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The Effects of Self Care Capacity of Elderly People in Rural Areas Diagnosed with Chronic Disease on Health-Related Quality of Life: A Two-Mediator Serial Mediation Effect of Social Support and Health Literacy

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Purpose: The aim of this study was to identify the serial mediation effect of social support and health literacy in the relationship between self care capacity and health-related quality of life.
Methods: Participants were 169 elderly people who lived in rural areas and were diagnosed with chronic diseases. Data collection was conducted from July 10, 2024 to August 30, 2024 through self-reported questionnaires. The data were analyzed by IBM SPSS Statistics 27 and SPSS PROCESS Macro 4.2 program.
Results: The direct effect of self care capacity on health-related quality of life was significant (β=.21, *p*=.023). The indirect effect of self care capacity on health-related quality of life was β=.14 (95% confidence interval [CI]=0.01~0.29). The double mediating effect of social support and health literacy in the relationship between self care capacity and health-related quality of life was β=.02 (95% CI=0.01~0.06).
Conclusion: It was found that the social support and health literacy of the elderly diagnosed with chronic diseases living in rural areas were affected by self care capacity, which in turn affected health-related quality of life. It is necessary to approach successful aging by improving health-related quality of life through a system that can improve self care capacity, social support, and health literacy by efficiently utilizing community resources.

Keywords: Health literacy; Quality of life; Rural health; Self care; Social support

Introduction

As Korea is undergoing rapid population aging and is expected to become a super-aged society in 2025, health problems of elderly people have taken on greater importance, and in particular, chronic disease management in elderly people is becoming increasingly important [1]. Chronic diseases affect health-related quality of life in elderly people because the progression processes of these diseases are complex, and chronic conditions require continuous treatment and management [2]. *Compared with elderly* people without chronic conditions, elderly people with chronic diseases experience greater changes in their health status and undergo a rapid decline in physical functions, and their health-related quality of life is significantly influenced by disease severity [2,3]. In particular, rural areas have a greater need for systematic support for chronic disease management due to problems such as population aging, limited access to medical services such as hospitals and medical welfare facilities, and social isolation [3,4].

Health-related quality of life is a multidimensional concept

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that encompasses an individual's physical, mental, and social well-being, and is used as an important indicator for assessing an individual's overall health status and quality of daily life [4,5]. According to previous studies, various factors, including self-care capacity [6,7], social support [4,5,7], and health literacy [7,8], are associated with health-related quality of life. In particular, elderly people living in rural areas, such as agricultural and fishing villages, experience limited access to healthcare services and social isolation, compared to those living in urban areas, and these factors have been shown to have a negative impact on health-related quality of life in elderly people living in rural areas [4,5,9]. In Korea, although some previous studies investigated health-related quality of life among elderly people living in rural areas, there has been relatively little research on health-related quality of life in elderly people with chronic diseases. In particular, there has been a lack of research to analyze health-related quality of life in elderly people with chronic diseases by considering the special characteristics of rural areas, so there is a need for additional research in this area.

Self-care capacity refers to individuals' activities that include maintaining their health, restoring their physical functions to pre-disease states through disease-specific self-care efforts, and thereby maintaining daily life [10]. According to previous studies, self-care capacity is significantly associated with health literacy [11,12] and social support [13], and it is closely linked to the improvement of health-related quality of life [5-8]. Chronic disease patients with a high level of self-care capacity can acquire knowledge and skills about their diseases, set treatment goals as well as health management goals with their healthcare providers, and thereby improve their health-related quality of life [6,10,14]. On the other hand, among elderly people with chronic conditions, a low level of self-care capacity is highly likely to cause the worsening of chronic diseases, leading to the development of complications and a decline in physical function, which are in turn likely to lead to a decline in health-related quality of life [6,9]. Elderly people living in rural areas were reported to have a relatively lower self-care capacity than those living in urban areas due to factors such as limited access to healthcare services, lack of social support networks, and lack of resources for utilizing health information [6,14]. Therefore, it is very important for elderly people in rural areas diagnosed with chronic diseases to continuously perform self-care, and it is necessary to establish a management and support system to ensure their consistent practice of self-care [10,14,15].

Social support refers to the resources that an individual can obtain from significant people around him or her through social bonds when he or she is exposed to a stressful situation, and it involves the concepts of emotional, informational, and practical support [7]. Previous studies have shown that in elderly people diagnosed with chronic diseases, social support is significantly correlated with self-care capacity and health-related quality of life [5,9,14]. Social support from the family or community members can improve individuals' health literacy, which is the ability to find and use health information [7,13]. Social support has been shown to contribute to improving the meaning of life based on individuals' confidence in their ability to manage their diseases on their own [5,7,9]. In particular, social support has been reported to play an even more important role in elderly people in rural areas diagnosed with chronic diseases because elderly people living in rural areas have lower access to healthcare and welfare services as well as limited social networks in the community, compared to those living in urban areas [7,9]. As described above, in elderly people diagnosed with chronic diseases, social support not only has a positive effect on psychological stability, but also plays a crucial role in improving self-care capacity and health-related quality of life, and especially among elderly people living in rural areas, social support acts as an important factor that supplements limited medical and welfare environments [7,9,13]. Therefore, in order to improve health-related quality of life in elderly people in rural areas diagnosed with chronic diseases, it is essential to provide policy-level and institutional support to strengthen social support for elderly people, and cooperation with the family and the local community is also required [9].

Low health literacy in elderly people hinders their accurate understanding of health information, and thus has a negative impact on self-management of chronic diseases [16]. Health literacy, which refers to the ability to understand, evaluate, and communicate information about one's health status, is one of the major factors that determines patients' participation in treatment as well as their health status [7,15]. A high level of health literacy has been found to have a positive impact on health promoting behaviors, self-efficacy, and health-related quality of life [13,15,17]. In particular, since elderly people living in rural areas have a lower utilization rate of healthcare services and limited access to health information compared to those living in urban areas, efforts to improve their health literacy by the local community and healthcare providers can be a very important strategy for improving chronic disease management and health-related quality of life in elderly people living in rural areas [5,8,12,16]. Therefore, it is essential to provide systematic support for the improvement of health literacy in elderly people in rural areas diagnosed with chronic diseases, and it is also required to provide tailored

education programs on health information by considering the characteristics of elderly people, and expand accessibility to health information [16,17].

However, so far, there have been few studies to investigate the double mediation path in which self-care capacity affects health-related quality of life through social support and health literacy in elderly people in rural areas diagnosed with chronic diseases. As Korea is expected to become a super-aged society in the near future, institutional efforts are needed to enable elderly people to act as active agents in their own lives and perform self-management of chronic diseases, and in these circumstances, it is necessary to investigate whether self-care capacity can improve health-related quality of life through social support and health literacy in elderly people in rural areas diagnosed with chronic diseases. Against this backdrop, this study aimed to provide basic data related to strategies for improving health-related quality of life in elderly people with chronic diseases living in rural areas by identifying the effects of social support and health information literacy in the effect of self-care capacity on health-related quality of life.

