Association between Behavioral Risk Factors and Self-Rated Health:
Data from National Health Surveys in South Korea and Thailand

Pholpark, Aungsumalee
(Yonsei University)

Shin, Hye Ri*
(Kyunghee University)

Aekplakorn, Wichai
(Mahidol University)

This study examined the association between behavioral risk factors and self-rated health (SRH) among Korean and Thai adult populations. The data came from the 2009 Korea National Health and Nutritional Examination Survey and the 2009 Thai National Health Examination Survey. These surveys were based on representative samples of the Korean and Thai populations aged between 18 and 59 years, a total of 5,649 and 7,753 respondents, respectively. Multiple logistic regression analysis showed that behavioral risk factors, including lack of physical activity and smoking, were homogenously associated with SRH in both countries. However, physical activity was more strongly associated with SRH in Korea (odds ratio [OR]: 1.46; 95% confident interval [CI]: 1.23-1.74) and Thailand (OR: 1.21; 95% CI: 1.04-1.41). Findings from this study suggest that disease prevention and promotion interventions regarding behavioral risk factors should be strengthened in both countries by taking demographic, socioeconomic, and psychosocial differences into considerations.

* Corresponding Author: Shin, Hey Ri/ Kyunghee University (ltc.shinhyeri@gmail.com)

Ⅰ. Introduction

Globally, a large body of evidence has established that health status is highly associated with behavioral risk factors that can lead to chronic diseases and mortality (Frasure-Smith et al., 1993) as well as posing a public health burden. Four main behavioral factors linked to chronic diseases are tobacco use, unhealthy diet, insufficient physical activity, and harmful alcohol use (Alwan, 2011), and understanding the magnitude of these risks to health is a key to preventing chronic diseases and mortality. Identifying risk factors is also important for health policy planning and evaluation, particularly for disease prevention and promotion (World Health Organization, 2009).

Health status can be measured with self-rated health (SRH) scale, which has been recognized as a simple and relatively inexpensive general health measurement tool that is easy to administer a survey (Bombak, 2013). Furthermore, SRH is a widely used health indicator in survey research on general health assessments in countries around the world (Bardage et al., 2005; Kaleta, Makowiec-Dabrowska, & Jegier, 2008; Zarini et al., 2014); it was found to be a valid measure of health status and mortality prediction in populations without cardiovascular diseases and functional disability (Bardage et al., 2005; DeSalvo, Bloser, Reynolds, He, & Muntner, 2006; Idler & Benyamini, 1997; Wu et al., 2013).

However, the relationship between SRH and behavioral risks appeared to be a complex association (Bombak, 2013); a number of studies have shown that behavioral risk factors are associated with SRH (Bodde, Seo, & Frey, 2009; Fylkesnes & Førde, 1991; Schulz et al., 1994; Zarini et al., 2014), but there are conflicting findings concerning the relationship between the two variables (Bombak, 2013; Manderbacka, Lundberg, & Martikainen, 1999). Some have argued that SRH varies by socioeconomic status (SES) (Delpierre, Lauwers-Cances, Datta, Berkman, & Lang, 2009; Kaleta, Makowiec-Dąbrowska, & Jegier, 2008).

Consequently, it remains unclear from the literature whether behavioral risk factors

are associated with how people assess their health. In addition, SRH can have different implications for diverse social and cultural backgrounds (Bardage et al., 2005; Jerković, Sauliūnė, Šumskas, Birt, & Kersnik, 2015; Prus, 2011; Zimmer, Natividad, Hui-Sheng, & Chayovan, 2000). Bardage et al. (2005) examined SRH among older adults in Finland, Sweden, the Netherlands, Spain, and Israel; Jerković et al. (2015) compared SRH among elderly populations in Slovenia, Lithuania, and the United Kingdom; Prus (2011) compared SRH between general population in the United States and Canada; and Zimmer, Natividad, Hui-Sheng, and Chayovan (2000) compared SRH among older adults in the Philippines, Taiwan, and Thailand.

Although SRH has been widely used and compared across European countries, research on the subject has been scarce in Asian countries (Page & Suwanteerangkul, 2009; Zimmer et al., 2000). South Korea (Korea), a high-income country, and Thailand, a middle-income country, are geographically located in Eastern Asia. They share the three behavioral risk factors that account for the highest public health burdens in both countries: diet, alcohol consumption, and smoking (Institute for Health Metrics and Evaluation, 2010), all of which contribute to chronic disease and mortality. However, the two countries do also differ from each other in meaningful ways, including economic development levels, health systems, social welfare programs, and income inequality, which are likely to yield different implications for health status in the two countries. To date, no study has compared SRH and the associated behavioral risk factors between these two countries.

This study, thus, aimed to examine the associations of diet, alcohol consumption, smoking, and physical activity with self-rated health across Korean and Thai adult populations.

Ⅱ. Literature Review

1. Country profiles

Korea and Thailand provided universal health coverage with public health insurance in 1989 and 2002, respectively, and now all citizens of both countries have the right to health services (Kwon, 2009; Evans et al., 2012). However, the countries differ in their sources of financing, health service delivery systems, and benefits packages. Korea administers a single-payer scheme, the National Health Insurance, which mainly relies on social health insurance, and medical aid is provided to the poor through general taxation (Kwon, 2009). In contrast, Thailand adopts multi-payer schemes: the Social Security Scheme (SSS) for private-sector employees, excluding dependents, the Civil Servant Medical Benefit Scheme (CSMBS) for government employees and their dependents, and the Universal Coverage Scheme (UCS) for the remaining population, the majority of which are self-employed or informal sector workers. These three schemes cover approximately 16%, 9%, and 75% of the Thai population, respectively (Evans et al., 2012). The schemes have differing financing sources. The SSS is financed by social health insurance, whereas the CSMBS and the UCS are financed by general taxation; in short, Thai public health insurance mainly relies on taxation. The health service delivery system in Korea relies mainly on private providers, whereas the major provider in Thailand is the public sector. In addition, Korea requires co-payment at the point of service, but Thailand does not. Although both countries provide comprehensive benefits, Thailand's benefits packages vary: the benefits under the CSMBS are slightly greater than those from the SSS or UCS (Evans et al., 2012).

