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Determinants of the Self-Rated Health Status of the Elderly in Healthy City Wonju, Republic of Korea

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CONTENTS

Ⅰ. Introduction

Self-rated health status is an important measure of general health status and well-being and is a proven predictor of mortality (Idler et al. 1997). Self-rated health status is particularly useful for assessing the overall health status of the elderly. A number of studies have examined what determines the self-rated health status of the elderly. However, it is not well understood whether factors associated with self-perceived health differ between younger adults and the elderly. In an aging society this information is particularly important in order to formulate policies and programs which meet the specific health needs of the elderly. Policies based on evidence from all age groups combined or lacking a comparative perspective on the needs of different age groups are unlikely to be effective in improving the health of the population.

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Elderly health is becoming an increasingly important issue in the Republic of Korea. The structure of the population is aging, and the percentage of the population aged 60 years and over is projected to increase from 14% in 2005 to 42% in 2050 (World Health Organization, 2006). To enhance elderly health, a number of cities in the Republic of Korea have launched Healthy Cities projects. Wonju City is one of them and initiated "Healthy City Wonju," a five-year project for promoting health of citizens and developing a health-friendly city environment, in 2006 (Nam et al. 2006). The essence of the project is to improve health equality. Because of the increase in the proportion of the elderly in the population and the vulnerability among this group, they are one of the main targets of the project through programs such as physical exercise, nutrition, and day care.

The objective of this study is to explore factors associated with self-rated health status of young adults and the elderly in Wonju City and examine any differences in the determinants of self-rated health status between young adults and the elderly. These points will have profound implications for the Healthy Cities projects in developing programs to highlight and address health needs of the elderly.

Ⅱ. Methods

1. Data

Data were obtained from the Community Health Survey in Wonju City conducted between August 28 and September 16, 2006. This interview surveys ought to collect baseline data on life styles, health status, and health service utilization of citizens for planning health strategies for the city. Trained field workers visited households across all areas in the city and asked for participation in a face-to-face interview with all household members aged 19 years and older who were present at home. Due to time constraints, houses were visited without prior appointment. Interviewers selected houses where they felt that participation was likely and with due regard for their own personal safety. Nonetheless, every care was taken to achieve a sample evenly distributed across all administrative areas of the city and representative of the population. The number of interviews in each area was proportionate to the area's population size. In total, 991 (1%) of 100,691 households registered in Wonju in 2005 participated in the survey, and interviews were conducted with 2,251 individuals, which was 1% of the total population of 205,894. After excluding returns with missing values for variables employed in this study 1,873 responses

Table 1. Explanatory variables of the survey

Variables group	Variables	Contents
Demographic and anthropometric factors	sex	- male, female
	age	- under 65, over 65
	BMI	- normal, overweight
Socioeconomic factors	rural dwelling	- nine rural areas in the city
	health insurance coverage	- insured, uninsured
	income	- individual monthly income - no income, less than 500,000 won, 500,000 ~ 999,999 won, 1,000,000 ~ 1,499,999 won, 1,500,000 ~ 1,999,999 won, 2,000,000 ~ 2,499,999 won, 2,500,000 ~ 2,999,999 won, and 3,000,000 and greater won
	education	- no schooling, primary school, junior high school, high school, and college/university or higher
	marital status	- never married, married and living with a spouse, widowed, divorced, or separated
	living alone	- lived alone or had lived with someone during the past three months
Lifestyle-related variables	smoking	- non-smoker, smoker (an ex-smoker or a current smoker)
	alcohol drinking	- non-drinker, drinker (less than once a month or more than once a month)
	frequency of regular exercise	- no exercise, once, twice, three times, four times, and five times or more during last week
	skipping breakfast	- yes, no
	insufficient sleep	- sufficient, insufficient
Social Participation	participation	- yes, no
Morbidity and functional status	poor health status	- yes (a lot of problem, a little problem), no (not at all, don't no)
	hypertension	- yes, no
	diabetes	- yes, no
	visual impairment	- yes (a little problem, significant problems, or I can't see at all), no
	hearing impairment	- yes (a little problem, a lot of problems or I can't hear at all), no
	mobility	- having problems with mobility, no problems
	self-management	- having problems with self-management (for taking a bath or getting dressed alone)
	daily activities	- having problems with daily activities including working, studying, and leisure, no problems
	pain/discomfort	- yes (a little or a lot of pain/discomfort), no (not at all, don't no)
	anxiety/depression	- yes (a little or a lot of anxiety/depression), no (not at all, don't no)

