

Activities of Daily Living, Depression, and life Satisfaction of Elders using Rural Day Group Homes in South Korea

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Research Article

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Abstract

Purpose: The purpose of this study was to identify the factors affecting life satisfaction in the communal life of elderly people in rural areas of South Korea.

Methods: This was a cross-sectional study. The study respondents were 143 elders (≥ 65 -years-old) selected through convenience sampling. The Instrumental Activities of Daily Living (IADL), depression, and life satisfaction were measured. The data were collected from self-reported questionnaires from 1 August to 30 August 2019. Data analysis was performed using the SPSS Program.

Results: The IADL scores were significantly different according to age ($p < 0.001$), education ($p < 0.001$), and cohabitation ($p = 0.003$), whereas depression was gender ($p = 0.033$), age ($p = 0.006$), education ($p = 0.006$), and cohabitation ($p = 0.039$). Life satisfaction was significantly different according to age ($p = 0.001$), education ($p < 0.001$), religion ($p = 0.008$), and cohabitation ($p = 0.009$). There was a positive correlation between IADL scores and depression ($r = 0.37$, $p < 0.001$). There was a negative correlation between life satisfaction and the IADL scores ($r = -0.39$, $p < 0.001$) and depression ($r = -.66$, $p < 0.001$). Forty-one percent of the respondent's life satisfaction was explained by depression ($p < 0.001$), religion ($p = 0.021$), and IADL scores ($p = 0.028$).

Conclusion: The results of this study may be useful in understanding the life satisfaction level of elderly people in communal living and developing more specific programs for mental and activity programs. Depression management strategies are also needed.

Key Summary Points

Aim:

To identify the factors affecting life satisfaction in rural communal life elderly of Korea.

Findings:

Forty-one percent of the respondent's life satisfaction was explained by depression, religion, and IADL scores.

Message:

To enhance the life satisfaction level in rural areas, it is necessary to sustain and expand social participation networks, such as the Rural Day Group Home.

Introduction

Among the total population of South Korea, there were 8.12 million (15.6 %) senior citizens aged 65 or older as of 2020 [1], and the number is increasing. Of these, 89.2% have chronic diseases [2], and 35% of the senior citizens aged 65 or older in the United States are also known to have disabilities and reduced ability to perform daily activities [3].

Difficulties in the ability of an elderly person to perform daily activities as may be the result of a physical disability [2] or an aggravating disease, and thus, adversely affect the self-reliance of elderly people [4]. This can decrease the social interaction of the elderly [4], impact the state of mind [2], and cause mental problems such as loneliness, loneliness, and depression [5], indicating that the ability to perform daily activities is an important factor in maintaining the satisfaction with living and lowering depression, indicators of the physical function and overall quality of life of the elderly [5]. Therefore, it is necessary to develop measures to maintain the healthy minds and bodies of elders to enhance their satisfaction with life.

Studies have reported that urban senior citizens are dissatisfied because they have to watch TV alone, without any special social programs [6], but there are many private or governmental residential-oriented living centers and programs that allow seniors to engage in community activities. Thus, there are many opportunities to enjoy leisure activities, depending upon their own efforts to enhance their life satisfaction. However, the nation's rural aging rate is 44.7%, three times the national average, and the proportion of elderly people living alone in rural areas is twice that of urban areas [7]. The rate of elderly activity constraints is higher than 30% in urban areas and the rate of chronic diseases is also higher [8]. In addition, there are not many facilities and programs for rural seniors—only 63% of the rural communities have senior citizen centers, welfare centers, and religious facilities— and 37% of the senior citizens do not socialize [9]. Moreover, the elderly in rural areas who live alone [7] have poorer housing and welfare conditions than city-dwelling seniors [10] and lower health and welfare life satisfaction levels [11]. Most want hobby leisure activities (61.6%) but spend most of their time with passive leisure activities [12] such as using senior citizens' homes or senior citizens' welfare centers (34.8%). This leads to psychological depression [5] in old age, whereby people are helped or more dependent on others, facing difficulties in controlling their own free physical activities and inevitably leading to a lower level of satisfaction [13] with life.

