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The Effects of Injury Experiences on the Quality of Life in South Korean Adults Aged 20 Years or Over

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Abstract

Background/Objectives*: The purpose of this study was to determine the effects of injury experiences on the quality of life. Injury can have a diversity of health-related effects, including activity restrictions, walking, and stress. This study used coded raw data.*

Methods/Statistical analysis*: The raw data from "The Seventh Korea National Health and Nutrition Examination Survey(KNHANES Ⅶ-2)" were used. The surveys were the health survey, the physical examination survey, and the nutrition survey. Of these, the health survey was used as an instrument. EQ-5D in the health survey was used for the quality of life. Of 8,127 respondents, a total of 6,113 were included, with the exception of 2,014 aged <20 years who had system missing values. The analyses were carried out by using an SPSS 20.0 version program.*

Findings*: EQ-5D was positively correlated with gender, age, subjective health status, and stress perception ($p<.01$). EQ-5D was negatively correlated with activity restrictions and injury experiences ($p<.01$). Activity restrictions ($\beta=-.261$, $p<.001$), followed by stress perception ($\beta=-.095$, $p<.001$) and injury experiences ($\beta=-.058$, $p<.001$), had the most negative affect EQ-5D.*

Improvements/Applications*: Subjective health status, activity restrictions, and injury experiences were found to affect the quality of life. It is necessary to make institutional reinforcement for constant research and program development in pursuit of good life.*

Keywords: *Activity restriction, EQ-5D, Health status, Injury, Quality of life*

1. INTRODUCTION

Kaufmann et al. [1] noted that repeated injuries were related to the young male group. They indicated that injury type was associated with penetrating wound and machines. Willem et al. [2] noted that injury might

be a cause of the disease-related burden and the lack of work and put a heavier burden on both inpatients and outpatients. Ahn and Joo [3] noted that the memory of a traumatic event might be recollected at both conscious and unconscious levels and affect present experiences.

Kim et al. [4] indicated that diseases and accidents might cause individuals to suffer dysfunction and financial loss and lower the quality of life and that evaluating the quality of life in relation to health could be useful as an index in setting a goal for disease treatment, in evaluating outcomes, and in estimating prognoses. WHO [5] suggested that the quality of life be "individuals' awareness of their own life in relation to their goals, expectations, standards, and concerns in their cultural and value systems." In addition, WHO contended that it was affected by their physical and mental status, independence level, social relationships, and environmental relationships.

As for the quality of life by physical health status, Yu et al. [6] indicated that the presence of chronic disease led to higher quality of life. Kim et al. [4] contended that the injured patients could have significantly lower quality of life than the uninjured control group. In contrast, Kim [7] indicated that for the injured, health recovery could have greater utility values with time.

Devlin and Brooks [8] used the EuroQol-5 Dimension (EQ-5D) to measure, compare, and evaluate conditions. Jo and Lee [9] noted that EQ-5D had five sub-areas: “Mobility”, “Self-care”, “Usual activities”, “Pain/discomfort”, and “Anxiety/depression”. In addition, Ye and Lee [10] divided the quality of life into three phases—"None," “Moderate," and "Severe"—in terms of health status. Jo and Lee [9] found that age, subjective status, activity restrictions affected the quality of life. Kim and Kim [11] noted that the quality of life was also related to mental health, which involved stress and depression. Lee & Kim [12] suggested that the quality of life require essential support to meet individuals' needs, wants, and desires.

Little research has been conducted on the quality of life by injury experiences. The raw data from KNHANES Ⅶ-2 were used [13] to determine the association between injury experiences and the quality of life and help develop policy-based programs.

2. METHODS OF STUDY

2.1. *Tools of Research*

This study used the coded data from KNHANES Ⅶ-2, as disclosed by MOHW and KCDC [13]. The data of KNHANES are not from a total survey but from a sample survey.

The survey is conducted from January to December (Rolling sampling). The data from the Population Housing Census were used as a sampling frame at the time of sample design. As an attempt to supplement the sampling frame, the data related to the declared values for apartment houses were added to improve the population inclusion rate. Two-stage stratified cluster sampling was used for the primary and secondary sampling of constituencies and households. The sample size is 13,248 households in a total of 576 constituencies (4,416 households in 192 constituencies a year).