Table 2. Key variables by age group from Wonju Community Health Survey in Wonju City, Republic of Korea in 2006

Variables	Age < 65 yrs (N=1,685)	Age ≥ 65 yrs (N=188)	P-value
Self-rated health status, 0-100	73.3(72.6-74.0)	63.4(60.9-66.0)	<0.001
Female, %	52.4(50.0-54.8)	47.3(40.0-54.7)	0.188
BMI (Body Mass Index), kg/m2	22.8(22.7-23.0)	22.5(22.1-22.9)	0.121
Socioeconomic background			
Rural, %	28.0(25.9-30.2)	50.0(42.6-57.4)	<0.001
No health insurance coverage, %	0.9(0.5- 1.5)	3.7(1.5- 7.5)	0.001
Monthly income of breadwinner < 2 mllion won, %	35.0(32.7-37.3)	70.7(63.7-77.1)	<0.001
Educational background < high school, %	16.7(14.9-18.5)	77.1(70.5-82.9)	<0.001
Married and living with a spouse, %	77.3(75.2-79.3)	67.6(60.4-74.2)	0.003
Living alone, %	1.2(0.7- 1.8)	6.4(3.3-10.9)	<0.001
Life style			
Skipping a breakfast yesterday, %	25.6(23.6-27.8)	3.2(1.2- 6.8)	<0.001
Having inadequate sleep, %	35.8(33.6-38.2)	20.2(14.7-26.7)	<0.001
Current smoker, %	62.8(60.4-65.1)	58.5(51.1-65.6)	0.251
Current drinker, %	33.1(30.8-35.4)	63.3(56.0-70.2)	<0.001
Having regular exercise once or more per week, %	46.9(44.5-49.3)	31.4(24.8-38.5)	<0.001
Participating in social activities, %	38.8(36.4-41.1)	35.6(28.8-42.9)	0.405
Physical conditions			
Daily/social life worsened with declined health status, %	8.3(7.0- 9.7)	31.4(24.8-38.5)	<0.001
Having hypertension, %	7.3(6.1- 8.6)	37.8(30.8-45.1)	<0.001
Having diabetes, %	2.8(2.1- 3.8)	13.8(9.2-19.6)	<0.001
Having visual impairment, %	32.1(29.9-34.4)	69.1(62.0-75.7)	<0.001
Having hearing impairment, %	11.5(10.0-13.1)	51.1(43.7-58.4)	<0.001
Having problem in motor ability, %	6.9(5.8- 8.3)	43.1(35.9-50.5)	<0.001
Having problem in self-management, %	1.1(0.7- 1.8)	16.0(11.0-22.0)	<0.001
Having problem in daily activities, %	5.5(4.4- 6.7)	29.8(23.4-36.9)	<0.001
Pain/discomfort, %	22.1(20.1-24.1)	60.6(53.3-67.7)	<0.001
Anxiety/depression, %	22.7(20.7-24.7)	31.4(24.8-38.5)	0.008

(83.3%, 1,685 younger adults and 188 elderly people) were used for analysis. All data in this survey were self-reports of individual respondents.

