

RESEARCH ARTICLE

The mediating effect of self-efficacy on the relationship between family functioning and quality of life among elders with chronic diseases

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Abstract

Aim: To explore whether self-efficacy has any positive or negative mediating effects between family functioning and quality of life among elders with chronic diseases.

Design: A cross-sectional study.

Methods: Questionnaires were collected from 516 community-dwelling elderly individuals with chronic diseases using a convenience sampling method. The questionnaires included the Self-efficacy for Managing Chronic Disease Six-Item Scale, the Family Adaptation Partnership Growth Affection Resolve Index and the MOS 36-Item Short Form Health Survey.

Results: Family functioning and self-efficacy impacted the quality of life of community-dwelling elderly individuals with chronic diseases. Family functioning was mediated by self-efficacy and had an indirect impact on quality of life. The mediating effect accounted for 62.50% of the total effect.

KEYWORDS

chronic diseases, elders, family functioning, quality of life, self-efficacy

1 | INTRODUCTION

With the ageing of the global population, the number of community-dwelling elderly individuals with chronic diseases is increasing (Sun et al., 2019; Zhou et al., 2016). It was reported that the four most common non-communicable chronic diseases (NCDs) among elderly individuals were cancer, diabetes, cardiovascular disorders and lung disease. The four major NCDs and a handful of other chronic conditions were responsible for two-thirds of mortality globally in 2016 (Nugent, 2019). In China, the Study of Global AGEing and Adult Health (SAGE)-China Wave 1 cross-sectional study reported

that half of the elderly individuals in China had at least one chronic illness (Zhao et al., 2018). In 2015, the China Family Development Report (2015) released by the National Health and Family Planning Commission showed that half of all elderly people were living without children (Croll et al., 2019), and the proportion was higher in rural areas than in urban areas; additionally, their family functioning was poor. Because of the characteristics of chronic diseases in the elderly population, such as long disease duration, difficult self-healing, complex aetiology, many complications, and high cost of treatment, coupled with retirement syndrome and other family and social factors, physical and psychological diseases are common in the elderly

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population and seriously affect patients's quality of life (Botes et al., 2018; Maresova et al., 2019). Additionally, chronic diseases place a heavy burden on the family and society, attracting the focus of medical services (Nurchayati et al., 2019; Wu et al., 2019).

Bandura defined self-efficacy as the conviction that one can successfully execute the behaviour required to produce an outcome (Bandura, 1977). In other words, self-efficacy is the perceived confidence that a person has the ability to accomplish something. Self-efficacy is thought to be an important factor in initiating and maintaining physical activity and is therefore believed to improve quality of life through its effects on both positive affect and negative affect (Hager et al., 2019; Lee et al., 2016; Yeung & Lu, 2014). Previous studies have verified that self-efficacy has certain influences on the quality of life of patients with chronic diseases (Du et al., 2018; Selzler et al., 2020; Zhang, Gilmour, et al., 2020; Zhang, Xue, et al., 2020). Lee's study demonstrated that self-efficacy, anxiety and depression play major roles in determining the perception of quality of life in cancer patients (Lee et al., 2016). Omran's research showed that health-related quality of life in patients with type 2 diabetes is related to self-efficacy, self-care activities and health literacy (Omran & McMillan, 2018).

Family is the core of society and provides not only material support but also spiritual and emotional support. Family functioning, in which the family is regarded as a system, refers to interactions with family members that involve physical, emotional, and psychological activities and affects many aspects of family life (Wang et al., 2015; Wei et al., 2020). Family functioning plays a crucial role in the growth of individuals, and if the family does not operate in such a way that it performs its basic functions, family members will have a variety of problems (Zhang, Gilmour, et al., 2020; Zhang, Xue, et al., 2020). In recent years, nursing professionals have expanded the focus of their attention from the patient alone to the patient and the family (Fjortoft et al., 2020). Good family support has a major impact on the patients' recovery from disease and on the improvement of self-efficacy and quality of life (Konradsen et al., 2018). Previous studies have shown that family functioning can improve self-efficacy (Puspasari et al., 2018; Wu & Sheng, 2019). Additionally, previous studies have demonstrated that family functioning has certain influences on the quality of life of patients with chronic diseases (Andrade et al., 2020). For example, Azmoude's paper showed that good family functioning associated with better quality of life in diabetics (Azmoude et al., 2016).

