Self-Rated Health Status Based on the Type of Health Insurance: A Socioeconomic Perspective

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Abstract

To investigate the effects of public and private health insurance on self-rated health (SRH) status within the National Health Insurance (NHI) system based on socioeconomic status in South Korea. The data were obtained from 10 867 respondents of the Korea Health Panel (2008-2011). We used hierarchical panel logistic regression models to assess the SRH status. We also added the interaction terms of socioeconomic status and type of health insurance as moderators. Medical aid (MA) recipients were 2.10 times more likely to have a low SRH status than those who were covered only by the NHI, even though the healthcare utilization was higher. When the interaction terms were included, those not covered by the NHI and had completed elementary school or less were 16.59 times more likely to have a low SRH status than those covered by the NHI and had earned a college degree or higher. Expanding healthcare coverage to reduce the burden of non-payment and unmet use to improve the health status of MA beneficiaries should be considered. Particularly, the vulnerability of less-educated groups should be focused on.

Keywords

National Health Insurance, Medical aid, Private health insurance, Self-rated health status, Social economic inequality, Longitudinal panel study

Introduction

The National Health Insurance (NHI) system, the Republic of Korea's public healthcare system, is a universal social insurance program that covers the entire population. It is operated by the National Health Insurance Service (NHIS) under government supervision, and it provides health security based on the Bismarckian social insurance principles.[1,2] The single insurer, the NHIS, improved the equity of insurance contributions and the efficiency of managerial operations by converting a society-based corporatist system with multiple insurers into a unified managed system.[3] The NHI system aims at promoting the national population's health and enhancing social security by ensuring the necessary healthcare utilization pertaining to disease and injury.[2] In general, the NHI facilitates the use of healthcare and protects against the high costs of catastrophic illnesses.[4,5]

The health insurance coverage rate of the NHI system in Korea was 64.2% in 2019, significantly lower than the Organization for Economic Cooperation and Development (OECD) average of 72%.[6] The rest of the medical expenses are disbursed as cost-sharing, and additional non-reimbursement may be incurred. Therefore, low-income individuals are burdened with medical expenses, which can lead to unmet medical needs or catastrophic health expenditure. Thus, the Korean government operates a medical aid (MA) as national health security program to low-income individuals who comprise about 4% of the population. The MA groups can thus use medical services for free except for non-reimbursement services.[3]

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However, there are major differences between the NHI and MA groups in terms of, for instance, the amount of medical use and health status.[7,8] The MA recipients have a high capacity for medical use because of the program's vast coverage. However, the gap between the health status of the NHI and MA groups continues to exist. It demonstrated the MA beneficiaries a higher probability of reporting poor health status caused by the unmet healthcare needs than the NHI insured group with the high-income.[8] Additionally, within the system, we identified gaps in health levels across different socioeconomic statuses, including education and income levels.[8] In the case of China also, compared to high-income groups, lower-income groups faced higher hospitalization expenses under the universal health service, and health inequality continues to persist.[9] Therefore, it is questionable whether Korea's NHI system is effective in reducing health disparities.

At the same time, the system now faces the challenge of sustaining the health security level due to aging population, epidemiological transition, and the expansion of private health insurance (PHI). Korea ranks seventh in the world in terms of PHI purchase rate, with about 87% because of low NHI coverage. Many people subscribe to PHI due to concerns about the low coverage of health insurance. The rate of enrollment rose to 78.1% in 2017 compared to 73.9% in 2011. In 2017, health insurance premiums averaged 101 178 won per month per household, while private insurance premiums paid 167 454 won, which was 1.66 times higher.[10] Recently, it was pointed out that private medical insurance may widen medical gap in the insurance subscription rates, insurance premiums, and reception rates based on age, income, and education level. Particularly, the average monthly private insurance premium was 9 times higher in the fifth quartile (376 670 won) than in the first quartile (43 351 won).[11] Unlike the NHI, the gap between rich and poor in PHI with unequal characteristics was found to be significant; higher-income families enjoyed more benefits even if they paid the same premiums. This means that PHI's subscription rate is capable of creating a health gap. While the individual purchase of PHI is expected in a liberalist society, the nation's social security benefits are insufficient because healthcare issues are primarily the responsibility of an individual, whereas the supply of medical services is the responsibility of the private sector.[2,12] Therefore, PHI could create more inequalities between the 2 groups due to the structure of the healthcare system in Korea.