2. Outcome variables

Self-rated health status on the day of the survey was rated by respondents during the interview using a continuous scale from 0

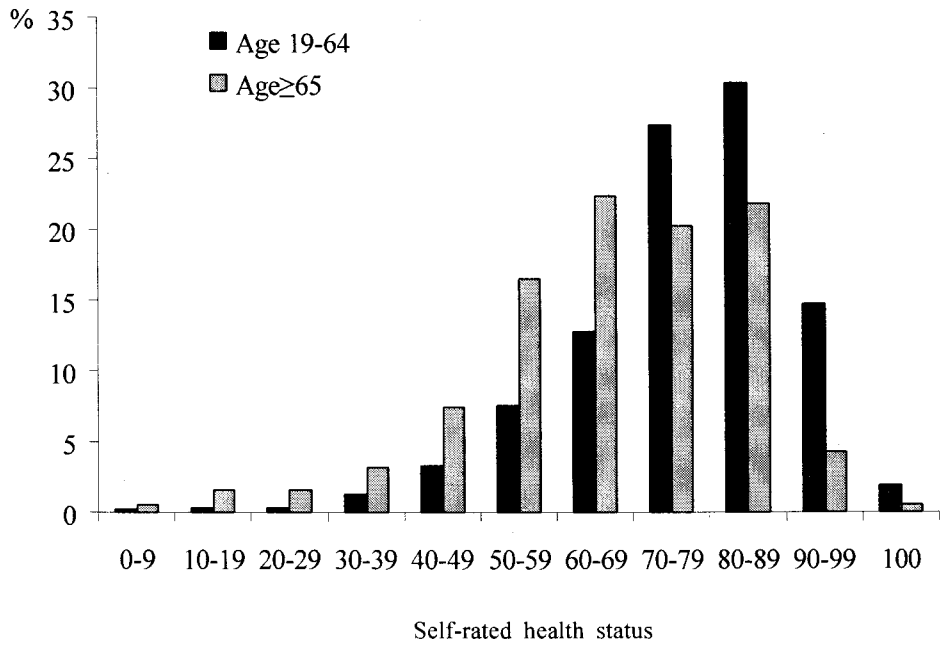

Figure 1. Distribution of self-rated health status by age group from Wonju Community Health Survey in Wonju City, Republic of Kore in 2006

(the worst they could imagine) to 100 (the best they could imagine). The distribution of self-assessed health status was not smooth but exhibited sharp jumps, probably because respondents tended to report round values such as 70 and 85. It was therefore collapsed into 11 categories for analysis (0-9, 10-19, ···, 90-99, and 100) to reduce the irregularities in the distribution.

3. Explanatory variables

Explanatory variables included in our model were demographic and anthropometric factors, socioeconomic factors, lifestyles, social participation, and morbidity and functional status.

4. Statistical analysis

All analyses were performed separately for comparison of the elderly (65 years old and over) and younger adults (19 to 64 years old). Both sexes were combined to ensure a sufficient sample size of elderly adults. Mean values of key variables were compared between the two groups using t-tests for continuous variables and Pearson's chi-squared tests for categorical variables. An ordered logistic regression was conducted to

examine factors associated with self-rated health status, and proportional odds ratios were obtained with 95% confidence intervals. The same model was run for all adults to supplement the analysis. All statistical analyses were performed using STATA (version 9.2, StataCorp LP, Texas).

Ⅲ. Results

Differences in means were significant in most of the variables between people aged 19 to 64 years old and the elderly, except for sex composition, body mass index, and social participation. The elderly rated their health significantly lower than younger adults ($p<0.001$). Figure 1 illustrates the distribution of self-rated health status by age group. The distribution of self-rated health status of younger adults had a more negative skew than that of the elderly.

Table 3 demonstrates proportional odds ratios estimated from the ordered logistic regression. The self-rated health status of people aged 19 to 64 years old was associated positively and significantly with rural dwelling ($p<0.001$), living alone ($p=0.014$), regular exercise twice a week or more (twice, $p=0.002$; 3times, $p<0.001$; 4times, $p=0.034$; 5times and more, $p<0.001$), while the association was significantly negative with no health insurance coverage ($p=0.003$), no income ($p=0.013$), no schooling ($p=0.023$), completing primary education only ($p=0.018$), skipping breakfast ($p=0.001$), daily and social life being affected by poor health status ($p<0.001$), having a problem with mobility ($p=0.021$), and having anxiety or depression ($p<0.001$).