Methods

Study design

This study is a descriptive survey study to identify the double mediating effect of social support and health literacy in the effect of self-care capacity on health-related quality of life in elderly people in rural areas diagnosed with chronic diseases. The relationships and directions between variables were posited based on a literature review, and the research hypotheses were postulated as follows (Figure 1).

First, self-care capacity [X], an independent variable, will have a positive effect on health-related quality of life [Y], the dependent variable, among the participants. Second, self-care capacity will have a positive effect on health-related quality of life through the mediating effect of social support [mediating variable 1, M1] among the participants. Third, self-care capacity will have a positive effect on health-related quality of life through the mediating effect of health literacy [mediating variable 2, M2] among the participants. Fourth, self-care capacity will have a positive effect on health-related quality of life through the double mediation effect of social support and health literacy among the participants.

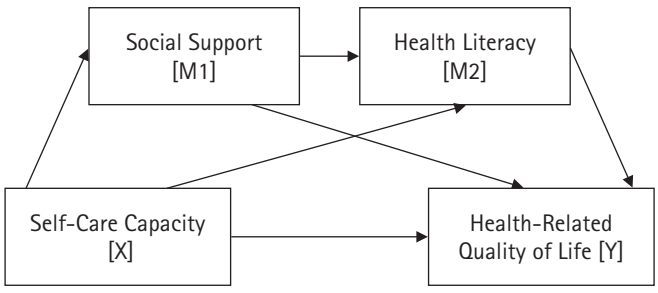


Figure 1. Conceptual framework of this study.

Participants

This study was conducted with elderly people aged 65 years or older who were diagnosed with chronic diseases, participated in the senior university programs of C-myeon and S-myeon operated by N-gun, Gyeongsangnam-do, and voluntarily agreed to participate in the study. The specific inclusion criteria were as follows:

1) elderly people aged 65 or older whose current address is in a rural area
2) people diagnosed with at least one of the following 10 chronic diseases presented by the National Health Insurance Service 3 or more months ago: hypertensive disease (I10-I15), diabetes (E10-E14, G40-G41), heart disease (I05-I09, I20-I27), respiratory tuberculosis (A15-A16, A19), cerebrovascular disease (I60-I69), nervous system disease (G00-G37, G43-G83), thyroid disorder (E00-E07), chronic renal failure (N18), malignant neoplasm (C00-C97, D00-D09), and liver disease (B18-B19, K70-K77) [18].
3) people who are able to read and respond to the questionnaire items or able to communicate verbally.

The exclusion criteria of this study were as follows:

1) elderly people with an acute illness or acute symptoms due to other diseases
2) elderly people diagnosed with depression, dementia, cognitive impairment, schizophrenia, and other mental disorders

People with mental disorders, such as depression, dementia, cognitive impairment, and schizophrenia, were excluded because these mental disorders can act as variables that affect the overall health status of patients with chronic diseases, and thus may distort the research results [19,20].

The sample size of this study was calculated with G*power 3.1.9.7 software by using a significance level of .05 for a two-tailed test, an effect size of .15, a power of 85%, and 14 predictor variables. As a result, the minimum sample size was calculated as 148 people. The participants of this study were elderly people, and considering a dropout rate of 20%, 180 copies of the questionnaire were distributed. After excluding 11 copies with missing re-

sponses, a total of 169 questionnaires were finally included in the analysis, so the minimum sample size required was satisfied.

Measures

The reliability and validity of the scales used in this study have been verified in previous studies, and this study used the instruments after obtaining permission to use each scale from the authors who developed the original scales as well as from the researchers who developed modified versions by revising and supplementing the original scales.

1. Self-care capacity

Self-care behaviors were assessed using a Korean-translated version of the Self-As-Carer Inventory for adults developed by Geden & Taylor [21]. The original scale consists of 40 items, but the Korean-translated, adapted version used in this study was a 34-item scale made by So [22], and it was used after receiving approval for its use from the authors. This instrument consists of items on cognitive aspects, physical skills, decision-making and judgment processes, information-seeking behaviors, awareness of self-regulation, and attention to self-care. Each item is rated on a 6-point Likert scale ranging from 1 point (= 'Strongly disagree') to 6 points (= 'Strongly agree'), and higher scores indicate higher levels of self-care capacity. Regarding the reliability of the scale, for the original scale, the value of Cronbach's α was reported as .96 by Geden and Taylor [21], and for the Korean-translated version, the value of Cronbach's α was reported as .92 by So [22]. In this study, the value of Cronbach's α was calculated as .89.

2. Social support

Social support was measured using a Korean-translated version of the Multi-dimensional Scale of Perceived Social Support (MSPSS) for adults that was developed by Zimet et al. [23]. The Korean version used in this study was made by Shin & Lee [24], and it was used after receiving approval from the authors. This scale contains 12 items in total, including 4 items on family support, 4 items on friend support, and 4 items on support from significant others. Each item is rated on a 5-point Likert scale ranging from 1 point (= 'Not at all') to 5 points (= 'Very much'), and a higher score indicates a higher level of social support. As to the reliability of the scale, the value of Cronbach's α was reported as .85 by Zimet et al. [23], the developer of the original scale, and for the Korean-translated version, the value of Cronbach's α was reported as .89 in the study by Shin and Lee [24], and it was calculated as .81 in this study.

3. Health literacy

Health literacy was measured using a Korean version of the HLS-EU-Q16, a short version of the HLS-EU-Q47 (European Health Literacy Survey) [25] developed by the World Health Organization Regional Office for Europe. The Korean-translated version used in this study was developed by Chun & Lee [26] as a scale for elderly people in Korea, and it was used after receiving permission from the authors. This scale consists of a total of 16 items: 7 items on health care, 5 items on disease prevention, and 4 items on health promotion. Each item is measured on a 4-point Likert scale ('Very difficult, Difficult, Easy, Very easy'). According to the evaluation criteria at the time of development, the responses are scored by giving 0 points to 'Very difficult' or 'Difficult' and giving 1 point to 'Easy' or 'Very easy,' so total scores can range from 0 to 16 points. Based on the total scores, the level of health literacy is classified as follows: 0–8 points are classified as 'inadequate', 9–12 points as 'borderline', and 13–16 points as 'adequate.' A higher total score indicates a higher level of health literacy. Regarding reliability, the overall reliability of the HLS-EU-Q16 was reported as Cronbach's α = .86 in the study by Chun & Lee [26], and in this study, the value of Cronbach's α was .88.