The overall demographic structures of the two countries are similar. In 2010, life expectancy at birth was 79.7 years in Korea and 74.1 in Thailand, and age-standardized year life with disability rate (per 100,000) were 9,575 and 10,369, respectively (Institute for Health Metrics and Evaluation, 2010). However, in 2015,

Korea's mortality rate for children under 5 years per 1,000 live births was 3%, whereas the rate was 12% in Thailand. In addition, in 2014, survival to age 65 for females in Korea and Thailand were 94% and 84% and for males, 86% and 72%, both respectively (http://worldbank.org).

The Gini coefficient reflects inequality of income distribution in a country. In 2013, the Gini coefficients for Korea and Thailand were 0.302 (Organisation for Economic and Co-operative Development, 2016) and 0.379 (http://worldbank.org), respectively, indicating that Korea had less inequality than did Thailand.

As with other high- and middle-income countries, the most important risk factors in these two countries are those associated with chronic diseases (World Health Organization, 2009); they shared 3 of the top 15 behavioral risk factors that account for their disease burdens as measured in disability-adjusted life years (DALYs), including dietary risks, alcohol consumption, and smoking. Total alcohol consumption per capita in 2015 (liters of pure alcohol, projected estimates for more than 15 years) was similar in both countries (Korea: 10.9%; Thailand: 8.3%), and smoking prevalence in 2012 was also similar (Korea: males, 51.7%, females, 4.4%; Thailand: males, 42.3%, females, 2.4%) (http://worldbank.org). These risk factors are the leading causes of chronic diseases such as cardiovascular and circulatory diseases, cancer, diabetes, and injuries (see Figure 1; Institute for Health Metrics and Evaluation, 2010).

Figure 1. Percentages of disability-adjusted life years lost due to 15 leading risk factors in Korea and Thailand, 2010
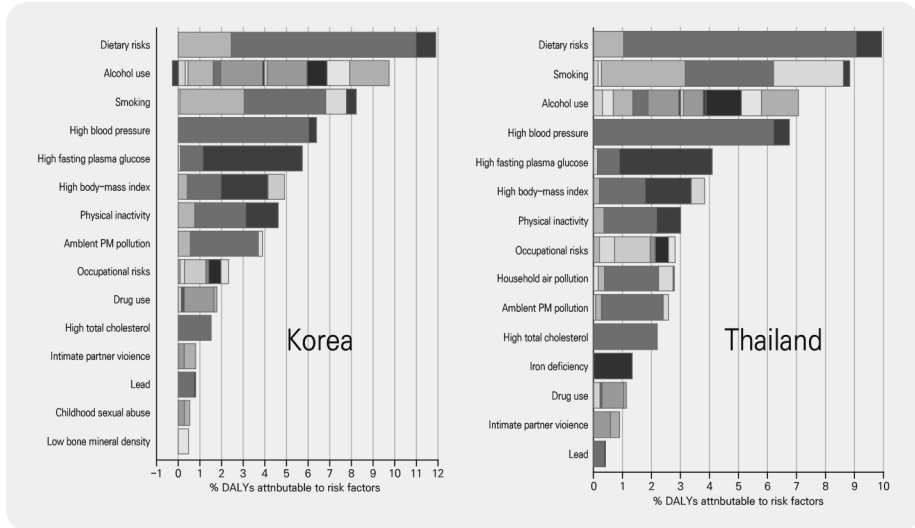
Source: GBD (2010).

2. Behavioral risk factors and Self-rated health

Some of the ways in which behavioral risk factors link to chronic diseases include the relationship between tobacco use, lung cancer, and stroke and how dietary risks (e.g., low fruit and vegetable intake) relate to obesity, high blood pressure, ischemic heart disease, and stroke. Alcohol and tobacco use, high blood pressure, high body mass index (BMI), high cholesterol, high blood glucose, low fruit and vegetable intake, and physical inactivity account for 61% of cardiovascular deaths (World Health Organization, 2009), and all of these risk factors affect individual health status.

World Health Organization (WHO) (1948) defined health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." WHO definition clearly suggests that "health status" consists of physical, mental, and social dimensions (Pinquart, 2001). Health status can be measured in

a variety of ways: SRH, one of the global health status measure (Bardage et al., 2005; Manor, Matthews, & Power, 2001), was developed by WHO in 2001 as a single-item scale on which individuals rate their current health status using a four- or five-point rating scale from "excellent" to "poor" (Wu et al., 2013). SRH provides an important complement to objective measures because it can predict the mortality (Bardage et al., 2005; DeSalvo, Bloser, Reynolds, He, & Muntner, 2006; Idler & Benyamini, 1997; Wu et al., 2013) and major episodes of illness (Hunt el al., 1981).

There are many studies on the relationship between behavioral risk factors and SRH in Korea (Choi, 2014; Choi & Kim, 2008; Choe, Kwon, & Paik, 2006; Han et al., 2009; Kim, 2012; Kim et al., 2010; Park, Jun, & Kim, 2015). Park, Jun, and Kim (2015) reported significant associations between current smoking, heavy alcohol use, and lack of physical activity and SRH among Korean adults. Kim (2012) also examined the relationship between health promotion behavior, health status, and quality of life among an elderly population in Korea and found that health promotion behavior such as physical activity affected SRH. In addition, other two studies also showed a significant relationship between physical activity and SRH among adolescents and adults in Korea (Choi, 2014; Han et al., 2009). Choe, Kwon, and Paik (2006) examined the association of health related behaviors and nutrient intake with SRH and reported that fruit intake was significantly associated with older adults' SRH in Korea. Kim et al. (2010) showed that behavioral risk factors (e.g., smoking, physical activity) mediated the association between SRH and SES among Korean adults. Choi and Kim (2008) did not study SRH, but they examined behavioral risk factors and frequency of visits to health care facilities among low-income adults in Korea, and their findings were similar to those from other SRH studies.

