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Factors Influencing Happiness of Elderly People with Cognitive Impairment in Korea

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Abstract

The purpose of this study is to investigate the factors that make an impact on the happiness of the elderly people with cognitive impairment in Korea.This study was conducted with 74,547 people aged 65 or older out of 229,099 people surveyed by the Korea Centers for Disease Control and Prevention in 2019.Among these elderly people, 21,880 subjects who responded with cognitive impairment, excluding 52,591 who did not have cognitive impairment and 76 who did not respond, were analyzed. Research method- The general characteristics and happiness emotions were frequency analyzed, and the level of happiness according to the general characteristics was t-test and one way ANOVA.The factors influencing happiness were analyzed in multiple sessions.Result- As a result of the study, factors influencing happinessinclude gender, education level, economic activity, monthly income, spouse, athletic ability, self-care, daily activities, pain discomfort, anxious depression, stress level, and falling experience. The explanatory power was 25.5% (Adj. R^2=0.225, F=498.718, *p*< 0.001).   Conclusion- As age increases, cognitive impairment worsens and the sense of happiness decreases. For happiness in older adults with cognitive impairment, active self-care and support from families and communities are needed.

Keywords-Cognitive Impairment, Korean Elderly, Happiness, Quality of life, Community Health Survey, Successful Old Age

1. Introduction

In the World Population Prospect, it seems that the ratio of people aged 65 and over will increase from 9.1% in 2019 to 18.6% in 2067 (2019:UN). Among the countries with the largest population in 2019, the elderly population of China accounts for 11.5% while in the United States is 16.2% [1]. The ratio of the elderly population in Korea has changed from 14.99% in 2019 to 16.64% this 2021 [2].It is estimated that the elderly population in Korea will increase up to 46.5 % by 2067 [1].Comparing the global elderly population, there is a rapid change in the elderly population in Korea. However, increasing social infrastructure efforts for the elderly population do not seem to be sufficient. As you get older, cognitive impairment can worsen and their happiness can decrease accordingly.

Cognitive impairment is a major health problem in old age. As age increases, physical and mental function deteriorates. Cognitive impairment is a typical symptom of dementia in older people. Cognitive impairment causes various problems such as losses of memory, orientation, attention, language and executive ability. In particular, parietal lobe disorders impair motor and sensory functions. So, an old man is not good at doing what they want[3]. Cases of serious disability are highly disruptive to their daily lives. Because the necessary movements of human muscles cannot be used properly, the surroundings become distracted and there is a risk of falling. Falling is when the body falls to the floor in consciousness due to muscle dissonance or lack of balance. Worldwide, it is reported that 28~35% of the elderly experience falls each year and are currence rate is 40% according to World Health Organization

(WHO)[3]. Falling decreases quality of life and raises depression levels. Fear of falling has affected the quality of life of Taiwanese elderly people[4]. There are internal and external factors in causing falls in older people. The higher cognitive impairment they have, which is an internal factor, the more fall-inducing behavioral factors they do. Conversely, the lower cognitive impairment, the less falls, which has a correlation[5].

This study was conducted based on the 2019 Community Health Survey (CHS) data of the elderly with cognitive impairment in Korea. The difference in happiness was analyzed and the factors affecting happiness were investigated according to the degree of daily life and health maintenance activities. The research was intended to contribute to the improvement of the quality of life of the elderly people in Korea and provide basic data for geriatric nursing. The specific purposes are as follows. To understand the general characteristics and health status of the elderly in Korea with cognitive impairment. To identify the difference in happiness according to the general characteristics and health status of the elderly in Korea with cognitive impairment. To figure out the factors affecting happiness of the elderly in Korea with cognitive impairment.

