Factors Influencing Hrqol in Elderly Korean with Osteoarthritis: Based on the 2018 Third-Year KNHAES Data

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Abstract

This study aimed to identify the factors affecting the HRQoL in the elderly Korean with osteoarthritis from the data of 2018 Third-Year 7th KNHAES data. Among the 1,653 elderly people who responded to the National Health Screening Survey, 515 elderly people over 65 years of age who were diagnosed with osteoarthritis were screened. Statistical analysis was performed by χ^2-test, one-way ANOVA, Pearson's correlation coefficients and multiple regression using SPSS 25.0. As the result of the study, the factors that showed statistically significant correlations: age, education level, personal income level, income, occupation, number of household members, number of comorbid diseases, alcohol consumption, subjective health status, activity restriction, depression, suicidal thoughts, and stress cognition was analyzed by multiple regression analysis. Among them, age, education level, occupation, alcohol consumption, subjective health status, activity restriction, and stress perception were significant factors influencing the HRQOL of in the elderly Korean with osteoarthritis, and residual square(R^2, R square) of the model was 31.1%(F=14.56, p<.001). Therefore, based on these research results, it is necessary to develop and apply the multidisciplinary approach program to improve the HRQoL in the elderly Korean with osteoarthritis.

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Introduction

In Korea, the population aged 65 or older accounts for 15.7% of total population, and is expected to increase to 46.5% in 2067. As the society rapidly changes to an ultra-aged society, the HRQoL is expected to decline due to economic poverty and disease(Statistics Korea. Elderly people statistics., 2019). Due to this change in the demographic structure, the medical expense paid to the elderly over 65 years of age is constantly increasing, and osteoarthritis, which accounts for the largest portion of the medical expense for chronic diseases after hypertension, will be the huge social and economic burden(Ministry of health & welfare., 2018).

Osteoarthritis is a degenerative disease in which normal skeletal structure changes as aging progresses, resulting in cartilage damage and ligaments stiffening. Elderly people with osteoarthritis experience the limitation of functional activity due to continuous pain with stiffness in the joints which affects their daily lives and causes physical problems(Hunter D J *et al*., 2014) and mental problems such as depression, helplessness, alienation and suicide (Vennu V*et al.*,2014). In addition, since osteoarthritis is a chronic disease that is difficult to cure and requires continuous management, it is important to improve the HRQoL of patients by improving their self-management ability so that they can maintain ordinary daily life rather than treatment-oriented one (So J T., 2014).

In the previous study on osteoarthritis in the elderly, the elderly Korean with osteoarthritis recognized that their health status was poor compared to the elderly without osteoarthritis (Yang S J*et al.*,2011). Chronic disease, obesity, inadequate exercise, alcohol and aspiration had direct and indirect effects on the prognosis, symptom experience and HRQoL (Kim M J *et al.*,2017). In particular, women have estrogen receptors in their articular cartilage in which genetic factors are involved in the development of women's osteoarthritis. So women have higher prevalence of osteoporosis and osteoarthritis than men because they have a lot of physical behaviors that make them more prone to osteoarthritis (Jeon E Y., 2015; Lian K *et al.*,2007). Although osteoarthritis is a chronic disease with high prevalence in the elderly, studies on the factors affecting HRQoL including psychological problems of osteoarthritis in the elderly who are vulnerable physically, mentally and socially are insufficient.

Therefore, in this study, using survey data from the 7th Third-Year KNHAES data in 2018, the factors affecting the HRQoL of the elderly Korean with osteoarthritis were identified by taking into account health-related, disease-related, and psychological characteristics. And an attempt was made to prepare basic data to develop nursing intervention to improve the HRQoL, and the specific purpose is as follows.