In the elderly group, self-rated health status was positively and significantly associated with participation in social activities ($p=0.043$), and significant negative associations were found with income (no income, $p=0.016$; less than 50,000won, $p=0.008$; 1,000,000~1,499,999won, $p=0.001$; 1,500,000won and more, $p<0.001$), no schooling ($p=0.004$), completing primary education only ($p<0.001$), being widowed ($p=0.044$), having insufficient sleep ($p=0.009$), daily and social life being affected by poor health status ($p<0.001$), having problems with mobility ($p=0.001$), and having anxiety or depression ($p<0.001$).

The supplementary analysis for both age groups combined showed that the combination of significant factors was equivalent to that of younger adults, except that living alone and no schooling were not significant and being a junior high graduate was significant in all adults (data not shown).

Differences between the two groups emerged from these regression results. Factors significantly associated with self-rated health status only in the elderly

Table 3. Proportional odds ratios (95% confidence intervals) estimated by the ordered logit model of self-rated health status by age group, using Wonju Community Health Survey in Wonju City, Republic of Korea in 2006

Independent variables	Age 19-64 years	Age≥65 years
Female	0.89(0.68- 1.17)	3.33(1.34- 8.26)
Age	0.99(0.97- 1.00)	0.98(0.93- 1.04)
Body Mass Index	0.99(0.95- 1.02)	1.04(0.91- 1.18)
Rural	1.93(1.56- 2.38)	1.84(0.90- 3.76)
No health insurance coverage	0.26(0.11- 0.64)	0.23(0.04- 1.35)
Income, won*		
No income	0.21(0.06- 0.72)	0.09(0.01- 0.63)
<500,000	1.09(0.41- 2.87)	0.19(0.06- 0.66)
500,000-999,999	0.97(0.52- 1.80)	0.31(0.09- 1.09)
1,000,000-1,499,999	1.05(0.74- 1.50)	0.13(0.04- 0.43)
1,500,000-1,999,999	1.07(0.79- 1.44)	0.08(0.02- 0.28)
2,500,000-2,999,999	0.93(0.69- 1.25)	0.04(0.01- 0.21)
≥3,000,000	0.95(0.74- 1.22)	0.13(0.04- 0.37)
Educational background*		
None	0.35(0.14- 0.87)	0.17(0.05- 0.56)
Primary school	0.60(0.39- 0.92)	0.11(0.04- 0.34)
Junior high	0.75(0.53- 1.05)	0.42(0.13- 1.35)
College/Univ. or higher	1.10(0.88- 1.37)	0.45(0.10- 2.04)
Marital status*		
Never married	1.08(0.79- 1.48)	
Bereaved	0.88(0.49- 1.58)	0.40(0.16- 0.97)
Divorced	0.58(0.30- 1.15)	5.57(0.08-400.82)
Separated	3.16(0.52-19.10)	
Living alone	2.81(1.23- 6.43)	0.37(0.08- 1.64)
Skipping a breakfast yesterday	0.63(0.51- 0.78)	0.26(0.04- 1.65)
Adequate sleep	0.85(0.70- 1.02)	0.35(0.16- 0.77)
Smoking*		
Ex-smoker	0.85(0.61- 1.19)	1.47(0.53- 4.08)
Current smoker	1.02(0.77- 1.34)	0.99(0.36- 2.70)
Drinking, glasses*‡		
1-2	1.09(0.81- 1.46)	4.90(1.64- 14.65)
3-4	1.28(0.98- 1.68)	1.82(0.67- 4.94)

