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Original Article

Sensory Impairment and Health-Related Quality of Life

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Abstract

Background: Sensory impairment is a common condition that exerts negative effects on health-related quality of life (HRQoL) in the elderly. This study aimed to determine the relationship between sensory impairment and HRQoL and identify sensory-specific differences in the HRQoL of elderly.

Methods: This study used data from the Korean National Health and Nutrition Examination Survey V (2010-2012), analyzing 5,260 subjects over 60 years of age who completed ophthalmic and otologic examinations. Vision and hearing impairment were measured and classified. HRQoL was determined according to the European QoL five dimension test (EQ-5D). Multivariate logistic regression analysis and analysis of covariance were performed to identify relationships between sensory impairment and HRQoL dimensions as well as differences in HRQoL scores.

Results: In the final adjusted multivariate model, there was a statistically higher proportion of those with dual sensory impairment who reported problems with mobility (adjusted odds ratio [aOR] 2.30, 95% confidence interval [CI] 1.45–5.03), usual activities (aOR 2.32, 95% CI 1.16–4.64), and pain/discomfort among EQ-5D subcategories (aOR 1.79, 95% CI 1.07–2.97). In the EQ-5D dimensions, the means and standard deviations of vision impairment (0.86 [0.01]) and dual sensory impairment (0.84 [0.02]) appeared meaningfully lower than those for no sensory impairment (0.88 [0.00]) or hearing impairment (0.88 [0.01]); $P = .02$).

Conclusion: Sensory impairment reduces HRQoL in the elderly. Improvement of HRQoL in the elderly thus requires regular screening and appropriate management of sensory impairment.

Keywords: Dual sensory impairment, Elderly, Hearing impairment, Quality of life, Vision impairment

Introduction

In most countries, the percentage of the elderly as a proportion of the total population is rapidly increasing owing to an increasing life expectancy and a decreasing birth rate (1). Accordingly, life expectancy worldwide is expected to increase from 68.7 in 2010 to 75.9 in 2050 (2). In South Korea, the percentage of the elderly above 65 years was 11% in 2010 and is expected to increase to 37.4% by 2050 (3). With the rapid aging of the Korean society, interest in the health and lifestyle of the elderly has increased (4).

The elderly experience physical and psychosocial changes with aging, including vision and hearing impairment (5). Sensory impairment is the most common health problem that the elderly experience and could occur or increase as a result of disease or aging (6-8). According to the Korean Longitudinal Study of Aging (6), 37.3% of the Korean elderly report vision impairment, and 14% report hearing impairment. Addressing sensory impairment in the elderly is essential, as it exerts harmful effects on their functional status, independence, and well-being (9). Vision impairment increases the risk of injury, falls, and depression, and limits the performance of activities of daily living (ADL) (10), leading to dissatisfaction with social activities

and affecting quality of life (QoL) and independence (5). Hearing impairment is associated with communication difficulties, depression, social isolation, and poor self-esteem, leading to serious psychosocial and functional problems (10). Elderly with dual sensory impairment face a higher risk of social and relational problems, depression, cognitive impairment, and poor health than the elderly with single sensory impairment; the percentage of those with dual sensory impairment increases with age (11-13). Moreover, as there is no established institutional or community program for the early diagnosis and preventative treatment of sensory impairment, the socioeconomic burden of the elderly due to sensory impairment is increasing (14, 15).

Previous studies on sensory impairment and HRQoL identified a relationship between vision impairment and HRQoL (16-18) and between hearing impairment and HRQoL (19, 20). However, no study has investigated the relationship between dual sensory impairment and HRQoL. Moreover, few studies have investigated the relationship between sensory impairment and HRQoL using representative samples, with the majority relying on self-reported data (17, 21). Therefore, this study examined the prevalence of sensory impairment in the elderly and its association with health-related quality of life (HRQoL) based on specific impairments. To ensure a more representative sample, data from the Fifth Korea National Health and Nutrition Examination survey (KNHANES V) were used.