To solve the problem of rural elderly persons living alone, who have more activity constraints and a higher rate of depression than the urban elderly living alone [7, 8], the South Korean government implemented a joint residential system for urban elderly people living alone [8]. The system utilizes community centers called Rural Day Group Homes for elderly people in rural areas as a work policy [7] and is spreading to 967 locations [14]. The Rural Day Group Home for senior citizens living alone in rural areas is recognized as a positive form of residence that can enhance life satisfaction [10] in that it can reduce economic benefits by reducing maintenance costs for living spaces and jointly solve accommodation problems while using a network for co-residential activities in their villages, thereby reducing loneliness and depression through the maintenance of social bonds. However, most senior rural residents, including senior citizens living alone, tend to lower their depression through mental solidarity by meeting rural seniors in the village center during the day and promoting social activities and friendship, thus using a form of weekly communal life where they return to their homes in the evening and receive respect for their private lives rather than living at the Rural Day Group Home [8]. Therefore, it is meaningful to evaluate the ability to perform daily activities, the

degree of depression, and the living satisfaction of seniors in rural areas who live together during the day in Rural Day Group Homes.

Most of the leading studies on the ability of rural elderly people to perform the activities of daily living have compared the activities performed, stress [5], health conditions, pain, and the quality of life [15]. However, there are few studies on the ability of rural elderly people to perform the activities of daily living, depression, and life satisfaction.

Since the health and physical condition of older people are closely related to depression [16] and health and mental health conditions are powerful factors in life satisfaction, it is necessary to examine the relationship between depression [17], an indicator of mental health in the elderly, and the ability to perform the activities of daily living used as an indicator of physical health, to confirm the life satisfaction of the elderly in rural areas. In particular, awareness of the differences between the ability to conduct the activities of daily living and depression levels according to the general characteristics of those in rural areas who live together during the day can help the elderly in rural areas improve their ability to conduct the activities of daily living and their life satisfaction through managing depression. Therefore, in this study, we intended to identify the differences between the ability to perform the activities of daily living, and the level of depression and life satisfaction of the elderly living together during the day and use them as basic data for improving their life satisfaction and developing mediation programs.

Research Design And Method

Population and Sample

This was a cross-sectional study. The participants in this study were those aged 65 or older living in 11 rural areas around A, Y, and S mid-sized cities, who had no difficulty communicating and were able to complete the survey. Day Group Homes are where residents come to eat together during the day, do hobbies together, and then go back home and sleep in the evening. There were about 10 to 30 senior citizens per facility who used the weekly communal living facility. The number of participants in the study was calculated to be a minimum of 136 when the G*Power 3.1 program was used to select a significance level of 0.05, a median effect size of 0.15 in the regression analysis, and power (1- β) of 0.90. A total of 150 questionnaires were distributed to those who volunteered to participate in the study, taking into account the dropout rate, and finally 143 people were selected for the study, excluding incomplete responses to the questionnaire.

Measures

General characteristics

Gender, age, educational level, religion, and cohabitating family situations were surveyed to investigate the general characteristics of the respondents.

Instrumental Activities of Daily Living

The Korean-IADL (Instrumental Activities of Daily Living) was used, which was developed by Kang et al. [18] as a Korean version (Supplementary material), who also conducted feasibility and reliability verification tests. The instrument consists of 11 questions on a 0 to 3-point Likert scale, to yield total possible scores of 11 to 33 points. The possible answers for each question were 'alone is possible' (0 points), 'need a little help' (1 point), 'need a lot of help' (2 points), and 'impossible' (3 points). A higher score indicated a lower ability to conduct the activities of daily living. The reliability of this instrument was 0.96 at the time of development and 0.83 in the present study.