4. Health-related quality of life

Health-related quality of life was measured using a Korean version of the Euro Quality of Life Questionnaire 5-Dimensional Classification (EQ-5D), which was developed as a scale for adults by the EuroQol Group [27]. The EQ-5D consists of 5 subdomains: Mobility (M), Self-care (SC), Usual Activities (UA), Pain/Discomfort (PD), and Anxiety/Depression (AD). Each item is rated by choosing a response from three options: 1. 'No difficulty'; 2. 'Some difficulty'; 3. 'A lot of difficulty'). If the respondents answers 2. 'Some difficulty' or 3. 'A lot of difficulty' for each item, it is judged to indicate that the respondent has some problem in the relevant subdomain, and the following weighting formula was used to calculate the score for health-related quality of life.

EQ-5D-3L-index = 1 – 0.05 – 0.096(M2) - 0.418(M3) - 0.046(SC2) - 0.136(SC3) - 0.051(UA2) - 0.208(UA3) - 0.037(PD2) - 0.151(PD3) - 0.043(AD2) - 0.158(AD3) - 0.050(N3)

In the case of N3, the value of 1 is given if the respondent answers any of the five questions by choosing '3. A lot of difficulty' as the response. The score ranges from –0.171 to 1, and a higher score indicates a higher level of health-related quality of life

Data collection and analysis

The data collection was carried out from July 10 to August 30, 2024. Before starting the study, the researcher visited the senior university centers in C-myeon (township) and S-myeon (township) that were operated by N-gun, explained the content, methods, and purpose of the study to the head of each senior university, and obtained permission and cooperation for the study from them before starting research. The participants were recruited by posting a notice on the bulletin boards of the senior university centers that they were using. A survey was conducted with elderly people that voluntarily applied for participation in the study through a process of checking whether the applicants met the inclusion criteria. When a participant did not agree to participate or did not meet the inclusion criteria, the person's participation in the survey was immediately terminated. After filling out the questionnaires, the participants were asked to put the completed questionnaires into the provided sealed envelopes, and the questionnaires were collected personally by the researcher. It took approximately 15 to 20 minutes for each respondent to complete the questionnaire, and a small gift was given to the participants as a token of appreciation for participation in the study. The collected data was entered into a database in a form that precludes personal identification.

The research data were analyzed using IBM SPSS/WIN 27.0 (IBM Co.). The general characteristics of the participants and the levels of self-care capacity, social support, health literacy, and health-related quality of life were analyzed using descriptive statistics. The reliability of each scale was presented as the value of Cronbach's α. Differences in self-care capacity, social support, health literacy, and health-related quality of life according to the general characteristics of the participants were analyzed using the independent *t*-test and one-way ANOVA. Also, Scheffe's post-hoc test was performed for variables showing significant differences. The correlations between self-care capacity, social support, health literacy, and health-related quality of life were analyzed using Pearson's correlation coefficient. Simple linear regression analysis was conducted to assess multicollinearity in the relationships between self-care capacity, social support, health literacy, and health-related quality of life. To verify the mediating effects of social support and health literacy in the relationship between self-care capacity and health-related quality of life, mediating effect analysis was conducted using SPSS PROCESS macro model 6 (SPSS INc., Chicago, IL, USA) developed by Hayes [28]. To calculate the indirect effects and total indirect effect, the bias-corrected bootstrapping process was performed 10,000 times, and the indirect effect was considered to be significant if the 95% confidence interval did not include '0'.

Ethical considerations

To protect the rights of the participants, this study was conducted after receiving approval from the Institutional Review Board of Gyeongsang National University (IRB No. GIRB-A24-NY-0060). In accordance with the Declaration of Helsinki and bioethics guidelines for research, the participant information sheet and the informed consent form stated the content, methods, and purpose of the study, and also specified that participants have the right to withdraw from the study at any time if they wish to, that anonymity would be guaranteed, and that the data would not be used for any purpose other than research.

Results

Differences in self-care capacity, social support, health literacy, and health-related quality of life according to general characteristics

With respect to the level of self-care capacity according to the general characteristics of the participants, a higher level of self-care capacity was significantly associated with younger age ($F = 19.48$, $p < .001$), a higher education level ($F = 17.30$, $p < .001$), living together with the family ($t = -2.16$, $p = .032$), a higher average monthly income level ($F = 40.71$, $p < .001$), a fewer number of chronic diseases ($F = 4.40$, $p = .014$), a few number of medications currently taken ($F = 3.19$, $p = .044$), better subjective heath status ($F = 46.46$, $p < .001$), and a larger number of healthy lifestyle habits ($F = 9.50$, $p < .001$)(Table 1).

Regarding the level of social support according to the general characteristics of the participants, a higher level of social support showed a significant association with male gender ($t = 2.70$, $p = .016$), younger age ($F = 5.14$, $p = .002$), a higher education level ($F = 6.79$, $p < .001$), living together with the family ($t = -2.99$, $p = .003$), a higher monthly income level ($F = 16.12$, $p < .001$), a fewer number of chronic diseases ($F = 5.42$, $p = .005$), better subjective health status($F = 25.88$, $p < .001$), and a larger number of healthy lifestyle habits ($F = 4.29$, $p = .015$).

As for the level of health literacy according to the general characteristics of the participants, a higher level of health literacy was significantly associated with younger age ($F = 8.78$, $p < .001$), a higher education level ($F = 11.54$, $p < .001$), a higher average monthly income level ($F = 44.34$, $p < .001$), a fewer number of chronic diseases ($F = 3.25$, $p = .041$), better subjective health status ($F = 54.67$, $p < .001$), and a larger number of healthy lifestyle habits ($F = 14.84$, $p < .001$).

Table 1. Differences in Self Care Capacity, Social Support, Health Literacy, and Health-Related Quality of Life according to General Characteristics (N=169)