The surveys were the health survey, the physical examination, the nutrition survey. The health survey involved interview and a self-administered questionnaire. The nutrition survey involved interview. The physical examination survey included measurement, observation, and specimen analysis. The instruments are as

presented in [Table 1].

Table 1: Tools of Research

Category	Contents	
Research	Rolling sampling	
Period	January - December	
Sample size	13,248 households in a total of 576 constituencies (4,416 households in 192 constituencies a year)	
Sampling frame	Declared values for apartment houses, Population and Housing Census	
Sampling unit	Constituency → household	
Stratified variable	Region. Housing type	
Surveys on items	Health Survey	• Method: Traveling physical examination center → Interview & self-administered questionnaire
	Nutrition Survey	• Method: Personal visit to target household → Interview
	Physical examination	• Method: Traveling physical examination center → measurement, observation, specimen analysis, etc.

2.2. *Subjects*

The raw data from 8,127 persons were disclosed by KNHANES Ⅶ-2 [13]. Coding was reviewed to determine the agreement between the number of household members related to health and that related to the "quality of life" in the raw data. Of 8,127 respondents, a total of 6,133 were included, with the exception of 2,014 in the age group <20 years who had system missing values.

The missing values can be divided into system and user missing values. The system missing data were first removed from the research. This study used the data from 6,133 persons in practice. However, there is variation in the number of persons for any variable treated as missing for the user missing values. The subjects are as presented in [Table 2].

Table 2: Subjects

Category		N : 6,133	%
Gender	Male	2,719	44.3
	Female	3,414	55.7
Age	20-29	672	11.0
	30-39	914	14.9
	40-49	1138	18.6
	50-59	1213	19.8
	60-69	1100	17.9

	70≤	1096	17.9

2.3. *Variable composition*

Of the health survey, the nutrition survey, and the physical examination survey in KNHANES Ⅶ-2 [13], the health survey was used because it was suitable for the theme of this study. The variables included the individual characteristics, subjective health characteristics, injury characteristics, and the quality of life. The general characteristics included gender and age. Self-perceived health and injury included subjective health status, the stress perception rate, activity restriction, and injury experiences.

The Euro Quality of Life – 5Dimension (EQ-5D) was used to measure the quality of life. The EQ-5D is a comprehensive index of the five description systems for the quality of life. Yu et al. [6], MOHW and KCDC [13], KCDC [14], and Lee et al. [15] suggested five areas: “Mobility”, “Self-care”, “Usual activities”, “Pain/discomfort”, and “Anxiety/depression”. Each area was measured at three levels(Level 1 "None”, Level 2 " Moderate," Level 3 "Severe”). The variable composition is as presented in [Table 3].

Table 3: Variable composition

Category	Item	
General characteristics	Gender	Male, Female
	Age	20-29, 30-39, 40-49, 50-59, 60-69, 70≤
Health and injury characteristics	Subjective health	Very good, Good, Normal, Bad, Very Bad
	Stress perception	Low, High
	Activity restriction	Yes, No
	Injury experiences	Yes, No
Quality of Life	Mobility	None, Moderate, Severe
	Self-care	None, Moderate, Severe
	Usual activities	None, Moderate, Severe
	Pain/Discomfort	None, Moderate, Severe
	Anxiety/Depression	None, Moderate, Severe

2.4. *Ethical consideration*

This study went through the review for ethics by the Institutional Review Board (IRB) of C University. This study has been exempted from the review (E-2nd-2019-005).

2.5. *Analysis*

The data were analyzed using an SPSS WIN Version 20.0 program. For empirical analyses, frequency analysis, $\chi 2$, t-test, correlation, ANOVA, multiple regression were performed. The significance level was set at $p<.05$.