Depression

To investigate depression in the elderly, the Korean Geriatric Depression Scale (KGDS) developed by Yesavage et al. [19], which was standardized by Jung et al. [20], was used. The instrument has a total of 30 questions, 15 negative and 15 positive questions, each scored on a 1-point scale to yield total possible scores of 0 to 30 points. The responses were 'yes' (1 point) or 'no' (0 points). Higher scores indicated greater levels of depression. The reliability of this instrument was 0.88 when tested by Jung et al. [20] and 0.87 in the present study.

Life satisfaction

Choi's instrument [21], which was developed by modifying 47 questions in 10 instruments used domestically and abroad to 20 questions, was used. This instrument consists of positive and negative questions in the past dimension (positive and negative questions, three questions each), eight questions in the present dimension (positive and negative questions, four questions each), and six questions in the future (positive and negative questions, three questions each). The positive questions were responded to with 'yes' (2 points), 'don't know' (1 point), or 'no' (0 points), and the negative questions were responded to with 'yes' (0 points), 'don't know' (1 point), or 'no' (2 points). Higher scores indicated higher life satisfaction. The reliability of this instrument when tested by Choi [21] was 0.87 and 0.84 in the present study.

Ethical considerations

This research was conducted after obtaining research approval from the Institutional Bioethics Committee regarding the bioethics and safety of the respondents. All the guidelines of the Institutional Bioethics Committee were complied with during the research period. The participants could withdraw from the study at any time before the collection of data. The collected data were only used for research purposes, and a written agreement was obtained that ensured the anonymity and autonomy of the participants.

Data collection

The data collection in this study was conducted in 11 rural areas near A, Y, and S cities from August 1, 2019, to August 30, 2019, by three research assistants who received protocol training for collecting data and research. Participants who could read and understand on the questionnaire, respond on their own, and write their own answers were included. The research descriptions included the purpose of research, research procedures, data collection processes, confidentiality, and the voluntary responses of the participants. The completion time for the survey was around 30 minutes, and a small compensation (bread, milk, and fruit) was provided to those who cooperated with the survey.

Statistical analysis

The collected data were statistically processed and analyzed according to the purpose of the study and the characteristics of the measurement variables using the SPSS/WIN 23.0 (IBM Corp., Armonk, NY, USA) statistical program. The general characteristics of the participants were calculated using frequencies and percentages, and means and standard deviation, and the differences between the ability to perform daily activities, depression, and life satisfaction according to the general characteristics were subsequently analyzed by independent t-tests, one-way ANOVA, and significant effects. Pearson's correlation coefficients were used to test the relationship between the target variables, and multiple regression analysis was performed to determine the factors affecting the participant's life satisfaction.

Results

General characteristics of the respondents

Most of the respondents were women (75.5 %), 57 (39.9 %) were aged 80 or older, 52 (36.3 %) were aged 70–79, and 34 (23.8 %) were under 69. Most of the participants were academic and elementary school graduates (69.9%), 29 high were school graduates (20.3%), 14 were middle school graduates (9.8%), 72 were religious (50.4%), and 71 were not (49.6%). The number of respondents cohabitating with families was 86 (60.1 %), and 27 (18.9 %), and 30 (21.0 %) were living alone or with their spouses and children, respectively (Table 1).

Table 1
 Difference in the Instrumental Activities of Daily Living Scores, Depression, and Life Satisfaction by General Characteristics (N = 143)