In Summary, previous studies have shown that family functioning has been separately associated with self-efficacy and quality of life. Additionally, self-efficacy has been found to be a major variable that affects the quality of life of patients with chronic diseases. Self-efficacy may be involved in the psychological mechanism underlying the relationship between family functioning and quality of life in people with chronic diseases. However, to the best of our knowledge, no study has been conducted with a focus on the mediating effects of self-efficacy between family functioning and quality of life in community-dwelling elderly individuals with chronic diseases. Thus, the research questions of this study were as follows: (a) What are the levels of family functioning, self-efficacy and quality of life

among elderly individuals with chronic diseases? (b) What are the relationships among family functioning, self-efficacy and quality of life? (c) To what extent, if at all, does self-efficacy mediate the association between family functioning and quality of life in community-dwelling elderly individuals with chronic diseases?

2 | METHODS

2.1 | Participants and sampling

Elderly individuals from different communities in Jiangsu Province (eastern China), Yunnan Province (southwestern China), Hunan Province (central China) and Shanxi Province (northern China) were selected by convenience sampling. The inclusion criteria were as follows (Kuhirunyaratn et al., 2019): (a) community-dwelling people aged 60 years and older; (b) the presence of one or more chronic diseases such as hypertension or diabetes or others; and (c) ability to communicate normally and cooperate with investigation and evaluation. The exclusion criteria were as follows: (a) participants with obvious mental disorders or obvious cognitive impairment; and (b) participants with acute respiratory, circulatory or digestive diseases or injuries. Verbal informed consents were obtained from all participants, and they could withdraw from the study at any time.

2.2 | Measurements

2.2.1 | Questionnaire on sociodemographic characteristics

The questionnaire was designed by the researchers themselves and included sociodemographic characteristics and general features of their diseases (type of disease, duration of disease, etc.).

2.2.2 | Self-efficacy for managing chronic disease 6-item scale (SECD6)

The SECD6 was created by Lorig (Lorig et al., 2001) and includes 6 items in total. Each item has 10 response categories ranging from 'No confidence at all' (1 point) to 'With absolute confidence' (10 points); thus, the average item score ranges from 1-10, where higher average scores indicate better self-efficacy. The Chinese version of SECD6 has good internal consistency with a Cronbach's alpha of 0.91 (Jiang et al., 2020).

2.2.3 | Family adaptation, partnership, growth, affection and resolve (APGAR) index

The APGAR index was designed by Good according to the characteristics of family functioning. The APGAR includes five

items: adaptation, partnership, growth, affection and resolve. All of the items are positive items, and each one includes three options: often = 2, sometimes = 1, and almost never = 0. Total scores on this scale can range from 0–10; a score of 0–3 indicates severe family dysfunction, 4–7 indicates moderate family dysfunction, and 8–10 indicates good family functioning. The Chinese version of the APGAR has been used widely in China, and it has been found to have good validity and reliability (Sun et al., 2011).

2.2.4 | MOS 36-Item short form health survey (SF-36)

The SF-36, translated by the School of Medicine, Zhejiang University, includes 36 items (Dong et al., 2017). The score conversion formula is as follows: conversion score = (actual score – the lowest possible score in this aspect)/(the difference between the highest possible score and the lowest possible score in this aspect) × 100. The higher the score, the better the quality of life. The scale consists of nine dimensions: general health, physiological function, role physiological, body pain, role emotional, mental health, vitality, social function and health transition. The scale can be divided into two subscales: the physical component summary and the mental component summary. The Cronbach's alpha values for the internal consistency reliability were 0.72 and 0.88, respectively. The 2-week test-retest reliability coefficients were 0.66 and 0.94, respectively (Hsu et al., 2018). The mental component summary includes vitality, social function, role emotional and mental health. The physical component summary includes physiological function, role physiological, body pain and general health. The total score on the SF-36 is the sum of all items except health transition.

2.3 | Data collection

Data were collected from 01 January–31 December 2019. After training and passing an examination, five nursing students began to conduct the investigation. Investigators went to community meeting sites or participants' homes, explained the purposes and methods of the study to the elderly individuals and then sent out questionnaires with their consent. While meeting face to face with the elderly participants, the researchers explained the meaning of each item clearly, and the participants could ask the researchers questions at any time if they could not understand the questionnaire. A total of 519 questionnaires were sent out. However, there questionnaires had unanswered questions and therefore invalid. Thus, a total of 516 valid questionnaires were collected, for an effective rate of 99.42%.