Variables	Category	N(%)	Self care capacity		Social support		Health literacy		Health-related quality of life	
			M±SD	t/F (*p*) Scheffe	M±SD	t/F (*p*) Scheffe	M±SD	t/F (*p*) Scheffe	M±SD	t/F (*p*) Scheffe
Sex	Male	57(33.7)	150.56±30.69	1.94 (.054)	47.60±7.26	2.70 (.016)	10.40±5.00	1.87 (.068)	0.87±0.16	2.55 (.012)
	Female	112(66.3)	139.88±35.38		43.91±10.23		8.90±5.04		0.81±0.16	
Age (yr)	65~69[a]	21(12.4)	179.38±23.35	19.48 (<.001) a>b,c,d b>d	50.67±6.50	5.14 (.002) a>d	13.10±4.38	8.78 (<.001) a>c,d b>d	0.95±0.11	17.29 (<.001) a>c,d b>d
	70~74[b]	41(24.3)	154.98±29.79		47.12±8.37		11.02±5.02		0.91±0.13	
	75~79[c]	46(27.2)	139.70±30.67		44.59±9.74		8.37±4.83		0.82±0.13	
	≥80	61(36.1)	126.25±30.56		42.36±9.89		9.41±5.06		0.74±0.17	
Education level	Uneducated[a]	21(12.4)	111.71±32.52	17.30 (<.001) a<c,d b<c,d	38.90±12.74	6.79 (<.001) a<c,d	5.90±4.13	11.54 (<.001) a<c,d b<d	0.67±0.12	20.35 (<.001) a<b,c,d b<c,d
	Elementary[b]	68(40.2)	134.63±32.01		43.72±9.44		8.79±4.70		0.79±0.15	
	Middle[c]	47(27.8)	151.28±26.97		47.40±7.74		10.51±4.75		0.88±0.16	
	≥High[d]	33(19.5)	168.91±28.43		48.88±6.73		12.58±4.68		0.94±0.82	
Living together with family	Living alone	45(26.6)	134.16±34.25	-2.16 (.032)	41.62±10.41	-2.99 (.003)	9.02±4.84	-.60 (.552)	0.77±0.17	-2.67 (.008)
	Living together	124(73.4)	146.86±33.63		46.44±8.81		9.55±5.15		0.85±0.15	
Monthly income	<50[a]	73(43.2)	126.21±30.47	40.71 (<.001) a<c b<c	41.27±10.47	16.12 (<.001) a<c b<c	6.44±4.25	44.34 (<.001) a<b,c b<c	0.73±0.16	43.32 (<.001) a<b,c b<c
	50~99[b]	34(20.1)	134.32±27.25		44.97±8.43		9.03±4.04		0.85±0.11	
	≥100[c]	62(36.7)	168.84±25.66		49.82±6.25		13.11±3.99		0.94±0.10	
Number of diseases	1[a]	62(36.7)	152.92±30.27	4.40 (.014) a>c	48.03±7.70	5.42 (.005) a>c	10.26±5.13	3.25 (.041) a>c	0.89±0.13	11.40 (<.001) a>c b>c
	2[b]	54(32.0)	141.26±35.66		44.50±9.40		9.83±4.94		0.84±0.15	
	≥3[c]	53(31.4)	134.70±34.77		42.45±10.60		7.98±4.90		0.75±0.18	
Number of medication	1[a]	71(42.0)	150.92±29.43	3.19 (.044)	47.11±8.20	2.70 (.070)	9.99±4.90	1.58 (.209)	0.88±0.12	7.23 (.001) a>b,c
	2[b]	58(34.3)	136.26±39.08		43.93±10.41		9.52±5.21		0.79±0.16	
	≥3[c]	40(23.7)	140.74±32.45		43.45±9.77		8.23±5.06		0.78±0.20	
Subjective health status	Bad[a]	51(30.2)	119.80±27.96	46.46 (<.001) a<b,c b<c	38.82±9.42	"25.88 (<.001) a<b,c b<c	6.06±4.06	54.67 (<.001) a<b,c b<c	0.69±0.15	56.44 (<.001) a<b,c b<c
	Moderate[b]	58(40.2)	140.18±30.28		45.87±9.35		8.50±4.50		0.83±0.13	
	Good[c]	50(29.6)	172.12±22.66		50.64±4.94		14.06±2.92		0.96±0.87	
Healthy lifestyle habit	1[a]	63(37.3)	135.86±25.80	9.50 (<.001) a<c b<c	43.73±9.32	4.29 (.015) a<c b<c	7.52±4.34	14.84 (<.001) a<c b<c	0.76±0.16	15.08 (<.001) a<c b<c
	2[b]	27(16.0)	128.15±34.11		42.15±10.97		7.67±5.09		0.78±0.17	
	≥3[c]	79(46.7)	154.80±36.58		47.32±8.64		11.51±4.82		0.90±0.13	
Health examination	Yes	163(96.4)	144.13±34.16	1.29 (.198)	45.31±9.50	1.14 (.257)	9.45±5.07	0.528 (.598)	0.83±0.16	0.634 (.527)
	No	6(3.6)	125.83±31.95		40.83±8.28		8.33±5.24		0.79±0.16	

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Regarding the level of health-related quality of life according to the general characteristics of the participants, male gender ($t = 2.55$, $p = .012$), younger age ($F = 17.29$, $p < .001$), a higher education level ($F = 20.35$, $p < .001$), living together with the family ($t = -2.67$, $p = .008$), a higher monthly income level ($F = 43.32$, $p < .001$), a fewer number of chronic diseases ($F = 11.40$, $p < .001$), a fewer number of medications currently taken ($F = 7.23$, $p = .001$), better subjective health status ($F = 56.44$, $p < .001$), and a large number of healthy lifestyle habits ($F = 15.08$, $p < .001$) were significantly linked to a higher level of health-related quality of life.

Levels of self-care capacity, social support, health literacy, and health-related quality of life

The analysis results of the levels of self-care capacity, social support, health literacy, and health-related quality of life of the research subjects are as follows (Table 2). The average score for self-care capacity among elderly people in rural areas diagnosed with chronic diseases was 143.48 ± 34.16 points, which was above the medium level, and the average scores of all the subdomains were above the medium level. The average score for social support was 45.15 ± 9.47 points, and regarding the average scores of the subdomains of social support, 'family support' showed the highest average score at 16.78 ± 3.57 points, followed by 'support from significant others' and 'support from friends' in descending order. The average score for health literacy was 9.41 ± 5.06 points, which indicates the borderline level. Regarding the levels of each subdomain, the mean score of health care was 4.29 ± 2.38 points, the mean score of disease prevention was 2.74 ± 1.71 points, and the mean score of health promotion was 2.38 ± 1.45 points, all showing a medium or higher level. The average score for health-related quality of life was 0.83 ± 0.16 points.

Correlations between self-care capacity, social support, health literacy, and health-related quality of life

There were statistically significant positive correlations between self-care capacity, social support, health literacy, and health-related quality of life (Table 3). More specifically, self-care capacity showed a significant positive correlation with social support ($r = .68$, $p < .001$), health literacy ($r = .70$, $p < .001$), and health-related quality of life ($r = .65$, $p < .001$). Social support was significantly positively correlated with health literacy ($r = .57$, $p < .001$) and health-related quality of life ($r = .54$, $p < .001$). In addition, there was a significant positive correlation between health literacy and health-related quality of life ($r = .62$, $p < .001$).