2. Contents
2.1. Study Materials and Subjects

This study was conducted on senior citizens aged 65 or older with cognitive impairment using the Korea Centers for Disease Control and Prevention 2019 Community Health Survey (CHS). This is a descriptive research study to analyze the degree of happiness of the subjects and to identify the factors influencing it. The CHS survey was conducted in cooperation with 17 cities and provinces and 255 public health centers and 35 responsible universities in Korea. The entire CHS survey group was aged 19 and over who lived in their homes. The primary sample size was determined based on an average of 900 persons per health center. Secondary sample furniture extraction was selected by systematic extraction method. The investigation period is from August 16, 2019 to October 31, 2019.A trained researcher conducted a 1:1 face-to-face electronic survey using a laptop equipped with a survey program. The survey questions consisted of 211 items in 21 areas [6].The total population of the 2019 CHS survey was 229,099.Of these, 74,547 were aged 65 or older. Among the elderly subjects, 21,880 (29.4%) answered that they had cognitive impairment, 52,591 (70.5%) answered that they had no cognitive impairment while 76 (0.1%) who did not respond were excluded.

2.2. Study Variables
2.2.1. Dependent Variable

The happiness index, which is the dependent variable of this study, is a one-question questionnaire that evaluates happiness in life in consideration of recent circumstances. In the demographic and sociological factor analysis, the score range was out of 10, with 1 being very dissatisfied, and the higher the score, the higher the happiness index. Based on a scale of 10, 1-3 points were classified as 'low happiness index', 4-6 points were classified as moderate, and 7-10 points were classified as high.

Difference verification of happiness index and analysis of influencing factors were analyzed with

a raw score of 10 points. In addition, 169 people who did not respond to the happiness index among the elderly subjects with cognitive impairment were excluded from the difference test and the influencing factor analysis.

2.2.2. Independent Variable

Independent variables in this study were divided into demographic and social factors, which are variables on an individual basis, and health form factors of individual activities. Demographic and sociological factors include gender, age, educational background, economic activity, monthly income, and the presence of a spouse. Health status factors are EuroQol-5 Dimension (EQ-5D), a life index measurement tool, motor ability, self-management, daily activity level, pain discomfort level, and anxiety or depression variables. And the stress level and whether the elderly experienced a fall were used as variables.

Among demographic factors, gender, economic activity, and spouse were converted into dummy variables. Ages were categorized as 65-74, 75-84 and over 85 years old, and education level was categorized as junior high school graduation or less, high school graduation, and university graduation. Monthly income was treated as a categorical variable as less than 1 million won, less than 1 to 3 million won, and 3 million won or more.

As a health status factor, in EQ-5D, a health-related quality of life measurement tool, motor ability is a question about the subject's ability to walk or exercise, and 3 points of no problem with walking, slight problem with walking, and serious problem with walking It was classified by the scale. Self-care was a three-point scale variable: having no problems bathing or dressing, having some difficulty, and having serious problems. Daily activity was a question about inability to do housework due to cognitive impairment, and it was a variable that was classified as no, slightly interfering, and very interfering with daily activities. Pain and Discomfort is an assessment of the pain or discomfort of a physical health condition caused by an illness or injury over the past several months on a 3-point scale, no pain or discomfort, slight pain or discomfort, and very severe pain or discomfort were measured. Anxiety and depression, the last variable of EQ-5D, are variables on a 3-point scale: depression or no anxiety, mild anxiety and depression, and very anxious or depressed. The level at which the subjects felt stress in their daily life was analyzed as feeling a lot, feeling a little, and not feeling it. The experience of falling in the elderly was analyzed by converting it into a dummy variable.

2.3 Ethical Consideration

The survey was conducted on nationally representative samples. The data was requested from the Korea Centers for Disease Control and Prevention[6]. A pledge of use was signed to receive research materials. The researcher agreed to collect and use personal information. A plan for use of research data has been submitted. No personally identifiable information was collected in the data. So, no ethical approval was required. Through this process, a total of 229,099 samples were received from the Korea Centers for Disease Control and Prevention. The 2019 CHS data was conducted under the approval of the Korea Disease Statistics Office (approval number 117075) based on the Local Health Act.