2.4 | Data analysis

Data were analysed using SPSS 20.0 and AMOS 20.0. Frequencies and descriptive statistics were used to describe the data. Pearson correlation analysis was used to verify the correlations among the

participants' self-efficacy, family functioning and quality of life. A structural equation model was applied to determine the intermediary effects of self-efficacy between family functioning and quality of life, and statistical significance was defined as $p < .05$.

2.5 | Ethical consideration

The study was reviewed and approved by the Ethics Committee of School of Nursing, Yangzhou University (YZUHL2019001). The study was carried out in compliance with the tenets of the Declaration of Helsinki. Verbal informed consents were obtained from all participants. All personal information was encrypted.

3 | RESULTS

3.1 | Sociodemographic characteristics, self-efficacy, family functioning and quality of life of the participants

A total of 516 community-dwelling elderly people took part in this study; the sociodemographic characteristics of the respondents are presented in Table 1. The distribution of participants' chronic disease types is presented in Figure 1.

The average scores for self-efficacy and family functioning were 6.219 ± 2.059 and 8.035 ± 2.248 , respectively. The average scores for general health, physiological function, role physiological, body pain, role emotional, mental health, vitality and social function were 55.878 ± 17.937 , 68.576 ± 26.470 , 61.773 ± 44.293 , 74.581 ± 20.036 , 72.674 ± 40.500 , 68.256 ± 17.384 , 66.337 ± 16.720 and 47.929 ± 11.879 , respectively. The average scores for the physical component summary and the mental component summary were 260.808 ± 88.584 and 255.196 ± 72.876 , respectively. The average total score for the 8 dimensions was 516.004 ± 151.884 , and the average health transition score was 48.256 ± 21.517 .

3.2 | Correlation analysis of the participants' self-efficacy, family functioning and quality of life

The results of the correlation analysis of self-efficacy, family functioning and the quality of life of the community-dwelling elders with chronic diseases are shown in Table 2. All variables were positively correlated and had statistical significance (all $p < .01$).

3.3 | Analysis of the mediating effects of self-efficacy

In order to test whether self-efficacy mediated the relationship between family functioning and quality of life, regression analysis was employed. The first step evaluated whether family functioning (as

an independent variable) predicted quality of life (as a dependent variable). The second step tested the relationships between family functioning (as an independent variable) and self-efficacy (a mediator). In step 3, when self-efficacy was induced in the model, family

TABLE 1 Distribution of respondents' sociodemographic characteristics (N = 516)

Characteristics	Observation (N)	Percentage (%)
Gender		
Female	255	49.42
Male	261	50.58
Age group (years)		
60–69	207	40.12
70–79	210	40.70
80 and above	99	19.19
Education level		
Illiterate or barely literate	192	37.21
Primary school	156	30.23
Junior high school	87	16.86
Senior high school or technical secondary school	42	8.14
Junior college diploma or higher	39	7.56
Residence		
Urban residents	165	31.98
Rural residents	264	51.16
Urban–rural fringe area	87	16.86
Current living conditions		
Living alone	54	10.47
With spouse	279	54.07
With children and grandchildren	180	34.88
With others	3	0.58

functioning was found to have a significant impact on quality of life. The results are all displayed in Table 3. The mediation model is displayed in Figure 2, and the model was demonstrated to fit well by the following indicators: goodness-of-fit index (GFI) = 0.978, adjusted goodness-of-fit index (AGFI) = 0.964, standardized root mean square residual (SRMR) = 0.026, root mean square error of approximation (RMSEA) = 0.038, normal fit index (NFI) = 0.985, and incremental fit index (IFI) = 0.993. Similarly, the results regarding whether self-efficacy is a mediator of the relationship between family functioning and the physical component summary or mental component summary are shown in Tables 4 and 5. The mediation models are displayed in Figure 3 and both models were demonstrated to fit well: GFI = 0.968 and 0.977, AGFI = 0.954 and 0.944, SRMR = 0.036 and 0.040, RMSEA = 0.037 and 0.039, NFI = 0.965 and 0.971, and IFI = 0.983 and 0.984, for the physical component summary and mental component summary, respectively. The results showed that self-efficacy played a partial intermediary role between family functioning and quality of life, and the ratio of intermediary effects to total effects was calculated as $0.462 \times 0.579 / 0.428 \times 100\% = 62.500\%$. Additionally, self-efficacy played a partial intermediary role between family functioning and both the physical component summary and the mental component summary, the ratios of intermediary effects to total effects were calculated as $0.462 \times 0.614 / 0.373 \times 100\% = 76.050\%$ and $0.462 \times 0.461 / 0.438 \times 100\% = 48.626\%$, respectively.