Double mediation effect of social support and health literacy in the relationship between self-care capacity and health-related quality of life

In order to determine whether self-care capacity, social support, and health literacy, which affect the disease management ability and decision-making process of elderly people in rural areas diagnosed with chronic diseases, have an effect on health-related quality of life, analysis was conducted to examine where there is a

Table 2. level of Self-Care Capacity, Social Support, Health Literacy and Health-Related Quality of Life (N=169)

Variables	Items	M ± SD	Min~max	Cronbach's alpha
Self-care capacity	34	143.48 ± 34.16	72~204	.89
The cognitive aspect	11	46.64 ± 11.51	20~66	.72
Physical skill	9	41.58 ± 10.56	15~60	.73
Decision making and judgement process	5	20.44 ± 6.49	5~30	.77
Information-seeking behavior	4	17.22 ± 4.45	6~24	.79
Perception of self-regulation	2	8.28 ± 2.57	2~12	.81
Attention to self-care	3	13.82 ± 2.77	5~18	.80
Social support	12	45.15 ± 9.47	15~60	.81
Family	4	16.78 ± 3.57	6~20	.83
Friends	4	13.86 ± 3.88	4~20	.80
Significant other	4	14.51 ± 3.64	4~20	.78
Health Literacy	16	9.41 ± 5.06	0~16	.88
Health care	7	4.29 ± 2.38	0~7	.77
Disease prevention	5	2.74 ± 1.71	0~5	.82
Health promotion	4	2.38 ± 1.45	0~4	.85
Health-related quality of life	5	0.83 ± 0.16	0.12~1.0	

Table 3. Correlation for Self-Care Capacity, Social Support, Health Literacy and Health-Related Quality of Life (*N*=169)

Variable	Self-care capacity	Social support	Health literacy	Health-related quality of life
	r (*p*)			
Self-care capacity	1			
Social support	.68 (< .001)	1		
Health Literacy	.70 (< .001)	.57 (< .001)	1	
Health-related quality of life	.65 (< .001)	.54 (< .001)	.62 (< .001)	1

Table 4. Path Coefficients and a Two-Mediator Serial Mediation Effect (*N*=169)

Direct effect		B	SE	β	t	*p*-value	95% CI		F(*p*)	R^2
							LLCI	ULCI		
Step 1	SCC → SS	0.19	.02	.68	8.48	< .001	0.15	0.23	9.37 (< .001)	.54
Step 2	SCC → HL	0.06	.01	.40	4.50	< .001	0.03	0.09	12.67 (< .001)	.63
	SS → HL	0.10	.04	.18	2.47	.015	0.02	0.18		
Step 3	SCC → HRQoL	0.01	.01	.21	2.30	.023	0.01	0.02	12.84 (< .001)	.65
	SS → HRQoL	0.01	.01	.06	0.81	.418	-0.01	0.04		
	HL → HRQoL	0.01	.03	.19	2.39	.018	0.01	0.11		
Indirect effect				β	Boot SE		LLCI		ULCI	
Total indirect effect				.14	.07		0.01		0.29	
Indirect 1 : SCC → SS → HRQoL				.04	.07		-0.19		0.17	
Indirect 2 : SCC → HL → HRQoL				.08	.04		0.01		0.17	
Indirect 3 : SCC → SS → HL → HRQoL				.02	.02		0.01		0.06	
Total effect		B	SE	β	t	*p*-value	LLCI	ULCI	F(*p*)	R^2
SCC → HRQoL		0.02	.01	.35	4.88	< .001	0.01	0.02	13.32 (< .001)	.63

SCC=self-care capacity; SS=social support; HL=health literacy; HRQoL=health-related quality of life.

double mediation effect in the relationship between variables (Table 4) As a result of testing the assumptions of regression analysis, the tolerance value for the variables was 0.51, which is greater than 0.1, and the variance inflation factor (VIF) value was 1.94, indicating that the residuals were independent and there was no autocorrelation of residuals. The results of residual analysis showed that the normal P-P plot of the standardized residuals in regression for health-related quality of life was linear, and the distribution of the residuals in the scatter plot was evenly distributed around 0, indicating the normality and homoscedasticity of the residuals. In addition, the assumption of normality for the independent variables was also satisfied, showing that the results of regression analysis were valid. In order to test the mediation effects of social support and health literacy in the relationship between self-care capacity and health-related quality of life, mediation effect analysis was conducted after controlling all the general characteristics except for health examination, which did not show a significant relationship with health-related quality of life.

In Step 1, self-care capacity was found to have a significant positive effect on social support, a mediating variable (B = 0.19, β = .68, t = 8.48, $p < .001$). In Step 2, self-care capacity was found to have a significant positive effect on health literacy, a mediating variable (B = 0.06, β = .40, t = 4.50, $p < .001$), and social support was also found to have a significant positive effect on health literacy (B = 0.10, β = .18, t = 2.47, $p = .015$). In Step 3, self-care capacity was found to have a significant positive effect on health-related quality of life (B = 0.01, β = .21, t = 2.30, $p = .023$), and social support, which is a mediating variable, did not have a significant effect on health-related quality of life(B = 0.01, β = .06, t = 0.81, $p = .418$). However, health literacy, which is another mediating variable, was found to have a significant positive impact on health-related quality of life (B = 0.01, β = .19, t = 2.39, $p = .018$). In the relationship between self-care capacity and health-related quality of life, the total effect of social support and health literacy (β = .35, $p < .001$) was greater than their direct effects (β = .21, $p = .023$) on health-related quality of life in elderly people with chronic diseases living in rural areas, indicating the presence of the mediating effect.

As a result of testing the significance of the indirect effects of social support and health literacy, which are mediating effects of the variables, in the relationship between self-care capacity and health-related quality of life, the total indirect effect was statistically significant (effect=.14, 95% confidence interval [CI]=0.01~0.29). However, in the verification of the indirect effect of social support in the relationship between self-care capacity and health-related quality of life, the indirect effect of social support (Indirect 1: SCC → SS → HRQoL) was not statistically significant (effect=.04, 95% CI=-0.19~0.17). On the other hand, in the analysis of the indirect effect of health literacy in the relationship between self-care capacity and health-related quality of life, the indirect effect of health literacy (Indirect 2: SCC → HL → HRQoL) was found to be statistically significant (effect=.08, 95% CI=0.01~0.17). In addition, as a result of performing the test for the double mediation effect of social support and health literacy in the relationship between self-care capacity and health-related quality of life, the double mediation effect (Indirect 3: SCC → SS → HL → HRQoL) was statistically significant (effect=.02, 95% CI=0.01~0.06) (Table 4, Figure 2).

Discussion

In this study, the score for self-care capacity in elderly people with chronic diseases living in rural areas was 143.48 points. This score is slightly higher than 140.67 points reported in the study by Lee & Shin [29], which used the same tool to measure self-care capacity in elderly patients with type 2 diabetes who visited a general hospital in a metropolitan city. Compared to the score reported in the study by Lee & Shin [29], a slightly higher score for self-care capacity in this study may be attributed to the fact that the participants of this study had high health-related needs, as shown by behaviors such as consistently practicing participation in chronic disease education and exercise through a senior university program and receiving regular health examinations. These results suggest that increasing the health needs of individuals is an important factor in improving self-care capacity, and systematic health education and customized support strategies are required to effectively enhance self-care capacity. According to previous studies, educational programs such as senior university programs were found to be effective in improving health awareness and self-management ability in elderly people and inducing the continuous practice of health behaviors [10,14]. In addition, group-based health education programs can improve self-care capacity and strengthen social support in elderly people, which can have a positive effect on health-related quality of life in elderly people [5-7].