2.4. Statistical Analysis and Flow Diagram

All statistical analyses were performed using SPSS version 25.0 (IBM Corp, Armonk, NY, USA). Independent variables affecting happiness were selected based on a literature review of the quality of life in older adults [7], [8].Frequency analysis based on general characteristics used percentages. Intervariable difference verification used t-test and ANOVA test. The Post-analysis of ANOVA tested the homogeneity of variance when the intergroup differences were significant. If the equal variance was assumed (*P*> 0.05), a Scheffe test was performed and if the equal variance was not assumed (*P*<0.05), a post hoc analysis was performed with Dunnet T3. A multiple regression was performed to verify the factors affecting happiness. In the model of the study, 13 variables were added to test the dependent variable, which is the sense of happiness. The flow diagram for analysis is shown in Fig. 1.
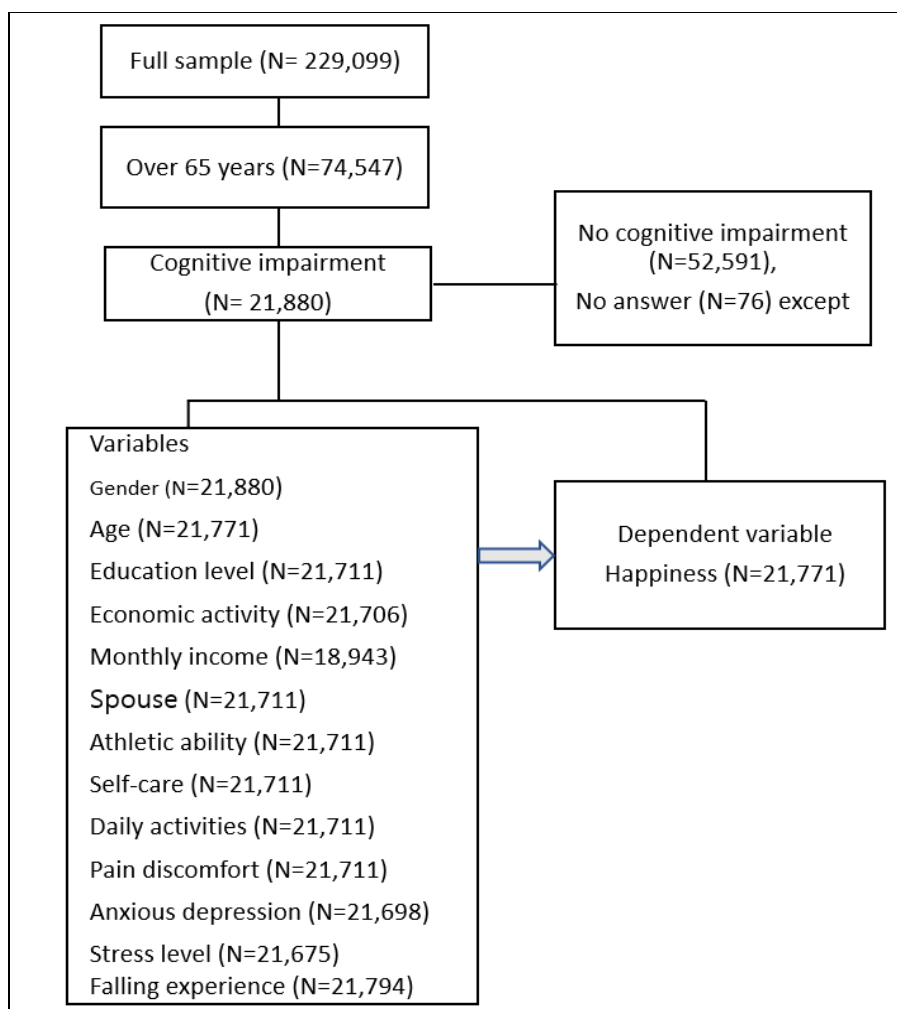
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┌─────────────────────────────────┐
│  Full sample (N= 229,099)       │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│  Over 65 years (N=74,547)       │
└─────────────────────────────────┘
                │                        ┌──────────────────────────────┐
┌─────────────────────────────────┐     │  No cognitive impairment     │
│  Cognitive impairment           │─────│  (N=52,591),                 │
│  (N= 21,880)                    │     │  No answer (N=76) except     │
└─────────────────────────────────┘     └──────────────────────────────┘
                │
┌────────────────────────────────────────┐
│  Variables                             │
│  Gender (N=21,880)                     │
│  Age (N=21,771)                        │      ┌──────────────────────────┐
│  Education level (N=21,711)            │      │  Dependent variable      │
│  Economic activity (N=21,706)          │ ───→ │  Happiness (N=21,771)    │
│  Monthly income (N=18,943)             │      └──────────────────────────┘
│  Spouse (N=21,711)                     │
│  Athletic ability (N=21,711)           │
│  Self-care (N=21,711)                  │
│  Daily activities (N=21,711)           │
│  Pain discomfort (N=21,711)            │
│  Anxious depression (N=21,698)         │
│  Stress level (N=21,675)               │
│  Falling experience (N=21,794)         │
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Fig. 1.Flow Diagram