Health coverage rates by both NHI and PHI affect health status and inequality. Having a PHI to cover health expenses not included in the public health care system was a protective factor for health outcomes, whereas having out-of-pocket expenditures was a risk factor.[13] Thus, the association between health insurance coverage and health outcome is important for developing the NHI system and realizing its universal coverage.[14] Additionally, equity of health status and people with different income levels remain problematic, requiring improved health service access and policies.

However, there is little empirical evidence about how NHI and PHI impact the health status of insurance subscribers. We hypothesize that, after attempting to access the healthcare services under the NHI system, the individual health status differs depending on the type of health insurance. To discuss this issue, the following 3 research questions guided our analyses: (1) Is there a difference between the SRH status of the NHI and MA groups after adjusting for their healthcare utilization? (2) Does PHI play a supplementary role to the NHI or MA to promote health status? (3) Does an individual's socioeconomic status (SES) influence his or her health status across the different types of health insurance? We attempted to answer these questions and aimed at contributing to the improvement of the health security of those insured under the NHI.

Methods

Study Population and Design

The data used for this study were sourced from a nationally representative, longitudinal sample of participants of the Korea Health Panel (KHP; www.khp.re.kr) from 2008 to 2011. After excluding responses with missing values, we used a sample of 10 867 adults each year to ensure a strongly balanced panel study.

We designed a natural experiment to compare the self-rated health status between those insured with NHI/PHI and those who were not. We examined the role of SES (Path A) and health insurance coverage (Path B) in the variation of self-rated health status after considering the mediators of individual healthcare utilization. We then modeled hierarchical panel logistic regression analyses and interaction terms according to education and household income after adjusting for heterogeneous treatment effect.[15]

Measures

Dependent variable. The outcome variable was self-rated health status. The SRH status was measured using a Likert-type 5-point scale with the following categories: Excellent = 1, good = 2, fair = 3, poor = 4, and very poor = 5. We grouped the answers into 2 categories, as per the literature.[16,17] Those who responded with "excellent" or "good" were coded as 0 and classified as the good-health status group. Those who responded with "fair," "poor," or "very poor" were coded as 1 and classified as the poor-health status group.

Independent variables. Socioeconomic status: We considered education and household income as baseline independent variables, suggesting that self-rated health is affected by SES.[18] The highest level of education completed was categorized into elementary school or less, middle school/associate degree, high school/associate degree, and college degree or higher. The household income included earned, financial,

real estate, and transfer income, which were divided by the root of the number of family members, in accordance with the literature. The household income was categorized into the lowest 25% (first quartile), middle 50%, and bottom 25%, with the highest 25% (fourth quartile) as the standard.

Household income adjusted by the number of members in the family $= Y/\sqrt{A}$
where $Y =$ average monthly income, A $=$ number of family members

Types of health insurance: The results revealed that type of health insurance is a significant determinant of self-rated health status.[19-21] The status of NHI was assessed by categories based on yes (ie, the entire population, including government employees with an insurance bill) or no (ie, basic livelihood security recipients or veterans/patriots). The status of PHI was similarly assessed.

Healthcare utilization: Much of the existing literature examined the effect of healthcare utilization, the utilization of inpatient and outpatient care influenced by the type of health insurance as well as their effect on health status.[22,23] We asked the respondents about their experiences of inpatient stays (including dental/oriental medicine hospitalization, stays in the intensive care ward, and 1-day inpatient stays during the last year) and instances of outpatient visits (including dental/oriental medicine treatment).

Covariates. Respondents were asked for their demographic characteristics that affected SRH status, such as age, gender, and marital status.[18,24]

Statistical Analyses

This study identified the self-rated health status of NHI, MA, and PHI groups in Korea. It analyzed the health gaps according to insurance types and SES using 4-year longitudinal panel data. Specific statistical analyses are as follows.

First, we described the general characteristics of the sample. Second, univariate chi-square analyses were run for each predictor variable to identify factors that were associated with health status. Third, we ran hierarchical panel logistic regression models according to types of SRH status with increasing significance values. Finally, the association between self-rated health status and insurance stratified by education and household income was assessed to identify a mediating effect, followed by a model which included an interaction term for insurance, education, household income, and healthcare utilization.

Results

General Sample Characteristics

Of the 10 867 participants, 54.9% were female and 39.2% were 60 years or above, and 72.8% were married (Table 1).