The mean score for social support was 45.15 points, and among the subdomains of social support, family support showed the highest score. In the study by Kim et al. [18], which used the same tool and was conducted with elderly people with multiple chronic diseases, the mean score of social support was reported as 41.06 points, which is lower than the mean score in this study, but their study also reported that among the subdomains of so-

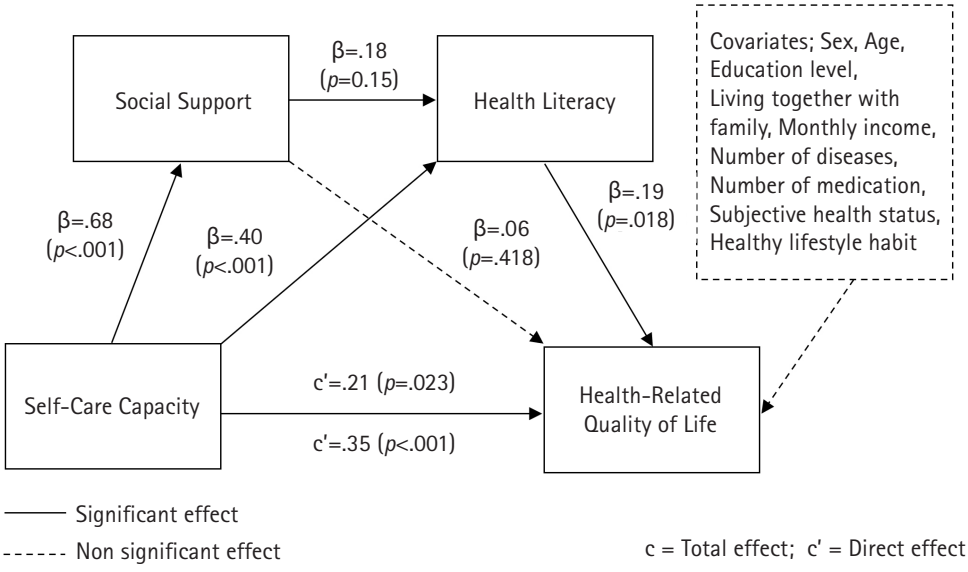


Figure 2. A serial multiple mediation model of the association between self-care capacity and health-realted quality of life through social support and health literacy.

cial support, family support had the highest score. Family support is very important for patients with chronic diseases because the family provides physical, emotional, and financial support during stressful situations and the period of treatment and management of illness [7]. However, the type of support system may differ depending on the individual characteristics and environments of patients. In particular, for elderly people in rural areas diagnosed with chronic diseases, significant others have the second greatest impact on their health-related quality of life after the role of the family, and this fact was confirmed again by the results of this study and previous studies [30]. These research findings indicate that especially for elderly people with chronic diseases, significant neighbors around them and the community resources can give them more help in maintaining physical and mental health than friends, so it is important to actively utilize them in expanding community-level health care policies [7,18]

The level of health literacy among the participants of this study was 9.41 points, which was the borderline level, and this score is higher than 8.06 points in the study by Choi et al. [17], which used the same tool to study elderly people living in rural areas. Compared to the mean score in the study by Choi et al. [17], a relatively higher score of health literacy in this study can be attributed to the fact that the participants of this study showed high participation rates for senior university programs and health examination, which gave them many opportunities to obtain education on chronic disease management and health information [8,17]. In addition, the findings of this study are in agreement with the results of previous studies [16,26] showing that age, education level, average monthly income, subjective health status, and the number of diagnosed chronic diseases had a significant impact on health literacy among elderly people diagnosed with chronic diseases. Age and education level are related to knowledge acquisition and the ability to manage health problems through various media, and a higher economic status provides opportunities to access more health-related information or helps to actually apply health-related information in real life [17]. In addition, good subjective health status and diagnosis of chronic diseases increase the possibility of exposure to health information, and increase interest in health management, leading to the improvement of the level of health literacy [16], so accessibility to medical services and the degrees of understanding and practice of health information have a significant impact on successful aging and health-related quality of life [8]. Therefore, in order to improve health literacy among elderly people diagnosed with chronic diseases living in rural areas, it is necessary to establish a customized health information education program that takes into account individuals' education level and information literacy as well as a community-centered health information provision system [16,17]. In addition, it is necessary to strengthen cooperation with healthcare workers to establish a customized health information provision plan, and provide policy-level support to increase accessibility to health information [12].

The score for health-related quality of life among the participants of this study was 0.83 out of 1 point. In a study of general elderly people living in urban areas by Kim, Lee & Kim that used the same tool, the mean score for health-related quality of life was reported as 0.84 points [31], and in a study of elderly people diagnosed with diabetes by Ahn & An, the mean score for health-related quality of life was reported as 0.87 points [32]. Thus, the score for health-related quality of life among the participants of this study was not significantly different from the scores reported in studies of elderly people living in urban areas. These results are presumed to be due to the fact that elderly people who stayed at home due to physically and emotionally poor health status were not included in the recruitment process for the study participants, and the recruitment of study participants was conducted at senior universities used by elderly people who were able to perform daily activities such as using public transportation on their own [9]. Therefore, it is necessary to interpret research findings carefully in generalizing the research results, and follow-up studies should include elderly people from a wider range of rural areas and conduct in-depth analyses of health-related quality of life according to regional characteristics. In this study, health-related quality of life showed a significant relationship with age, gender, education level, presence of family members living together, average monthly income, number of diagnosed chronic diseases, number of medications currently taken, subjective health status, and healthy lifestyle habits. These results are consistent with previous studies reporting that general characteristics have a significant impact on health-related quality of life [4,5,8]. The education level of elderly people can be improved by strengthening the provision of health information through senior universities or community programs, and community-based services through linkage to community resources for elderly people living alone can contribute to increasing social support [5]. In addition, government-level income support policies can increase the economic stability of elderly people and thus improve their access to healthcare services, and programs to improve healthy lifestyle habits through the interventions of healthcare workers can have a positive impact on the improvement of health-related quality of life among elderly people [32]. In preparation for the era of a super-aged society in Korea, to

support the successful aging of elderly people, the improvement of individual health behaviors is required, and it is also necessary to implement diverse support measures and establish effective policies at both the community and government levels [2,4].

The analysis of correlations between variables revealed that there were significant positive correlations between self-care capacity, social support, health literacy, and health-related quality of life, as shown in previous studies [6-8,13]. These findings support prior studies reporting that there is a positive association between self-care capacity and health-related quality of life, and they also showed that there are positive correlations between social support, health literacy, and health-related quality of life.