3. Results And Discussion

3.1. *Injury experiences by individual characteristics*

The injury experiences by the individual characteristics are as presented in [Table 4]. Gender and age were likely to be associated with no injury experience. It was statistically insignificant. Of 6,113 respondents, 5,782 were included, with the exception of 331 having missing values, in relation to injury experiences.

Table 4: Injury experiences by general characteristics

Category		Injury experiences (5,782)		χ^2	p
		Yes(375)	No(5,407)		
Gender	Male	162(43.2)	2,390(44.2)	.143	.706
	Female	213(56.8)	3017(55.8)		
Age	20-29	48(12.8)	604(11.2)	6.308	.277
	30-39	46(12.3)	811(15.0)		
	40-49	58(15.5)	1,004(18.6)		
	50-59	77(20.5)	1,075(19.9)		
	60-69	78(20.8)	963(17.8)		
	70 ≤	68(18.1)	950(17.6)		
***p<.001					

3.2. *Differences from injury experiences in EQ-5D*

The differences from injury experiences in EQ-5D are as presented in [Table 5]. The group having injury experiences was at higher risk of “Mobility”, “Self-care”, “Usual activities”, “Pain/discomfort”, and “Anxiety/depression” than the group without injury experiences. It was statistically significant for each item (p<.001).

Jo and Lee [9] found that the group with disease showed lower quality of life in the sub-groups of EQ-5D than the group without disease. Kim et al. [4] found that the injured group showed lower quality of life than the healthy group.

Table 5: Differences from injury experiences in EQ-5D index

Category			Injury experiences				t	p
			Yes		No			
			M	S.D	M	S.D		
EQ-5D index	Mobility	1. None	1.26	.451	1.14	.368	5.907	.000***
		2. Moderate						
		3. Severe						
	Self- care	1. None	1.10	.345	1.04	.204	5.035	.000***

		2. Moderate						
		3. Severe						
	Usual Activity	1. None	1.16	.391	1.08	.280	5.669	.000***
		2. Moderate						
		3. Severe						
	Pain/ Discomfort	1. None	1.42	.564	1.25	.483	6.246	.000***
		2. Moderate						
		3. Severe						
	Anxiety/ Depression	1. None	1.12	.352	1.09	.307	2.203	.000***
		2. Moderate						
		3. Severe						
***p<.001								

3.3. *Variation Difference in EQ-5D by respondents' characteristics*

The difference in the EQ-5D by the respondents' characteristics is as presented in [Table 6]. The weight for the quality of life was based on the weight coded by MOHW and KCDC [13].

Male (0.96) showed higher quality of life than Female (0.94) (p<.001); the respondents in their twenties (0.98), thirties (0.98), and forties (0.98) showed higher quality of life than those in their seventies or older (0.86) (p<.001). The respondents perceiving their own health as very good showed higher quality of life than those perceiving it as very bad (0.98) (0.72) (p<.001). The group experiencing less stress (0.92) showed higher quality of life than the group experiencing more stress (0.95) (p<.001). The group without activity restriction (0.78) showed higher quality of life than the group having activity restriction (0.96) (p<.001). The group without injury experiences (0.91) showed higher quality of life than the group having injury experiences (0.95) (p<.001).

Yu et al. [6] found that the group with good subjective health status showed higher quality of life than the group with bad subjective health status. As for the quality of life with time after injury, Kim et al. [7] found that resilience was higher three months after injury than 10 days after injury. This is probably because resilience increased with time after injury, showing accumulated responses.

Table 6: Variation in EQ-5D index by respondents' characteristics

Category			Quality of Life : EQ-5D			
			M	S. D	t / F	p-value
General characteristics	Gender	Male	0.96	.101	7.276	.000***
		Female	0.94	.120		
	Age	20’s	0.98	.053	187.109	.000***
		30’s	0.98	.053		

		40’s	0.98	.055		
		50’s	0.96	.092		
		60’s	0.92	.127		
		70’s≤	0.86	.168		
Health and injury characteristic	Subjective health	Very good	0.98	.056	463.087	.000***
		Good	0.98	.056		
		Normal	0.96	.078		
		Bad	0.89	.137		
		Very bad	0.72	.248		
	Stress perception	Low	0.95	.095	11.263	.000***
		High	0.92	.142		
	Activity restriction	Yes	0.78	.202	-38.776	.000***
		No	0.96	.083		
	Injury experiences	Yes	0.91	.131	-6.358	.000***
		No	0.95	.111		
***p<.001						

3.4. *Inter-variable correlation*

Inter-variable correlation is as shown in [Table 7]. EQ-5D was positively correlated with gender, age, subjective health status, and stress perception (p<.01). EQ-5D was negatively correlated with activity restrictions and injury experiences (p<.01).