Variables	Categories	n	%	IADL		Depression		Life satisfaction	
				M ± SD	F or t(p)	M ± SD	F or t(p)	M ± SD	F or t(p)
Gender	Male	35	24.5	4.27 ± 5.27	-1.54 (.127)	8.45 ± 6.58	-2.15 (.033)	25.63 ± 10.05	1.25 (.213)
	Female	108	75.5	6.51 ± 7.84		11.18 ± 6.04		23.35 ± 8.53	
Age [†]	≤ 69	34	23.8	3.38 ± 4.05 ^a	9.95 ($< .001$)	7.97 ± 5.89 ^a	5.33 (.006)	28.42 ± 8.29 ^b	7.88 (.001)
	70–79	52	36.3	4.47 ± 7.34 ^b		10.22 ± 6.22 ^b		24.11 ± 8.49 ^a	
	≥ 80	57	39.9	9.49 ± 8.08 ^{a,b}		12.37 ± 5.98 ^{ab}		23.84 ± 8.89 ^{ab}	
Educational level [†]	Ignorance	57	39.9	9.65 ± 9.27 ^{ab}	6.52 ($< .001$)	12.16 ± 5.77 ^b	4.37 (.006)	20.21 ± 7.88 ^a	7.44 ($< .001$)
	Elementary school	43	30.0	4.09 ± 5.46 ^b		11.11 ± 5.83 ^a		24.12 ± 7.81 ^b	
	Middle school	14	9.8	5.93 ± 4.46		10.46 ± 5.88		23.00 ± 8.12	
	≥ High school	29	20.3	3.55 ± 5.37 ^a		7.00 ± 6.59 ^{ab}		29.73 ± 9.68 ^{ab}	
Religion	Yes	72	40.4	7.27 ± 8.04	1.09 (.353)	11.83 ± 6.07	2.07 (.108)	22.53 ± 7.98	4.13 (.008)
	No	71	49.6	8.74 ± 8.50		13.00 ± 5.54		18.83 ± 8.53	
Cohabitation [†]	Spouse	27	18.9	2.63 ± 3.55 ^a	5.94 (.003)	8.88 ± 7.45	3.34 (.039)	25.72 ± 10.47	4.86 (.009)
	Spouse + child	30	21.0	4.18 ± 4.32		8.05 ± 5.33 ^a		28.40 ± 8.18 ^b	

IADL: Instrumental Activities of Daily Living; [†] Scheffe test: a < b

Single	86	60.1	7.66 ± 8.49 ^b	11.43 ± 5.88 ^b	22.86 ± 8.14 ^a
IADL: Instrumental Activities of Daily Living; [†] Scheffe test: a < b					

Comparison of IADL scores, depression, and life satisfaction according to the general characteristics of the respondents

The general characteristics significantly associated with the activities of daily living were age ($F = 9.95$ and $p < 0.001$), education level ($F = 6.52$, $p < 0.001$) and living together with family ($F = 5.94$, $p = 0.003$). The significant variables for depression were gender ($t = -2.15$, $p = 0.033$), age ($F = 5.33$, $p = .006$), education level ($F = 4.37$, $p = 0.006$), and cohabitating with family ($F = 3.34$, $p = 0.039$). The variables significantly associated with life satisfaction were age ($F = 7.88$, $p = 0.001$), education level ($F = 7.44$, $p < 0.001$), religious status ($t = 4.13$, $p = 0.008$), and cohabitating with family ($F = 4.86$, $p = 0.009$) (Table 1).

The responses showed that older age, low education, and older people living alone had worse scores on the IADL than older people living with their spouses. The responses also showed that older women (compared to older men), older age, less education, and elderly people living with their children were less depressed. Also, the responses showed that lower age, higher education, religion, and elderly people living with their children had higher life satisfaction levels than the elderly living alone.

Correlation between the IADL scores, depression, and life satisfaction of the respondents

Pearson's correlation was used to determine the relationship between the IADL scores, depression, and life satisfaction level of the respondents. Significant positive relationships were found between the IADL scores and depression ($r = 0.37$, $p < 0.001$). However, significant negative relationships were found between life satisfaction and IADL scores ($r = -0.39$, $p < 0.001$) and depression ($r = -0.66$, $p < 0.001$) (Table 2).

Table 2
Correlations Among the Instrumental Activities of Daily Living Scores, Depression, and Life Satisfaction (N = 143)

Variables	IADL	Depression	Life satisfaction
	r (p)	r (p)	r (p)
IADL	1		
Depression	.37 ($< .001$)	1	
Life satisfaction	-.39 ($< .001$)	-.66 ($< .001$)	1
IADL: Instrumental Activities of Daily Living			