5-6	1.19(0.89- 1.60)	1.26(0.40- 4.01)
≥7	1.36(1.02- 1.83)	1.46(0.40- 5.38)
Regular exercise per week*		
Once	1.24(0.94- 1.64)	1.68(0.35- 8.00)
Twice	1.65(1.21- 2.25)	0.66(0.15- 2.86)
3 times	2.11(1.58- 2.82)	0.60(0.15- 2.44)
4 times	1.52(1.03- 2.24)	0.57(0.11- 3.05)
≥5 times	2.34(1.65- 3.32)	0.60(0.23- 1.55)
Participating in social activities	1.08(0.90- 1.30)	2.02(1.02- 3.97)
Daily/social life worsened with declined health status	0.44(0.30- 0.65)	0.14(0.07- 0.30)
Having hypertension	1.00(0.69- 1.44)	1.59(0.82- 3.07)
Having diabetes	0.73(0.43- 1.24)	0.64(0.26- 1.60)
Having vision impairment	0.96(0.78- 1.19)	0.66(0.31- 1.43)
Having hearing impairment	0.76(0.56- 1.03)	1.79(0.87- 3.68)
Problem in motor ability	0.60(0.39- 0.93)	0.28(0.13- 0.61)
Problem in self-management	1.60(0.63- 4.12)	0.88(0.30- 2.56)
Problem in daily activities	1.86(1.11- 3.11)	1.48(0.59- 3.71)
Pain/discomfort	0.87(0.67- 1.12)	1.44(0.66- 3.14)
Anxiety/depression	0.50(0.39- 0.63)	0.22(0.10- 0.46)
Chi squared	328.7	136.4
Log likelihood	-2,777.4	-291.4
Pseudo R squared	0.056	0.190

* Referent values were "2,000,000-2,499,999 won", "high school", "married and living with a spouse", "non-smoker", "non-drinker", and "no exercise."

‡ Korean distilled liquor named soju (beer 350ml = 1.4 glasses of *soju*) and was categorized into "1-2 glasses," "3-4 glasses," "5-6 glasses," and "7 glasses or more."

were sex, income, bereavement, insufficient sleep, and participation in social activities, while age, rural dwelling, health insurance coverage, living alone, missing breakfast, and frequency of regular exercise were correlated with the self-rated health status of younger adults only. Factors significantly associated with self-rated health status in both groups were no schooling, completing primary education only, daily/social life affected by poor health status, having problems with mobility, and having anxiety/depression.

Ⅳ. Discussion

This study showed that the self-rated health status of the elderly living in private

households in Wonju City was associated with household income, education, bereavement, adequate sleep, daily and social life being affected by poor health status, mobility, and anxiety and depression. Determinants of self-rated health status were different between the elderly and younger adults. Being female, living in middle-income households, having adequate sleep, and participating in social activities were associated with improved self-rated health status in the elderly only, while younger age, rural residence, being single, having breakfast regularly, and frequent regular exercise were significant only in younger adults.

Owing to a time limit, houses were selected by interviewees in consideration of the possibility to participate the survey. This study was performed in a middle sized city, therefore there is a limitation for generalization of the results from this study.

The study by Lee et al. (2007) showed that social participation increases as age advances and is more notable in adults aged 65 and over (Lee et al. 2007). Choi et al. (2006) analyzed the raw data on health behavior, self-perceived health status and body mass index from a 2001 National Health and Nutrition survey in Korea which involved 6,572 respondents aged over 20 years . As a result older age, low education level, blue collar work and/or low income were found to be significantly correlated with low self-perceived health status. This result is same as the study in 2005 (MOHW, 2005). Social participation is significantly associated with self-rated good health (Greiner et al. 2004; Hyyppa and Maki 2003; Lindstrom et al. 2004). Conversely, lack of participation has been associated with poorer self-rated health status in the aged (Pollack et al. 2004).

Pinquart et al. (2001) analyzed correlates of self-rated health status in older adults and presented a meta-analysis study. According to this meta-analysis, several studies showed that as people get older, objective health decreases (with greater prevalence of various health problem, multi-morbidity, chronic disease, disabilities etc). This is also associated with a decrease in the self-rated health status of the elderly. That is, the aged, who are frailer than younger adults, have lower self-rated health status. Other studies, on the contrary, have suggested that age is not a strong factor affecting self-rated health status, because age is not the only factor associated with self-rated health status.