Materials and Methods

Study design

This study employed a cross-sectional design to identify differences in HRQoL according to the presence and type of sensory impairment in the South Korean elderly aged ≥60 years.

KNHANES and the study population

This study used data collected in the KNHANES V, a cross-sectional and nationally representative study that collected data to assess the state of national health and nutrition from 2010–2012. The survey consisted of a health interview, an examination, and a nutrition survey. The sample was extracted through sampling design to improve the representativeness and estimation accuracy. Moreover, the rolling sampling survey method was used. To ensure consistent and reliable performance and reduce bias in the interview and surveys, KNHANES uses a technical investigation team composed of a nurse, nutritionist, and health science major, and the investigation performance ability was verified through regular education and field quality control; this information is available on the KNHANES homepage. There were 8,473, 8,055, and 7,645 KNHANES V participants in 2010, 2011, and 2012, respectively (response rate, 75.9–77.5%) (22-24). Subjects were included (n = 6,178) if they were >60 years of age and completed an ophthalmic and otologic examination. Data was excluded for those who failed to complete the health survey (n = 127), visual acuity test (n = 188), or pure tone audiometry test (n = 603), leaving 5,260 subjects in the final analysis. KNHANES receives annual deliberation and approval of the Research Ethics Deliberation Committee of the Korea Centers for Disease Control and Prevention, and all participants provided written consent. We submitted a data use plan and a written pledge on the KNHANES homepage and received approval to use the data.

Variables

Sensory impairment

Sensory impairment was categorized as follows: no sensory impairment, vision impairment only, hearing impairment only, or dual (both vision and hearing) sensory impairment (13). Vision impairment was defined as worse than 6/18 for the highest corrected vision of the better eye in the visual acuity test, in accordance with WHO International Classification of Diseases (CD-10) (25). Hearing impairment was defined as a pure tone average (pure tone frequencies of 500, 1,000, 2,000, and 4,000 Hz average) >40 dB using pure tone audiometry (26). To ensure validity of the vision and hearing test, the medical physician who conducted it received regular training from established societies. For the visual acuity test, we used

the Jinyonghan eye chart, which was officially approved by the Ministry of Health and Welfare after being developed for Koreans based on international vision standards. The hearing test was conducted in a double-wall structure hearing booth with external noise excluded. A quality control report verifying the quality of the measuring equipment (optometry table, audiometer, and audiometric booth) was posted on the KNHANES homepage (27).

Health-related quality of life (HRQoL)

The European QoL five dimension test (EQ-5D) was used to measure HRQoL. The EQ-5D self-reported questionnaire is a generic instrument and is one of the most frequently used quality of life assessment tools. The reliability and validity of the EQ-5D has been verified in patients with various diseases and in the general population of several countries (28). The EQ-5D assesses five dimensions—mobility, self-care, usual activity, pain/discomfort, and anxiety/depression—using a three-point scale: 1, no problems; 2, moderate problems; and 3, severe problems. EQ-5D values are reported as the average or applied weighted values or as the percentage of respondents with any problems (29). The current study defined reports of no problems or moderate problems as 'no problem' and reports of severe problems as 'having problems'. The final HRQoL was calculated using a quality weight model designed to reflect the unique Korean lifestyle. QoL scores ranged from 0–1, with 1 indicating a higher QoL (24, 30). In KNHANES, the EQ-5D was administered by an investigator who had their ability verified through regular education and training.

Covariates

The subject characteristics examined were age, sex, residence, marital status, educational status, and economic status. Residence was categorized as urban or rural. Marital status was categorized as living with a spouse or not; if not, it was further categorized as never having married, being divorced, or being widowed. Educational status was categorized as having completed the tenth grade or above or having completed the ninth grade or below. Economic status was calculated by dividing the total household income by the square root of the number of members in the household. The lifestyle characteristics examined were smoking status, alcohol-consumption status, and regular exercise status. Smoking status was categorized as being a non-smoker, ex-smoker, or current smoker. Alcohol consumption status was classified as being a mild to moderate drinker (1–15 g/day) or heavy drinker (more than 30 g/day) (31). Exercise status was categorized as performing regular exercise, defined as exercising strenuously at least three times weekly for at least 20 minutes at a time or not performing regular exercise.