3. Result

3.1. General Characteristics of the Subjects

The characteristics of the subjects were 63.5% female seniors and 36.5% men, 47.9% of senior citizens were under the age of 74, while 9.1% of those aged 85 or older. As for the educational level, 81.7% of those with a middle school graduation or lower were the most numerous and 65.9% of them did not have economic activity. For 50% of the subjects, their monthly household income was less than one million won. A high income of more than three million won was surveyed as low as 9.7%. Furthermore, 57.6% of the subjects had spouses.

EQ-5D, an independent variable for scalingthe quality of life, was measured where 54.1% said that athletic activity was uncomfortable. Self-care was possible in 76.7%. In daily activities, 57.6% answered that there was no problem, 55.5% reported slight pain and discomfort and 12.1%reported very severe pain and discomfort, 68.1% reported no anxious depression, 66.6% reported feeling stress, and 75.7% reported no falling experience. Subjective happiness is 49.8%for moderate and 41.8%for high[TableI].

Table II. General Characteristics of the Subjects(N=21,880)

characteristics	Divide	Frequency(n)	Ratio(%)
Gender	Man	7,979	36.5
	Woman	13,901	63.5
Age	≤74	10,479	47.9
	75~84	9,403	43.0
	≥85	1,998	9.1
Education level	≤middle school	17,853	81.7
	high school	2,784	12.7
	≥College	1,243	5.6
Economic activity	Yes	7,407	34.1
	No	14,299	65.9
	No answer	7	.0
Monthly income	<100	10,934	50.0

(10^{4}Korean won)	100-300	6,026	27.5
	>300	2,114	9.7
	No answer	2,806	12.8
Spouse	Yes	12,607	57.6
	No	9,273	42.4
EQ-5D Athletic ability	No trouble	10,049	45.9
	A Little trouble	11,305	51.7
	Serious trouble	526	2.4
EQ-5D Self-care	No trouble	16,781	76.7
	A Little trouble	4,525	20.7
	Serious trouble	574	2.6
EQ-5D Daily activities	No trouble	12,592	57.6
	A Little trouble	8,447	38.6
	Serious trouble	841	3.8
	No answer	1	.0
EQ-5D Pain discomfort	No	7,084	32.4
	A Little trouble	12,136	55.5
	Serious trouble	2,659	12.1
	No answer	1	.0
EQ-5D Anxious depression	No	14,908	68.1
	A Little trouble	6,158	28.2
	Serious trouble	794	3.6

	No answer	20	.1
Stress level	No	7,265	33.2
	A Little trouble	9,448	43.2
	Serious trouble	5,118	23.4
	No answer	49	.2
Falling experience	No	16,571	75.7
	Yes	5,299	24.2
	No answer	10	.1
Happiness	Lowness	1,679	7.7
	usually	10,887	49.8
	height	9,145	41.8
	No answer	169	.7

3.2. Differences in Happiness According to General Characteristics

The difference between other variables in the degree of happiness was analyzed by t-test and ANOVA test. Males showed a higher happiness index than females ($p< .001$).There was a significant difference in age ($p< .001$) than older people. There was a significant difference in happiness in higher education ($p< .001$) subjects than in lower education. It was significant for those with economic activity ($p< .001$).The higher the monthly income ($p< .001$), the more significant the difference. The presence of a spouse made a significant difference ($p< .001$).