4 | DISCUSSION

In this study, a total of 333 elderly individuals were 'living alone' or 'living with their spouses'; that is, the proportion of participants living without children was 64.53% (higher than shown by national data), which may be related to the growing proportion of elderly individuals living without children and the large rural population in this study. In this study, the top four chronic disease types were hypertension (300, 58.14%), osteoarthropathy (195, 37.79%), hyperlipidemia (132, 25.58%) and chronic gastrointestinal diseases (132,

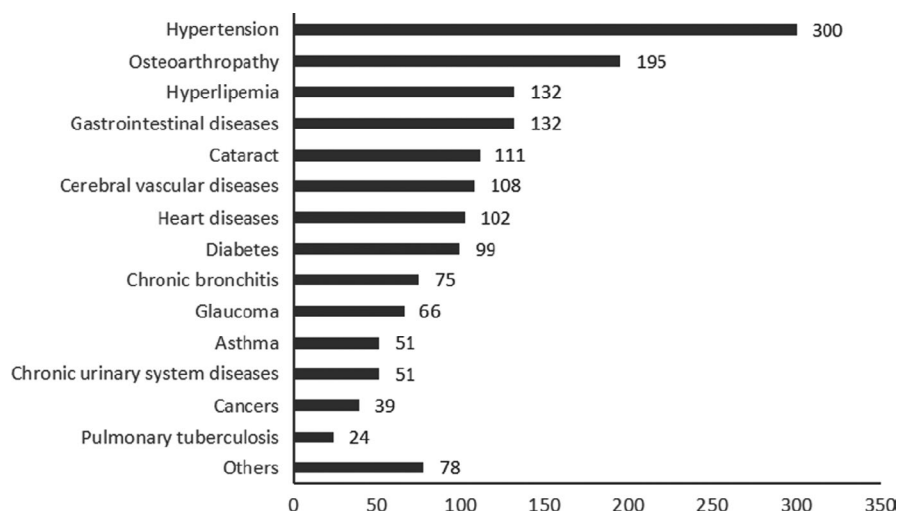


FIGURE 1 Distribution of participants' chronic disease types

TABLE 2 Correlation analysis of self-efficacy, family functioning and the quality of life of the community-dwelling elders with chronic diseases

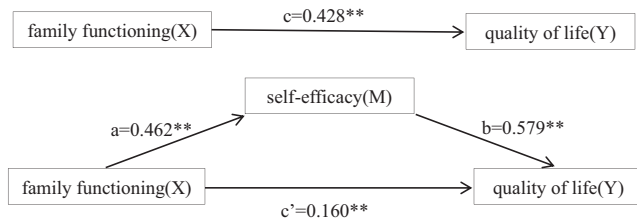
	SECD6	APGAR	General health	Physiological function	Role physiological	Body pain	Role emotional	Mental health	Vitality	Social function	Physical component summary	Mental component summary	SF-36
SECD6	1												
APGAR	0.462**	1											
General health	0.625**	0.320**	1										
Physiological function	0.605**	0.355**	0.518**	1									
Role physiological	0.507**	0.247**	0.526**	0.584**	1								
Body pain	0.416**	0.347**	0.477**	0.523**	0.487**	1							
Role emotional	0.431**	0.382**	0.425**	0.581**	0.694**	0.392**	1						
Mental health	0.515**	0.394**	0.446**	0.509**	0.436**	0.370**	0.562**	1					
Vitality	0.543**	0.330**	0.531**	0.524**	0.484**	0.431**	0.516**	0.762**	1				
Social function	0.474**	0.342**	0.499**	0.644**	0.531**	0.587**	0.551**	0.591**	0.610**	1			
Physical component summary	0.655**	0.373**	0.728**	0.814**	0.891**	0.723**	0.695**	0.544**	0.604**	0.692**	1		
Mental component summary	0.564**	0.438**	0.546**	0.670**	0.687**	0.501**	0.898**	0.822**	0.797**	0.750**	0.768**	1	
SF-36	0.653**	0.428**	0.687**	0.796**	0.850**	0.662**	0.836**	0.712**	0.735**	0.763**	0.952**	0.928**	1

Abbreviations: APGAR, Family Adaptation, Partnership, Growth, Affection and Resolve; SECD6, Self-efficacy for Managing Chronic Disease 6-item Scale.