As for the association between intentional and unintentional injury and the quality of life, Kim et al. [4] found that the group with intentional injury got lower utility values. Jo and Lee [9] found that activity restriction affected the quality of life. Similarly, this study found that activity restriction and injury experiences were correlated with the quality of life.

Table 7: Inter-variable correlation

Category	Mobility	Self-care	Usual Activities	Pain/ Discomfort	Anxiety/ Depression
Gender	.083**	.021	.048**	.116**	.056**
Age	.358**	.184**	.245**	.244**	.114**
Subjective health status	.337**	.212**	.303**	.350**	.257**
Stress perception	.064**	.052**	.085**	.128**	.234**
Activity restriction	-.376**	-.303**	-.403**	-.357**	-.256**
Injury experiences	-.077**	-.066**	-.074**	-.082**	-.026*

*p<.05, **p<.01

3.5. *Factors affecting subjects' EQ-5D*

The factors affecting EQ-5D are presented in [Table 8]. The dependent variable was the EQ-5D. The independent variables were gender, age, subjective health status, stress perception, activity restriction, and injury experiences. For regression analysis, the independent variables were transformed into dummy variables. The explanatory power (R2) for the EQ-5D index was 38.1% of the total variance, which was statistically significant (p<.001).

Gender positively affected the EQ-5D index (β=.063, p<.001). The age group in their seventies or older (β=-.247, p<.001), followed by that in their sixties (β=-.108, p<.001) and fifties (β=-.034, p<.05), had the most negative impact on the EQ-5D. Very bad subjective health status (β=-.296, p<.001), followed by bad (β=-.191, p<.001) and normal (β=-.058, p<.05), had the most negative impact on EQ-5D.

Activity restrictions (β=-.261, p<.001), followed by stress perception (β=-.095, p<.001) and injury experiences (β=-.058, p<.001), had the most negative affect EQ-5D.

Kim and Kim [11] noted that stress perception, depression, and age affected the quality of life. Lee and Kim [12] contended that walking ability for maintaining activity affected the quality of life in terms of "Self-care", "Usual Activities", "Pain/discomfort", and "Anxiety/depression". Similarly, this study found that stress, age, activity restrictions, and injury experiences affected the quality of life.

Table 8: Factors affecting subjects' quality of life

Category		EQ-5D				
		B	S.E	β	t	p
Gender		.014	.002	.063	6.039	.000***
Age#	30-39	.000	.005	.001	.071	.943
	40-49	.001	.004	.003	.222	.824
	50-59	-.010	.004	-.034	-2.208	.027*
	60-69	-.031	.004	-.108	-6.991	.000***
	70≤	-.072	.005	-.247	-15.836	.000***
Subjective health #	Good	-.005	.006	-.020	-.886	.376
	Normal	-.013	.006	-.058	-2.191	.028*
	Bad	-.058	.006	-.191	-8.985	.000***
	Very bad	-.169	.008	-.296	-19.878	.000***
Stress perception#		-.024	.003	-.095	-8.812	.000***
Activity restriction#		-.101	.004	-.261	-22.872	.000***
Injury experiences#		-.026	.005	-.058	-5.614	.000***
R=.619, R^2=.383, Modified R^2=.381, p=.000						

[#] Transformed into dummy variable for analysis
[*]p<.05, ***p<.001

4. CONCLUSION

The quality of life by injury experiences was determined. Subjective health status, activity restrictions, stress, and injury experiences negatively affected the quality of life. It is necessary to conduct constant research and develop programs that can help improve the quality of life.

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