For most respondents (95.2%), their healthcare services were covered by the NHI, and 78.7% received benefits from their own PHI. Regarding the SRH status, most respondents were perceived as fair (40.7%) or good (37.5%). Regarding the experience of healthcare services, only 9.3% and 81.7% had received inpatient and outpatient care during the last year respectively.

Differences Between the High and Low SRH Group

As shown in Table 2, a higher proportion of women were likely to have low SRH ($P < .001$) compared to men. Regarding socioeconomic factors, the low SRH group had lower educational qualifications and were in the lowest quartile range of household income compared to their counterparts. Regarding types of health insurance, 7.0% of MA recipients reported lower SRH status ($P < .001$). A gap in health status was also observed between those with and without PHI ($P < .001$). For healthcare utilization, the low SRH group had received frequent inpatient or outpatient care ($P < .001$).

Effects of NHI on SRH Status

After controlling for individuals' demographic characteristics, those who had completed elementary school or less were 1.60 times more likely to have low SRH than the respondents with a college degree or higher, as shown in model II (Table 3). Regarding household income, those in the lowest income bracket were 1.49 times more likely to have low SRH than those in the highest income bracket. When we added the types of health insurance in model III, MA recipients were 2.10 times more likely to have low SRH than those who were covered only by NHI, after controlling for covariates. When we added the healthcare utilization in model IV, those who received inpatient or outpatient care for the last year were 1.79 and 1.37 times more likely to have low SRH than those who had not received inpatient or outpatient treatment, respectively.

Comparison of Interaction Effects Between Health Insurance and SRH Status by Socioeconomic Factors

As shown in Table 4, when we added the interaction terms of the SES factors in the model, those who were covered by MA and had completed elementary school or less were 16.59 times more likely to have low SRH than those who were covered by the NHI and had earned a college degree or higher, after controlling for covariates. However, the type of health insurance was not associated with SRH status according to household income. The effects of healthcare utilization were lowest after adjusting for the interaction terms of SES and NHI status.

Table 1. General Sample Characteristics (n = 10867).

	First wave, 2008	Second wave, 2009	Third wave, 2010	Fourth wave, 2011
	N (%)	N (%)	N (%)	N (%)
Gender				
Men	4906 (45.1)	4906 (45.1)	4906 (45.1)	4906 (45.1)
Women	5961 (54.9)	5961 (54.9)	5961 (54.9)	5961 (54.9)
Age				
20-29	797 (7.3)	800 (7.4)	799 (7.4)	799 (7.4)
30-39	1194 (11.0)	1191 (11.0)	1195 (11.0)	1194 (11.0)
40-49	2486 (22.9)	2486 (22.9)	2483 (22.8)	2482 (22.8)
50-59	2126 (19.6)	2125 (19.5)	2125 (19.5)	2130 (19.6)
60 or older	4264 (39.2)	4265 (39.2)	4265 (39.3)	4262 (39.2)
Marital status				
Single	1721 (15.8)	1725 (15.9)	1707 (15.7)	1662 (15.3)
Married couple	7965 (73.3)	7938 (73.0)	7933 (73.0)	7909 (72.8)
Divorced or separated	304 (2.8)	300 (2.8)	314 (2.9)	328 (3.0)
Separation by death	877 (8.1)	904 (8.3)	913 (8.4)	968 (8.9)
Education				
Elementary school or less	2410 (22.2)	2414 (22.2)	2417 (22.2)	2416 (22.2)
Middle school to associate	1383 (12.7)	1292 (11.9)	1285 (11.8)	1286 (11.8)
High school to associate	3720 (34.2)	3741 (34.4)	3681 (33.9)	1286 (32.7)
College degree or higher	3354 (30.9)	3420 (31.5)	3484 (32.1)	3614 (33.3)
Household income				
Fourth quartile (highest)	2112 (19.4)	2543 (23.4)	2935 (27.0)	2826 (30.1)
Third quartile	2556 (23.5)	2616 (24.0)	2868 (26.4)	2826 (26.0)
Second quartile	2957 (27.2)	2822 (26.0)	2486 (23.7)	2505 (23.1)
First quartile (lowest)	3242 (29.9)	2886 (26.6)	2486 (22.9)	2262 (20.8)
Healthcare covered by NHI				
Yes	10374 (95.5)	10344 (95.2)	10301 (94.8)	10342 (95.2)
No (medical aid)	493 (4.5)	523 (4.8)	566 (5.2)	525 (4.8)
Purchase of PHI				
Yes	8621 (79.3)	8809 (81.0)	8629 (79.4)	8557 (78.7)
No	2246 (20.7)	2058 (19.0)	2238 (20.6)	2310 (21.3)
Inpatient care during the last year				
Received	616 (5.9)	675 (6.5)	864 (8.3)	966 (9.3)
Not received	9764 (94.1)	9705 (93.5)	9516 (91.7)	9414 (90.7)
Outpatient care during the last year				
Received	7448 (71.7)	7722 (74.3)	8144 (78.4)	8483 (81.7)
Not received	2932 (28.3)	2658 (25.7)	2236 (21.6)	1897 (18.3)
Self-rated health status (SRH)				
Excellent				766 (7.1)
Good				4072 (37.5)
Fair				4427 (40.7)
Poor				1417 (13.0)
Very poor				185 (1.7)