Factors affecting the life satisfaction of the respondents

To identify the factors affecting life satisfaction in elders, multiple regression analyses were conducted by treating age, education, religion, and cohabitating with family as dummy variables. Tests of the assumptions in the regression analysis showed that they were all met. The autocorrelation of error using Durbin-Watson was 2.014, which was larger than the test statistic, indicating no autocorrelation. The multicollinearity test showed that all variables had no multicollinear problems because the tolerance was less than 0.1 and the variance inflation factor (VIF) value was not greater than 10. The factors that significantly affected life satisfaction were depression ($\beta = -0.53$, $p < 0.001$), religion ($\beta = 0.25$, $p = 0.021$), and IADL scores ($\beta = -0.18$, $p = 0.028$). Taken together, these factors accounted for 41.0% of the total variation in life satisfaction and were suitable for inclusion in the overall regression model with a significance level of 0.05 ($F = 7.26$, $p < 0.001$) (Table 3).

Table 3
 Predictive Variables for Life Satisfaction of the Participants

Variables	B	SE	β	t	p
(Constant)	19.42	7.89		2.46	.017
IADL	-0.21	0.09	-.18	-2.40	.028
Depression	-0.80	0.18	-.53	-4.42	<.001
Age†	1.02	1.73	.08	0.59	.557
Education level†	1.34	1.16	.16	1.16	.251
Religion†	4.19	1.75	.25	2.39	.021
Cohabitation†	0.30	1.07	.03	0.28	.778
Adj. R ² = 0.41, F = 7.26, p < 0.001					
IADL: Instrumental Activities of Daily Living					
†Dummy variables (age: ≤ 65 = 0, 70–79 = 1, ≥ 80 = 2; education level: ignorance = 0, elementary school = 1, middle school = 2, ≥ high school = 3; religion: Yes = 0, No = 1; cohabitation: spouse = 0, spouse + child = 1, single = 2)					

Discussion

This study attempted to identify the degree of ability of rural elderly people to conduct the activities of daily living, their depression levels, and life satisfaction, and identify the correlation between these variables and the factors affecting life satisfaction.

As of 2018, elderly people living alone accounted for 19.4% [22] of the population of Korea, compared to 60.1% found in this study, which is three times higher. The national statistics were derived by combining the rates in urban and rural areas, and the ratio of elderly people living alone in rural areas was twice as high as that in urban areas [7]. However, this study was conducted on participants living in rural areas to demonstrate that the aging of rural areas is a serious issue. This raises the importance of policies focusing on elderly people living alone in rural areas when establishing measures to improve life satisfaction for the elderly population.

The study results showed that the ability to conduct the activities of daily living was poor if the level of education was low, and the ability of elderly people living alone was worse than that of elderly people living with their spouses. These results were consistent with the current status of functional state restrictions for senior citizens presented by Statistics Korea [23]. Therefore, for the physical health of the elderly in rural areas with a large number of senior citizens living alone, social support systems and activity programs are necessary to improve the ability of seniors to perform the activities of daily living, especially for elderly people living alone.

Depression was significantly higher in elderly women than in men, and higher age and lower education levels were associated with depression, consistent with studies by Jung [24] and Statistics Korea [25]. In addition, this study found that the level of depression among senior citizens living alone was higher than that of senior citizens living with their children, consistent with the report by Statistics Korea [25] that elderly people living alone had the highest level of depression. Depression increases in older people when social participation is low, social networks are low, or social support is cut off [26]. Therefore, social participation, the expansion of relationship networks, and social interest and support for the elderly in rural areas are required.

The level of life satisfaction was high for younger seniors and those with a high level of education. This was an opposite result from that reported by Jung [24], which supported the research of Park and Hur [16] and Bang [27] on city-dwelling elderly people but studied seniors in the hospital. In this study, Protestantism had significantly associated with higher life satisfaction than that of the non-religious participants. The results supported a prior study [16, 17] that reported that people with religion were more satisfied than those without religion. This is believed to be because religious values and beliefs, forgiveness, and religious support help to ease and overcome the problems experienced by elderly people. Elderly people living with their children were found to be more satisfied than those living alone, which supported the findings of Park and Hur [16]. Elderly people living with their children and spouses probably have a higher level of satisfaction with their lives because of the higher level of support and care from their families than those of seniors living alone. Therefore, community and volunteer support systems and programs that can replace the closeness and care of the family are required to improve the life satisfaction of elderly people not cohabitating with their families.