The physical and psychosocial health-related factors examined were fall experience, obesity, hypertension, diabetes, stress, depression, and suicide ideation. Fall experience was defined as having experienced a fall serious enough to be treated at an emergency unit or hospital. Obesity was defined as a body mass index ≥25.0 kg/m² (32). Hypertension was defined as a systolic blood pressure ≥140 mmHg (33) or currently taking antihypertensive drugs. Diabetes was defined as fasting glucose ≥126 mg/dL (34), previous diagnosis, or use of a hypoglycemic agent or injected insulin. Stress was defined as having experienced very much or a little stress in the past year. Depression was defined as having felt sadness or despair that caused hindrance in daily life in the past two consecutive weeks within the recent year. Suicidal ideation was defined as having thought of committing suicide in the past year.

Statistical analysis

Complex sample analysis was conducted with SAS software ver. 9.3 (SAS Institute Inc., Cary, NC, USA) using a survey procedure reflecting the sample design and sampling weights. For general characteristics according to sensory impairment type, continuous variables are presented as mean (standard error [SE]) and categorical variables as percentage. Multivariate logistic regression analysis and analysis of covariance were used to identify relationships between sensory impairment and each of the five HRQoL dimensions as well as differences in the HRQoL scores.

Results

General characteristics according to sensory impairment type

The differences in sensory impairment type according to general characteristics are illustrated in Table 1. There were 32.6% of subjects with sensory impairment. The most common form of impairment was vision, followed by hearing impairment and dual sensory impairment.

Table 1: Demographic characteristics according to sensory impairment type (n = 5, 260)

Variables (unit or range)	Sensory impairment type				
	Normal (n = 3568)	Hearing impairment (n = 568)	Vision impairment (n = 856)	Vision & Hearing impairment (n = 268)	*P*
Age (mean)	67.6±0.1	72.1±0.3	71.6±0.3	76.4±0.5	<.0001
Sex					
Male	45.8 (0.9)	56.9 (2.5)	35.0 (1.9)	38.9 (3.4)	<.0001
Female	54.2 (0.9)	43.1 (2.5)	65.0 (1.9)	61.1 (3.4)	
Living place					
Urban	27.5 (2.4)	31.9 (3.4)	37.8 (3.3)	41.3 (4.7)	<.0001
Rural	72.5 (2.4)	68.1 (3.4)	62.2 (3.3)	58.7 (4.7)	
Spouse					
None	23.5 (1.0)	32.8 (2.3)	35.8 (2.1)	45.2 (3.7)	<.0001
Have	76.5 (1.0)	67.2 (2.3)	64.2 (2.1)	54.8 (3.7)	
Educational status					
≤ 9th grade	72.7 (1.2)	83.5 (1.8)	85.1 (1.5)	86.2 (2.7)	<.0001
≥10 th grade	27.3 (1.2)	16.5 (1.8)	14.9 (1.5)	13.8 (2.7)	
Economic status					
Low	38.2 (1.2)	48.8 (2.7)	52.3 (2.3)	66.0 (3.9)	<.0001
Low~middle	28.8 (1.1)	25.2 (2.3)	24.4 (1.8)	17.4 (2.8)	
Middle~high	18.0 (0.9)	14.6 (1.9)	13.9 (1.7)	10.4 (2.1)	
High	15.0 (1.0)	11.3 (1.8)	9.4 (1.2)	6.2 (2.0)	
Smoking					
Non or Ex-smoker	87.2 (0.7)	80.8 (2.2)	88.3 (1.3)	87.2 (2.8)	.006
Current smoker	12.8 (0.7)	19.2 (2.2)	11.7 (1.3)	12.8 (2.8)	
Drinking					
Non to Moderate drinker	94.5 (0.4)	94.8 (1.1)	96.0 (1.1)	96.3 (1.5)	.495
Heavy drinker	5.5 (0.4)	5.2 (1.1)	4.0 (1.1)	3.7 (1.5)	
Regular exercise					
No	84.1 (0.8)	85.5 (1.9)	85.3 (1.6)	85.0 (3.0)	.835
Yes	15.9 (0.8)	14.5 (1.9)	14.7 (1.6)	15.0 (3.0)	
Fall experience (yes), %					
Yes	3.6 (0.4)	4.2 (1.0)	4.9 (0.8)	4.9 (1.5)	.375
No	96.4 (0.4)	95.8 (1.0)	95.1 (0.8)	95.1 (1.5)	
Obesity (yes), %					
Yes	38.1 (1.1)	29.7 (2.3)	34.2 (1.9)	24.9 (3.3)	<.0001
No	61.9 (1.1)	70.3 (2.3)	65.8 (1.9)	75.1 (3.3)	
Hypertension (yes), %					
Yes	58.3 (1.1)	62.0 (2.1)	62.6 (2.1)	68.3 (3.5)	.023
No	41.7 (1.1)	38.0 (2.1)	37.4 (2.1)	31.7 (3.5)	
Diabetes (yes), %					
Yes	19.6 (0.8)	22.2 (2.1)	22.5 (1.9)	20.8 (3.4)	.389
No	80.4 (0.8)	77.8 (2.1)	77.5 (1.9)	79.2 (3.4)	
Stress					
Yes	20.3 (0.9)	20.9 (2.3)	25.2 (1.7)	24.7 (3.3)	.056
No	79.7 (0.9)	79.1 (2.3)	74.8 (1.7)	75.3 (3.3)	
Depression					
Yes	15.5 (0.8)	13.9 (1.8)	17.1 (1.5)	19.1 (2.9)	.375
No	84.5 (0.8)	86.1 (1.8)	82.9 (1.5)	80.9 (2.9)	
Suicidal ideation (yes), %					
Yes	16.9 (0.9)	24.4 (2.4)	23.1 (1.6)	30.1 (3.6)	<.0001
No	83.1 (0.9)	25.6 (2.4)	76.9 (1.6)	69.9 (3.6)	