** $p < .01$.

TABLE 3 The mediating effects of self-efficacy on family functioning and quality of life

Step	Independent variable	Dependent variable	Adjusted R ²	F	β	t	p
Step1	Family functioning	Quality of life	.181	115.014	0.428	10.724	<.01
Step2	Family functioning	Self-efficacy	.212	139.425	0.462	11.808	<.01
Step3	Family functioning	Quality of life	.444	206.918	0.160	4.325	<.01
	Self-efficacy				0.579	15.632	<.01

**FIGURE 2** Mediation model of the effects of self-efficacy on the relationship between family functioning and quality of life.** $p < .01$

25.58%). Although the study was carried out in communities and inpatients were not included, the incidence of each type of chronic disease was still high. Hypertension and other chronic diseases have a high incidence in the elderly population in China. If the situation cannot be resolved properly and in time, it will lead to serious social and economic problems (Cao et al., 2017; Zhao et al., 2018).

In this study, the participants' average SECD6 score was 6.219 ± 2.059 , which is at a moderate value and indicates that the self-efficacy of the participants needs to be improved. This result was similar to that of a previous study (Fan & Lv, 2016). The average APGAR score was 8.035 ± 2.248 , indicating that family functioning was relatively good. The average total score on the eight main dimensions of the SF-36 was 516.004 ± 151.884 , which was consistent with a study in China showing that the quality of life of elderly individuals based on the community nursing model was higher than the quality of life of elderly individuals based on the family and institutional nursing model. This may be because there was no strict separation between community nursing and family nursing in this study and because the basic characteristics of the participants were slightly different.

Self-efficacy refers to people's subjective judgment and inner experience of whether they can successfully complete a certain behaviour. Quality of life is determined by an individual's

physiological function, psychological status and other factors (Tuluca & Kutluturkan, 2018). In this study, self-efficacy and quality of life were positively correlated and had a significant relationship. Research by Chirico et al. (2017) showed a positive relationship between self-efficacy for coping with cancer and quality of life. Additionally, research findings from Son and Won (2017) demonstrated that the self-efficacy of elderly patients with hypertension could affect their quality of life directly and could act as an intermediary variable influencing the effects of other variables on quality of life. The results of these prior studies were in accordance with the results of the present study.

In a study of the relationship between family functioning and quality of life, researchers found that people with better family functioning had higher quality of life, and correlation analysis showed that quality of life and family functioning had a strong positive correlation (Lu et al., 2017). This means that the low family functioning of elderly patients with chronic diseases was an important factor affecting their quality of life. In the present study, family functioning had a significant positive correlation with each dimension of quality of life, which was in agreement with the previous research results. Caregiving by family members has an extremely important impact on the quality of life of elderly individuals.

In this study, there was a statistically significant between self-efficacy and family functioning. It is suggested that caregivers should help patients establish a systematic social and family support network and pay additional attention to family members, especially spouses and children, to help them participate in patients' disease management. Doctors and nurses can teach family members how to care for patients properly and can give supervision and full support in terms of emotion and action, which plays an extremely important role in improving patients' self-efficacy, prolonging the stable period of disease and promoting patients' recovery.

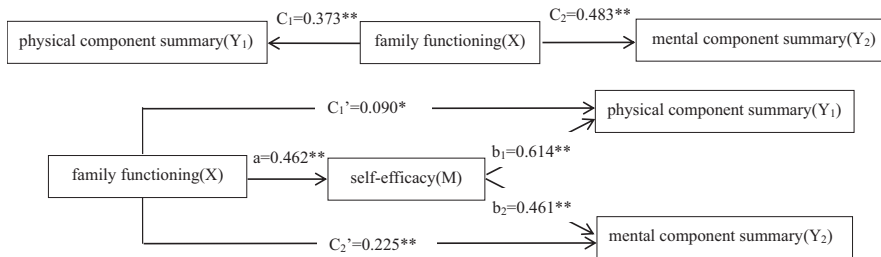
To test the intermediary effects of self-efficacy between family functioning and quality of life, we can use the intermediary

TABLE 4 The mediating effects of self-efficacy on family functioning and physical component summary