Park and Hur [16], and Bang [27] conducted studies of urban senior citizens and reported that the participants' ability to perform the activities of daily living was positively associated with depression, while their life satisfaction level was negatively related to depression and the ability to perform the activities of daily living. In other words, fewer restrictions on daily activities mean fewer problems with daily activities and fewer bad health conditions, supporting previous studies [16, 17] that reported good health conditions led to low depression and high life satisfaction. These results are thought to be related to the physical, mental, social, and economic conditions of the elderly rather than the results of the differences between urban and rural areas. In addition, most of the participants in this study have lived in rural areas by performing physical labor, and although the amount of labor has decreased, they continue to carry out physical daily life activities such as gardening, so there are not many restrictions on their daily activities. The result is that they have continued to participate in social life where they like to eat together in one room and enjoy hobbies [8].

In this study, the greatest influences on life satisfaction were in the order of depression, religion, and the ability to perform daily activities, and the model's ability to explain the differences was 41.0%. This supports Park and Hur's findings [16] that depression was the biggest factor in life satisfaction and that religion affects the activities of daily living, confirming the significant impact on the life satisfaction of elderly people, regardless of differences between living in urban and rural areas. In addition, a prior study [28] supported that depression had the greatest impact on life satisfaction, and that the ability to perform daily

activities was important to maintaining or lowering the level of life satisfaction of the elderly [16], and that religion was important in life, increasing the level of life satisfaction and helping seniors adapt well to life. This leads to psychological depression as elderly people become more vulnerable [5], and it is likely that expressing their beliefs in God and participating in religious activities will help them feel happy [28]. This sense of happiness is thought to reduce the chances of depression among the elderly and help them adapt to life in their old age. These findings confirm that the continuous provision of programs such as education and weekly communal living activities, which can ease depression and restrictions on physical activities, are necessary to enhance the life satisfaction of the elderly, especially if religious participation programs are also provided.

Elderly people are likely to experience symptoms of loneliness and depression due to tendencies for declines in physical ability, their ability to perform the activities of daily living, and their participation in social activities [1]. Furthermore, depression has a strong negative effect on seniors' satisfaction with life [16, 27]. Thus, providing education can help seniors adjust to changes in their lives, reducing and alleviating depression, and physical activity programs and participation in spiritual activities can provide support for emotional problems. And for the elderly in rural areas who lack housing, welfare means, and social support, the experience of communal weekly life has the effect of forming interdependencies, promoting and coordinating coping mechanisms, expanding their sense of belonging to the community, and providing spiritual stability by expanding their social support network. Therefore, the study confirmed [29] that sharing common living facilities can help seniors rely on each other and relieve loneliness by saving living expenses and forming close relationships with neighbors for social support, thereby helping to reduce depression and increase life satisfaction among elderly people in rural areas who lack support from their families and children. The study also confirmed that the social support of the Rural Day Group Home played an important role in keeping the minds and bodies of vulnerable rural seniors healthy. Therefore, expansion of the Rural Day Group Home social network can maintain the safety and health of rural seniors and form mutual care relationships by reviving the unique sense of community and expanding the functions of communal living, which should lower depression and enhance the life satisfaction of rural seniors. In addition, the results of this study confirmed the influence of religion on the life satisfaction of the elderly in rural areas, suggesting a possible synergistic effect in enhancing the life satisfaction level if programs for spiritual participation were added to those in the Rural Day Group Homes.

Conclusion

The elderly people living in rural areas who were participants in this study have generally lived by farming for a lifetime and are still participating in farming and gardening at some of the Rural Day Group Homes, promoting friendship. Therefore, the degree of physical independence was above average and the level of life satisfaction was generally high. However, the level of depression was higher than that reported in prior research, confirming the need for countermeasures against depression.