Data are presented as mean ± SE or % (SE), as determined using a t-test or chi-square test

Subjects with dual sensory impairment had the highest age, followed by hearing impairment, vision impairment, and no sensory impairment, respectively; the age of subjects with dual sensory impairment was significantly higher than that of subjects with other forms of impairment ($P < .0001$). A significantly higher percentage of male subjects experienced hearing impairment than had no sensory impairment ($P < .0001$). The percentage of subjects who lived in a rural area ($P < .0001$), lived without a spouse ($P < .0001$), had completed the ninth grade or less ($P < .0001$), and were of a lower economic status ($P < .0001$) with sensory impairment was significantly higher than those without sensory impairment. The percentage of subjects with hearing impairment was the highest in current smokers ($P = .006$), and a significantly greater percentage of subjects who were not obese ($P < .0001$), had hypertension ($P = .023$), and had suicidal ideation ($P < .0001$) experienced sensory impairment.

The response rate of EQ-5D subcategories according to the sensory impairment type

There was a higher response rate reporting problems in all EQ-5D subcategories in subjects with sensory impairment compared to those without (Table 2). Severe problems in the dimensions of mobility, usual activities, and pain/discomfort meaningfully increased in order of no sensory impairment, hearing impairment, vision impairment, and dual sensory impairment ($P < .0001$).

Table 2: The response rate of EQ-5D subcategories according to the sensory impairment type