There are five categories of EQ-5D that evaluate the quality of life. It was significant when there was no motor performance problem ($p> .001$).It was significantly shown when self-care was possible ($p> .001$).It was significant when the subject performed well in daily activities ($p> .001$).There was a significant difference in the absence of pain and discomfort ($p> .001$).It showed significantly in the absence of anxiety depression ($p> .001$).It was statistically significant when the stress level of the cognitively impaired elderly was low ($p> .001$). There was a significant difference when the elderly had no experience of falling ($p> .001$) [Table II].

Table II. Differences in Happiness According to General Characteristics

Characteristics	Divide	N	M	SD	t/f	p	scheffe / Dunnet t`s T3
Gender (N=21,711)	Man	7,939	6.35	1.890	7.987	<.001***	-
	Woman	13,772	6.14	1.922			
Age (N=21,711)	≤74	10,455	6.37	1.892	83.856	<.001***	a>b, a>c, b>c
	75~84	9,304	6.11	1.910			
	≥85	1,952	5.85	1.953			
Education level (N=21,711)	≤middle school	17,689	6.11	1.912	181.168	<.001***	a< b, a< c, b<c
	high school	2,781	6.54	1.834			
	≥College	1,241	7.02	1.821			
Economic activity (N=21,706)	Yes	7,407	6.51	1.800	16.234	<.001***	-
	No	14,299	6.06	1.952			
Monthly income (10^{4}Korean won) (N=18,943)	<100	10,832	5.91	1.948	281.644	<.001***	a< b, a< c, b<c
	100만-300	6,010	6.52	1.822			
	>300	2,101	6.67	1.754			
Spouse (N=21,711)	Yes	12,554	6.40	1.861	17.068	<.001***	-
	No	9,157	5.96	1.952			
Athletic ability (N=21,711)	No trouble	10,021	6.70	1.763	774.865	<.001***	a> b, a> c, b>c
	Alittle trouble	11,177	5.86	1.911			
	Serious trouble	513	4.47	2.063			
Self-care (N=21,711)	No trouble	16,696	6.46	1.814	696.601	<.001***	a> b, a> c, b>c
	Alittle trouble	4,459	5.47	1.966			
	Serious trouble	556	4.68	2.108			
Daily activities	No trouble	12,552	6.63	1.78	912.465	<.001***	a>b, a>c,

(N=21,711)	Alittle trouble	8,344	5.74	1.89			b>c
	Serious trouble	815	4.60	2.05			
Pain discomfort (N=21,711)	No	7,054	6.78	1.755	784.164	<.001***	a>b, a>c, b>c
	Alittle trouble	12,039	6.12	1.826			
	Serious trouble	2,618	5.14	2.161			
Anxious depression (N=21,698)	No	14,814	6.70	1.718	1400.313	<.001***	a>b, a>c, b>c
	A little trouble	6,096	5.36	1.807			
	Serious trouble	788	3.73	1.913			
Stress level (N=21,675)	No	7,208	6.92	1.805	1499.433	<.001***	a>b, a>c, b>c
	Alittle trouble	9,398	6.27	1.660			
	Serious trouble	5,069	5.12	1.996			
Falling experience (N=21,794)	No	16,549	6.33	1.895	14.895	<.001***	-
	Yes	5,245	5.86	2.032			

M: Data are mean, SD: Standard deviation

* $p<.05$, ** $p< .01$, * * *$p< .001$: Independent Sample T-test, One-Way ANOVA. If equal variance is assumed ($P> .05$), Scheffe, if equal variance is not assumed ($P< .05$), Dunnett's T3.