NHI = National Health Insurance; PHI = private health insurance.

Discussion and Conclusion

We examined whether individuals with NHI were more likely to have low SRH than those with MA and/or PHI. The MA recipients, who seem to be overlooked by the public health insurance, are exempted from user fees and thus create unnecessary medical costs. Thus, they were identified as the cause of increased health expenditure in the national health insurance revenue.[25,26] However, not only do we need to confirm that their use of medical services was excessive, but we also need to investigate whether their health status ultimately improved. Additionally, it is necessary to observe whether increasing PHI in South Korea serves as a protection for effective health promotion in the insurance market.

Table 2. Bivariate Analyses of the Sample by Self-Rated Health (SRH) Status.

	Low SRH	High SRH	Chi square
	N (%)	N (%)	*P*-value
Gender			
Men	2481 (41.2)	2425 (50.1)	<.001
Women	3548 (58.8)	2413 (49.9)	
Age			
20-29	311 (5.2)	488 (10.1)	<.001
30-39	570 (9.5)	624 (12.9)	
40-49	1227 (20.3)	1255 (25.9)	
50-59	1177 (19.5)	953 (19.7)	
60 or older	2744 (45.5)	1518 (31.4)	
Marital status			
Single	719 (11.9)	943 (19.5)	<.001
Married couple	4443 (73.7)	3466 (71.6)	
Divorced or separated	209 (3.5)	119 (2.5)	
Separation by death	658 (10.9)	310 (6.4)	
Education			
Elementary school or less	1675 (27.8)	741 (15.3)	<.001
Middle school to associate	826 (13.7)	460 (9.5)	
High school to associate	1853 (30.7)	1698 (35.1)	
Bachelor's degree or higher	1675 (27.8)	1939 (40.1)	
Household income			
Fourth quartile (highest)	1571 (26.1)	1703 (35.2)	<.001
Third quartile	1510 (25.0)	1316 (27.2)	
Second quartile	1435 (23.8)	1070 (22.1)	
First quartile (lowest)	1513 (25.1)	749 (15.5)	
Healthcare covered by NHI			
Yes	5609 (93.0)	4733 (97.8)	<.001
No (medical aid)	420 (7.0)	105 (2.2)	
Purchase of PHI			
Yes	4563 (75.7)	3994 (82.5)	<.001
No	1466 (24.3)	844 (17.5)	
Inpatient care during the last year			
Received	706 (12.07)	260 (5.74)	<.001
Not received	5142 (87.93)	4272 (94.26)	
Outpatient care during the last year			
Received	5028 (85.98)	3455 (76.24)	<.001
Not received	820 (14.02)	1077 (24.76)	

NHI = National Health Insurance; PHI = private health insurance.

