive environment and comprehensive care characteristic of elderly care in southwestern China. In this context, older adults with chronic diseases have ready access to educational resources, including disease prevention and health management training, as well as popular science knowledge and skills. The effectiveness of this approach in improving patients' confidence and ability to make informed health decisions has been well documented, leading to notable improvements in their ability to cope with illness (49).

Self-efficacy is defined as an individual's belief in their capacity to successfully perform a specific task or activity (50). It significantly influences patients' attitudes toward disease and health behaviors, thereby affecting disease progression (51). A positive sense of self-efficacy has been shown to encourage a proactive approach to disease management (49). Health education interventions can modify patients' cognition and rebuild their confidence (52). Patients with chronic diseases who have high self-efficacy actively acquire disease-related knowledge through various channels, continuously explore their own strengths, and accumulate and summarize their own experiences, thereby enhancing their confidence and ability to make health decisions (53). The present study found that the mean self-efficacy score of elderly patients with chronic diseases was moderate (23.61 ± 5.10), a result consistent with several other studies (53, 54). However, a fully satisfactory explanation for this phenomenon has not yet been identified in other studies. The following hypotheses are proposed as potential explanations. First, due to their age and physical condition, older adults may be vulnerable to adverse external environments, which may hinder their ability to pursue their ideals and goals. Second, chronic diseases tend to recur frequently and persist for extended periods. Patients experience considerable psychological and physical pressure, which impedes their ability to cope effectively with emotional distress. This, in turn, can reduce their confidence in the recovery process and potentially affect recovery outcomes.

Self-management refers to the process by which individuals take responsibility for their own health. It encompasses the competencies and methods individuals use to regulate their health and effectively manage chronic diseases (55). Effective self-management requires a combination of knowledge, skills, attitudes, and support. For patients with chronic diseases, effective self-management strategies can enhance overall health and well-being (56). By fostering self-understanding and promoting a comprehensive understanding of their condition, these strategies can reduce the frequency of hospital visits, thereby alleviating the financial and medical burdens on patients and their families (57). The ability to self-manage health conditions has been shown to facilitate recovery and reduce the likelihood of recurrence (58). The present study found a moderate self-management score among elderly patients with chronic diseases (47.75 ± 9.88), a finding consistent with similar studies (57–60). Compared with previous research, the current study further observed that the communication score with doctors was unsatisfactory. Two potential explanations are proposed. One factor is the high patient volume handled by doctors, which results in shorter consultation times and limited opportunities for interaction. Second, due to disease-related stigma, some patients may be less inclined to proactively engage with healthcare providers or express their opinions.

4.2 Correlation analysis of disability, empowerment, self-efficacy, and self-management in older adults with chronic diseases

First, the results of this study indicate that empowerment has a direct negative predictive effect on disability among elderly patients with chronic diseases (β = −0.123, p < 0.05). In other words, higher levels of empowerment are associated with lower degrees of disability. This finding aligns with previous research (61, 62). Research suggests that as elderly patients with chronic diseases age, they frequently face complex circumstances, including cognitive decline, multimorbidity, and the need for multiple medications. These factors collectively make it challenging for them to manage their health conditions independently (63). For example, elderly patients with type 2 diabetes often struggle to understand the professional terminology used in medication instructions when managing their condition, which may lead to medication errors due to confusion about different drugs. The consequences of this phenomenon extend beyond blood sugar stability to an increased risk of complications in vital systems such as the cardiovascular, nervous, and renal systems, thereby accelerating the process of frailty and the subsequent onset of disability (64). Elderly patients with chronic diseases who have high levels of empowerment are able to identify their disease-related problems, express their emotions in a timely manner, set disease management goals, formulate management plans, and evaluate outcomes. Implementing these positive measures can enhance their ability to cope effectively with their illness and reduce the occurrence of disability (65). For instance, elderly patients with type 2 diabetes who are highly empowered can meticulously record their medication use, closely monitor their physical condition, promptly identify physical discomfort, and seek medical attention in a timely manner, thereby reducing complications and ultimately lowering the risk of disability (64).