3.3. Factors Affecting the Happiness of the Cognitive Impairment of the Elderly

Table III shows the results of entering multiple regression to analyze the factors influencing the feelings of happiness of the elderly with cognitive impairment. In the difference test, significant variables such as gender, age, education level, economic activity, monthly income, and spouse's presence were used as input. Pain discomfort, anxiety, depression, exercise ability, self-management, daily activities, subjective stress, and experiences of falling were introduced, and the dependent variable quality of life was analyzed. Among the control variables, gender and spouse's presence were dummy variables. Variance inflation factor (VIF) and tolerance limit were checked to find out the multicollinearity problem. As a result, the variance expansion factors of the variables were all less than 2 (1.056-1.594), and the tolerance limits were all greater than 0.5 (0.627-0.947).These results showed that there was no problem of multicollinearity [7].

The explanatory power (Adjusted R²) of the variables input to the analysis model was significant at 25.5% ($p< .001$).Age was not significant (β=.002, $p>$.005).On the other hand, gender (β=.074, $p<$.001), education level (β=.074, $p<$.001), economic activity (β=-.033, $p<$.001), monthly household income (β=.080, $p<$.001), and spouse (β=.070, $p<$.001) were statistically significant. Athletic ability (β=-.046, $p<$.001), self-care (β=-.050, $p<$.001), daily activities (β=-.062, $p<$.001), pain discomfort (β=-.039, $p< .001$), and anxious depression (β=-.242, $p<$.001) were significant. Stress level (β = -.240, $p< .001$) and fall experience (β = -.014, p = .027) were significant and analyzed as factors affecting the happiness of the elderly with cognitive impairment[Table III].

TableIII. Impact on the Subject's Sense of Happiness

variable	Unnormalization factor		Standardization factor		t	p	tolerance	VIF
	B	S.E.	β					
Gender	.297	.029	.074	10.350		<.001***	.761	1.314
Age	.006	.021	.002	.284		.776	.787	1.271
Education level	.260	.024	.074	10.819		<.001***	.843	1.186
Economic activity	-.133	.027	-.033	-4.960		<.001***	.890	1.124
Monthly income	.223	.018	.080	12.068		<.001***	.899	1.112
Spouse	.272	.028	.070	9.692		<.001***	.750	1.334
EQ-5D Athletic ability	-.161	.032	-.046	-5.014		<.001***	.475	2.106
EQ-5D Self-care	-.191	.033	-.050	-5.799		<.001***	.538	1.860
EQ-5D Daily activities	-.208	.034	-.062	-6.087		<.001***	.381	2.623
EQ-5D Pain discomfort	-.038	.007	-.039	-5.164		<.001***	.993	1.007
EQ-5D Anxious depression	-.833	.026	-.242	-32.636		<.001***	.719	1.391
Stress level	-.614	.018	-.240	-34.926		<.001***	.833	1.201

Falling experience	-.063	.029	-.014	-2.207	.027**	.946	1.058
R²	.255						
Adjusted R²	.255						
F(Sig.)	498.718 ($p < .001$)***						
SE: Standard Error.							
* $p < .05$, ** $p < .01$, * * *$p< .001$: Enter Multiple Regression, VIF: Variance Inflation Factor							

4. Discussion

The study surveyed elderly Koreans with cognitive impairment.It utilized the 2019 CHS data in Korea. The factors affecting the happiness of the subjects were identified. It provides basic data that can be applied to the development of programs that make the life of the elderly happy. Cognitive disorder is an important variable in the health of the elderly. That 29.4% (21,880) of the elderly in Korea have cognitive impairment as a serious situation[6].

In 2016, the Hankook Iibo surveyed the happiness level of 2,500 people from Korea, Denmark, Brazil, and Japan. In the three countries except Korea, happiness increased with age. However, as Korean grew older, the sense of happiness decreased. The reason is considered to be a lack of preparation for social old age after retirement. In the happiness index survey of international organizations, Korea ranked low. As people get older, the unfortunate situation appears to be the world's highest suicide rate of the elderly [9].Korea, where the elderly population is rapidly increasing, needs deep consideration.