Life satisfaction, IADL scores, and depression in the elderly in rural areas were positively correlated with each other, and depression was the most influential variable in life satisfaction, followed by religion and IADL scores, and the model's explanation for the effects was 41.0%. Therefore, to enhance the life satisfaction

level of seniors in rural areas, and alleviate depression in particular, it is necessary to sustain and expand social participation networks, such as the Rural Day Group Home, which revives the unique sense of community in rural areas and expands the functions of communal living. The provision of customized health education and physical activity programs focusing on the elderly and the elderly living alone is required to ease their depression and maintain their physical health. Social and emotional support systems and spiritual programs that can replace family intimacy and care should also be developed and provided. Rural elderly individuals need emotional activities that can help them form interdependent relationships to ease their decline in physical capacity and expand their sense of belonging and intimacy. This can be accomplished by expanding the role of volunteers and social supporters for rural seniors in their surrounding areas and suggests that the government and local governments should continue to expand their support activities in Rural Day Group Homes to improve the life satisfaction of rural senior citizens.

Study Limitations

This study was conducted by convenience sampling of some local senior citizens. Thus, there is a limit to generalizing the results of this study by limiting the independent variables affecting the dependent variables, which were the common characteristics of the elderly, the ability to perform the activities of daily life, and depression. These problems will be solved through an in-depth analysis of the types and numbers of future study participants and by expanding the independent variables.

Declarations

Conflicts of interest

The authors report no conflict of interest.

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Ethical Approval

This research was conducted after obtaining research approval (1040191-202001-HR-022-01) from the Institutional Bioethics Committee of Andong National University. All guidelines of the Institutional Bioethics Committee were complied with during the research period.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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Author contributions

B.J.I. and C.N.H. contributed to the conception and design of this study; C.N.H. performed the statistical analysis and drafted the manuscript; B.J.I. critically reviewed the manuscript and supervised the whole study process. All authors read and approved the final manuscript.

Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

References

1. Statistics Korea. Ratio of elderly population. Statistics Korea. 2020. [updated 2020 Feb 5] <https://url.kr/PWCBze> Accessed 10 Apr 2020.
2. Statistics Korea. (2017a). Rate of elderly living alone. Statistics Korea. 2017. [updated 2020 Jan 6]. <https://url.kr/FwiGTs> Accessed 1 Apr 2020.
3. Administration for Community Living. A Profile of Older Americans. National Institute on Disability, Independent Living, and Rehabilitation Research 2019. 2017. [updated 2019 May 5] <https://url.kr/umUzYX> Accessed 25 June 2020.
4. Metha KM, Simonsick EM, Penninx BWJH, Schulz R, Rubin SM, Satterfield S, et Prevalence and correlates of anxiety symptoms in well-functioning older adults: findings from the health aging and body composition study. *J Am Geriatr Soc.* 2003;51(4):499-504. <https://doi.org/10.1046/j.1532-5415.2003.51158.x>.
5. Seo EJ, Cha NH. The relationships between stress and ADL in elderly living alone. *J Digit Convergence.* 2016;14(7):251-258. <https://doi.org/10.14400/JDC.2016.14.7.251>
6. Yoo SH. (2009). Exploring ways toward development of Kyungrodang: focusing on the characteristics of the elderly based on the types of Kyungrodang participation. *Korea Gerontol Soc.* 2009;29(4):1463-1478.
7. Farmer's Press. Starting with the promotion of human rights and strengthening of leisure and welfare functions for the elderly in rural areas. Farmer's Press. 2019, June 21. <https://url.kr/UazqDk> Accessed 10 Apr. 2020.
8. Bae JI, Cha NH. A study on the actual condition of the rural communal living for elders who live alone- focusing on the case of Yecheon-gun-. *J Korean Hous Assoc.* 2018;29(6):1-10. <https://doi.org/10.6107/JKHA.2018.29.6.001>