•   To assess the HRQoL in the elderly Korean with osteoarthritis

•   To identify general and health-related characteristics of the elderly Korean with osteoarthritis, and identify differences in HRQoL of life accordingly

•   To identify the factors that affect the HRQoL in the elderly Korean with osteoarthritis

Materials and Methods
Research process and data collection

This study is the secondary data analysis to grasp the HRQoL characteristics of the elderly Korean with osteoarthritis using data from the 7th Third-Year KNHAES data in 2018. The subjects were 7,992 who responded to the 7th Third-Year KNHAES data in 2018. In this study, among 1,653 elderly people over 65 years old, 515 who received the medical certificate for osteoarthritis were selected as the final study subjects. Using research tool, among the health survey items of the 7th Third-Year KNHAES data in 2018, gender, age, education, marital status, income level, occupation, number of household members, body mass index among physical measurements, number of comorbid disease, smoking, alcohol consumption, exercise, subjective health status, activity restrictions, depression, suicidal thoughts and stress perception were analyzed. The HRQoL in the subjects was measured with the EQ-5D(EuroQol-5 dimension) developed by EuroQol Group.

Statistical analysis

The data were analyzed by SPSS 25.0 while general characteristics and health-related characteristics in the subjects being identified with descriptive statistics. The difference in HRQoL according to general, health-related characteristics was analyzed using x2-test and one-way ANOVA and Pearson's correlation coefficients, and post-hoc analysis of one-way ANOVA was analyzed by Scheffé. Multiple regression analysis with the simultaneous input method was conducted with the variable significantly derived from univariate analysis as the independent variable to identify the factors affecting the HRQoL in the elderly Korean with osteoarthritis.

Ethical concerns

While this 7th Third-Year KNHAES data in 2018 being conducted with the approval of the IRB(No: 2018-01-03-P-A), on January 30, 2020, the researcher was approved to use the data through the link that disclosed raw data to the public on National Health and Nutrition Survey website. The researcher received the exemption of IRB review(IRB No. DUC-2020-04-001-01)

Results and Discussion

Subject's Quality of life

The HRQoL of the subjects showed the range of 0.83±0.16 points if 1 is the maximum value as shown in table 1.

Table 1: Descriptive Statistics of HRQoL (N=515)

Variables	Categories	Mean±SD /n(%)
EQ-5D		0.83±0.16
Mobility	No problem Moderate Severe	231(44.9) 270(52.4) 14(2.7)
Self-care	No problem Moderate Severe	432(83.9) 75(14.6) 8(1.6)
Usual activities	No problem Moderate Severe	360(69.9) 147(28.5) 8(1.6)
Pain/ discomfort	No problem Moderate Severe	242(47.0) 230(44.7) 43(8.3)
Anxiety/ depression	No problem Moderate Severe	407(79.0) 94(18.3) 14(2.7)

Differences in HRQoL according to general and health-related characteristics of the subjects

Among the subjects, females accounted for 81.2%, and the age of 70-75 was 29.2%. As for the education level, 66.2% were the highest among elementary school graduates and below., and 57.8% were married. Obesity according to body mass index was 48.2%. Subjects without comorbid diseases were 10.2%, and subjects with 3 or more comorbid diseases were 34.4%. 19.3% of the subjects currently smoke, 72.3% of the subjects drink at least one drink per month for the past 1 year, and 24.4% of the subjects do not exercise regularly. 10.9% of the subjects answered that their subjective health status was bad, and 45.5% of the subjects were restricted in their daily life and social activities due to health problems or physical or mental disorders. In the last 1 year, 9.9% of the subjects had a depressive experience that interfered with their daily life for more than 2 weeks in a row, 2.5% of the subjects thought of suicide, and 67.1% of the subjects felt a lot of stress in their daily life as shown in table 2.

