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國際學碩士學位論文

Mental Health of Korea's Ageing Population

韓國 老人의 精神健康에 關한 研究

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Mental Health of Korea's Ageing Population

ABSTRACT

The world is in the midst of a demographic transition that will result in larger share of older population. Ageing speed of Korea's population is the fastest in the world with 11.8% of total population aged over 65 years in 2012. Since entering the 'ageing society' at the beginning of the millennium, Korea is expected to enter the 'aged society' in 2017 with 14% of the population aged 65 years and older and to enter the 'super-aged society' in 2026, only nine years from entering the 'aged society', with 20% of the population aged 65 years and older. Despite such ageing rapidity, lack of preparation for late life has resulted in poor mental health of the older population. With the rapid economic development, changes in social structures and patterns in family life, focus has been on the improvement of somatic health, while the importance of mental health had been neglected.

The aim of this study is to assess factors affecting the mental health of elderly Koreans aged 60 years and older in terms of socioeconomic, health, and household factors and to further analyze by reviewing cross-national comparison. Data from the 4th Korean National Health and Nutrition Examination Survey (KNHANES IV) was used for analysis. This survey was conducted from 2007 to 2009 by the Korean Ministry of Health and Welfare. KNHANES surveys have been repeated every three years with very similar cross-sectional designs with nationally representative samples

of non-institutionalized persons residing in Korea. A total of 5,233 people aged 60 years and older were included in this study.

Results of Korean elders' mental health demonstrated that for depressive symptoms, self-rated health, limitation in activity and having one or more major diseases were found to be significantly associated and for suicidal ideation, self-rated health, having limitations in activity, and household income were found to be significantly associated. Thus, for the mental health of the elderly, subjectivity of good health status, not having limitations in activity and adequate economic status are important factors to maintain good mental health.

In conclusion, policies regarding sufficient per capita health expenditure and state-provided safety nets in comparison to countries with relatively good mental health should be considered to enhance the mental health of Korea's ageing population.

Keywords: mental health, depression, suicide, ageing, elderly

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I. INTRODUCTION

The world is in the midst of a demographic transition that will result in a larger share of older population. This demographic transition commonly observed in advanced countries is rapidly spreading over newly developed countries and emerging economies, accompanied by economic changes, industrialization, changes in social organization and the patterns in family life. With the continuing decline in birth rates, the proportion of persons aged over 60 is expected to double between 2007 and 2050, and the actual number will more than triple, reaching 2 billion by 2050 (UN, 2007). In most countries, the number of those aged 80 and older is expected to quadruple to 400 million by then.

Increasing life expectancy and low birth rate has accelerated ageing society. Korea's life expectancy is 81 years, a year higher than the OECD average of 80 years. Life expectancy for women is 85 years and 78 years for men. Considering life expectancy in 1981 was 66.2 years, it has increased by 15 years in 32 years. At the beginning of new millennium, Korea became an 'ageing society' in which 7.2% of the total population became older than 65 years old. With population of over 65 years accounting for 11.8% of Korea's total population in 2012, it is projected that Korea will enter 'aged society' in 2017 with 14% of the total population over 65. Only nine years after it has reached 'aged society', in 2026 Korea is forecasted to enter 'super-aged society' with 20% of the population over 65 years of age (StatisticsKorea, 2012).

Although countries in Table 1 entered ‘ageing society’ much faster than Korea, ageing rapidity in Korea is the fastest in the world.

Table 1. Comparison of Ageing Rapidity

	Ageing Society	Aged Society	Super-aged Society
Korea	2000	2017 (17 years)	2026 (9 years)
Japan	1970	1994 (24 years)	2005 (11 years)
England	1929	1975 (46 years)	2028 (53 years)
France	1864	1979 (115 years)	2018 (39 years)
United States	1942	2014 (72 years)	2032 (18 years)

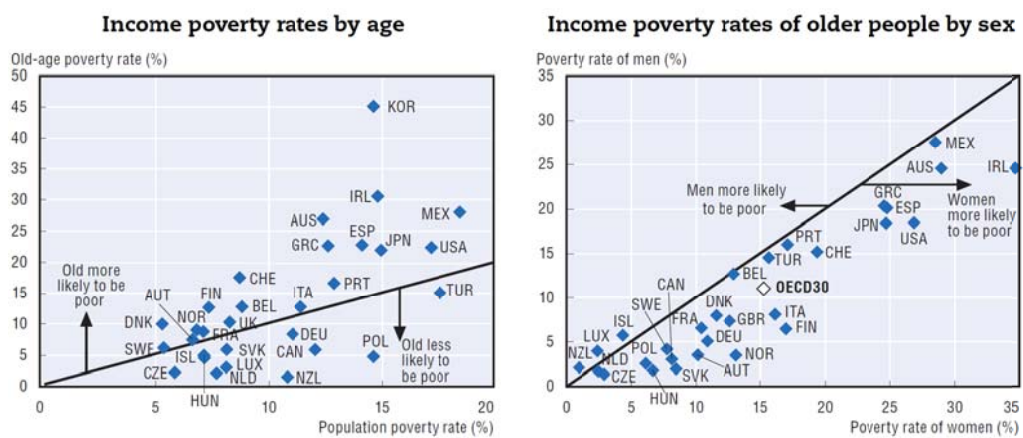
Note: A country is considered an “ageing society” when the number of people aged 65 or older reaches 7.0% of its population. It becomes an “aged society” when the number of people aged 65 or older reaches 14% and a “super-aged society” when the number of elderly account for 20% of the population.

Source: Japan’s National Institute of Population and Social Security Research (2010)

Rapid industrialization, late introduction of social security and speedy ageing all became reasons for lack of preparation for life after 60. According to 2013 Social Survey by National Statistics Korea, 48.4% of Koreans over the age 60 responded that they were not prepared for life after retirement and 38.8% responded that economic poverty is their most serious concern. In 2050, the ratio of working-age population to the elderly will drop from 6.0 in 2010 to 1.3; implying that public social spending will pose a heavy burden on a shrinking labor force (Jones, 2013). Also, Korea’s income poverty rate of population over 60 years old is noticeably high in comparison to other OECD countries as shown in figure 1. Unpreparedness for late life and economic

burdens increasingly aggravate not only the physical well-being but also the mental well-being of the elderly calling for strengthened measures to deal with the rapidly ageing population.

Figure 1. Income poverty rate of OECD countries



Source: OECD

II. LITERATURE REVIEW

1. Suicide

It is estimated that suicides take approximately 1 million lives worldwide every year (Y. Y. Chen, Wu, Yousuf, & Yip, 2012). Among the OECD countries, there were almost 150,000 suicide deaths in 2009. Suicide rates recorded highest in Korea, the Russian Federation, Hungary, and Japan, at more than 19 deaths per 100,000 people, and lowest in southern European countries (Greece, Italy and Spain) and in Mexico and Israel, at six or fewer deaths per 100,000 people. A ten-fold difference is observed between Korea and Greece, the countries with the highest and lowest suicide rates (OECD, 2011b).

Across OECD countries, death rates from suicide are 3 to 4 times greater for men than for women and the gap has remained stable over time, except in the case of Korea. Korean women are more likely to commit suicide, although male rates are still twice those of females. For attempted suicides, the gender gap is narrower, reflecting that women tend to use less fatal methods compared to men. Suicide is also related to age, with the elderly at a higher risk.

Since 1995, suicide rates have increased in Korea, Chile, Japan, Mexico and Portugal. In Mexico rates remain low and in Japan rates have been static since the late 1990s. In the case of Korea, suicide rates among women are the highest in the OECD, at 20 per 100,000 persons and male suicide rates more than doubled from 17 per

100,000 in 1995 to 39 per 100,000 in 2009. From 2006 to 2010 in Korea, the number of persons treated for depression and bipolar disease rose sharply (17 and 29 per cent increase respectively), with those in low socioeconomic groups more likely to be affected. The recent increase in Korea's suicide rate reflect the economic downturn, weakening social integration and the erosion of the traditional family support base for elders (Kwon, Kwon, Chun, & Cho, 2009). Suicide is often related to depression and alcohol or other substances abuse. Early detection by families and health professionals of these psycho-social problems in high-risk groups is an important part of suicide prevention campaigns, together with the provision of effective support and treatment. Many countries are promoting mental health and developing national strategies for prevention of suicide, focusing on at-risk groups (Hawton & van Heeringen, 2009). In Germany, as well as Finland and Iceland, suicide prevention programs have been based on efforts to promote strong multi-sectoral collaboration and networking (NOMESCO, 2007).