Second, a negative correlation was observed between self-efficacy and disability severity (β = −0.206, p < 0.001), which is consistent with the findings reported by Marceron et al. (66) and Wang et al. (38). Older adults with higher self-efficacy have been shown to exhibit several notable characteristics. First, they have a deeper understanding of their health conditions. Second, they demonstrate better emotional management skills. Third, they possess the confidence and skills necessary to cope with illness. Fourth, they show greater adaptability to changes in social and family roles following illness. Fifth, they actively seek medical and family support. Finally, they hold positive expectations for their future lives (67). As a result, they are able to effectively regulate anxiety, depression, and other negative emotions. This finding suggests that healthcare providers should consider increasing the provision of psychological interventions for patients to enhance their self-efficacy in disease management and thereby reduce disability levels.

Third, a negative correlation was found between self-management and disability level (β = −0.314, p < 0.001), indicating that patients with better self-management have lower levels of disability. This result is consistent with previous studies (68, 69). The Individual and Family Self-Management Theory (IFSMT) proposes that the ability to care for oneself can be developed through scientific and rational guidance and learning, thereby improving quality of life and prognosis (70). This suggests that elderly patients with higher self-management can utilize both internal and external resources, actively participate in decision-making processes, fully exercise their subjective initiative, realize their self-worth, enhance their confidence in self-management, improve their self-management ability, and maintain their physical health, prevent disease, and facilitate recovery, thereby reducing disability levels.

4.3 The mediating effects of self-efficacy and self-management between empowerment and disability in older adults with chronic diseases

First, the results of this study indicate that self-efficacy plays a partial mediating role in the relationship between empowerment and disability among elderly patients with chronic diseases, accounting for 45.6% of the total indirect effect. It is evident that elderly patients with chronic diseases who have high levels of empowerment can access diverse sources of knowledge, thereby gaining a more comprehensive and accurate understanding of their own disease conditions. When facing challenges related to disease management, they tend to seek external resources and support to address these issues. For example, they communicate effectively with healthcare staff, seek their assistance in a timely manner, and take proactive measures to manage their illness. Over time, they gradually integrate these behaviors into their own capabilities and routines, thereby enhancing their self-efficacy—a finding consistent with prior research (71). Furthermore, elderly patients with chronic diseases who possess high levels of self-efficacy have been observed to actively acquire knowledge related to disease management. Individuals with a strong belief in their ability to overcome the disease demonstrate greater confidence in dealing with difficulties encountered during the disease process. They also maintain a positive attitude toward changes in their health status and take the initiative to manage their health. This proactive approach is conducive to improving their physical health and delaying the onset and progression of disability (38).

Second, the findings of this study demonstrate that self-management plays a partial mediating role between empowerment and disability in elderly patients with chronic diseases, accounting for 40.0% of the total indirect effect. Vainauskienė et al. (48) reported a correlation between high levels of empowerment and improved self-management ability in patients. Nevertheless, to the best of our knowledge, a relatively comprehensive explanation of this relationship has not yet been established. It is hypothesized that the underlying mechanism may be that patients with higher levels of empowerment tend to have a stronger sense of well-being. They can access accurate disease management information through various channels, thereby enhancing their understanding and management skills related to their own diseases. When illness occurs, they are able to implement effective countermeasures in a timely and proactive manner, thereby promoting their ability to actively participate in disease management. Self-management capacity is a significant factor influencing disease outcomes in elderly patients with chronic diseases (10). For instance, research indicates that medication self-management ability is closely related to medication adherence in elderly patients with type 2 diabetes, which may further affect blood glucose control. It is hypothesized that a long-term hyperglycemic state may induce sarcopenia by affecting the energy metabolism and protein synthesis of skeletal muscle cells, thereby further promoting the occurrence of frailty and disability (72). Meanwhile, inadequate medication self-management skills have been shown to increase the likelihood of adverse drug reactions, which in turn exacerbate the onset and progression of frailty and disability through various mechanisms, including falls, malnutrition, sleep disturbances, and cognitive impairments (73).