Our findings show that the SRH of the MA group was about 2 times lower than that of the general public who are under the compulsory NHI coverage after controlling for demographic and socioeconomic covariates. Despite MA recipients purchasing PHI, they were about 3 times more likely to have low SRH than the general public who were covered under the compulsory NHI coverage. Some studies have shown that MA beneficiaries incur unmet medical needs as mediators, further deteriorating their health conditions, despite higher healthcare utilization than the NHI insured groups, particularly the high-income group.[8]

This might be due to a couple of reasons. First, the coverage rate of the health care insurance system. Even if the volume of medical use is high, the MA group may incur a large medical burden due to non-reimbursement, and there may be restrictions on medical use. A lack of health care coverage for MA recipients can lead to deterioration in health by causing unmet medical care.[27] Therefore, there is a need for greater interest in expanding the diversity of coverage or effective medical use. Second, the effectiveness of the health insurance system. Even though health care utilization was higher in the MA group than NHI group, they exhibited poorer health status despite PHI. This implies that the health care system does not provide effective medical use. This is supported by a study that revealed that the medical utilization decreased after increasing the co-payment to the MA

Table 3. Adjusted Odds Ratio (aOR) and 95% Confidence Interval (CI) for Reporting a Low Self-Rated Health Group after Controlling for Individual Socio-Demographic Characteristics in the Korea Health Panel Survey, 2008 to 2011.

	Model I		Model II		Model III		Model IV	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Gender (ref.: men)								
Women	1.44***	1.33-1.56	1.36***	1.25-1.48	1.37***	1.26-1.29	1.27***	1.17-1.39
Age (ref.: 20-29)								
30-39	1.43**	1.17-1.74	1.41**	1.15-1.72	1.43***	1.17-1.75	1.25***	1.17-1.75
40-49	1.53***	1.22-1.91	1.45**	1.16-1.82	1.45**	1.16-1.82	1.28***	1.16-1.82
50-59	1.92***	1.52-2.43	1.68***	1.32-2.13	1.66***	1.31-2.12	1.42*	1.31-2.12
60 or older	2.77***	2.19-3.49	1.87***	1.46-2.39	1.88***	1.46-2.41	1.52**	1.46-2.41
Marital status (ref.: single)								
Married couple	1.01	0.86-1.20	1.03	0.87-1.22	1.07	0.90-1.27	0.95	0.79-1.13
Divorced or separated	1.33*	1.00-1.77	1.20	0.90-1.60	1.12	0.84-1.49	0.97	0.73-1.31
Separation by death	1.11	0.88-1.39	0.96	0.76-1.21	0.95	0.75-1.20	0.87	0.69-1.11
Education (ref.: college degree or higher)								
High school to associate			1.05	0.95-1.16	1.05	0.95-1.16	1.06	0.96-1.18
Middle school to associate			1.45***	1.25-1.69	1.44***	1.23-1.68	1.42***	1.22-1.66
Elementary school or less			1.60***	1.37-1.86	1.58***	1.36-1.84	1.56***	1.33-1.82
Household income (ref.: fourth quartile, highest)								
Third quartile			1.18**	1.06-1.31	1.18**	1.06-1.31	1.21**	1.08-1.34
Second quartile			1.26***	1.13-1.41	1.23***	1.10-1.37	1.22**	1.09-1.37
First quartile (lowest)			1.49***	1.32-1.70	1.30***	1.13-1.48	1.32***	1.15-1.52
Inpatient care (ref.: not received)								
Received						1.79***	1.54-2.09	
Outpatient care (ref.: not received)								
Received						1.37***	1.24-1.55	
Types of health insurance (ref.: covered by only NHI)								
Covered by only the medical aid					2.10***	1.57-2.81	2.07***	1.51-2.81
Covered by both NHI and PHI					0.94	0.84-1.05	0.94	0.84-1.06
Covered by both the medical aid and PHI					3.19***	2.18-4.65	3.21***	2.14-4.82

Note. All models are additionally adjusted for gender, age, and marital status.
NHI = National Health Insurance; PHI = private health insurance; Dependent variable is self-rated health (SRH) status: the high SRH (0) and the low SRH (1).
*P < .05. **P < .01. ***P < .001.

group.[28] A survey conducted in Taiwan on national health insurance also showed that the NHI has significantly increased utilization of both outpatient and inpatient care, but this increased utilization of health services did not reduce mortality and low self-rated health status.[22] While the MA program is necessary for universal healthcare, which is one of the civil rights of social security,[29] its effect is uncertain regarding the improvement of health inequality.

We also examined the interaction effect between SES and the type of insurance by adopting an intersectional approach. The result showed that, after adjusting for covariates, MA recipients whose educational level was of elementary school or below were 16 times more likely to show poor SRH than those covered by the NHI and with a college degree or higher. This is consistent with the previous studies that suggested health inequality is a plausible explanation for the link between SES and health outcomes.[18] Previous research has also shown that the NHI system in a country has created a health gap based on income gaps, but according to the results of this study,[9] health status was significantly poor for the group alienated from the NHI and had a low educational level. It is estimated that the interaction effect for household income was not significant because eligibility for MA recipients in Korea is based on an individual's income.