9. Ministry of Health and Welfare. A survey was conducted on the living conditions of about 1 million elderly people living alone in the country. Ministry of Health and Welfare. 2015. [updated 2015 Apr 21] <https://haehyo29.blog.me/220338795226> Accessed 10 Apr. 2020.
10. Park CS, Park HC, Kim SK. A field survey on the operational realities of community living home for the elders living alone in the rural village. *J Korean Inst Rural Archit.* 2014;16(4):1-8. <https://doi.org/10.14577/kirua.2014.16.4.1>
11. Mecocci P, Cherubini A, Mariani E, Ruggiero C, Senin U. Depression in the elderly: new concepts and therapeutic approach. *Aging Clin Exp Res.* 2004;16(3):176-189. <https://doi.org/10.1007/BF03327382>
12. Hwang NH. Policy considerations for the leisure activities of older Koreans. *Health Welf Policy Forum.* 2015;223(1):57-67.
13. Jan M, Masood T. An assessment of life satisfaction among women. *Stud Home Community Sci.* 2008;2(1):33-42. <https://doi.org/10.1080/09737189.2008.11885250>
14. Kim YJ. A qualitative case study of communal living arrangements for older adults who live alone in rural areas. *J Korean Gerontol Soc.* 2016;36(1):21-38.
15. Lee MS. Quality of life, perceived health status, pain, and difficulty of activity of daily living of degenerative arthritis patient in island residents. *J Agric Med Community Health.* 2009;34(3):291-302. <https://doi.org/10.5393/JAMCH.2009.34.3.291>.
16. Park SA, Hur JS. The effects of functional capacity and depression on the life satisfaction among the elderly: focused on the mediating effects of spirituality. *J Korean Gerontol Soc.* 2017;37(1):125-149.
17. Baltes PB, Myer KU. *The Berlin Aging Study Aging from 70 to 100.* New York (NY): Cambridge University Press;
18. Kang SJ, Choi SH, Lee BH, Kwon JC, Na DL, Han SH. The reliability and validity of the Korean instrumental activities of daily living (K-IADL). *J Korean Neurol Assoc.* 2002;20(1):8-14.
19. Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res.* 1983;17(1):37-49. [https://doi.org/10.1016/0022-3956\(82\)90033-4](https://doi.org/10.1016/0022-3956(82)90033-4)
20. Jung IK, Kwak DI, Shin DG, Lee MS, Lee HS, Kim JY. A reliability and validity study of geriatric depression scale. *J Korean Neuropsychiatr Assoc.* 1997;36(1):103-112.
21. Choi SJ. A study on the development of measuring scale of the concept of life satisfaction. *J Collect Res Korean Cult.* 1986;49(1):233-258.
22. National Statistical Office. Household estimation. Statistics Korea. [updated 2019 Dec 16]. <http://www.index.go.kr/unify/idx-info.do?idxCd=8039> Accessed 8 Apr 2020.
23. Statistics Korea. A survey on the elderly: the status of restrictions. Statistics Korea. 2018. [updated 2018 Dec 12]. <https://url.kr/LJnpwT> Accessed 15 Apr 2020.
24. Jung DI. Impact of the service quality on the life satisfaction and depression of senior residents at long-term care facilities: the mediation effect of self-efficacy. *J Korean Welf Pract Soc.* 2013;5(1):61-86.
25. Statistics Korea. A survey on the elderly: the depression in the elderly. Statistics Korea. 2017. [updated 2018 Dec 10]. <https://url.kr/2vnwtY> Accessed 1 Apr 2020.

26. Lee MS, Kim NY. Study on the effect of social support on depression of the old. *Korean J Clin Soc Work*. 2007;4(1):161-76.
27. Bang MG. The influence of solitude and depression on the life satisfaction of elderly people living alone a mediating effect of social support (Master's thesis). Daejeon: Baekseok University. 2017.
28. Brown PH, Tierney B. Religion and subjective well-being among the elderly in China. *J Socio Econ*. 2009;38(2):310-31 <https://doi.org/10.1016/j.socec.2008.07.014>
29. Yu EJ, Kim MY, Lee GJ. The experiences of the elderly living in group home in rural area. *Korean J Gerontol Soc Welf*. 2013;62(1):151-72.

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