


# Associations Between Private Health Insurance and Medical Care Utilization for Musculoskeletal Disorders: Using the Korea Health Panel Survey Data for 2014 to 2015

INQUIRY: The Journal of Health Care Organization, Provision, and Financing  
Volume 57: 1–11  
© The Author(s) 2020  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/0046958020981467  
journals.sagepub.com/home/inq  


Yoon-Sun Jung<sup>1</sup>, Young-Eun Kim<sup>2</sup>, Dun-Sol Go<sup>3</sup>, Radnaabaatar Munkhzul<sup>4</sup> , Jaehun Jung<sup>5</sup>, and Seok-Jun Yoon<sup>6</sup> 

## Abstract

In South Korea, people may increase their medical coverage by purchasing private health insurance to augment low coverage provided by the National Health Insurance (NHI). Frequent and excessive use of medical care by those with private health insurance is an issue, especially for musculoskeletal disorders that require excessive care and contribute to moral hazard. In South Korea, since private health insurance is structurally linked to the scope of coverage with public health insurance, this increased use of medical care may adversely affect public health insurance finances. This study aimed to analyze the effects of private health insurance on medical care use for patients with musculoskeletal disorders. We used the Korea Health Panel 2014 to 2015 data that included 5622 participants who used medical care for musculoskeletal disorders in 2015. Two groups were created: those who purchased private health insurance ( $n=3588$ ) and those without private insurance ( $n=2034$ ). We compared their medical utilization using logistic regression, negative binomial regression, and multiple linear regression to determine the associations of private health insurance with medical care use. Medical expenditures by private health insurance purchasers were higher than those of non-purchasers for outpatient care ( $P<.001$ ), but no differences were found for inpatient care. Our findings suggest that the expansion of private health insurance further burdened the NHI financially, ultimately increasing the burden of medical expenses for the population. Research should implement demonstration studies with different groups of diseases.

## Keywords

private health insurance, medical care utilization, moral hazard, South Korea, musculoskeletal disorders

### What do we already know about this topic?

Several studies have been conducted to demonstrate the impact of private health insurance on health care demand; however, few studies have focused on specific diseases, although the method of payments by private health insurance differs depending on the disease.

### How does your research contribute to the field?

We analyzed the associations of private health insurance with medical use behavior to provide a basis for policy data that helps establish the roles of public and private health insurance.

### What are your research's implications toward theory, practice, or policy?

Private health insurance should be improved so that its finances are not concentrated on people with mild illnesses, thereby increasing access to medical services and the proportion of insurance payments for people with severe diseases.

## Background

The National Health Insurance (NHI) program established in 1997 in South Korea has improved accessibility and equity in health care utilization and improved the level of health for the Korean population. However, NHI provides insufficient

coverage, and the burden of out-of-pocket payments continues to be problematic. In South Korea, between 2006 and 2016, health care insurance coverage remained at approximately 60%, while the out-of-pocket expenses increased by about 4% points.<sup>1</sup> To solve the uncertainty caused by the low coverage of the NHI program, along with the rising medical



costs and growing demand for medical services due to aging, many people purchase private health insurance.<sup>2-6</sup>

The different types of private health insurance in OECD countries are quite complex; however, there are 4 main types depending on the relationship with public health insurance: supplementary, complementary, duplicate, and primary.<sup>7</sup> Of these 4 types, private health insurance in South Korea functions as both complementary and supplementary insurance. Further, in South Korea, private health insurance is available in 2 forms: fixed-benefit insurance and indemnity insurance. Fixed-benefit insurance reduces the economic burden caused by disease because it provides income compensation or medical benefits, and most of these insurance policies guarantee a certain amount of compensation. However, indemnity insurance does not specify the amount in advance; instead, coverage is based on the actual medical expenses incurred due to illnesses or injuries.<sup>6,8</sup>

In South Korea, private health insurance was developed to serve as an income-loss preservation function of the fixed-benefit insurance for specific diseases since the late 1970s. Sales of fixed-benefit insurance for specific diseases have increased significantly.<sup>6</sup> Until the revision of the Insurance Business Act in 2003, life insurance companies sold only fixed-benefit insurance; non-life insurance companies sold both fixed-benefit and indemnity insurance. Since September 2003 and following the amendment of the Insurance Business Act, both life insurance and non-life insurance companies sell private health insurance in the same way. Private health insurance sales volume has increased sharply, as life insurance and non-life insurance companies competed for market preemption of the indemnity insurance before and after the amendment of the Insurance Business Act in 2003.<sup>9</sup> The private health insurance market, especially the indemnity private healthcare insurance market, has grown rapidly in response to the increase in medical expenses due to an aging population and the demand for high-quality medical services.<sup>2,4,10</sup>

Among private medical insurance plans, indemnity type insurance is closely related to the medical services covered under the NHI program. In South Korea, private health insurance plans provide out-of-pocket payments for insured services except for those costs that are covered by the NHI, as well as services not covered by the NHI program. Thus, the relationship between public and private insurance in South Korea is stronger than in other countries. Since private health

insurance, especially indemnity type insurance, pays a certain percentage of the actual cost for the purchaser's health care services, the purchaser must first use the health services through the NHI system to be eligible to receive private health insurance payments. Therefore, coverage by the national and private health insurance programs are linked, as coverage of the private health insurance will decrease (or expand) if coverage of the NHI program is expanded (or decreased).