In the countries where Confucianism is practiced, despite the veneration and respect for older adults in East Asia (e.g., China, South Korea, Hong Kong, Taiwan, and Singapore), suicide rates in the aged group are observed to be high (Y. Y. Chen et al., 2012). The elderly-to-general-population suicide ratio ranges from 4 to 6. Suicide rates are also higher for older adults in Western countries, especially in males. However, the elderly-to-general-population ratio is not as striking as that of Eastern Asian countries.

Sociocultural conditions are an importance factor of suicide in Asia. Compared with their Western counterparts, unemployment or job-related stress is a more common precipitant of suicide among Asian men (Amagasa, Nakayama, & Takahashi, 2005; Phillips, Yang, Zhang, Wang, & et al., 2002). Similarly, societal economic situations seem to have greater impact in Asia. A recent meta-analysis of the association between suicide and socioeconomic characteristics of geographic areas showed that studies from Asian countries, compared with those from the West, were more likely to have found a significant impact from adverse socioeconomic conditions on increased suicide rates (Rehkopf, Rehkopf, & Buka, 2006).

In Korea, a sharp increase in suicide rates is observed in older adults, where a 300% increase among adults older than 64 years in the past 20 years (Kim, Kim, Kim, Kawachi, & Cho, 2011). Suicide rates surpassed those in Japan after 2000, mainly because of this steep increase among the elderly. Unpreparedness for the ageing population and rapid breakdown of traditional family values in Korea have been proposed as possible explanations for the upsurge in suicides among older adults (Kim et al., 2011; Park BCB, 2008). Globalization and cultural transition have resulted in disrupted traditional values and norms the elderly hold dear (Park BCB, 2008; Yip & Tan, 1998). Countries such as Japan that have relatively well-developed welfare program for the elderly may have prevented such an upsurge in suicides (J. Chen, Chen, Choi, & Sawada, 2009; Cho, 2006).

Shah et al. found that there is wide cross-national variations in elderly suicide rates; elderly suicide rates were the lowest in Caribbean, central American and Arabic

countries, and the highest in central and eastern European, some oriental and some west European countries; suicide rates were higher in men compared; and suicide rates were higher in the age-band of over 75 years compared to the age-band of 65 to 74 years for males and females (A. Shah, Bhat, McKenzie, & Koen, 2007). Potential explanations for the regional and cross-national variations in elderly suicide rates include cross-national differences in genetic and environmental factors, prevalence of mental illness, life expectancy, socio-economic deprivation, social fragmentation, cultural factors, the availability of appropriate healthcare services, and public health initiatives to improve detection and treatment of mental illness, mental health and suicide prevention. Among Arabs in Jordan (Daradkeh, 1989), Malays in Singapore (Ko & Kua, 1995; Kua & Ko, 1992), non-white Americans (Seiden, 1981) and some east European groups (Sartorius, 1995) suicide rates decline with age. Traditionally, in these societies the elderly are respected, held in high esteem and live in closely knit families, and this offers protection against loneliness and despair which may lead to suicide (Ajit Shah & De, 1998). Family and social integration may be important factors in this context (Rao, 1991). A similar hypothesis might explain increasing suicide rates found in elderly Japanese (Shimuzu, 1990; Watanabe, Hasegawa, & Yoshinaga, 1995), in Hong Kong women (Yap, 1963) and two ethnic groups in Singapore (Ko & Kua, 1995; Kua & Ko, 1992) who have lost their traditional role in the family. Differing cultural factors could also explain elderly suicide rates in different regions and countries. Among Arabs (Daradkeh, 1989), Malays in Singapore (Ko & Kua, 1995), non-white Americans (Seiden, 1981) and some east European groups (Sartorius, 1995)

suicide rates decline with age. Traditionally, in these societies the elderly are respected, held in high esteem and live in closely knit families offering protection against loneliness and despair which may lead to suicide (Ajit Shah & De, 1998). Family and social integration may be important factors in this context (A. Shah et al., 2007). Similar hypothesis might explain increasing suicide rates found in elderly Japanese (Shimuzu, 1990; Watanabe et al., 1995), in Hong Kong women (Yap, 1963) and in two ethnic groups in Singapore (Yap, 1963) who have lost their traditional role in the family. This can be further evaluated by examining cross-national differences in the relationship between elderly suicide rates and household size, and the proportion of elders living in extended families, in nuclear families and on their own.

2. Depression

Depression has been described as the world's most prevalent illness and a leading cause of disability across age groups (Tiedt, 2010). Particularly, depression is a major source of suffering among the elderly, however, it is overlooked because of its co-occurrence with the ageing process (Casey, 2012). According to Korean National Health and Nutrition Examination Survey (KNHANES IV) conducted from 2007 to 2009 by the Korean Ministry of Health and Welfare, more than 20% of people aged over 60 are reported to have experienced depressive symptoms in Korea.

Demographic changes in fertility rates, migration patterns and overall structural changes in industrialized economies have resulted in adjustments for families

(Tiedt, 2010). Many studies that examine trends in East Asian elder care highlight the multigenerational structure of Asian families. However, among modern Japanese elders and their adult children, considerable opposition to traditional filial norms exist (Izuhara, 2000). The same applies to many other Asian countries, as well as Korea. Family structures have shifted from multigenerational structure towards a nuclear family structure. There will be an increasing number of elders living independently (Ogawa & Retherford, 1993). Also, with the increase in female labor force participation, the traditional caretakers of elder family members are absent from households.

Depressive symptoms among elders have been correlated with social support (both instrumental and emotional), proximity of kin, age, physical health and urban residence (Tiedt, 2010). Instrumental support refers to the physical aspects of providing care such as bathing, changing clothes, paying bills and preparing meals, and emotional support refers to more invisible aspects of care such as providing company and conversation. Overall, depression has been negatively correlated with instrumental and emotional support and positively associated with age and physical pain when instrumental support is lacking (Koizumi et al., 2005). Depressive symptoms are positively related with isolation.

Fukunaga et al. demonstrated that for Japan's elderly living in rural communities, living alone was significantly associated with depression (Fukunaga et al., 2012). Bilotta et al. reported that quality of support and physical-psychological ability to seek assistance were more important than living with others and concluded

that the quality of life of elderly individuals living alone was independently associated with 'social relationship and participation' and 'home and neighborhood'(Bilotta, Bowling, Nicolini, Case, & Vergani, 2012). Fukunaga et al.'s results demonstrate that sufficient social support system and good health from proper care are protective factors against development of depression, regardless of living status and arrangements.

III. CROSS-NATIONAL COMPARISON OF MENTAL HEALTH

World Health Organization defines mental health as “a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community”. On 10th of October every year, the World Health Organization joins in celebrating the World Mental Health Day. The day is celebrated at the initiative of the World Federation of Mental Health and WHO supports this initiative through raising awareness on mental health issues. The theme of the day in 2013 is “Mental health and older adults”, which highlights the importance of the mental health of the elderly (WHO, 2013).