In contrast to Korea, there are few studies regarding behavioral risk factors and SRH in Thailand (Kaewpan & Kalampakorn, 2012; Mota et al., 2012; Page & Suwanteerangkul, 2009; Zimmer, Natividad, Hui-Sheng, & Chayovan, 2000). Kaewpan and Kalampakorn (2012) studied SRH and health promoting behavior of middle-aged workers and found that there was a significant association between SRH

and health promoting behaviors, which comprised self-actualization, health responsibility, nutrition, exercise, interpersonal relationship, and stress management. Mota et al. (2012) studied the association of physical inactivity and body mass index (BMI) with SRH among Thai adolescent girls and found that girls who were classified as unfit were more likely to report poor SRH, after adjusting for BMI. Page and Suwanteerangkul (2009) studied SRH, psychosocial functioning, and health-related behaviors among Thai adolescents and found that those adolescents who rated their health status as poor were less physically active and were more likely to be overweight. Zimmer, Natividad, Hui-Sheng, and Chayovan (2000) compared SRH among older adults in the Philippines, Taiwan, and Thailand and found that current smoking was significantly associated with older adults' SRH in Thailand.

Moreover, there is evidence how people rate their health depends on their expectations of what their health should be, which may, in turn, be associated with their demographic characteristics and SES such as gender, age, education level, employment status, income, and health insurance (Decker, Kostova, Kenney, & Long, 2013; Delpierre, Lauwers-Cances, Datta, Berkman, & Lang, 2009; Haseen, Adhikari, & Soonthorndhada, 2010; Kaleta, Makowiec-Dabrowska, & Jegier, 2008; Kim, 2007; Lee, 2005; Park, Jun, & Kim, 2015; Subramanian, Huijts, & Avendano, 2010) as well as psychosocial factors such as depression, stress, and unhappiness (Haseen, Adhikari, & Soonthorndhada, 2010; Molarius & Janson, 2002; Mui, 2000).

III. Methods

The data came from the Korea National Health and Nutritional Examination Survey (KNHANES) and the Thai National Health Examination Survey (NHES). KNHANES has been conducted by the Center for Disease Control and Prevention (CDC) from 1998 to the present, aiming for examining the general health, nutrition

status, health behavior, the status of chronic diseases, and so on, while NHES has been conducted by the National Health Examination Survey Office, Health Systems Research Institute from 1991 to the present, aiming for examining the general health, disease prevalence, and health risk factors. Additionally, the questionnaires that have been adopted in KNHANES and NHES, particular on behavior risk factors, are relatively similar.

The 2009 NHES, the latest version available, is used here to compare the cases of Thailand and Korea due to the NHES is only the Thai National Health Survey that includes behavioral risk factors of Thai adult population. In this sense, it would be more meaningful to compare behavioral risk factors between the two national surveys that had been conducted in the same year. Noted that a strict approval procedure is required for the data access in Thailand.

According to the 2009 KNHANES and 2009 NHES, the response rates were 82.8% and 93%, respectively. The face-to-face survey interviews were conducted in both countries based on sample representatives of the Korean and Thai populations. However, this study included only data concerning those aged between 18 and 59 years, a total of 5,649 and 7,753 respondents, respectively.

For this study, we used the same questions for the data analysis that were used in the surveys in both countries. Health status was defined based on SRH, specifically, the single question, "How do you rate your general state of health? Excellence, good, fair, poor, or very poor." We analyzed self-rated health as a dichotomous measure, coding both "Excellence" and "good" as "good health," and "fair", "poor," and "very poor" as "poor health." Diet was assessed based on fruit and vegetable intake per day (grams) and coded smoking as (1) never smokers, (2) former smokers, and (3) current smokers. Alcohol consumption was measured as the amount of drinking per year and was coded into (1) high risk and (2) low risk. Physical activity was measured based on duration and frequency of moderate exercise, more than 30 minutes of exercise more than 5 days per week, was coded into yes and no.

Confounding variables included gender, age, education, family income, employment status, residence area, national health system, BMI, and depression. Education was classifed into five levels: (1) no education, (2) elementary school, (3) middle school, (4) high school, and (5) vocational and university. Family income was classified into five quintiles and employment status was classified into employed and unemployed, and residence area was classified into rural and urban areas. BMI was calculated as weight/height2. Depression was measured by using a yes/no question: "Did you have feelings (sad, do not interest in anything, or loss energy) more than two weeks?" The national health insurance system was categorized based on the system in each country. For Korea, the categories were (1) employee health insurance, (2) self-employed health insurance, and (3) medical aid beneficiaries and for Thailand, they were (1) Social Security Scheme (SSS), (2) Universal Coverage Scheme (UCS), and (3) Civil Servant Medical Benefit Scheme (CSMBS).

Multiple logistic regressions were conducted to analyze the factors associated with SRH, analyzing the data separately by country, controlling for gender, age, education, family income, employment status, residence area, BMI, depression, and national health insurance system. The results are presented as odds ratios (ORs) and confidence intervals. For all statistical analyses, we used STATA software, version 13, all tests were two-sided, and considered p values less than 0.05 statistically significant.

$$
\begin{aligned}
Logit(p) = {} & \alpha + \beta_1 Dietary + \beta_2 Alcohol + \beta_3 Smoking \\
& + \beta_4 Physical\,Activity + \beta_5 Gender + \beta_6 Age \\
& + \beta_7 Education + \beta_8 Family\,Income + \beta_9 Employment \\
& + \beta_{10} Area + \beta_{11} BMI + \beta_{12} Depression \\
& + \beta_{13} National\,Health\,Insurance\,System
\end{aligned}
$$

Ⅳ. Results

Table 1 shows the results of comparing the general characteristics of the Korean and Thai samples; the two countries had similar proportions of gender and age among their respondents. More than half of the Thai sample had an elementary school education, whereas one-third of the Korean sample had completed high school. The mean family income in Korea was approximately seven times higher than that in Thailand, and compared with Korea, Thailand had a greater proportion of employed respondents. In both samples, more people lived in urban areas, but Korea had a greater proportion of people in its urban areas than did Thailand. The mean BMIs were similar in the two countries, and the proportions of respondents with depression were low in both samples. Most respondents were covered under the health insurance for self-employed or informal sector workers. A higher proportion of Thai respondents reported good health than Korean respondents, but the Korean sample consumed greater portions of fruits and vegetables per day. Both samples had low-risk alcohol consumption and were non-smokers, but both countries also had large proportions of respondents who did not exercise much.