As noted above education and socio-economic status are also important factors (Choi et. al.). Lee et al. (1998) studied a nationally representative sample of 2,058 people aged 60 years or older living in the community. The results from multiple regression analysis showed poor self-rated health status to be significantly associated

with lower age (60~64 years old), being male, having a lower education level, urban dwelling, lack of a paid work, having a number of chronic illnesses, and having poor physical and mental health (Lee et al. 1998). Park et al. (2003) studied the relationship between self-rated health status, the degree of interest in health status, personal health management, and life satisfaction outcomes of the elderly. The study was conducted with 222 elderly participants who were over 65years in the Daegu and Gyengbuk areas. The self-rated health status condition of the elderly was positive in males, youngest people who were 65~70 years among the respondents, people who have a spouse and high-income people (Park et al. 2003). Song et al. (2003) studied 1,043 people older than 65 years who registered a hall for the aged (Gyeongnodang where is a free space for the aged in community at Gwonsun-gu, Suwon. The self-rated health status of the elderly varied significantly in relation to sex, economic level, drinking, physical activity, having breakfast regularly, adequate sleep and healthy lifestyle (Song et al. 2003).

Determinants of self-rated health status are different between the elderly and younger adults in Wonju City. Tailored policies for each age group would be effective for improving health in the community. In order to enhance health of the elderly in Wonju City, it would be necessary to develop and effectively incorporate in the Healthy City project health promotion programs that address specific needs of the elderly.

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ABSTRACT

Objectives: The purpose of this study was to examine factors associated with the self-rated health status of the elderly and whether these factors were different from younger adults.

Methods: An interview survey was conducted on non-institutionalized adults in Wonju City, Korea. Determinants of self-rated health status were identified and compared between individuals aged 19 to 64 years and those aged 65 years and over, using an ordered logistic regression conducted separately on these two groups. Participants were 1,685 younger adults and 188 elderly people. Self-rated health status was measured along a continuous scale from 0 to 100 (0 for the worst and 100 for the best they could imagine) and then binned into 11 categories.

Results: Self-rated health status of the elderly in Wonju was associated with household income, education, bereavement, adequate sleep, daily and social life being affected by poor health status, mobility, and anxiety and depression. Household income, adequate sleep, and participation in social activities were significant only in the elderly, while some factors associated with the self-rated health status of younger adults, such as rural dwelling, regular exercise, living alone, and skipping breakfast were not significant in the elderly.

Conclusion: In order to improve the health of the elderly in Wonju City, it would be necessary to develop programs addressing those specific needs of the elderly and to integrate them effectively in the Healthy City projects.

Key Words: Healthy cities, Self-rated health status, Elderly, Korea

〈국문초록〉

노인과 청장년의 주관적 건강에 관한 비교 연구

목적 : 본 연구는 노인의 주관적 건강과 연관된 요인들을 살펴보고 이러한 것들이 청장년층들과는 어떻게 다른지를 규명하는데 그 목적이 있다.

방법 : 본 조사대상은 원주시에 거주하는 노인으로 하여, 65세 이상 노인들의 주관적 건강 결정요인과 19~64세 인구집단의 주관적 건강 결정요인을 분석하고 두 집단에 대하여 각각 회귀분석을 이용하여 이들을 비교하였다. 응답자는 청장년층이 1,685명, 노인이 188명이다. 주관적 건강은 0에서부터 100까지 10점 단위로 표시하여, 11개의 카테고리로 나뉘어진 자 모양의 그림을 제시하여 자신의 건강에 대하여 점수를 표시할 수 있도록 하여 측정하였다.

결과 : 원주시 노인들의 주관적 건강은 '가구소득', '교육', '배우자 유무', '적절한 취침', '불건강에 영향을 받는 일상생활 및 사회생활', '이동능력', '불안', '우울'과 관련이 있었다. 노인들에게서 유의한 변수는 '가구소득', '적절한 취침', '사회활동 참여'였고, 반면, 청장년층의 주관적 건강은 '농촌거주', '규칙적인 운동', '혼자거주', '아침식사 결식'과 같은 요소들이 영향을 주는 것으로 나타났다. 반면에 '아침식사 결식'은 노인의 주관적 건강에 유의하지 않았다.

결론 : 원주시 노인들의 건강을 향상시키기 위하여는 노인들의 특별한 요구를 충족시켜줄 수 있는 건강증진 프로그램을 개발하여야 하고, 이를 위해 사회적 자본의 강화와 같은 프로그램들을 건강도시사업에 도입 · 운영 하여야 할 것으로 사료된다.

주제어: 건강도시, 주관적 건강, 노인, 한국