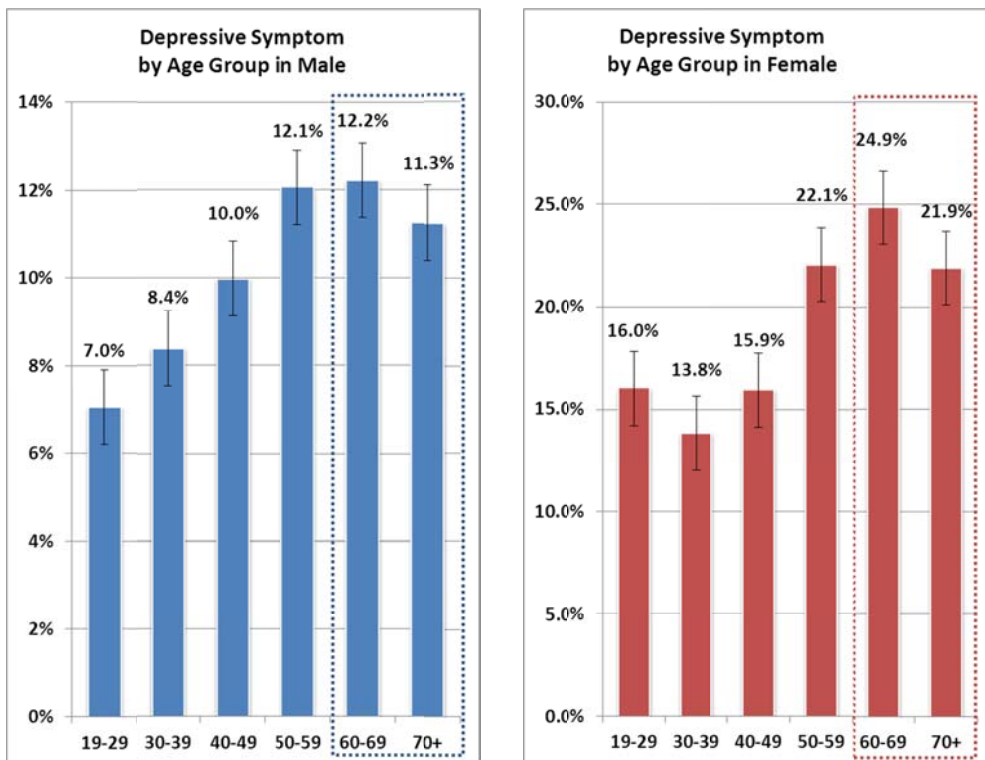
1. Mental Health of Korean Elderly

Depression

According to data from 4th Korean National Health and Nutrition Examination Survey (KNHANES) conducted from 2007 to 2009 by the Korean Ministry of Health and Welfare, 12.2% of Korean men aged 60 to 69 years old and 11.3% aged over 70 years old respectively responded to have had depressive symptoms for more than 2 weeks in a row during the past year. In the case of Korean women aged 60 to 69 years old, 24.9% responded to have had depressive symptoms and 21.9% of women over 70

years old responded to have had depressive symptoms for more than 2 weeks in a row during the past year.

Figure 2. Depressive symptoms by age group



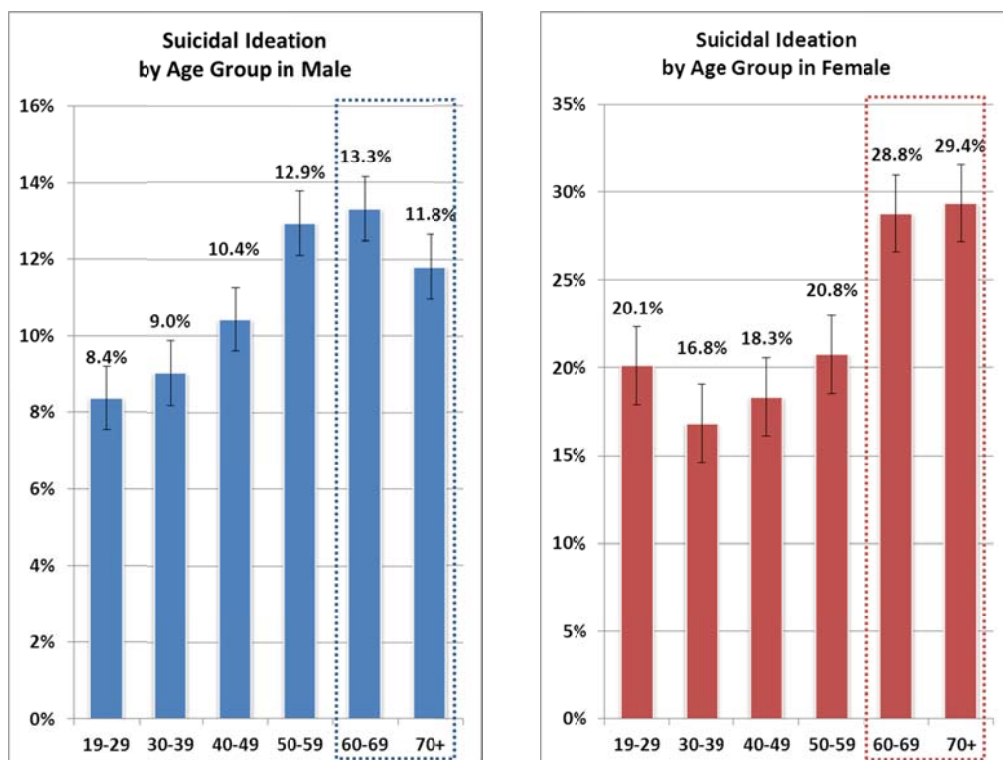
Source: 4th Korean National Health and Nutrition Examination Survey (KNHANES), Korean Ministry of Health and Welfare

Suicidal Ideation

Also using data from 4th Korean National Health and Nutrition Examination Survey (KNHANES) conducted from 2007 to 2009 by the Korean Ministry of Health and Welfare, 13.3% of Korean men aged 60 to 69 years and 11.8% aged over 70 years

old respectively responded to have thought of suicide. For Korean women aged 60 to 69 years old, 28.8% and for women aged over 70 years old, 29.4% respectively responded to have thought of suicide.

Figure 3. Suicidal ideation by age group



Source: 4th Korean National Health and Nutrition Examination Survey (KNHANES), Korean Ministry of Health and Welfare

Ageing population and elder care is a critical issue for the world. Over the past 50 years, the health of populations in OECD countries has improved greatly, with people living longer than ever before. Since 1960, life expectancy has increased on

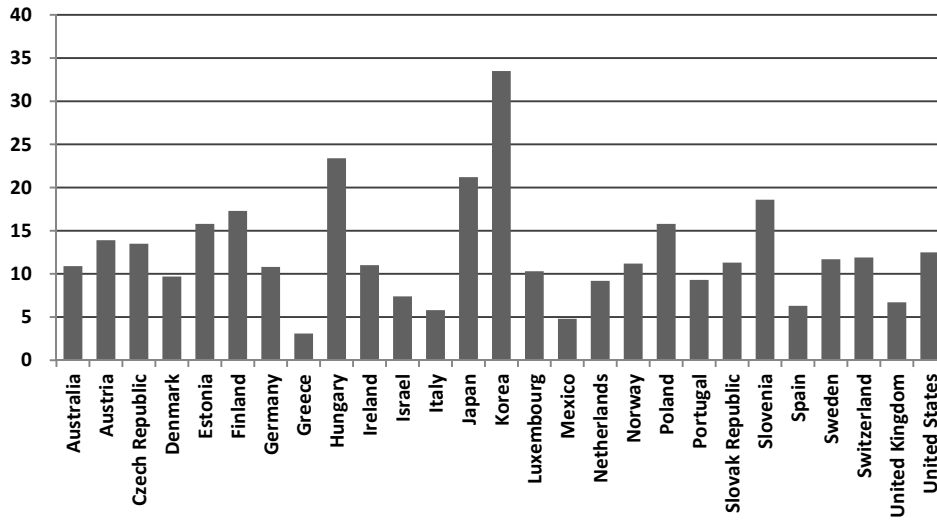
average across OECD countries by more than 11 years, reaching nearly 80 years in 2009. The increase has been particularly noticeable in those OECD countries that started with relatively low levels in 1960, such as Korea where life expectancy has increased by a remarkable 28 years between 1960 and 2009. There have also been noticeable gains in Turkey and Mexico as well as in Chile, a country that has recently joined the OECD. Japan has also achieved large gains with a life expectancy of 83 years. In 2000, only two OECD countries had a total life expectancy of more than 80 years but by 2009, 22 countries had reached this milestone (OECD, 2011a).

2. Cross-cultural comparison of mental health indicators

There have been significant improvements in somatic health in most countries, followed by substantial increases in life expectancies and reductions in mortality. The ageing population prompts an increased interest in the quality of life of the elderly, including the importance of mental health. Ageing often includes exposures to events and conditions associated with higher risks of depressive illness, including bereavement, somatic illness, and poverty (Ploubidis & Grundy, 2009).