Table 1. Characteristics and behavioral risk factors of the study participants by country

	Korea (N = 5,649)		Thailand (N = 7,753)	
	Total	%	Total	%
Gender				
Men	2,510	45.4	3,759	48.5
Women	2,910	54.6	3,994	51.5
Age				
Mean		39.5		41.9
18-29	1,256	22.2	1,099	14.2
30-44	2,287	40.5	3,284	42.3
45-59	2,106	37.3	3,370	43.5
Education				

	Korea (N = 5,649)		Thailand (N = 7,753)	
	Total	%	Total	%
None	25	0.5	141	1.8
Elementary school	456	8.5	4,237	54.6
Middle school	557	10.5	1,067	13.8
High school	1,945	36.5	1,137	14.7
Vocational and university	2,342	44	1,171	15.1
Family income (per month)				
Average		$3,198.9		$474.2
Quintile 1	967	17.1	1,742	22.5
Quintile 2	1,666	29.5	1,559	20.1
Quintile 3	1,173	20.8	1,409	18.2
Quintile 4	1,019	18.0	1,522	19.6
Quintile 5	824	14.6	1,521	19.6
Employment status				
Employed	3,550	66.7	6,991	90.2
Unemployed	1,775	33.3	762	9.8
Residence area				
Urban	4,565	80.8	4,080	52.6
Rural	18,084	19.2	3,673	47.4
Body mass index (BMI) Mean		23.5		24.4
Depression				
Yes	768	14.4	1,310	16.9
No	4,559	85.6	6,441	83.1
National health insurance system				
Type 1 (Korea: Employee health insurance; Thailand: SSS)	2,136	38.1	1,147	14.8
Type 2 (Korea: Self-employed health insurance; Thailand: UCS)	3,332	59.4	5,820	75.1
Type 3 (Korea: Medical aid beneficiaries; Thailand: CSMBS)	140	2.5	786	10.1
Self-rated health				
Good	2,416	45.4	4,038	52.1
Poor	2,910	54.6	3,715	47.9
Fruits & Vegetables intake (grams/day) Mean		516.2		262.3
Alcohol consumption				
High risk	1,364	24.2	5,809	25.1
Low risk	4,285	75.8	1,944	74.9
Smoking				

	Korea (N = 5,649)		Thailand (N = 7,753)	
	Total	%	Total	%
Non smoker	3,170	59.3	4,681	60.4
Former smoker	831	15.6	920	11.9
Current smoker	1,340	25.1	2,152	27.7
Physical activity				
Yes	760	14.6	793	10.2
No	4,454	85.4	6,957	89.8

Table 2 shows the odds ratios (OR) for each of the status characteristics and behavioral risk factors in relation to SRH, within each country, when controlling for gender, age, education, family income, employment status, residence area, BMI, depression, and national health insurance system. Controlling for other variables in the model, only smoking and physical activity showed a statistically significant association with SRH in both countries. Fruit and vegetable intake had a significant association with SRH in Korea, but not in Thailand.

Korean adults who consumed few servings of fruits and vegetables per day were more likely to report poor SRH, which similar to previous study (Choe, Kwon, & Paik, 2006). In contrast, fruit and vegetable intake in Thailand did not show a significant association. According to Satheannoppakao et al. (2009), 36.5% and 68.0% of Thai adults consumed fruits and vegetables on a daily basis; compared with adults in Korea (fruits: 65.5%, vegetables: 99.1%; http://stats.oecd.org, 2014), Thai adults consumed considerably fewer fruits and vegetables, a possible reason for the insignificant association with SRH in Thai adults.

Current smokers were more likely to report poor SRH than were non-smokers in both countries. Similar to the findings from previous studies in both countries, Choi and Kim (2008) reported a relationship between smoking and frequency of health and medical facility visits in Korea. Similar research also showed that average number of visits to medical facilities had a negative relationship with average amount of smoking per year, and in Thailand, Zimmer, Natividad, Hui-Sheng, and Chayovan

(2000) found that current smokers were more likely to report poor SRH than were non-smokers.

Both Korean and Thai adults who did not perform more than 30 minutes of exercise more than five days per week were more likely to report poor SRH than those who performed, and physical activity had the highest ORs in both countries (Korea: OR=1.46 and Thailand: OR=1.21). Therefore, physical activity has a powerful impact on SRH. These results are similar to findings from previous studies in both Korea (Choi, 2014; Han et al., 2009; Kim, 2012) and Thailand (Kaewpan & Kalampakorn, 2012; Mota et al., 2012; Page & Suwanteerangkul, 2009).

Gender, education, family income, and depression effects were statistically significant in both countries; female, less education, lower family incomes, and depressed respondents were more likely to report poor SRH. Although higher age, being unemployed, and living in urban areas were significantly associated with poor SRH in Thailand, they were not in Korea. Separately, Thai adults on the SSS were more likely to report poor SRH than were those on the CSBMS.