Third, the results of this study indicate that self-efficacy and self-management exert a chain mediating effect between empowerment and disability, with a mediation effect value accounting for 14.4% of the total indirect effect. The Health Empowerment Theory (12) posits that an individual's health is influenced by multiple factors. When individuals are perceived as having high levels of empowerment, they exhibit positive emotions such as self-esteem, wisdom, and self-control when facing symptoms. They are more inclined to integrate and utilize available resources to effectively cope with various adverse life events, such as chronic diseases, widowhood, and living alone, thereby enhancing their quality of life (12). Compared with other studies, the results of the present research further support the aforementioned Health Empowerment Theory. Elderly patients with higher levels of empowerment have been shown to exhibit

increased confidence and a greater propensity to proactively use both internal and external resources, as well as to acquire relevant knowledge and skills. They then apply these competencies to the management of their physical and mental health, proactively managing adverse events in their lives. As individuals transition through life stages, they undergo a process of growth and adaptation, achieving a new equilibrium and consequently reducing their disability levels. Furthermore, the Information-Motivation-Behavioral Skills (IMB) model proposes that the adoption of healthy behaviors requires the integration of information, motivation, and behavioral skills to improve health outcomes (13). Elderly patients with chronic diseases who have been granted significant levels of empowerment may enhance their self-efficacy regarding disease management by actively sourcing effective health-promoting information and forming positive beliefs about managing their conditions. Higher self-efficacy has been shown to effectively stimulate patients' intrinsic motivation, thereby enabling them to actively participate in disease management, overcome difficulties and obstacles in disease coping, reduce disease burden, and decrease the occurrence of disability. Research indicates that for elderly patients diagnosed with type 2 diabetes, those with high levels of empowerment can develop positive beliefs about medication by proactively seeking information about their condition and available treatments. This process has been shown to enhance their self-efficacy regarding rational medication use (74). Furthermore, patients with higher levels of self-efficacy have the capacity to modify detrimental medication habits, adopt positive behaviors that promote better medication adherence, and improve their medication self-management (74). Effective medication self-management has been shown to improve blood glucose levels, reduce the occurrence of adverse drug reactions, promote the formation of healthy behaviors, and ultimately lower the risk of frailty and disability (75).

4.4 Implications for future interventions

The present study suggests two directions for future research and public health practice. First, enhancing self-efficacy and self-management among elderly patients with chronic diseases represents an important strategy for delaying the onset of disability. Evidence indicates that stimulating cognitive function in older adults can effectively reduce disability rates (76). Positive self-management encourages older individuals to proactively address the effects of aging, thereby facilitating the acquisition of knowledge and skills needed for self-directed health management. Ravesloot et al. (77) developed a management program for people with disabilities aimed at helping participants establish healthy self-management routines and build confidence in changing health behaviors. Since its launch in 1995, the program has served approximately 8,900 individuals across 279 community institutions in 46 states in the United States. states. This management plan is based on multi-level interventions designed to meet individual participants' needs and improve their functional status. Within the context of China's current policy implementation environment—which emphasizes an "elderly-centered" approach—it is necessary to explore strategies that effectively shift elderly patients with chronic diseases from a passive self-management model to active participation in their own care. Such a transformation could enhance their disease-related self-efficacy and self-management abilities, thereby contributing to the active delay of disability.

Second, the fundamental principle underlying all intervention measures is respect for the autonomy, lived experience, and inherent value of elderly patients with chronic diseases. Health empowerment signifies a paradigm shift in healthcare delivery that goes beyond simply granting authority to patients. Instead, it encompasses a holistic approach to nurturing individuals' intrinsic capabilities and self-confidence, thereby fostering a sense of autonomy in health management practices. The relationships among empowerment, self-efficacy, self-management, and disability observed in elderly patients with type 2 diabetes can serve as a useful reference. First, it is essential to equip patients with the necessary knowledge. Nurses can use food models to guide patients in estimating carbohydrate content, rather than simply providing a list of prohibited foods. Second, the use of technology is encouraged to empower patients, with the goal of promoting understanding and practical application of methods such as using basic blood glucose meters and maintaining blood glucose diaries.