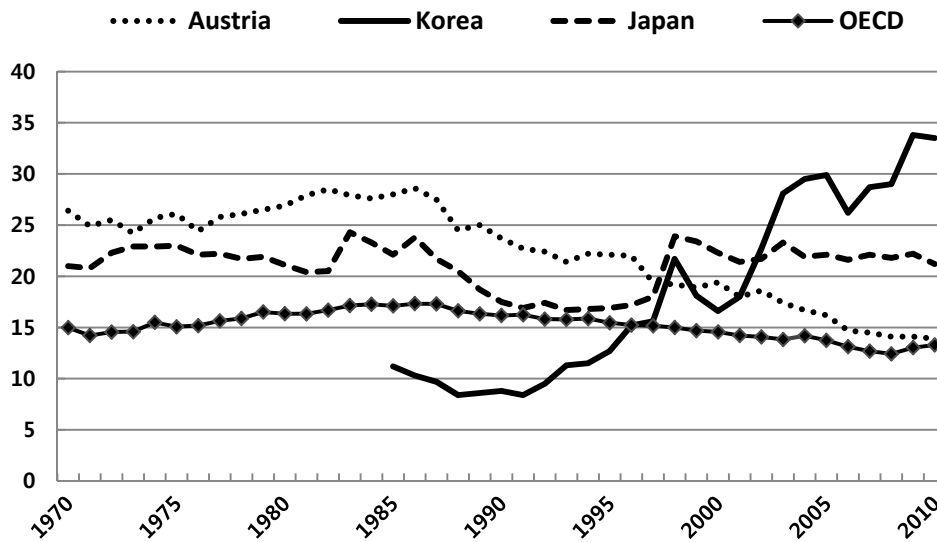
In assessing mental health, suicide and depression are often used as proxy indicators of the mental health status of a population. For suicide rate, Korea's records highest among OECD countries as shown in figure 4.

Figure 4. Suicide rates of OECD countries in 2010 (per 100,000 persons)



Source: stats.oecd.org, OECD statistics, 2010

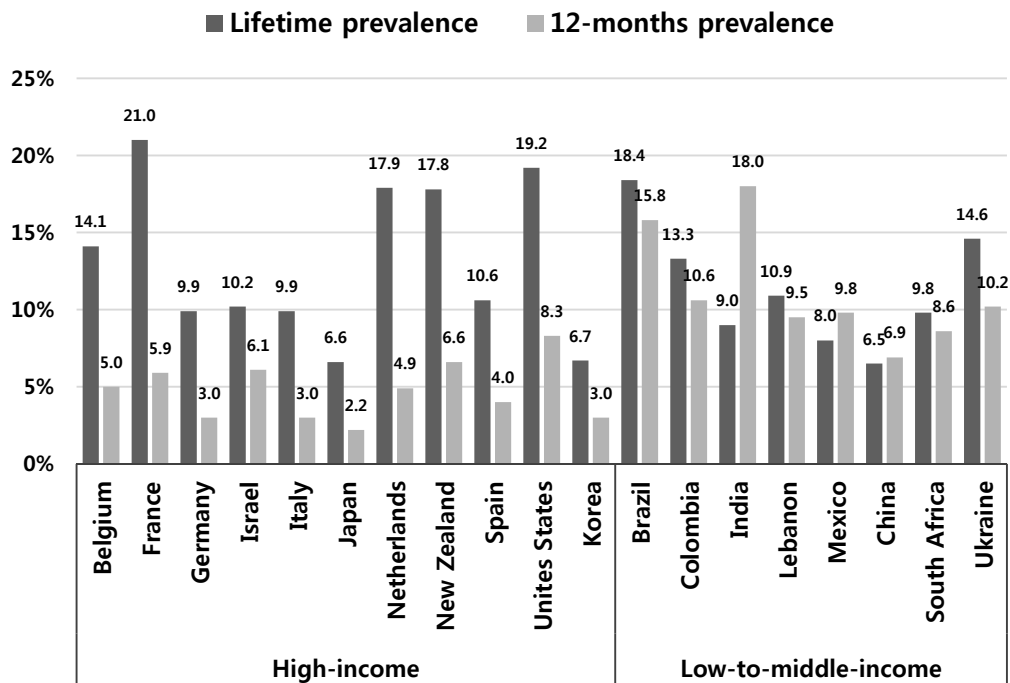
Figure 5. Trends in suicide rates (per 100,000 persons)



Source: OECD Factbook 2013: Economic, Environmental and Social Statistics

In comparison to other OECD countries, Korea's suicide rate was at low levels in 1980s, however, it has sharply increased since mid-nineties, reaching 33.5 per 100,000 persons committing suicide in 2010, which is far above the average of OECD average of 13.29 per 100,000 persons (figure 5).

Figure 6. Prevalence of major depressive disorder



Note: Lifetime prevalence was estimated based on the proportion of respondents who had ever experienced major depressive disorder at the time of the interview. 12-month prevalence refers to the proportion of study participants who identified symptoms occurring in the 12 months preceding the study interview that could be categorized as major depressive disorder.

Source: 1. Bromet et al.: Cross-national epidemiology of DSM-IV major depressive episode. BMC Medicine 2011 9:90. 2. The Epidemiological Survey of Mental Disorders in Korea (2011), Ministry of Health and Welfare

Another indicator of mental health is depression. Lifetime prevalence and 12-months prevalence of major depressive disorder (MDD) were compared grouping countries into high-income countries and low-to-middle income countries (figure 6) (Bromet et al., 2011). Korea recorded 6.7% and 3.0% respectively for lifetime prevalence of MDD and 12-months prevalence of MDD. Relatively low diagnosis of Korea's MDD prevalence is due to the fact that Koreans do not endorse "depressive mood" and a number of contextual factors may influence the response to questions (Jeon, 2012). Also, the responses tend to be under the influence of socially desirable response tendency resulting in low levels of MDD diagnosis in Korea.

IV. DATA AND METHOD

1. Research Hypotheses

Hypothesis 1

Socioeconomic factors (level of education, labor market participation, level of household income) are associated with the mental health of Korean elderly.

Hypothesis 2

Health factors (self-rated health, having limitation in activity, having one or more major diseases, being a smoker, engaging in regular exercise) are associated with the mental of Korean elderly.

Hypothesis 3

Household factors (number of generations in family, number of family members, living arrangement) are associated with the mental health of Korean elderly.

2. Study Design and Population

Data from the 4th Korean National Health and Nutrition Examination Survey (KNHANES IV) conducted from 2007 to 2009 by the Korean Ministry of Health and Welfare was used for analysis. KNHANES surveys have been repeated every three years with very similar cross-sectional designs and nationally representative samples of non-institutionalized persons residing in Korea. For the KNHANES IV, researchers

selected a nationwide probability sample of the population via a stratified multistage probability sampling using rolling survey system based on the 2005 Korean National Census Registry (Korean Ministry of Health and Welfare, 2005). For the health behavior survey, investigators selected 13,800 households, consisting of 31,705 individuals aged 1 and older. A total of 23,632 individuals completed interviews by a trained interviewer, constituting a response rate of 74.5%. The present study limited its analysis to 5,233 elders aged 60 years or older from the health behavior survey of the 4th KNHANES.

Two self-reported mental health indicators, depressive symptoms and suicidal ideation, were used as outcome measures for this analysis. Both depressive symptoms and suicidal ideation were assessed by single yes/no response items: “During the past year, have been sad or despaired enough to affect your daily life for more than 2 weeks?” and “Have you ever thought of taking your life during the past year?” respectively. Three demographic factors – gender, age, and habitant area - were assigned as control variables. Age was categorized into four groups in order to have similar numbers. Habitant area was divided into two groups, urban and rural, according to population density. An urban area has population density of more than 1,000 persons per square kilometers and includes Seoul, Kwangju, Daejeon, Daegu, Pusan, Incheon, and Gyeonggi-do among Korean administrative districts; and the other districts belonged to rural.