From the results, it can be seen that the control variables affected SRH differently in Korea and Thailand. While age, employment status, residence area, and national health insurance system had significant effects on SRH in Thailand, in Korea, they did not. The findings showed that SRH in Thailand varied by demographic characteristics, SES, residence area, and health insurance scheme, and they were similar to findings from previous studies in Thailand that demographic and SES variables were significantly associated with SRH (Seubsman, Kelly, Yiengprugsawan, Sleigh, & the Thai Cohort Study, 2011; Tangcharoensathien et al., 2006; Yiengprugsawan, Lim, Carmichael, Sidorenko, & Sleigh, 2007; Zimmer & Amornsirisomboon, 2001). However, this study's findings differed from other Thai studies with regard to residence area and health insurance scheme (Tangcharoensathien et al., 2006; Yiengprugsawan, Lim, Carmichael, Sidorenko, & Sleigh, 2007): we found that respondents who lived in urban areas were more likely to report poor SRH than were those in rural areas. One explanation for this is that

rural residents are less-exposed to pollution than are those who live in urban areas. From the health insurance system perspective, residents of rural areas have better access to primary health care from health care centers, which heavily emphasize on disease prevention and health promotion, than did urban residents, and this is because primary care is a gatekeeper in the district health system in Thailand. In contrast to rural areas, urban Thai residents can choose either hospitals or private clinics - which mainly focus on curative care - as their primary contacts. Thus, they might have less access to health education, which in turn might lead to poor SRH. Because of the differences in the benefits across schemes, CSMBS members receive greater benefits than SSS and UCS members (Evans et al., 2012), which could contribute to poorer SRH among SSS members, compared to the CSMBS, and SRH did not significantly differ between SSS and UCS members.

In contrast to Thailand, Korea was characterized by relationships between demographic and SES variables such as gender and education and SRH. Thailand also showed significant associations between these variables, but Korea had higher ORs. As reported in previous studies, the relationship between SES and SRH is an important issue in Korea (Kim, 2007). According to Kim (2007), SES factors such as gender and education not only affect SRH but also suggest social inequality. Therefore, persons of lower SES need to be taken under consideration when designing and implementing social interventions in Korea (Kim, 2007). As found in Kim and other studies in Korea (Kim et al., 2010; Choi, 2014; Shin, Shin, & Rhee, 2012), our analyses showed that females and those with less education tended to report poor SRH.

Another control variable that affected SRH in this study in both countries was depression, and this result is similar to findings from previous studies in Korea that those with poor SRH were more likely to be depressed (Lee, 2005; Mui, 2000). Other studies in Thailand also found that those with poor psychosocial scores such as stress, loneliness, hopelessness, and unhappiness tended to report poor SRH (Haseen, Adhikari, & Soonthorndhada, 2010; Page & Suwanteerangkul, 2009).

Table 2. The association of self-rated good health status with behavioral risk factors among the Korean and Thai adult populations

		Korea			Thailand		
		OR	CI		OR	CI	
			Lower	Upper		Lower	Upper
Independent Variables	Fruits & Vegetables intake	1.00**	1.00	1.00	1.02	0.99	1.04
	Alcohol consumption						
	Low risk						
	High risk	1.15	0.98	1.35	1.00	0.89	1.11
	Smoking						
	Never smokers						
	Former smokers	0.94	0.77	1.15	0.99	0.83	1.17
	Current smokers	0.71**	0.58	0.86	0.83**	0.72	0.95
	Physical activity	1.46***	1.23	1.74	1.21*	1.04	1.41
Control Variables	Gender	0.73**	0.61	0.88	0.70***	0.61	0.79
	Age	0.99	0.99	1.00	0.97***	0.97	0.98
	Education	1.19***	1.10	1.30	1.06*	1.01	1.11
	Family income	1.08**	1.03	1.14	1.05**	1.01	1.09
	Employment status	1.08	0.94	1.24	1.21*	1.03	1.41
	Area	1.13	0.97	1.32	1.12*	1.02	1.24
	BMI	0.99	0.97	1.01	1.00	0.98	1.01
	Depression	0.48***	0.40	0.58	0.58***	0.52	0.66
	National health system						
	Type1						
	Type2	0.93	0.81	1.06	0.93	0.81	1.07
	Type3	0.99	0.65	1.52	1.27**	1.07	1.50

***p<0.001, **p<0.01, *p<0.05

To attain meaningful findings, this study compared Thailand's 2009 data to Korea's data of the same year despite the fact that Korea National Health and Nutritional Examination Survey data is currently available until 2015. It is also important to look at the latest health risks in Korea. Therefore, the analysis results of Korea in 2009 and 2015 are also presented as follows.

Table 3. The association of self-rated good health status with behavioral risk factors among Korean adult population, 2009 and 2015

		Korea (2009)			Korea (2015)		
		OR	CI		OR	CI	
			Lower	Upper		Lower	Upper
Independent Variables	Fruits & Vegetables intake	1.00**	1.00	1.00	1.01†	1.00	1.01
	Alcohol consumption						
	Low risk						
	High risk	1.15	0.98	1.35	1.22	0.96	1.55
	Smoking						
	Never smokers						
	Former smokers	0.94	0.77	1.15	0.90	0.56	1.43
	Current smokers	0.71**	0.58	0.86	0.52***	0.39	0.71
	Physical activity	1.46***	1.23	1.74	1.36**	1.13	1.63
Control Variables	Gender	0.73**	0.61	0.88	0.60***	0.47	0.77
	Age	0.99	0.99	1.00	0.99†	0.98	1.00
	Education	1.19***	1.10	1.30	1.20***	1.09	1.31
	Family income	1.08**	1.03	1.14	1.04	0.96	1.12
	Employment status	1.08	0.94	1.24	1.07	0.88	1.30
	Area	1.13	0.97	1.32	1.17	0.89	1.52
	BMI	0.99	0.97	1.01	0.96**	0.94	0.99
	Depression	0.48***	0.40	0.58	0.46***	0.33	0.64
	National health system						
	Type1						
	Type2	0.93	0.81	1.06	0.86	0.70	1.06
	Type3	0.99	0.65	1.52	0.67	0.34	1.32

***$p<0.001$, **$p<0.01$, *$p<0.05$, † $p<0.10$

Comparison between the data of 2009 and 2015 versions yielded the main similar findings; fruit and vegetable intake, current smoking and exercise were significantly associated to SRH. Noted that a physical activity variable was defined differently between 2009 and 2015; it was measured as appropriate exercise in 2009, while in 2015, it was measured as aerobic physical activity practice. Among the control variables, age and BMI were significantly associated to SRH, which were different

from the 2009 results.