Third, it is crucial to involve patients in decision-making. In a collaborative manner, physicians and patients review blood glucose records together and make decisions based on the results of their discussion. Concurrently, patients can be encouraged to join diabetes support groups, where they can exchange recipes and share experiences related to effective blood glucose management. Finally, environmental empowerment should be provided for patients. For example, establishing "low-sugar food zones" in medical facilities and public shared spaces can help elderly patients better understand which foods are beneficial to their health and well-being. Knowledge acquisition, confidence building, effective tool use, and comprehensive support have been identified as key elements in empowering elderly patients with chronic diseases (78). It is argued that strengthening these factors can enhance patients' belief in their ability to overcome disease and their capacity to proactively manage their health, thereby reducing the occurrence of disability.

4.5 Limitations

This study has several limitations. First, the cross-sectional design may introduce bias, and longitudinal studies are needed to confirm the findings. Second, the study was carried out in eight tertiary hospitals located in Sichuan Province; therefore, the generalizability of the results to hospitals at different levels in other provinces should be interpreted with caution. Third, future research should further consider additional influencing factors among elderly patients with chronic diseases, such as psychological resilience and disease burden, in order to further refine the research model. For example, developing a mixed model that includes moderated mediation among these variables represents a potential direction for subsequent studies.

5 Conclusion

The results of this study indicate that patients demonstrated moderate levels of disability. Moreover, a negative correlation was observed between disability and each of the following variables among elderly patients with chronic diseases: empowerment, self-efficacy, and self-management. Clearly, higher levels of empowerment in this population are directly associated with enhanced self-efficacy and improved self-management skills, which in turn lead to a lower risk of disability related to chronic diseases. Furthermore, empowerment was found to have a direct effect on disability. In addition, empowerment can also indirectly influence disability by boosting self-efficacy and self-management. Taken together, self-efficacy and self-management serve as mediating factors in the relationship between empowerment and disability.

Declarations

Funding

The author(s) declare that no financial support was received for the research and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contribution

TW: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. SH: Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. JL: Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. YL: Conceptualization, Methodology, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing. All authors reviewed the manuscript.

Data Availability

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

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Figures

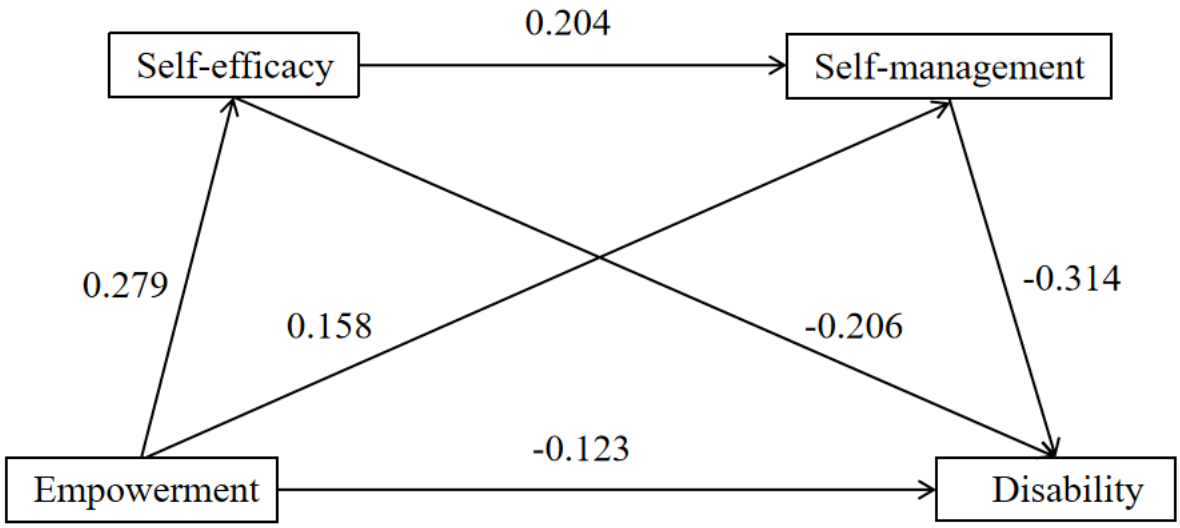


Figure 1

The chain mediating effect model of self-efficacy and self-management between empowerment and disability in elderly patients with chronic diseases