In this study, the double mediation effect of social support and health literacy in the relationship between self-care capacity and health-related quality of life was found to be statistically significant. The four paths posited in the research design are discussed as follows: First, self-care capacity had a direct positive effect on health-related quality of life. In this regard, previous studies also reported that among elderly people with chronic diseases living in rural areas, those with a higher level of self-care are more likely to effectively manage diseases and maintain health, which leads to improved health-related quality of life [6,9]. Second, in this study, self-care capacity did not have a significant direct effect on health-related quality of life through the mediating effect of social support. Although social support has been shown to be a significant influencing factor for health-related quality of life [4,5], these research results suggest that there are qualitative differences in social support. In other words, not the simple presence of social networks but the type of support that is practically helpful in the actual process of health management, such as providing customized disease management information and promoting health behaviors, may act as an important factor [2,7]. Third, this study found that self-care capacity had a positive effect on health-related quality of life through the mediating effect of health literacy. This finding supports the results of previous studies [4,8,17] showing that the ability to correctly understand and utilize health information in chronic disease management plays an important role in the relationship between self-care capacity and health-related quality of life. A previous study of elderly people in urban areas reported that health literacy had a stronger effect on health-related quality of life [32]. This stronger effect of health literacy in a previous study of elderly people living in urban areas is presumed to be due to the fact that elderly people living in urban areas have more opportunities to access various kinds of health information than those living in rural areas, and medical institutions and environments for utilizing health information are more easily available in urban areas. On the other hand, in this study, health literacy was found to have a significant impact on health-related quality of life, and this finding suggests that even in an environment with limited access to healthcare services, a high level of health literacy can improve the practice of health behaviors and health-related quality of life. Therefore, in view of the fact that improving health literacy among elderly people can be an important strategy for improving health-related quality of life among elderly people, it is necessary to secure the reliability of health information, improve accessibility to education on health information, and provide tailored health information that can be practically applied in daily life. Fourth, in this study, self-care capacity was found to have a positive effect on health-related quality of life through the double mediation effect of social support and health literacy. This means that elderly people with a higher level of self-care capacity are likely to more easily utilize meaningful social networks and health information within the community, and this process of utilizing social networks and health information promotes the practice of self-care, thereby contributing to improving health-related quality of life. These results differentiate this study from the previous studies that analyzed only the mediating effects [13,17] in that the present analysis revealed that social support and health literacy work together in explaining the relationship between self-care capacity and health-related quality of life. These findings of the present study suggest that building social support networks in conjunction with providing health information is an effective strategy for strengthening the self-care capacity of elderly people with chronic diseases living in rural areas. In particular, in order to improve health literacy, there is a need to employ elderly-friendly methods, such as oral explanations and the use of video materials, in providing health information to elderly people [7,8], and to expand community-centered health management programs to promote social support [13]. These measures are expected to support successful aging of elderly people in rural areas diagnosed with chronic diseases, and they are also expected to produce social benefits such as reduced medical expenses [3,9].

This study was the first research that attempted to investigate the double mediation effect of social support and health literacy in the relationship between self-care capacity and health-related quality of life among elderly people with chronic diseases living in rural areas in Korea. In this respect, this study has significance in that it provided data that can serve as a basis for promoting successful aging in elderly people in the upcoming super-aged society. The Code of Ethics for Korean Nurses revised in 2023 states that nurses have the responsibility of caring for recipients

of nursing care to promote their health, prevent their diseases, restore their health, and alleviate their pain, and that they should contribute to their health and well-being regardless of age, gender, and social, economic, and geographical differences [33]. In particular, health disparities may vary depending on individual characteristics, and rural areas can be classified as medically vulnerable areas due to poor medical resources, including the lack of healthcare professionals, facilities, and equipment, and geographical isolation, which can lead to health inequities between urban and rural areas [9]. Therefore, it is required to provide government-level support and implement effective government policies through a thorough examination of accessibility to medical resources and health behaviors in rural areas to ensure that elderly people living in rural areas will have successful aging as active agents in their life.

Conclusions

This study attempted to investigate and verify the double mediation effect of social support and health literacy in the relationship between self-care capacity and health-related quality of life among elderly people in rural areas diagnosed with chronic diseases in order to provide basic data for promoting the health of elderly people with chronic diseases living in rural areas. The results of the study showed that self-care capacity directly influences health-related quality of life, and that social support and health literacy play an important mediating role in this process. Self-care capacity can be enhanced by utilizing customized health management strategies, and social support can be promoted through the use of the family and community resources such as caregivers. In addition, since health literacy is a key factor in improving accessibility to medical information and assisting decision-making on health management, it is necessary to use elderly-friendly methods in providing health information. The above-described approaches are expected to improve health-related quality of life in elderly people in rural areas diagnosed with chronic diseases. Based on the results of this study, the following suggestions for future research are presented. First, since this study was conducted as a quantitative study, there is a need to conduct qualitative research to conduct a more in-depth exploration of the experiences of elderly people with chronic diseases. Second, one of the limitations of this study is that this research considered only the number of chronic diseases and did not reflect disease severity. Since the severity of chronic diseases may have a significant impact on health-related quality of life, follow-up studies should conduct analyses considering the severity of chronic diseases as well as the number of chronic diseases. Third, since the experience of chronic diseases among elderly people may vary depending on various social, psychological, and regional factors, it is necessary to increase external validity through research that reflects such factors. Lastly, since this study was conducted with elderly people who were using senior university programs in a specific region, there are limitations in generalizing the research results. Therefore, there is a need to conduct replication studies by including elderly people from various regions.

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Conflict of interest

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Authors' contributions

Sanguk Kim contributed to conceptualization, data curation, formal analysis, methodology, project administration, visualization, writing - original draft, review & editing and investigation. Minjeong Seo contributed to conceptualization, data curation, formal analysis, methodology, writing - review & editing and supervision.

Data availability

Please contact the corresponding author for data availability.