3. Factors affecting mental health

Socioeconomic Factors

Education levels were classified into four categories of elementary school or lower; middle school; high school; and college or higher. Current labor market participation was categorized into yes or no (“no” included retired, unemployed, and disabled and out of work). Equivalized household income (total household income divided by the square root of the number of household members) was calculated into quartiles to detect a nonlinear relationship.

Health Factors

Self-rated health was measured with the question “How would you rate your health in general?” There were five response options: 1 = very bad, 2 = bad, 3=fair, 4=good and 5=very good. The responses to this question was trichotomized as “very bad and bad”, “fair”, and “good and very good” for statistical analysis. Presence of disability and diagnosis of any of three major diseases (cancer, cardiovascular and neurologic diseases) were also included as independent variables. Smoking status was categorized as never; former; and current smokers. Physical activity was assessed based on accomplishment of regular hard exercise and walking.

Household Factors

Five indicators of household factors were used. Marital status was classified as unmarried, divorced, bereaved, or separated; and living together. And number of family members was measured and categorized as one; two; and three or more. Living arrangements were divided into four categories of living alone; without spouse and living with others; living with spouse only; and living with spouse and children, elderly parents, or nonrelated individuals. In addition, having breakfast or dinner together with family was also assigned as independent factors to measure close ties with family.

4. Statistical Analysis

Cases were divided into two groups according to mental health indices (depressive symptoms and suicidal ideation). First, the group differences were evaluated by using chi-square and t-test. Second, binary logistic regression analysis was performed to assess the association between mental health indices and covariates in terms of socioeconomic, health, and household aspects. Possible multicollinearity between covariates was evaluated by correlation analysis and collinearity statistic tests. As significant interaction between living arrangement and number of family members was found, two variables were separated in multivariate analysis. Multivariate analyses were performed using hierarchical logistic regression to figure out most significant factor among socioeconomic, health, and household factors. The last parameter was consistently the reference value. All statistical analyses were performed with SPSS

(Version 20, SPSS, Chicago, IL) and p-value less than 0.05 was considered as statistically significant.

V. RESULTS

1. Basic Demographics

Table 2 summarizes the descriptive information of our cases, as well as prevalence of mental health problems (depressive symptoms and suicidal ideation). The mean age was 69.7 years with standard deviation (SD) of 6.7. More than half of elders were aged between 60 and 70 years (53%) and number of those older than 80 years were 531 (9.7%). 58.4% (n=3,056) of the elders were female and 52.7% (n=2756) lived in urban areas. Nearly 70% (n=3,673) had education level of elementary school or lower while 6.2% (n=322) graduated college or higher, and majority of our sample earned less than median of equivalized household income (74.4%; n=3,740). 41.4% (n=2,144) of elders have rated overall health status as bad and very bad. 16.3% had one or more of three Korean major diseases, and 40.5% had limitation in activity. Regarding marital status, 99.5% of elders were married and 68.7% of them were living with their spouses. 43.7% lived only with their spouse constituting the largest portion of living arrangement whereas 6.1% lived without spouse but with other persons. Multigenerational families were 43.5%; 26.3% were living in two generation families and 17.5% in three generation ones.

Differences of Mental Health by Socioeconomic, Health, and Household Factors

Overall prevalence of depressive symptoms and suicidal ideation was 19.9% (n=1,039) and 26.4% (1,377), respectively. Group differences according to socioeconomic, health, and household factors were listed in Table2.

For depressive symptoms, prevalence was significantly higher in the female group and age groups of 75 or more and between 65 and 69. Regarding socioeconomic factors, lower education level, separation from labor market, and lower household income were significantly associated with high risk of depressive symptom ($p<0.01$, all). Bad and very bad self-reported health status was also revealed as significant risk factor ($p<0.01$) together with limitation in activity ($p<0.01$), history of major diseases ($p<0.01$), never smoker ($p<0.01$), and insufficient regular walking ($p<0.05$). Elders who lived without spouse were more likely to experience depressive symptoms; unmarried or widowed, bereaved, separated ones reported higher prevalence of depressive symptoms when compared to married ones living together ($p<0.01$). Similar result was found in terms of living arrangement: living alone, living with others but without spouse vs. living with spouse and others, and living only with spouse ($p<0.01$). Last, those who had breakfast or dinner with their families showed lower prevalence of depressive symptom than those who did not ($p<0.01$).

Regarding suicidal ideation, female gender ($p<0.01$) and age group of more than 75 years ($p<0.01$) showed significant relationships with high prevalence. Among socioeconomic variables, lower education level, separation from labor market, and lower household income was significantly associated with higher prevalence of

suicidal ideation ($p < 0.01$, all). For health factor, worse self-reported health status ($p < 0.01$) was significantly associated with suicidal ideation together with presence of limitation in activity ($p < 0.01$), history of major diseases ($p < 0.01$), never and former smokers ($p < 0.01$), and insufficient regular hard exercise or regular walking ($p < 0.01$ for both). And divorced, separated, and bereaved elders were more likely to experience suicidal ideation than those who were unmarried or living with spouses ($p < 0.01$). Living without spouse – living alone or with others – was revealed to be a correlate of suicidal ideation ($p < 0.01$). Last, those who had breakfast or dinner with their families showed lower prevalence of suicidal ideation than those who did not ($p < 0.01$).

2. Effect of Socioeconomic, Health, and Household Factors

Effects on Depressive Symptom

Base model consisted of three control variables – gender, age, and habitant area. Three more models were made by consequently adding socioeconomic (model 1), health (model 2), and household factors (model 3) to the base model. Hierarchical logistic regression was performed to evaluate effect of each factor on depressive symptom and result was illustrated in Table-3 with R-square values in the bottom row. Whether or not having breakfast or dinner with families was excluded from multivariate analyses for both depressive symptom and suicidal ideation because entering of this variable in the model undermined overall model fitness.

Statistical fitness based on R-square was 4.4% for the base model and 13.6% for the final model (model 3). Health factor was most significant risk factor for depressive symptom in our sample with increase of model fitness by 6.8%, and second was socioeconomic factor (2.3%) and the last was household (0.1%). For all individual variables combined, most powerful predictor of depressive symptom was self-reported health status with OR of 2.45, followed by presence of limitation in activity (OR=1.65), low household income (OR=1.47), living alone (OR=1.46), current smoker (OR=1.41), and history of major disease (OR=1.39).

Effect on Suicidal Ideation

Similar modeling and statistical analysis were performed for study of suicidal ideation. Result of multivariate analysis was summarized in Table-4. Statistical fitness based on R-square was 7.4% for the base model and 18.5% for the final model (model 3), but the best fit model was model 2 with R-square based fitness of 18.9%. Health factor was again most important predictor of suicidal ideation by 8.1% with socioeconomic factor (3.4%) at second. For all individual variables combined, most powerful risk factor of suicidal ideation was self-reported health status with OR of 2.16, followed by presence of limitation in activity (OR=1.97, low household income (OR= 1.86), current smoker (OR= 1.33), lower education level (OR=1.30), living alone (OR= 1.25), and insufficient regular walking (OR=1.21).