Overall, the results of data analysis did not show a significant difference despite the 6-year gap, which means that the health risk behaviors of Koreans have not changed much, and the policy and intervention for health behaviors are still needed.

V. Discussion and Conclusion

Cross-country comparisons provide a unique opportunity to examine how differences in different countries' social and cultural contexts shape the relationships between behavioral risk factors and health status. Using multiple logistic regression to predict self-reported good health, we found similar patterns of behavioral risk factors in the two countries, including physical activity and smoking, were significantly associated with SRH; in addition, the sizes of their impacts tended to be similar between the two. Unlike in Thailand, Korean adults who consumed few fruits and vegetables were more likely to report poor SRH.

However, it can be seen that social determinants of health include micro-level social factors such as SES and other demographic characteristics (gender, education, family income, depression as a psychosocial factor) that were related to SRH in both countries. Interestingly, age, employment status, residence area, and national health insurance were significantly associated with SRH in Thailand, but not in Korea.

Findings from this study showed that lower socioeconomic status contributed to poor SRH in both Korea and Thailand, and according to Kim (2007), these social and health disparities increase with age. Although Korean adults have longer life expectancies and lower mortality than Thai adults, health promotion interventions still need to be introduced among adults of lower socioeconomic status. Both the Korean and Thai governments should establish fundamental policies to improve health status particularly among these vulnerable groups.

In contrast to Korea, residence area and health insurance variables contributed to poor SRH in Thailand; as we observed earlier, there were differences in Thailand in these two variables. Thus, the Thai government should consider how to improve disease prevention and health promotion programs in urban areas as well as to improve the equality of benefits package across three schemes.

In addition, psychosocial factors such as depression are also important to consider when designing and implementing health promotion policies because these affected SRH in both countries. This factor appears to be more complex than others in that seeking care for depression is perceived as a stigma, which in turn might lead to suicide if patients do not receive treatment properly.

The implications of this study are as follows. First, the effects of behavioral risk factors on SRH in Thailand and Korea are similar, and thus, it can be inferred that universal risk factors could affect health similarly.

Second, although Korea and Thailand showed similar results for the behavioral risk factors, some control variables differed based on social and cultural contexts; it is important to understand and analyze the social and cultural backgrounds of each country. With this study, we aimed not only to simply analyze behavioral risk factors but also to take into account the context of each country, including demographic characteristics, SES, and health insurance systems as control variables.

Finally, the last analysis between 2009 and 2015 Korean among adult population emphasized the fact that the policy and intervention for health behaviors in Korea are strongly needed to be modified.

Limitations of this study are as follows. First, we limited the study to comparing behavioral risk factors between two countries, and thus, the results cannot be generalized to other countries; additional studies should expand to other countries in Asia to establish whether the results are similar. Second, we only analyzed Korean and Thai adults, and it is necessary to conduct subgroup analysis of SRH by country, especially the demographic and SRH variables that showed significant associations with SRH, for example, gender, family income, and education. Finally, the study's

cross-sectional design has the limitation of assuming cause-effect relationships, and these apparent relationships should be examined in longitudinal studies.

폴팍 앙수말이는 태국에서 심리학 석사학위를 받고, 현재 연세대학교 사회복지대학원 박사과정에 재학 중이다. 주요 관심분야는 노인장기요양보험 및 건강보험이며, 현재 태국과 한국의 건강보험 개혁 비교 연구를 하고 있다.

(E-mail: aungsumalee@hisro.or.th)

신혜리는 연세대학교에서 사회복지학 박사학위를 받았으며, 현재 경희대학교 노인학과에서 연구 박사로 재직 중이다. 주요 관심분야는 노인장기요양보험 및 건강보험이며, 현재 노인과관련된 다양한 연구들을 진행하고 있다.

(E-mail: ltc.shinhyeri@gmail.com)

액플라콘 비차이는 미국 North Carolina University에서 공중위생학 박사학위를 받았으며, 현재 태국의 마히돌 대학교 라마티버디 의과대학 교수로 재직 중이다. 주요 관심분야는 전염병이며, 현재 태국의 전국건강검진조사(Thai National Health Examination Survey, NHES)를 연구하고 있 다.

(E-mail: wichai.aek@mahidel.ac.th)

References

Bardage, C., Pluijm, S. M. F., Pedersen, N. L., Deeg, D. J. H., Jylhä, M., Noale, M., et al. (2005). Self-rated health among older adults: a cross-national comparison. *European Journal of Ageing, 2*(2), pp.149-158. doi: 10.1007/s10433-005-0032-7.

Bodde, A. E., Seo, D.-C., & Frey, G. (2009). Correlation between physical activity and self-rated health status of non-elderly adults with disabilities. *Preventive Medicine, 49*(6), pp.511-514. doi: 10.1016/j.ypmed.2009.10.004.

Bombak, A. E. (2013). Self-Rated Health and Public Health: A Critical Perspective. *Frontiers in Public Health, 1*(15), doi: 10.3389/fpubh.2013.00015.

Choe, J. S., Kwon, S. O., & Paik, H. Y. (2006). Nutritional Status and Related Factors of the Elderly in Longevity Areas. *Korean Nutrition Society, 39*(3), pp.286-298.

Choi, K. W. (2014). Factors related to self-rated health in adolescents: findings form the korea youth panel survey. *Korean Journal of Health Education and Promotion, 31*(3), pp.39-50.