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References

1. Statistics Korea. Elderly statistics for 2023 [Internet]. Daejeon: Statistics Korea. c2023 [cited 2024 Mar 28]. Available from: https://kostat.go.kr/board.es?mid=a10301010000&bid=10820&act=view&list_no=427252

2. Song WB. The basic considerations in understanding and preparing for a "super-aged society" : Focused on the Japanese case. Studies of Japan. 2022;37:9–32.
3. Han YC, Lee SM, Jung HK, Park DS, Ahn KM. Measures to expand basic living services in depopulated rural areas. Korea Rural Economic Institute. 2022:1-208
4. Krawczyk-Suszek M, Kleinrok A. Health-related quality of life (HRQoL) of people over 65 years of age. International Journal of Environmental Research and Public Health. 2022;19(2):625. https://doi.org/10.3390/ijerph19020625
5. Lee DH. The effect of chronic diseases morbidity on health-related quality of life of the elderly. Korean Journal of Academic Convergence with Health and Welfare. 2021;13(1):29–41.
6. Kessing D, Denollet J, Widdershoven J, Kupper N. Self-care and health-related quality of life in chronic heart failure: A longitudinal analysis. European Journal of Cardiovascular Nursing. 2017;16(7):605–613. https://doi.org/10.1177/1474515117702021
7. Dinh TTH, Bonner A. Exploring the relationships between health literacy, social support, self-efficacy and self-management in adults with multiple chronic diseases. BMC Health Services Research. 2023;23(1):923. https://doi.org/10.1186/s12913-023-09907-5
8. Sayah FA, Qiu W, Johnson JA. Health literacy and health-related quality of life in adults with type 2 diabetes: A longitudinal study. Quality of Life Research. 2016;25:1487–1494. https://doi.org/10.1007/s11136-015-1184-3
9. Zhou Z, Zhou Z, Gao J, Lai S, Chen G. Urban-rural difference in the associations between living arrangements and the health-related quality of life (HRQOL) of the elderly in china—Evidence from Shaanxi province. PLoS One. 2018;13(9):e0204118. https://doi.org/10.1371/journal.pone.0204118
10. Alqahtani J, Alqahtani I. Self-care in the older adult population with chronic disease: Concept analysis. Heliyon. 2022;8(7):e09991. https://doi.org/10.1016/j.heliyon.2022.e09991
11. Han HO, Park SJ, Kang JS, Moon KS, Kim JH, Hwang JN, et al. Development of Korean version of European health literacy survey (HLS-EU-Q47) and applied to the elderly. Therapeutic Science for Rehabilitation. 2021;10(4):65–80. https://doi.org/10.22683/tsnr.2021.10.4.065
12. Aljassim N, Ostini R. Health literacy in rural and urban populations: A systematic review. Patient Education and Counseling. 2020;103(10):2142–2154. https://doi.org/10.1016/j.pec.2020.06.007
13. Jo EH, Lee SJ, Han SH. Mediating effects of self-efficacy and social support on the relationship between eHealth literacy and self-care competency in patients undergoing percutaneous coronary interventions: A cross-sectional study. Journal of Korea Academy of Fundamentals of Nursing. 2023;30(3):325–334. https://doi.org/10.7739/jkafn.2023.30.3.325
14. Cong Z, Huo M, Jiang X, Yu H. Factors associated with the level of self-management in elderly patients with chronic diseases: A pathway analysis. BMC Geriatrics. 2024;24(1):377. https://doi.org/10.1186/s12877-024-04956-9
15. Tulu SN, Cook P, Oman KS, Meek P, Kebede Gudina E. Chronic disease self-care: A concept analysis. Nursing Forum. 2021;56(3):734–741. https://doi.org/10.1111/nuf.12577
16. Lu J, Sun S, Gu Y, Li H, Fang L, Zhu X, et al. Health literacy and health outcomes among older patients suffering from chronic diseases: A moderated mediation model. Frontiers in Public Health. 2023;10:1069174. https://doi.org/10.3389/fpubh.2022.1069174
17. Choi HW, Son JR, Choi YJ, Choi JS. Mediating effect of self-efficacy on relationship between health literacy in rural elderly individuals and health promoting behavior. Korean Journal of Human Ecology. 2023;32(5):521–534. https://doi.org/10.5934/kjhe.2023.32.5.521
18. Kim JE, Park JH, You MA, Seo EJ. Impact of depression and social support on medication adherence in older adults with multimorbidity. Journal of Korean Biological Nursing Science. 2022;24(3):200–207. https://doi.org/10.7586/jkbns.2022.24.3.200
19. Casher MI, Gih D, Agarwala P. Confounding factors in treatment-resistant depression (part 2). Comorbidities and treatment resistance. Psychiatric Times. 2012;29:43.
20. Yang VX, Lam CCSF, Kane JPM. Cognitive impairment and development of dementia in very late-onset schizophrenia-like psychosis: A systematic review. Irish Journal of Psychological Medicine. 2023;40(4):616–628. https://doi.org/10.1017/ipm.2021.48
21. Geden E, Taylor S. Self-as-carer: A preliminary evaluation. in proceedings of the seventh annual nursing research conference; 1988; Colombia, MO. Columbia(MO): University of Missouri-Columbia School of Nursing; 1988. Abstract, 7 p.
22. So HS. Testing construct validity of self-as-carer inventory and its predictors. Journal of Korean Adult Nursing. 1992;4(2):147–161.
23. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. Journal of Personality Assessment. 1988;52(1):30–41. https://doi.org/10.1207/s15327752jpa5201_2

24. Shin JS, Lee YB. The effects of social supports on psychosocial well-being of the unemployed. Korean Journal of Social Welfare. 1999;37:241–269.
25. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. (HLS-EU) Consortium Health Literacy Project European. Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health. 2012;12:80. https://doi.org/10.1186/1471-2458-12-80
26. Chun HR, Lee JY. Factors associated with health literacy among older adults: Results of the HLS-EU-Q16 measure. Korean Journal Health Education and Promotion. 2020;37(1):1–13. https://doi.org/10.14367/kjhep.2020.37.1.1
27. EuroQol Group. EuroQol-A new facility for the measurement of health-related quality of life. Health Policy. 1990;16(3):199–208. https://doi.org/10.1016/0168-8510(90)90421-9
28. Hayes, AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. 2nd ed. NY: Guilford press; 2017. 692 p.
29. Lee GM, Shin SY. Influence of self-care competency, family support, and depression on life satisfaction in older patients with diabetes mellitus. Journal of Korean Gerontological Nursing. 2020;22(4):326–334. https://doi.org/10.17079/jkgn.2020.22.4.326
30. Woo MS, Min HJ, Sung SI, Lee SY, Lee CL, Jang HJ. Relationship between social support and self-care of patients with hypertension. Journal of Korean Academy of Rural Health Nursing. 2020;15(2):49–56. https://doi.org/10.22715/jkarhn.2020.15.2.49
31. Kim SY, Lee HJ, Kim SN. Recognition of well-dying, health-related quality of life and repulsion-related nursing home of community-dwelling older adults. Journal of Muscle and Joint Health. 2024;31(1):31–41. https://doi.org/10.5953/JMJH.2024.31.1.31
32. Ahn SH, An MJ. Factors related to health-related quality of life in elderly diabetic patients: Utilization of the Korea national health and nutrition examination survey. Health & Welfare. 2024;26(3):33–57. https://doi.org/10.23948/kshw.2024.09.30.3.33
33. Korea Nurses Association (KNA). Korea nurse ethics [Internet]. Seoul: Korea Nurses Association. 2023 [cited 2024 May 2]. Available from: https://www.koreanurse.or.kr/about_KNA/ethics.php