	Normal	HI	VI	DSI	*P*
Mobility					<.0001
No problem	66.7 (1.1)	59.4 (2.5)	51.8 (2)	46.5 (3.7)	
Moderate problem	32.2 (1.1)	38.3 (2.6)	44.7 (2)	47.6 (3.8)	
Severe problem	1.1 (0.2)	2.3 (0.8)	3.5 (0.8)	5.9 (1.7)	
Self-care					<.0001
No problem	91 (0.6)	88.2 (1.7)	83.5 (1.5)	82.1 (2.8)	
Moderate problem	8.6 (0.6)	10.9 (1.6)	14.4 (1.4)	17.2 (2.9)	
Severe problem	0.4 (0.1)	0.9 (0.5)	2.1 (0.7)	0.7 (0.6)	
Usual activities					<.0001
No problem	80.5 (0.9)	74.9 (2.2)	69.7 (1.7)	61.4 (3.9)	
Moderate problem	17.3 (0.8)	22 (2.1)	26.1 (1.6)	26.9 (3.6)	
Severe problem	2.1 (0.3)	3.1 (1.1)	4.2 (0.9)	11.7 (2.6)	
Pain/discomfort					<.0001
No problem	64.7 (1.1)	65.3 (2.4)	56.3 (2.1)	53.8 (4)	
Moderate problem	29.8 (1)	28.8 (2.2)	34.2 (2.1)	29.9 (3.8)	
Severe problem	5.6 (0.5)	5.9 (1.2)	9.4 (1.3)	16.2 (3)	
Anxiety/depression					0.1162
No problem	85.2 (0.7)	84.3 (2.1)	80.7 (1.7)	83.5 (2.6)	
Moderate problem	13.7 (0.7)	13.8 (1.9)	17 (1.6)	14.7 (2.5)	
Severe problem	1.1 (0.2)	1.9 (0.8)	2.3 (0.7)	1.8 (0.9)	

HI: hearing impairment, VI: vision impairment, DSI: dual sensory impairment/Data are presented as the % (SE)/ Obtained by chi-square test

Relationships between the sensory impairment and EQ-5D subcategories

The odds ratio of the percentage reporting problems with mobility (adjusted odds ratio [aOR] 2.30, 95% confidence interval [CI] 1.06–5.03), usual activities (aOR 2.32, 95% CI 1.16–4.64), and pain/discomfort (aOR 1.79, 95% CI 1.07–2.97) with dual sensory impairment was 1.8–2.3 times higher than in those without sensory (Table 3). In the EQ-5D self-care dimension, there was a 2.8-fold higher odds ratio in those with vision impairment than in those without sensory impairment (model 3; aOR 2.82, 95% CI 1.18–6.75).

Table 3: Multivariate logistic regression analysis determining the relation between sensory impairment and the five dimensions of health-related quality of life

	Mobility	Self-care	Usual activities	Pain/Discomfort	Anxiety/Depression
	Model 1				
Normal	1	1	1	1	1
HI	1.44 (0.64,3.22)	1.36 (0.8,4.88)	0.94 (0.41,2.11)	0.88 (0.55,1.39)	1.39 (0.50,3.84)
VI	2.02 (1.12,3.66)	3.18 (1.36,7.45)	1.17 (0.66,2.07)	1.23 (0.87,1.75)	1.53 (0.72,3.26)
DSI	2.48 (1.07,5.73)	0.70 (0.11,4.42)	2.43 (1.21,4.89)	1.90 (1.12,3.22)	0.91 (0.25,3.29)
	Model 2				
Normal	1	1	1	1	1
HI	1.38 (0.61,3.10)	1.38 (0.38,4.99)	0.87 (0.40,1.91)	0.83 (0.53,1.30)	1.41 (0.50,3.95)
VI	1.98 (1.08,3.64)	3.23 (1.41,7.44)	1.18 (0.66,2.09)	1.22 (0.86,1.73)	1.57 (0.73,3.37)
DSI	2.58 (1.13,5.90)	0.72 (0.11,4.81)	2.45 (1.24,4.86)	1.88 (1.11,3.17)	0.95 (0.26,3.46)
	Model3				
Normal	1	1	1	1	1
HI	1.40 (0.63,3.11)	0.89 (0.21,3.73)	0.88 (0.40,1.91)	0.83 (0.53,1.30)	1.51 (0.70,3.23)
VI	1.69 (0.90,3.16)	2.82 (1.18,6.75)	1.07 (0.59,1.94)	1.14 (0.80,1.63)	1.05 (0.99,1.10)
DSI	2.30 (1.057,5.03)	0.65 (0.10,4.36)	2.32 (1.16,4.64)	1.79 (1.073,2.97)	1.41 (0.52,3.88)