The HRQoL according to the general characteristics of the subjects, such as age($F=8.31$, $p<.001$), education level($F=9.64$, $p<.001$), marital status($F=15.16$, $p) <.001$), personal income level($F=3.93$, $p=.009$), occupation($t=8.81$, $p=.003$), and the number of household members($F=3.31$, $p=.020$), showed the statistically significant difference. As the result of post-

hoc analysis, the HRQoL in high school graduates and above was statistically significantly higher than that of below elementary school graduates, and that in the upper middle class and upper class showed significantly higher than the lower class. As the result of analyzing the difference in HRQoL according to the subject's health-related characteristics, such as the number of concomitant diseases(F=3.44, p=.017), alcohol consumption(t=6.88, p=.009), and subjective health status, the HRQoL was statistically significantly lower(F=72.74, p<. 001). Subjects with activity restrictions had a statistically significant lower HRQoL than subjects without restrictions(t=49.34, p<.001). Subjects who experienced depression(t=5.30, p=.022) and suicidal thoughts(t=7.86, p=.005) had the significantly lower HRQoL than those who did not. The subjects who felt a lot of stress in their daily life(F=72.74, p<.001) had the significantly lower HRQoL than those who did not as shown in table 2.

Table 2: General and Health related Characteristics & Differences in HRQoL according to Participants Characteristics (N=515)

Variables	Categories	n(%)	EQ-5D	
			Mean±SD	t/F (p)
Gender	Male	94(18.8)	0.86±0.14	2.94(.087)
	Female	421(81.2)	0.82±0.17	
Age	65-69	141(28.8)	0.87±0.13	8.31(.000)*
	70~75	147(29.2)	0.85±0.15	
	75-79	124(23.2)	0.80±0.16	
	≥80	103(18.8)	0.78±0.21	
Education	≤Elementary school	347(66.2)	0.81±0.18	9.64(.000)*
	Middle school	82(16.4)	0.85±0.13	
	≥High school	82(17.3)	0.89±0.10	
Marital status	Married, lived with spouse	289(57.8)	0.85±0.14	15.16(.000)*
	Unmarried, divorced, widow	226(42.2)	0.80±0.18	
Income	1 Quartile	272(51.4)	0.80±0.18	3.93(.009)*
	2 Quartile	129(25.7)	0.85±0.15	
	3 Quartile	67(13.5)	0.86±0.15	
	4 Quartile	46(9.4)	0.87±0.15	
Occupation	No	356(68.5)	0.81±0.17	8.81(.003)*
	Yes	155(31.5)	0.86±0.14	
Number of household members	1	150(27.9)	0.79±0.18	3.31(.020)*
	2	245(48.7)	0.85±0.15	
	3	63(12.1)	0.82±0.17	
	4	57(11.2)	0.84±0.16	
BMI (kg/m2)	Underweight	5(0.9)	0.72±0.26	2.43(.064)
	Normal	144(28.1)	0.82±0.17	
	Overweight	111(22.8)	0.86±0.14	
	Obesity	246(48.2)	0.82±0.16	
Number of comorbidities	None	48(10.2)	0.90±0.15	3.44(.017)*
	1	138(26.6)	0.82±0.16	
	2	150(28.8)	0.82±0.18	
	>=3	179(34.4)	0.82±0.16	

Smoking status	No Yes	418(80.7) 97(19.3)	0.85±0.13 0.82±0.17	2.10(.148)
Alcohol drinking status	No Yes	148(27.7) 367(72.3)	0.80±0.19 0.84±0.15	6.88(.009)*
Regular exercise	No Yes	123(24.4) 392(75.6)	0.85±0.13 0.82±0.17	1.77(.183)
Subjective health status	Good Common Poor	211(36.3) 253(52.7) 51(10.9)	0.73±0.18 0.89±0.12 0.92±0.09	72.74(.000)*
Restriction of activity	No Yes	268(55.0) 247(45.5)	0.88±0.14 0.78±0.17	49.34(.000)*
Depressive mood	No Yes	461(90.1) 54(9.9)	0.83±0.16 0.78±0.20	5.30(.022)*
Suicidal ideation	No Yes	500(97.5) 15(2.5)	0.83±0.16 0.71±0.27	7.86(.005)*
Perceived stress	Low High	160(32.9) 355(67.1)	0.88±0.13 0.81±0.17	20.87(.000)*

Correlation between age, body mass index, number of comorbid disease and HRQoL

Table 3 shows the results of the correlation analysis between subjects' research variables. HRQoL showed the significant negative correlation with age(r=-.210, p<.000) and number of comorbid diseases(r=-.136, p=.002). As the number of comorbid disease increases, the HRQoL related to health decreases as shown in table 3.