Table 2. Basic Demographics and Differences of Mental Health According to Various Factors

	Total	Depressive symptom			Suicidal ideation		
		No Count	Yes Count (%)	<i>p</i>	No Count	Yes Count (%)	<i>p</i>
Age	69.7 ± 6.7	69.6 ± 6.7	70.2 ± 6.5	< 0.010	69.2 ± 6.6	71.1 ± 6.7	< 0.001
Age group				< 0.001			< 0.001
> 75	1,228	953	275 (22.4)		799	427 (34.8)	
70-74	1,230	990	240 (19.5)		891	338 (27.5)	
65-69	1,430	1,117	313 (21.9)		1,073	356 (24.9)	
60-64	1,345	1,125	220 (16.4)		1,085	256 (19.1)	
Sex				< 0.001			< 0.001
Female	3,056	2,284	772 (25.3)		2,035	1,018 (33.3)	
Male	2,177	1,901	276 (12.7)		1,813	359 (16.5)	
Habitation				0.522			< 0.010
Urban	2,760	2,198	562 (20.4)		2,073	683 (24.8)	
Rural	2,473	1,987	486 (19.7)		1,775	694 (28.1)	
Education level				< 0.001			< 0.001
Elementary school or lower	3,637	2,817	820 (22.5)		2,476	1,155 (31.8)	
Middle school	641	535	106 (16.5)		536	105 (16.4)	
High School	609	535	74 (12.2)		533	74 (12.2)	
College or higher	322	283	39 (12.1)		288	34 (10.6)	
Labor market participation				< 0.001			< 0.001
Inactive	3,185	2,464	721 (22.6)		2,240	942 (29.6)	
Active	1,991	1,686	305 (15.3)		1,571	415 (20.9)	
Equivalized household income				< 0.001			< 0.001
< 25 percentile	2,407	1,814	593 (24.6)		1,638	766 (31.9)	
25 - 50	1,333	1,121	212 (15.9)		1,010	321 (24.1)	
50 - 75	725	598	127 (17.5)		581	143 (19.8)	
> 75 percentile	563	488	75 (13.3)		477	85 (15.1)	
Self-rated health				< 0.001			< 0.001
Very bad to bad	2,144	1,492	652 (30.4)		1,293	847 (39.6)	
Fair	1,345	1,157	188 (14.0)		1,093	251 (18.7)	
Good to very good	1,727	1,528	199 (11.5)		1,453	271 (15.7)	
History of major diseases				< 0.001			< 0.001
Yes	851	610	241 (28.3)		564	285 (33.6)	
No	4,382	3,575	807 (18.4)		3,284	1092 (25.0)	
Limitation in activity				< 0.001			< 0.001
Yes	2,111	1,501	610 (28.9)		1,275	830 (39.4)	
No	3,104	2,675	429 (13.8)		2,565	537 (17.3)	
Regular hard exercise				0.145			< 0.010
No	4,640	3,698	942 (20.3)		3,382	1251 (27.0)	
Yes	586	482	104 (17.7)		459	126 (21.5)	
Regular walking				< 0.05			< 0.001
No	2,670	2,106	564 (21.1)		1,866	799 (30.0)	
Yes	2,549	2,068	481 (18.9)		1,969	577 (22.7)	
Smoking status				< 0.001			< 0.001
Never	808	659	149 (18.4)		607	198 (24.6)	
Current	1,353	1,170	183 (13.5)		1,079	273 (20.2)	
Former	3,065	2,352	713 (23.3)		2,156	905 (29.6)	

Marital status				< 0.001			< 0.001
Unmarried	27	17	10 (37.0)		16	11 (40.7)	
Separated, bereaved, or divorced	1,593	1,173	420 (26.4)		1,028	564 (35.4)	
Living with spouse	3,490	2,904	586 (16.8)		2,720	763 (21.9)	
Number of family members				< 0.001			< 0.001
One	846	603	243 (28.7)		542	303 (35.9)	
Two	2,361	1,939	422 (17.9)		1,822	535 (22.7)	
Three or more	2,019	1,642	382 (18.9)		1,483	538 (26.6)	
Number of generations in the family				< 0.001			< 0.010
One	2,935	2,348	587 (20.0)		2,180	750 (25.6)	
Two	1,375	1,093	282 (20.5)		1,028	345 (25.1)	
Three	915	739	176 (19.2)		635	279 (30.5)	
Living arrangement				< 0.001			< 0.001
Alone	843	600	243 (28.8)		540	302 (35.9)	
Without spouse and with others	290	210	80 (27.6)		196	94 (32.4)	
With spouse and others	1,527	1,728	340 (16.4)		1,623	441 (21.4)	
With spouse only	2,068	1,248	279 (18.3)		1,149	375 (24.6)	
Breakfast with families				< 0.001			< 0.001
No	1,479	1,098	381 (25.8)		1,002	476 (23.8)	
Yes	3,366	2,795	571 (17.0)		2,566	794 (25.6)	
Dinner with families				< 0.001			< 0.001
No	1,380	1,027	353 (25.6)		933	446 (25.1)	
Yes	3,465	2,866	599 (17.3)		2,635	824 (30.5)	

* presented as mean ± standard deviation

† Monthly household income divided by the square root of the number of household members.

‡ Cancer, cardiovascular, and neurologic diseases; three of four major diseases defined by Korean Ministry of Health and Welfare.

§ In the past week, was engaged in intense physical activity more than 3 times a week for more than 20 minutes each time.

¶ Walks five days a week for more than 30 minutes each time.

Table 3. Effect of Socioeconomic, Health, and Household Factors on Depressive Symptom

Variables	Base model		Model 1		Model2		Model 3	
	B	OR (95% CI)	B	OR (95% CI)	B	OR (95% CI)	B	OR (95% CI)
Control variables								
Sex								
Female	0.832	3.1 (1.98-2.70)**	0.68	1.98 (1.67-2.35)**	0.62	1.86 (1.46-2.36)**	0.47	1.60 (1.23-20.7)**
Male		1		1		1		1
Age								
> 75	0.331	3.39 (1.13-1.71)**	0.04	1.04 (0.83-1.30)	0.00	0.99 (0.79-1.25)	-0.06	0.94 (0.73-1.20)
70-74	0.211	2.24 (1.00-1.53) *	-0.01	0.98 (0.78-1.22)	-0.08	0.91 (0.73-1.15)	-0.12	0.89 (0.70-1.13)
65-69	0.361	4.4 (1.18-1.75)**	0.22	1.25 (1.02-1.53) *	0.20	1.23 (0.99-1.51)	0.17	1.18 (0.95-1.48)
60-65		1		1		1		1
Habitation								
Urban	0.061	0.06 (0.92-1.22)	0.04	1.05 (0.90-1.22)	0.17	1.19 (1.02-1.40) *	0.17	1.19 (1.00-1.40)*
Rural		1		1		1		1
Socioeconomic variables								
Education level								
Elementary school or lower			0.21	1.23 (0.84-1.80)	-0.01	0.98 (0.66-1.45)	0.02	1.02 (0.67-1.56)
Middle school			0.12	1.13 (0.74-1.71)	0.01	1.01 (0.66-1.56)	0.08	0.19 (0.69-1.70)
High School			-0.17	0.83 (0.54-1.28)	-0.25	0.77 (0.49-1.20)	-0.19	0.83 (0.52-1.31)
College or higher								
Labor market participation								
Inactive			0.36	1.44 (1.22-1.69) *	0.16	1.17 (0.99-1.40)	0.16	1.17 (0.98-1.41)
Active				1		1		1
Equivalized household income §								
< 25 percentile			0.63	1.88 (1.42-2.48) *	0.47	1.60 (1.20-2.13)**	0.38	1.47 (1.07-2.01)*
25 - 50			0.17	1.19 (0.88-1.61)	0.07	1.07 (0.79-1.45)	0.01	1.01 (0.73-1.41)
50 - 75			0.32	1.37 (1.00-1.89)**	0.25	1.28 (0.92-1.78)	0.19	1.20 (0.85-1.70)
> 75 percentile				1		1		1
Health variables								
Self-rated health								
Very bad to bad					0.83	2.30 (1.89-2.80)**	0.90	2.45 (1.99-3.02)**
Fair					0.18	1.20 (0.96-1.50)	0.23	1.26 (0.99-1.60)
Good to very good						1		1
Limitation in activity								
Yes					0.52	1.68 (1.43-1.98)**	0.50	1.65 (1.39-1.96)**
No						1		1
History of major diseases ‡								
Yes					0.35	1.42 (1.18-1.71)**	0.33	1.39 (1.15-1.70)**
No						1		1
Smoking status								
Never					0.18	1.20 (0.93-1.54)	0.20	1.22 (0.94-1.59)
Current					0.35	1.43 (1.10-1.85)**	0.34	1.41 (1.07-1.84)*
Former						1		1
Regular walking ¶								
No					-0.05	0.94 (0.81-1.09)	-0.03	0.97 (0.83-1.14)
Yes						1		1
Household Variables								
Living arrangement								
Alone							0.38	1.46 (1.18-1.82)*
Without spouse and with others							0.23	1.26 (0.91-1.74)
With spouse and others							0.20	1.22 (1.00-1.48)
With spouse only								1
R-square	0.044		0.067		0.135		0.136	

* $p < 0.05$, ** $p < 0.01$

† Monthly household income divided by the square root of the number of household members.