HI: hearing impairment, VI: vision impairment, DSI: dual sensory impairment
Five dimensions of health-related quality of life: mobility, self-care, usual activities, pain/discomfort, anxiety/depression/Model 1: age, sex adjusted/Model 2: age, sex, body mass index, smoking, drinking, regular exercise adjusted/Model 3: age, sex, body mass index, smoking, drinking, regular exercise, living place, educational status, economic status adjusted

EQ-5D scores according to the sensory impairment type

To confirm the differences of EQ-5D scores by type of sensory impairment, covariate-adjusted analysis was performed (Table 4). Analysis of model 1, which was adjusted for age and sex, revealed that the EQ-5D scores of subjects with vision impairment and dual sensory impairment were 0.85 and 0.83; this was lower than subjects with hearing impairment or without sensory impairment (both 0.88; P = .0018). In model 2, which was adjusted for age, sex, smoking status, alcohol consumption, regular exercise, residence, and economic status, the EQ-5D scores of subjects with vision impairment and dual sensory impairment were 0.86 and 0.84; this was lower than subjects with no sensory impairment or with hearing impairment (both 0.88; P = .0158).

Table 4: Means of EQ-5D scores according to sensory impairment type

EQ-5D	EQ-5D	
	Model 1	**Model 2**
No sensory impairment	0.88 (0.00)	0.88 (0.00)
Hearing impairment	0.88 (0.01)	0.88 (0.01)
Vision impairment	0.85 (0.01)	0.86 (0.01)
Dual sensory impairment	0.83 (0.02)	0.84 (0.02)
p-value	0.0018	0.0158

Model 1: age, sex adjusted/ Model 2: age, sex, smoking status, drinking, regular exercise, living place, economic status adjusted/ Data were obtained using analysis of covariance

Discussion

Sensory impairment in the elderly is common and impairs ADL. This study aimed to identify differences in HRQoL of the elderly by type of sensory impairment. Age; sex; residence; and marital, educational, and economic status differed according to the type of sensory impairment.

The following results were consistent with those of previous studies. The age of subjects with dual sensory impairment was higher than that of subjects with single sensory impairment (35). The percentage of male subjects who experienced hearing impairment was higher than that of those who experienced vision impairment or dual sensory impairment (36); this may be because men tend to become involved in more social activities, be exposed to more noise in occupational settings, and be exposed to more cigarette smoke and other potential risk factors that adversely affect hearing (37). The rate of sensory impairment was higher in subjects not living with spouses than that in those living with spouses and in subjects living in rural areas than that in those living in urban areas; previous studies report that environmental factors affect sensory impairment (38) and that spousal support affects the health behavior of the elderly (39-41). Additionally, subjects with sensory impairment had lower educational status and economic status than those without sensory impairment (39, 42).

Current smokers had a higher rate of hearing impairment than nonsmokers, a result that accords with those of previous studies (37, 43). The reason for this difference may be that smoking negatively affects the cardiovascular system in a manner that increases the risk of cardiovascular disease, which adversely affects hearing (37). However, analysis of physical health-related factors revealed differences in sensory impairment and obesity that did not accord with previous research. A previous study (37) found a higher rate of sensory impairment in obese than non-obese subjects, while the current study found a lower rate of rate of sensory impairment in subjects who were obese. This disparity may be due to racial differences between the subjects in the two studies, a possibility that should be explored further. In addition, a higher rate of sensory impairment was found in subjects with hypertension, similar to that in previous studies (44, 45). This may be that hypertension influences the vascular system in a manner that affects the structure and function of the eye (44). Moreover, a higher percentage of subjects with suicidal ideation experienced sensory impairment. Although no previous studies have directly examined the relationship between suicidal ideation and sensory impairment, these findings may provide indications regarding the manner in which depression influences suicidal ideation and sensory impairment (21, 46-48).

In the EQ-5D, those with sensory impairment displayed more problems in all EQ-5D subcategories than those without. Also, those with dual sensory impairment reported more problems in mobility, usual activities, and pain/discomfort dimensions. After adjusting for covariates, the results showed the same trend and were similar to previous research confirming the relationship between sensory impairment and functional independence in the elderly (49).