Some limitations of the study should be noted. First, while the severity of the disease can affect the degree of healthcare utilization, such a relationship was not reflected in the model. Second, this study design has limitations regarding the method of setting the personal characteristics among groups according to insurance types as a baseline. Thus, future research must examine the characteristic heterogeneity between the 2 publicly and privately insured groups and compare their behavior according to the differentiated payment schedule.

Monitoring inequalities in health is fundamental to the equitable and progressive realization of the NHI system.[30] Many developed countries, including South Korea, operate a health security system, such as NHI, while a MA program is separately provided for the poor, who are exempted from paying fees. Nevertheless, the reason why the MA beneficiaries are not as good as the health insurance members can be attributed to the lack of healthcare coverage in terms of aspects such as the burden of non-payment and unmet medical services. Particularly, attention must be paid to the vulnerable health of low educated groups among MA recipients. This study serves as a reminder of the role of the NHI and PHI in the lives of people who suffer from the dual pressure of social and health inequality. Thus, health coverage should be designed to reduce health inequalities and improved to ensure the health care delivery system is more efficiently

Table 4. Adjusted Odds Ratio (aOR) and 95% Confidence Interval (CI) for Reporting a Low Self-Rated Health Group after Controlling for Individual Socio-Demographic Characteristics in the Korea Health Panel Survey, 2008 to 2011.

	Model I (education by NHI status)		Model II (education by PHI status)		Model III (income by NHI status)		Model IV (income by PHI status)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Education (ref.: college degree or higher)								
High school to associate	0.61	0.31-1.17	0.97	0.77-1.22	1.06	0.96-1.18	1.07	0.96-1.19
Middle school to associate	2.88***	1.64-5.08	1.37*	1.05-1.80	1.42***	1.22-1.66	1.44***	1.23-1.68
Elementary school or less	0.22***	0.10-0.51	1.20	0.88-1.65	1.56***	1.33-1.82	1.57***	1.34-1.83
Household income (ref.: first quartile, highest)								
Second quartile	1.21**	1.08-1.34	1.18**	1.08-1.34	0.56	0.17-1.84	1.10	0.87-1.43
Third quartile	1.22***	1.09-1.37	1.25***	1.10-1.39	5.51***	2.81-10.81	1.47***	1.20-1.80
Fourth quartile (lowest)	1.34***	1.17-1.53	1.46***	1.29-1.69	.	.	1.37	0.94-1.99
Inpatient care (ref.: not received)								
Received	1.80***	1.54-2.09	1.84***	1.59-2.15	1.79***	1.54-2.08	1.85***	1.59-2.15
Outpatient care (ref.: not received)								
Received	1.38***	1.24-1.55	1.41***	1.27-1.58	1.89***	1.24-1.55	1.41***	1.27-1.58
SES × type of insurance (ref.: 1st group, highest)	1		1					
Second group	1.71	0.89-3.27	1.08	0.87-1.36	2.13	0.65-6.93	1.10	0.86-1.41
Third group	0.50*	0.28-0.87	1.09	0.83-1.44	0.22***	0.11-0.43	0.82	0.67-1.01
Fourth group	7.05***	3.05-16.29	1.33	0.98-1.81	.	.	1.12	0.79-1.61
Last group (lowest)	16.59***	6.64-41.45	1.38	0.96-1.98	.	.	1.12	0.75-1.68

Note. All models are additionally adjusted for gender, age, and marital status.

NHI=National Health Insurance; PHI=private health insurance; Dependent variable is self-rated health (SRH) status: the high SRH (0) and the low SRH (1).

*$P < .05$. **$P < .01$. ***$P < .001$.

through the NHI and PHI system in order to promote the health of the whole nation.[13]

Declaration of Conflicting Interests

Funding

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Ethics Approval and Consent to Participate

Ethics and Governance approvals were awarded by the Korea Institute for Health and Social Affairs (Ref.: 2015–13). All participants provided written informed consent prior to participation. During the data collection process, no information that could distinguish individual respondents was collected.

Availability of Data and Materials

The datasets generated and analyzed during the current study are available in the Korea Health Panel repository, https://www.khp.re.kr.

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