‡ Cancer, cardiovascular, and neurologic diseases; three of four major diseases defined by Korean Ministry of Health and Welfare.

¶ Walks five days a week for more than 30 minutes each time.

|| Odds ratio (95% confidence interval)

Table 4. Effect of Socioeconomic, Health, and Household Factors on Suicidal

Ideation

Variables	Base model		Model 1		Model2		Model 3	
	B	OR (95% CI)	B	OR (95% CI)	B	OR (95% CI)	B	OR (95% CI)
Control variables								
Sex								
Female	0.91	2.48 (2.16-2.84)**	0.64	1.90 (1.63-2.21)**	0.78	2.19 (1.76-2.73)**	0.75	2.12 (1.66-2.70)**
Male		1		1		1		1
Age								
> 75	0.76	2.14 (1.78-2.57)**	0.40	1.49 (1.22-1.82)**	0.32	1.37 (1.11-1.70) *	0.27	1.30 (1.04-1.64) *
70-74	0.46	1.58 (1.31-1.91)**	0.20	1.22 (0.99-1.49)	0.13	1.14 (0.93-1.41)	0.10	1.11 (0.88-1.39)
65-69	0.31	1.37 (1.14-1.65)**	0.10	1.11 (0.91-1.35)	0.06	1.06 (0.86-1.29)	0.01	1.01 (0.82-1.26)
60-65		1		1		1		1
Habitation								
Urban	-0.13	0.88 (0.77-1.00) *	-0.10	0.91 (0.79-1.04)	0.03	1.03 (0.89-1.20)	0.02	1.02 (0.87-1.19)
Rural		1		1		1		1
Socioeconomic variables								
Education level								
Elementary school or lower			0.69	2.00 (1.36-2.95)**	0.49	1.63 (1.09-2.43) *	0.45	1.57 (1.02-2.42) *
Middle school			0.17	1.18 (0.77-1.82)	0.07	1.08 (0.69-1.67)	0.08	1.08 (0.68-1.73)
High School			-0.09	0.91 (0.59-1.42)	-0.17	0.85 (0.54-1.33)	-0.14	0.87 (0.54-1.40)
College or higher								
Labor market participation								
Inactive			0.34	1.41 (1.21-1.64)**	0.13	1.14 (0.97-1.33)	0.10	1.10 (0.93-1.31)
Active				1		1		1
Equivalized household income †								
< 25 percentile			0.70	2.02 (1.55-2.63)**	0.54	1.72 (1.31-2.26)**	0.62	1.86 (1.36-2.55)**
25 - 50			0.52	1.69 (1.28-2.23)**	0.44	1.56 (1.17-2.07)**	0.47	1.59 (1.16-2.18)**
50 - 75			0.32	1.37 (1.01-1.87) *	0.27	1.31 (0.95-1.81)	0.22	1.24 (0.88-1.75)
> 75 percentile				1		1		1
Health variables								
Self-rated health								
Very bad to bad					0.80	2.23 (1.87-2.67)**	0.77	2.16 (1.78-2.60)**
Fair					0.21	1.23 (1.00-1.51)	0.21	1.23 (0.99-1.53)
Good to very good						1		1
Limitation in activity								
Yes					0.66	1.93 (1.67-2.24)**	0.68	1.97 (1.68-2.30)**
No						1		1
History of major diseases ‡								
Yes					0.22	1.25 (1.04-1.49) *	0.26	1.29 (1.07-1.56) *
No						1		1
Smoking status								
Never					-0.19	0.83 (0.66-1.04)	-0.21	0.81 (0.64-1.04)
Current					0.26	1.30 (1.03-1.64) *	0.28	1.33 (1.04-1.70) *
Former						1		1
Regular hard exercise §								
No					-0.12	0.89 (0.70-1.12)	-0.16	0.85 (0.67-1.09)
Yes						1		1
Regular walking ¶								
No					0.19	1.21 (1.05-1.39) *	0.19	1.21 (1.04-1.40) *
Yes						1		1
Household Variables								
Number of generations in family								
One							-0.27	0.76 (0.09-6.59)
Two							-0.15	0.86 (0.65-1.14)
Three								1

Living arrangement				
Alone	0.22	1.25	(1.01-1.53)	*
Without spouse and with others	-0.06	0.94	(0.11-8.28)	
With spouse and others	0.14	1.15	(0.13-9.86)	
With spouse only				1
R-square	0.074	0.108	0.189	0.185

* $p < 0.05$, ** $p < 0.01$

|| Odds ratio (95% confidence interval)

† Monthly household income divided by the square root of the number of household members.

‡ Cancer, cardiovascular, and neurologic diseases; three of four major diseases defined by Korean Ministry of Health and Welfare.

§ In the past week, was engaged in intense physical activity more than 3 times a week for more than 20 minutes each time.

¶ Walks five days a week for more than 30 minutes each time.

VI. CONCLUSION

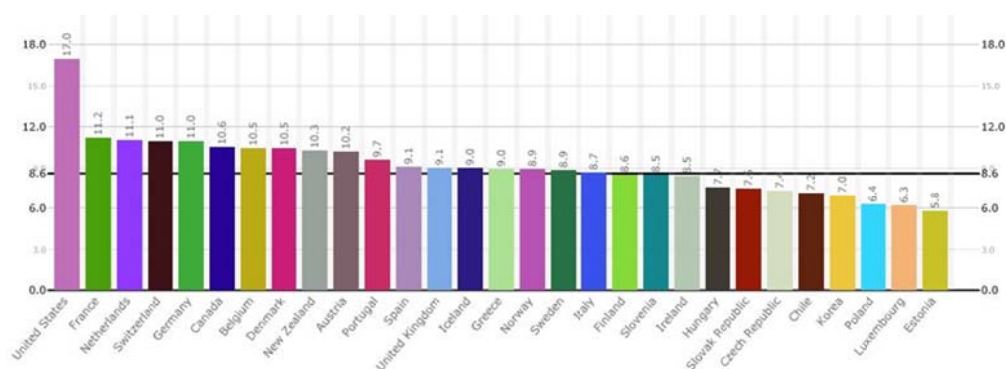
Results of Korean elders' mental health demonstrate that for depressive symptoms, health factors of self-rated health, limitations in activity, history of major diseases, smoking status and for socioeconomic factors, equivalized household income of below 25 percentile, and for household variables, living alone were significantly associated. To prevent depressive symptoms, having good self-rated health, not having limitation in activity and no history of major diseases were important.

For suicidal ideation, socioeconomic factors of educational level (elementary school or lower), equivalized household income of less than 50 percentile, health factors of self-rated health (very bad to bad), having limitation in activity, having a history of major diseases, being a current smoker, not being able to exercise regular walking; and household factor of living without spouse but with others were significantly associated. To prevent suicidal ideation, the most important factors were having good self-rated health, not having limitations in activity, and having sufficient household income. For the mental health of the elderly, subjectivity of good health status, not having limitations in activity and adequate economic status is important. Thus, sufficient per capita health expenditure and state-provided safety nets should be considered to enhance the mental health of a nation's ageing population.

One of the key aims of governments is to promote a society where citizens are happy, healthy, capable and engaged (H. Shah & Marks, 2005). Good mental health is a vital part of this aim, also as an important contributor to other aims, such as social

well-being and economic productivity. Examining national differences in mental health may provide valuable insights into macro-level influences on mental health in later life. The results of a comparative study may help enhance our understanding of possible variations between countries in the mental status of the older people and also provide us with information on public health policy relevant to mental health in older age groups (Ploubidis & Grundy, 2009).