However, unlike previous studies confirming an association between anxiety/depression and sensory impairment (21, 50), this study found that the rate of sensory impairment increased non-significantly in subjects with anxiety/depression. This phenomenon may be related to differences among the subjects and the sensory impairment severity, a possibility that should be explored further.

After adjusting for covariates, the EQ-5D score was the same for subjects without sensory impairment and subjects with hearing impairment, while the EQ-5D score of subjects with vision impairment and dual sensory impairment was lower than that of subjects without sensory impairment and subjects with hearing impairment. However, no differences in the EQ-5D score were found between subjects with vision impairment and dual sensory impairment. These findings are similar to previous research (13) which examined the effects and frequency of dual sensory impairment.

The current analysis indicates differences in HRQoL of the elderly by sensory impairment type.

The HRQoL of the subjects with dual sensory impairment was lower than that of subjects with single sensory impairment, and the HRQoL of subjects with vision impairment was lower than that of subjects with hearing impairment. Unfortunately, it is impossible to compare these results with previous studies because no previous research has directly examined and confirmed the association between the three types of sensory impairment (vision, hearing, and dual sensory) and HRQoL. However, it is possible to infer the relationship between sensory impairment and HRQoL through the results of previous studies confirming the independent effects of sensory impairment on HRQoL of the elderly (7, 51, 52). Further, many of the negative effects of dual sensory impairment on HRQoL result from vision impairment (8, 13, 53, 54). As vision impairment is more clearly experienced than hearing impairment, the elderly tend to think that vision impairment is more serious than hearing impairment (48).

The present results indicate that improving HRQoL of the elderly requires prevention and correction of sensory impairment so that it does not negatively affect their lives (55). This requires early detection and continuous treatment through regular vision and hearing screening, improvement of the environment, provision of governmental support for vision or hearing aids, and rehabilitation of sensory impairment to allow the elderly to act independently without inconvenience in everyday life.

The present results were similar to those of previous studies (13, 16, 17, 19) and were based on representative national data. Thus, it is possible to infer the relationship between sensory impairment and HRQoL in the whole elderly Korean population. The results can thus assist in the production of materials as part of health-promotion business planning for individuals with sensory impairment and enactment of governmental policies for enhancing the QoL of the elderly through vision and hearing improvement.

Despite its use of a representative sample, this study faced several limitations that should be considered. Firstly, although it achieved objectivity through the use of an examination survey to confirm vision and hearing status, this study was unable to verify subjective complaints regarding vision and hearing status because it did not reexamine the previously self-reported data. To address this limitation, further research should assess vision and hearing status by collecting both objective and self-reported data and analyzing it in relation to QoL. Secondly, approximately 18.5% of the elderly who participated in KNHANES did not complete part of the assessment and were excluded from the analysis. Therefore, the true prevalence of vision and hearing impairment in Korean elderly might have been underestimated. Finally, due to the nature of a cross-sectional study, it was not possible to infer a causal relationship among the sensory impairment and risk factors and other variables.

These results underscore the necessity for further research on current and projected socioeconomic costs of sensory impairments in the elderly, current support for the elderly with sensory impairment, and methods for the improvement quality of life in the elderly with sensory impairment. In addition, it is important to establish programs for early diagnosis and preventive or continuous treatment of sensory impairment.

Conclusion

The early detection and active treatment of sensory impairment in the elderly are rarely performed due to the tendency to attribute sensory impairment to the natural aging process. However, sensory impairment negatively affects their lives, a problem that is increasing in tandem with the increase in the number of the elderly suffering from sensory impairment. The present results indicate that vision impairment more negatively influences QoL than hearing impairment and that dual sensory impairment more negatively influences QoL than single sensory impairment. Therefore, improving the HRQoL of the elderly requires prevention of dual sensory impairment through regular screening and continuous management of vision and hearing impairment.

Ethical Considerations

All ethical issues including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the author

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