Choi, E. J., & Kim, C. W. (2008). Factors associated with tobacco and alcohol use. *Journal of Korean Society for Health Education and Promotion, 25*(5), pp.39-51.

Decker, S. L., Kostova, D., Kenney, G. M., & Long, S. K. (2013). Health status, risk factors, and medical conditions among persons enrolled in Medicaid vs uninsured low-income adults potentially eligible for Medicaid under the Affordable Care Act. *Jama, 309*(24), pp.2579-2586.

Delpierre, C., Lauwers-Cances, V., Datta, G. D., Berkman, L., & Lang, T. (2009). Impact of Social Position on the Effect of Cardiovascular Risk Factors on Self-Rated Health. *American Journal of Public Health, 99*(7), pp.1278-1284. doi: 10.2105/AJPH.2008.147934.

DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self rated health question. *Journal of general*

internal medicine, 21(3), pp.267-275.

Evans, T., Chowdhury, A., Evans, D., Fidler, A., Lindelow, M., Mills, A., & Scheil-Adlung, X. (2012). *Thailand's Universal Coverage Scheme: Achievements and Challenges. An independent assessment of the first 10 years (2001-2010).* Nonthaburi, Thailand: Health Insurance System Research Office.

Frasure-Smith, N., Kaplan, G., Krantz, D., Manuck, S., Muller, J., Powell, L., & Schnall, P. (1993). Behavior change and compliance: keys to improving cardiovascular health. *Circulation, 88*(3), pp.1406-1407.

Fylkesnes, K., & Førde, O. H. (1991). The Tromsø study: Predictors of self-evaluated health—Has society adopted the expanded health concept? *Social Science & Medicine, 32*(2), pp.141-146. doi: dx.doi.org/10.1016/0277-9536(91)90053-F.

Han, M. A., Kim, K. S., Park, J., Kang, M. G., & Ryu, S. Y. (2009). Association between levels of physical activity and poor self-rated health in Korean adults: The Third Korea National Health and Nutrition Examination Survey (KNHANES), 2005. *Public Health, 123*(10), pp.665-669. doi: 10.1016/j.puhe. 2009.08.005.

Haseen, F., Adhikari, R., & Soonthorndhada, K. (2010). Self-assessed health among Thai elderly. *BMC Geriatrics, 10*(1), p.30. doi: 10.1186/1471-2318-10-30.

Hunt, S. M., McKenna, S. P., McEwen, J., Williams, J., & Papp, E. (1981). The Nottingham Health Profile: subjective health status and medical consultations. *Social Science & Medicine. Part A: Medical Psychology & Medical Sociology, 15*(3), pp.221-229.

Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: a review of twenty-seven community studies. *Journal of health and social behavior, 38*(1), pp.21-37.

Institute for Health Metrics and Evaluation. (2010). *Global Burden of Disease Study.* http://www.globalburden.org에서 2016.12.20. 인출.

Jerković, O. S., Sauliūnė, S., Šumskas, L., Birt, C., & Kersnik, J. (2015). Determinants of self-rated health in elderly populations in urban areas in

Slovenia, Lithuania and UK: findings of the EURO-URHIS 2 survey. *The European Journal of Public Health, 27*(2), pp.74-79.

Kaewpan, W., & Kalampakorn, S. (2012). Health status and health promoting behaviors among aging workers in Thailand. *J Med Assoc Thai, 95*(6), pp.S16-20.

Kaleta, D., Makowiec-Dąbrowska, T., & Jegier, A. (2008). Employment status and self-rated health. *International Journal of Occupational Medicine and Environmental Health, 21*(3), pp.227-236.

Kim, J. Y. (2007). The Relationship between Socioeconomic Status and Health in Korea – Focusing on Age Variations -. *Korean Journal of Sociology, 41*(3), pp.127-153.

Kim, W.K. (2012). The relationship among health promotion behavior, health status, and quality of life of elderly. *Korean Journal of Sports Science, 21*(5), pp.89-98.

Kwon, S. (2009). Thirty years of national health insurance in South Korea: lessons for achieving universal health care coverage. *Health policy and planning, 24*(1), pp.63-71.

Lee, M. S. (2005). Health Inequalities Among Korean Adults – Socioeconomic Status and Residential Area Differences -. *Korean Journal of Sociology, 39*(6), pp.183-209.

Manderbacka, K., Lundberg, O., & Martikainen, P. (1999). Do risk factors and health behaviours contribute to self-ratings of health? *Social Science & Medicine, 48*(12), pp.1713-1720. doi: 10.1016/S0277-9536(99)00068-4.

Manor, O., Matthews, S., & Power, C. (2001). Self-rated health and limiting longstanding illness: inter-relationships with morbidity in early adulthood. *International Journal of Epidemiology, 30*(3), pp.600-607.

Molarius, A., & Janson, S. (2002). Self-rated health, chronic diseases, and symptoms among middle-aged and elderly men and women. *J Clin Epidemiol, 55*(4), pp.364-370. doi: 10.1016/S0895-4356(01)00491-7.

Mota, J., Santos, R. M., Silva, P., Aires, L., Martins, C., & Vale, S. (2012).

Associations between self-rated health with cardiorespiratory fitness and obesity status among adolescent girls. *J Phys Act Health, 9*(3), pp.378-381.

Mui, A. C. (2000). Stress, Coping, and Depression Among Elderly Korean Immigrants. *Journal of Human Behavior in the Social Environment, 3*(3-4), pp.281-299. doi: 10.1300/J137v03n03_17.

OECD (2016). *Income inequality (indicator)*. doi: 10.1787/459aa7f1-en/에서 2016.12.31. 인출.

OECD. (2016). *Food supply and consumption*. http://stats.oecd.org/ 에서 2016.12.16. 인출.