Table 3: Correlations among Age, Body Mass Index, Number of Comorbidities, and HRQoL (N=515)

Variables	EQ-5D Index	Age	Body Mass Index	Number of comorbidities
	r(p)			
EQ-5D Index	1			
Age	-.210(< .001)**	1		
Body Mass Index	.001(.985)	-.097(.029)*	1	
Number of comorbidities	-.136(.002)*	.085(.053)	.115(.010)*	1

Factors affecting HRQoL in elderly patients with osteoarthritis

In order to identify factors affecting the subject's HRQoL, age, education level, income, occupation, number of household members, number of concomitant disease, alcohol consumption and subjective health status, activity restriction, depression, suicidal thoughts, and stress experience which were produced as statistically significant variables in univariate analysis, were analyzed as independent variables by multiple regression analysis using the simultaneous input method. As the result of regression analysis, Tolerance of each variable was found to be 0.1 or more, and Variance Inflation Factor(VIF) value was not more than 10, meaning no

multicollinearity between independent variables. And Dubin-Watson correlation coefficient was 1.90, indicating that the mutual independence of residuals was satisfied. As the result of multiple regression analysis, the regression model for the HRQoL in the subjects turned out to be significant(F=14.56, p<.001). The factors that significantly affect the HRQoL in the elderly Korean with osteoarthritis were age, education, occupation, alcohol, subjective health status, activity restriction, and stress. The residual square(R2, R square) was 31.1%. The younger the age, the higher the level of education, the higher the level of education, the more a person has a job, the less alcoholic beverages, the more moderate to good subjective health conditions, the lower the stress level without experiencing activity restrictions, the HRQoL of the elderly Korean with osteoarthritis appeared higher as shown in table 4.

Table 4: Factors Affecting the HRQoL (N=515)

Variables	Unstandarized coefficient		Standarized coefficient	t	p
	B	SE	β		
(Constant)	.52	.08			
Age	.01	.02	.02	0.46	.642
Education(ref.=≥high school)	.02	.00	.11	2.85	.003*
Marital status	.00	.00	-.02	-0.53	.599
Income (ref.=quartile 1)	.00	.00	.04	0.93	.393
Occupation(ref.=no)	.04	.01	.11	2.83	.004*
Number of household members	-.00	.00	-.01	-0.22	.897
Number of comorbidities	-8.53	.00	-.00	-0.19	.684
Body Mass Index (kg/m2)	-.00	.00	-.03	-0.92	.334
Smoking status(ref.=no)	.00	.02	.01	0.21	.880
Alcohol drinking status(ref.=no)	.03	.01	.10	2.63	.009*
Subjective health status (ref.=poor)	.08	.01	.31	7.49	< .001**
Restriction of activity(ref.=no)	.05	.01	.16	4.13	< .001**
Depressive mood(ref.=no)	-.03	.02	-.06	-1.52	.127
Suicidal ideation(ref.=no)	-.02	.03	-.03	-0.82	.448
Perceived stress(ref.=low)	-.08	.01	-.20	-4.98	< .001**
R^2=.311, Adjusted R2=.289, F=14.56, p < .001.					

This study is a large-scale national survey, based on the raw data of the 7th Third-Year 2018 KNHAES data, which has national representation, to identify factors affecting the HRQoL in the elderly Korean with osteoarthritis. Attempts were made to provide the basic data for developing nursing intervention to manage osteoarthritis effectively and improve the quality of life.

As a result of the study, the HRQoL in the elderly Korean with osteoarthritis was 0.83 points, which was lower than 1. This is consistent with previous studies that confirmed the HRQoL with

osteoarthritis in the elderly using data from the 6th KNHAES data supporting the results of previous studies(Kim M J *et al.,*2017). These results support the results of previous studies. In order to improve the HRQoL in the elderly Korean with osteoarthritis, intensive preventive management is required, and it is necessary to check whether it is related to other diseases.