Recently, many elderly generations live separately from their children in Korea. The elderly who live without a spouse also want to live separately from their children. The reason is the value change of supporting parents and urbanization[10]. According to the survey, the elderly who lived without a spouse made up 42.4% (9,273). Men were happier than women. Age had nothing to do with happiness. In the prior research, male Vietnamese senior citizens also had a higher quality of life than women [11].A study by Kim (2013) also showed that older men in Korea feel happier than women[12].Another study showed that there were differences in age, gender, occupation status, degree of disease, and happiness depending on cohabitation[13]. Korean men are somewhat superior to women due to social activities and economic reasons. This study also showed that happiness increased when economic activity and monthly income were high. This has also been confirmed in a number of studies. However, male seniors living alone had a lower quality of life than female seniors living alone[12].The absence of a life partner is thought to reduce happiness.

All five categories of EQ-5D affected the happiness of the cognitively impaired elderly. The daily activity level of the elderly is the same as the motor ability. The feeling of happiness increased with the activity of moving. Older adults with good athletic ability will be able to manage their own health well. Also, if the subjects had pain and anxiety, their motor ability would decrease and their sense of well-being also decreased. The same result was found in a survey by Kim (2013)[12].

Everyone wants to go where they want and take care of themselves. This is the basic way of life that humans have. So, everyday life should be active. The pain that usually occurs in older people is caused by chronic degenerative diseases caused by aging. Pain poses a variety of problems in the everyday life of the elderly [14]. Effective management of this can improve the quality of life. Pain is associated with depression and is a factor that degrades the quality of life of the elderly [15]. Pain in older people is common in combination with depression. A program to manage depression and pain is needed to improve the quality of life for older people with cognitive disabilities [16].The study also showed that pain, discomfort, and depression have an influence on happiness. Old age is prone to severe stress due to various changes. Stress management is important to increase happiness in old age[17].

Elderly falls are psychologically disturbing. Falling experience is an important factor in the quality of life. Falling occurs a lot in elderly people with chronic diseasesor cognitive impairment. In particular, there was a significant increase in walking disability such as slipping or pain discomfort caused by chronic diseases [18]. A virtual reality training program can be proposed to delay cognitive impairment. Virtual reality training may reduce depression in the elderly, improve quality of life, or delay dementia[19].With the integrated health promotion program, physical activities through entertainment, dietary management, exchanges with friends, and making or playing strengthened sense of balance, prevented muscle weakness due to aging, and improved cognitive skills [20].Everyone experience aging at some point in life. Therefore, all efforts should be done to try to restore the quality of life for the elderly with cognitive disabilities. Communities and states, including individuals and families, should work together to create a happy society for them.

5. Conclusions

The pursuit of happiness of the elderly with cognitive impairment is an important right. It is necessary to identify the influencing factors and improve the quality of their lives. Aging that occurs with the passage of time in life needs to take good care of our own health in daily life. Management of chronic diseases is more important. This requires a joint effort between the national health system and the individual. Management of chronic diseases in the elderly will reduce depression and anxiety, thereby enhancing happiness. Regular exercise and nutrition will increase self-care so that you can live a well-being life. However, factors such as economic activity and monthly income require national attention. It is necessary to reinforce policies such as senior citizens' jobs that suit their abilities and senior citizens' pensions. Active leisure activities programs are required centering around senior welfare centers. Counseling communities should be activated to relieve elderly loneliness or depression. All these things should be continuously carried out and improved so that the happiness of the elderly with cognitive disabilities can be promoted. The data of this study utilized the 2019 Community Health Survey

(CHS) data which was examined nationally in Korea and opened to the general public.Due to the nature of the data, there is a limitation in that it was not possible to analyze it precisely as a cross-sectional study. It is necessary to conduct follow-up studies to improve the happiness of the elderly with cognitive impairment in the future.

6. Ackowledgments

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