Step	Independent variable	Dependent variable	Adjusted R ²	F	β	t	p
Step1	Family functioning	Physical component summary	.138	83.193	0.373	9.121	<.01
Step2	Family functioning	Self-efficacy	.212	139.425	0.462	11.808	<.01
Step3	Family functioning	Physical component summary	.433	197.886	0.090	2.401	.017
	Self-efficacy				0.614	16.406	<.01

TABLE 5 The mediating effects of self-efficacy on family functioning and mental component summary

Step	Independent variable	Dependent variable	Adjusted R ²	F	β	t	p
Step1	Family functioning	Mental component summary	.190	121.675	0.438	11.031	<.01
Step2	Family functioning	Self-efficacy	.212	139.425	0.462	11.808	<.01
Step3	Family functioning	Mental component summary	.356	143.265	0.225	5.635	<.01
	Self-efficacy				0.461	11.554	<.01

**FIGURE 3** Mediation model of the effects of self-efficacy on the relationship of family functioning with physical component summary or mental component summary. * $p < .05$, ** $p < .01$

effects test procedure summarized by Wen (Wen & Fan, 2015). If self-efficacy has intermediary influences on family functioning and quality of life, the following three conditions should be met: (a) family functioning (as an independent variable) significantly predicts quality of life (as a dependent variable); (b) family functioning (as an independent variable) significantly predicts self-efficacy (as an intermediary variable); and (c) family functioning and self-efficacy jointly predict quality of life. When self-efficacy (the intermediary variable) is added, if the influences of family functioning on quality of life are not significant, the intermediary variable shows a full intermediary effect, and if the influences of family functioning on quality of life are significant, the intermediary variable shows a partial intermediary effect. We found that self-efficacy played a partial mediating role between family functioning and quality of life according to the above conditions, and the ratio of mediating effects to total effects was 62.500% in this study. Similarly, self-efficacy also played a partial mediating role between family functioning and both the physical component summary and mental component summary, and the ratios of mediating effects to total effects were 76.050% and 48.626%, respectively. The proportions of the mediating effects of self-efficacy were relatively large, especially between family functioning and the physical component summary. The findings suggested that higher family functioning was associated with more positive self-efficacy, which, in turn, was associated with better quality of life. This finding demonstrated that effective family functioning can improve the ability of community-dwelling elderly patients with chronic diseases to cope with their disease and control their emotions; additionally, it is conducive to cultivating the self-efficacy of the patients. A strong sense of self-efficacy can strengthen elderly people's capacity for self-attribution and self-adjustment, enabling them to take note of the combination of internal and external factors, which plays an important role in the health management of chronic diseases. Self-efficacy can mobilize the subjective initiative of the patients so that they fully participate in self-management of

the disease, which is of great significance in improving their quality of life. Consequently, self-efficacy, as a mediator, plays a key role in the process of behaviour change and is an important factor in maintaining and improving quality of life.

4.1 | Strengths

To the best of our knowledge, this is the first representative analysis of the mediating effect of self-efficacy in the association between family functioning and quality of life in community-dwelling elderly individuals with chronic diseases. In addition, a variety of statistical methods (descriptive analysis, Pearson's correlation analysis and structural equation modelling) were employed to investigate the relationship among family functioning, self-efficacy and quality of life.

4.2 | Limitations

This study has a few limitations. First, we used a cross-sectional design, with data being collected at only one point in time. Therefore, the study could not identify the changes and trends over time and, as such, might provide weak evidence of correlations among self-efficacy, family functioning and quality of life. Second, the convenience sample may not be representative of the targeted population, and the results may be biased. In the future, we need to expand the sample size and use stratification and random sampling to enrich the research results and make them more representative.

5 | CONCLUSION

This study demonstrated that family functioning, self-efficacy and quality of life are closely related in community-dwelling elderly

individuals with chronic diseases. Family functioning, with self-efficacy as the intermediary, has certain impacts on quality of life. This suggests that medical and health personnel should increase their focus on the indirect impacts of family functioning in the care process of community-dwelling elderly patients with chronic diseases to enhance the patients' self-efficacy and improve their quality of life.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Yuan Yuan and Hui-wen Xu contributed equally to this work. Wei-juan Gong and Jing-yan Liang contributed equally to this work. Yuan Yuan, Hui-wen Xu, Wei-juan Gong and Jing-yan Liang : Study design, study conduction, collection and analysis of data and manuscript draft preparation. Akio Kitayama and En Takashi: Data collection, statistical analysis and manuscript draft preparation. Song Zhang, Ying Wang: Data collection. All authors read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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