As a result of analyzing the difference in HRQoL according to general characteristics and health-related characteristics of the subjects, subjects with low education level, low income, a large number of comorbid diseases, alcohol drinking, poor subjective health status, and activity restrictions showed the significantly low quality of life. These results are consistent with previous studies showing that elderly people with osteoarthritis with alcohol and a large number of comorbid diseases showed low HRQoL(Kim M J *et al.,*2017; Kaplan M S*et al.,* 2012), but different from previous studies that patients with osteoarthritis in rural areas showed higher HRQoL when drinking alcohol (Song H Y *et al.,* 2017). These various results suggest that social activities through drinking can affect HRQoL, so follow-up studies are needed to confirm the mediating effects of HRQoL by alcohol in the elderly Korean with osteoarthritis. In addition, it is consistent with previous studies showing that elderly people with osteoarthritis with poor educational level, poor household income and poor subjective health status showed low HRQoL (Kwon Y S., 2020). It is thought that osteoarthritis has the characteristics of limiting activity and stiffening muscles, which is believed to lower the HRQoL. For preventive management, it is necessary to apply an exercise program tailored to each individual that strengthens the muscles around the joints while helping to relieve joint pain and improve function.

In addition, the HRQoL of the elderly Korean with osteoarthritis had not only physical problems, but also depression and suicidal thoughts, and the HRQoL was significantly lower in the subjects who felt a lot of stress. It was consistent with previous studies(Kwon Y S., 2020) that the limitation of activity in osteoarthritis patients caused negative emotional problems such as depression and suicidal thoughts. Kwon(Kwon Y S., 2020), to solve this problem, argued the necessity of developing nursing intervention to reduce complications of osteoarthritis patients by standardizing the joint health self-management program. In addition, since depression and suicidal thoughts appear to be relatively common emotional disorders in the elderly, prevention should be preceded before the osteoarthritis develops, and the program that combines emotional intervention as well as physical intervention needs to be developed and applied.

The HRQoL of the elderly Korean with osteoarthritis decreased with increasing age and the number of comorbid diseases. The factors affecting the HRQoL of the elderly Korean with osteoarthritis were age, education, occupation, alcohol, subjective health status, activity restriction, and stress perception. The residual square(R^2, R square) was 31.1%. In the elderly Korean with osteoarthritis, the younger the age, the higher the level of education, the more a

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person has a job, the less alcoholic beverages, the more moderate to good subjective health conditions, the lower the stress level without experiencing activity restrictions, the HRQoL in the elderly Korean with osteoarthritis appeared higher which was similar to the results of previous studies (Kim M J *et al.,*2014). This is the result of confirming that in the present society where the proportion of elderly population is rapidly increasing, the measures to improve the HRQoL in the elderly Korean with osteoarthritis need to be approached not only from physical problem but also from socioeconomic and emotional perspective. Therefore, it is necessary to recognize it(the HRQoL in the elderly Korean with osteoarthritis) as the social problem, not the individual problem, and to develop and apply the multidisciplinary program.

Conclusion

This study was attempted to identify the factors affecting the HRQoL in the elderly Korean with osteoarthritis using the data from the 7th Third-Year KNHAES data in 2018. As the result of this study, the HRQoL in the elderly Korean with osteoarthritis was poor. In addition, the factors influencing on the quality were age, education level, occupation, drinking, subjective health status, activity restriction and stress perception. Residual square(R2, R square) was 31.1%. These results are meaningful as the basic data to suggest the way to improve the HRQoL in the elderly Korean with osteoarthritis by identifying emotional factors in addition to physical and social factors of the elderly Korean with osteoarthritis.

Based on the results of this study, it is suggested that the development of multidisciplinary approach program including emotional intervention to improve the HRQoL in the elderly Korean with osteoarthritis is necessary and the application effect should be confirmed.

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