Figure 7. Public health expenditure as a percentage of GDP (OECD countries)



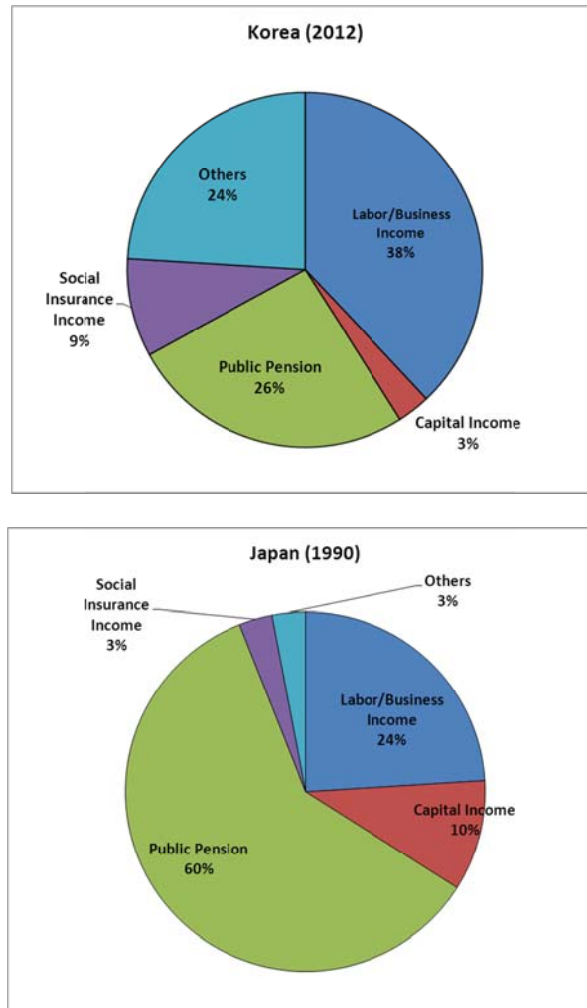
Source: OECD statistics

Socioeconomic factors are an important determinant of the ageing population's mental health. Studies comparing household income of the elderly in Korea and Japan show that Korea's elderly household income rely largely on labor and business income whereas Japan's household income of the elderly is composed mostly of public pension reaching 60% in 1990. In the case of Korea, public pension consists of only 26% of total household income of the elderly in 2012 (LG Economic Research

Institute, 2013). The share of Japanese elderly households that received pensions out of all elderly households already exceeded 80% in 1970s, whereas in Korea, only 32% received pensions in 2011. Therefore Korea's aged population is more likely to suffer from poverty unless they are supported by their offspring or have incomes generated from their own assets. However, many Korean elders are not able to generate incomes by themselves and the breakup of traditional family values has left them in poverty which in turn threatens their mental health. The poverty rate of Korean households with household heads aged more than 65 was the highest among the OECD countries at 47% based on 2010 disposable incomes.

Furthermore, Korea's elders usually work as a low-wage temporary worker since job offered to them are limited. The share of temporary day workers out of over-65 wage earners in Korea in 2012 reached 76%, while in Japan in 1989, the ratio was 49%. Demand for elderly's labor is not diversified in Korea and most elders find it hard to engage in stable jobs after retirement. The earned income of households of workers aged over 65 in Korea was a mere 49% of total average income in 2012, compared to a 67% in Japan in 1989 (LG Economic Research Institute, 2013). It implies that the income of the elderly is below average, and low income was significantly associated with poor mental health.

Figure 8. Income composition of elderly households (Korea vs. Japan)



Note: Elderly households mean households that do not include members aged 18 years or more but younger than 65 years while including one or more elderly persons aged 65 years or more and single-person households of elderly persons aged 65 years or more are included.

Source: HIES and Comprehensive Survey of Living Conditions (CSLC)

Previous research revealed that household characteristics such as living alone is significantly related to depressive symptoms and suicidal ideation (Jeon et al., 2007). Living in multigenerational family without a spouse and having low household income were also significantly associated with poor mental health. Our research verified that living alone and having low income are significantly associated with depressive symptoms and suicidal ideation. Chen et al. mentioned a steep increase in suicide rates in Korea was observed in elderly. A 300% increase in the past 20 years among adults aged over 64 years is a striking observation in the suicide rate of Korea. Overall suicide rates in Korea surpassed that of Japan after 2000, mainly due to the sharp rise among the elderly (Kim et al, 2011). Unpreparedness for ageing and rapid breakdown of traditional extended family systems in Korea are possible explanations for the upsurge. Globalization and the cultural transition have resulted in disrupted traditional values and norms the older generation hold dear (Yip & Tan, 1998; and Park & Lester, 2008). In Japan, relatively well-developed welfare program for elderly have prevented an upsurge in elderly suicides, however, the growing number of unmarried persons and couples without children has become a major concern, as without the support of their children, meeting their physical and mental needs is not easy (Chen et al., 2009; Cho, 2006; and Yip et al., 2010).

The mental health of the elders often go unrecognized and therefore are untreated due to their co-presence with physical illnesses associated with prominent somatization and/or stressful life events (Baldwin, 1988). Somatic health is another important factor affecting the mental health of the elderly. Physical well-being and

independency in activity are significantly associated with reducing depressive symptoms and suicidal ideation. This underscores the government's role and a possible factor underlying country-level variation may be the availability of state-provided supports and services. The availability of state-provided safety nets may largely enhance feeling of security and reduce anxiety (Ploubidis & Grundy, 2009). With the exception of France, countries with generous social security schemes, such as the Scandinavian countries, the Netherlands, and Austria, where per capita public expenditure on health and welfare services is among the highest in Europe, people are less depressed and have higher well-being than in countries where the state provides less (Ploubidis & Grundy, 2009). These findings are consistent with previous research which examined associations between welfare state regime typologies and population health and concluded that population health is enhanced by the relatively generous and universal welfare provisions of the Scandinavian countries (Navarro et al., 2006). Also, it has been suggested the introduction of universal old pensions contributed to historical declines in suicide rates at older ages observed in England and Wales (Murphy, Lindsay, & Grundy, 1986).

The observed cross-country heterogeneity in late-life mental health is largely due to environmental influences, which suggests some potential for policies and population-based interventions to alleviate depression and enhance well-being in the older population. The older population is growing and the rates of depression and suicide increase with age. Any success in these areas would potentially have a large public health impact, particularly as the children, grandchildren and relatives of the

older people may also benefit from improvements in the mental health of their elders. Improving the mental health of the ageing population will have an overall positive effect on the society as a whole.

The present study has some methodological limitations. First, it is based on a cross-sectional assessment, thus a survival effect cannot be ruled out. Second, the use of cross-sectional data does not allow the assessment of the cause-and-effect relation between depressive symptoms and associated conditions.

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국문초록

전세계적으로 급속한 인구 고령화가 진행되는 가운데, 한국은 2000 년 인구의 7%가 65 세 이상인 ‘고령화사회’에 진입하였고, 2017년에는 인구의 14%가 65 세 이상인 ‘고령사회’, 그로부터 9 년 후인 2026년에는 인구의 20%가 65 세 이상으로 구성되는 ‘초고령사회’에 진입할 전망이다. 이와 같은 급속한 인구 고령화에도 불구하고, 한국은 OECD 국가 중 노인빈곤율 1 위를 기록하고 있어 선진국에 비해 노인들의 사회경제적 지위가 낮고, 노후에 대한 대비가 부족한 실정이다. 또한, 급속한 경제발전, 사회구조의 변화, 전통적 가족체계의 붕괴 등에 의해 노인들의 정신건강이 위협받고 있는 상황이다. 보건복지부에서 발표한 제 4 기 국민건강영양조사에 의하면 노인들의 상당수가 우울증상을 경험하였고, 자살에 대한 생각을 한 경험이 있다고 응답하였다. 실제로 한국은 OECD 국가 중 자살률 1 위를 차지하고 있으며 노인 자살률 또한 높다.

본 연구의 목적은 한국의 60 세 이상 고령층의 정신건강에 미치는 영향을 사회경제적 요인, 건강 관련 요인, 가구 특성 요인으로 분류하여 국가간 비교를 통해 원인을 분석하였다. 국제 비교를 통해 나라간 정책을 비교하여 인구 고령화 속도에 맞추어 한국 고령자들의 신체적 건강뿐

아니라 급격히 악화되고 있는 정신건강을 위한 대책을 수립할 것을 제안한다.

키워드: 인구 고령화, 노인, 정신건강, 우울증, 자살

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