Page, R. M., & Suwanteerangkul, J. (2009). Self-rated health, psychosocial functioning, and health-related behavior among Thai adolescents. *Pediatrics International, 51*(1), pp.120-125. doi: 10.1111/j.1442-200X.2008.02660.x.

Park, E. J., Jun, J. N., & Kim, N. S. (2015). The Association of Multiple Risky Health Behaviors with Self-reported Poor Health, Stress, and Depressive Symptom. *Health and Social Welfare review, 35*(1), pp.136-157.

Prus, S. G. (2011). Comparing social determinants of self-rated health across the United States and Canada. *Social Science & Medicine, 73*(1), pp.50-59.

Pinquart, M. (2001). Correlates of subjective health in older adults: a meta-analysis. *Psychology and aging, 16*(3), pp.414-426.

Satheannoppakao, W., Aekplakorn, W., & Pradipasen, M. (2009). Fruit and vegetable consumption and its recommended intake associated with sociodemographic factors: Thailand National Health Examination Survey III. *Public health nutrition, 12*(11), pp.2192-2198.

Schulz, R., Mittelmark, M., Kronmal, R., Polak, J. F., Hirsch, C. H., German, P., & Bookwala, J. (1994). Predictors of Perceived Health Status in Elderly Men and Women: The Cardiovascular Health Study. *Journal of Aging and Health, 6*(4), pp.419-447. doi: 10.1177/089826439400600401.

Seubsman, S.-a., Kelly, M. J., Yiengprugsawan, V., Sleigh, A. C., & the Thai Cohort Study, T. (2011). Gender, Socioeconomic Status, and Self-Rated Health in a

Transitional Middle-Income Setting: Evidence From Thailand. *Asia-Pacific journal of public health / Asia-Pacific Academic Consortium for Public Health, 23*(5), pp.754-765. doi: 10.1177/1010539509356807.

Shin, H. Y., Shin, M. H., & Rhee, J. A. (2012). Gender differences in the association between self-rated health and hypertension in a Korean adult population. *BMC Public Health, 12*(1), p.135.

Subramanian, S. V., Huijts, T., & Avendano, M. (2010). Self-reported health assessments in the 2002 World Health Survey: how do they correlate with education? *Bulletin of the World Health Organization, 88*(2), pp.131-138.

Tangcharoensathien, V., Cheachanwattana, A., Limwattananon C., Vasavid, C., Lerkiatbundit, S. , Boonperm, J. (2006). Health status report among Thai population: the analysis of the Health and Welfare Survey 2003. *J Health Sci., 15*(4), pp.515-527.

WORLD BANK. (2016). *Gini index.* http://data.worldbank.org/indicator/SI. POV.GINI?locations=TH/에서 2016.12.31. 인출.

WORLD BANK. (2016). *Health.* http://data.worldbank.org/topic/health? locations=KR-TH/에서 2016.12.16. 인출.

World Health Organization. (1948). *WHO constitution.* http://www.who.int/governance/eb/who_constitution_en.pdf

World Health Organization. (2009). *Global health risks: mortality and burden of disease attributable to selected major risks*: World Health Organization.

Wu, S., Wang, R., Zhao, Y., Ma, X., Wu, M., Yan, X., & He, J. (2013). The relationship between self-rated health and objective health status: a population-based study. *BMC Public Health, 13*(1), 320. doi: 10.1186/1471-2458-13-320.

Yiengprugsawan, V., Lim, L. L. Y., Carmichael, G. A., Sidorenko, A., & Sleigh, A. C. (2007). Measuring and decomposing inequity in self-reported morbidity and self-assessed health in Thailand. *Int J Equity Health, 6.* doi: 10.1186/1475-9276-6-23.

Zarini, G. G., Vaccaro, J. A., Canossa Terris, M. A., Exebio, J. C., Tokayer, L., Antwi, J., . . . Huffman, F. G. (2014). Lifestyle behaviors and self-rated health: the Living for Health Program. *Journal of environmental and public health, 2014.*

Zimmer, Z., & Amornsirisomboon, P. (2001). Socioeconomic status and health among older adults in Thailand: An examination using multiple indicators. *Soc Sci Med, 52.* doi: 10.1016/s0277-9536(00)00232-x.

Zimmer, Z., Natividad, J., Hui-Sheng, L., & Chayovan, N. (2000). A cross-national examination of the determinants of self-assessed health. *J Health Soc Behav, 41*(4), pp.465-481.

건강위험행동과 주관적 건강수준 간의 관계:
한국과 태국의 데이터를 중심으로

폴팍 앙수말이
(연세대학교)

신 혜 리
(경희대학교)

액플라콘 비차이
(마히돌대학교)

본 연구는 한국과 태국 성인을 대상으로 건강위험행동이 주관적 건강수준에 영향을 미치는지를 살펴보고자 하였다. 한국은 건강영양조사(Korea National Health and Nutritional Examination Survey, KNHANES)의 2009년 자료를 이용하였고, 태국은 전국 건강검진조사(Thai National Health Examination Survey, NHES)의 2009년 자료를 이용하였다. 분석대상은 한국과 태국의 18세에서 60세 미만의 성인으로 각 각 5,649명 및 7,753명이다. 분석은 다중로지스틱 분석방법(multiple logistic regression analysis)을 수행하였으며, 분석결과 한국과 태국 모두 건강위험행동요인 중 운동과 흡연은 주관적 건강수준에 유의미한 영향을 미치는 것으로 나타났다. 그 중에서도 운동이 한국(OR: 1.46; 95% CI 1.23-1.74)과 태국(OR: 1.21; 95% CI 1.04-1.41)의 주관적 건강수준에 강하게 유의하게 나타나는 것을 확인하였다. 분석결과를 통해 본 연구는 한국과 태국의 인구학적, 사회경제적, 사회심리적인 차이를 고려한 건강위험행동에 관한 질병 예방 및 건강 증진 활동의 강화를 제안하고자 한다.

주요 용어: 주관적 건강수준, 건강위험행동, 대한민국, 태국