According to the Financial Supervisory Service (FSS), as of the end of June 2018, the number of contracts for personal private (indemnity type) health insurance was 33.96 million, which represented an increase of 370 000 cases (1.1%) from the end of 2017. Approximately 66% of the total population of South Korea is covered by indemnity type private health insurance.<sup>11</sup> As private health insurance has a negative-type comprehensive coverage structure that covers all non-payments except for beauty and plastic surgery, problems exist, such as the moral hazard of insured people, excessive medical use, and incentives for the excessive use of medical services by some healthcare providers, referred to as "physician-induced demand (PID)." According to the FSS, the loss ratio (ie, the ratio of losses to premiums earned by the insurance company) was 122.9% in 2018, suggesting that oversold medical treatments were the cause of the increase in the loss ratio.<sup>11</sup> However, excessive use by insured people is not limited to the private insurers' loss ratios and insurance premium increases. Increases in uninsured medical costs due to private health insurance contribute to the public burden of health care expenditures as it also increases the number of insured services. Thus, the increase in the number of individuals with private health insurance may be a factor that contributes to the overall increase in medical expenditures.<sup>2,5,12</sup>

The characteristics of South Korea's private health insurance that cannot easily control the health care utilization by purchasers and the medical behavior of health care providers have triggered debates regarding moral hazard and reverse selection of insurance. For the past 20 years, empirical research has been conducted to demonstrate the impact of private health insurance on health care demand,<sup>2-4,6,13-22</sup> reaching a variety of conclusions. However, few studies have focused on specific diseases. Unlike the United States and France, which sell standardized complementary private health insurance, various types of indemnity insurance are

<sup>1</sup>Department of Public Health, Korea University, Seoul, Korea

<sup>2</sup>Big Data Department, National Health Insurance Service, Wonju, Korea

<sup>3</sup>Department of Health Care Policy Research, Korea Institute for Health and Social Affairs, Sejong, Korea

<sup>4</sup>Artificial Intelligence and Big-Data Convergence Center, Gil Medical Center, Gachon University College of Medicine, Incheon, Korea

<sup>5</sup>Department of Preventive Medicine, Gachon University College of Medicine, Incheon, Korea

<sup>6</sup>Department of Preventive Medicine, Korea University College of Medicine, Seoul, Korea

Dates Received: 2 April 2020; revised: 5 November 2020; accepted: 24 November 2020

#### Corresponding Author:

Seok-Jun Yoon, Department of Preventive Medicine, Korea University College of Medicine, 73, Goryeodae-ro, Seongbuk-gu, Seoul 02841, Korea.

Email: yoonsj02@korea.ac.kr

sold in South Korea. Indemnity insurance is divided into injury and illness, and inpatient and outpatient insurance can be purchased separately. In addition, the injuries and diseases that can be guaranteed are different for each insurance product, and the purchaser's medical use behavior is different according to the nature of the diseases.<sup>9</sup> In other words, since there is a difference in the method of payments by private health insurance depending on the characteristics of the disease, a closer study relating to specific disease is required to achieve statistical reliability.

The purpose of this study was to compare the health care behaviors of participants using medical services for musculoskeletal diseases. Thus, we analyzed the associations of private health insurance with medical use behavior and provided a basis for policy data that could help to establish the roles of public and private health insurance.

## Methods

### *Data and Study Population*

The Korea Health Panel data from 2014 to 2015 were used for analysis. These data were constructed by the Korea Institute for Health and Social Affairs and the National Health Insurance Corporation to form a consortium that produces basic data on the health care utilization status, health expenditure level, and health level of Koreans.<sup>23</sup> It selects a representative sample of households using the probability proportional stratified cluster extraction method for the entire population and investigates the household members in full. The survey included information on inpatient and outpatient services, demographic and social variables for the household and individual household members, socioeconomic status, and other health-related variables and cost of medical services. In particular, the Korea Health Panel has investigated the different types of private health insurance (eg, indemnity, fixed-benefit, and mixed), insurance maintenance, and cancellation in addition to the participation in private health insurance.<sup>23</sup> As these data cover not only the total cost of medical expenses but also specific information on out-of-pocket payments, uninsured costs, and health insurance benefits, it is possible to analyze various factors related to medical insurance usage associated with the purchase of private health insurance policies.

We limited the current study to diseases that are classified as musculoskeletal disorders. We aimed to compare the medical use behavior within the same diagnoses as closely as possible for each hospitalization and outpatient use. Only the diagnoses that accounted for the majority of inpatient and outpatient services were selected, with the majority also in the non-purchaser and purchaser groups, respectively. Therefore, the included target disorders and corresponding Korean Classification of Diseases (KCD)-6 codes for inpatient care were M13 (Other arthritis), M17 (Gonarthrosis [arthrosis of the knee]), M48 (Other spondylopathies), M50

(Cervical disc disorders), M51 (Other intervertebral disc disorders), M54 (Dorsalgia), M75 (Shoulder lesions), M79 (Other soft tissue disorders, Not elsewhere classified [NEC]), and M94 (Other disorders of cartilage). The included target disorder's codes in outpatient care were M13, M17, M19 (Other arthrosis), M25 (Other joint disorders, NEC), M48, M51, M54, and M79. Children and adolescents under age 20 were excluded from the analysis, as they are more likely to be affected by parental decisions rather than by their own decision-making.<sup>4,14</sup> Household members aged 65 and over were excluded from the analysis since insurance companies may refuse coverage to older adults through underwriting.<sup>4</sup> According to the big data analysis of the Korea Credit Information Services, the private health insurance participation rate for those under 59 years old was high at 70 to 80%, but for those 60 years old and above, the participation rate dropped significantly to 46.8%.<sup>24</sup> We also excluded those who terminated their insurance in the short term by removing household members who were not covered or insured in 2014 to 2015. We excluded cases in which only one of the analyzed variables had a missing value. Thus, our unit of analysis was the household member, and the total number of participants analyzed was 5622.

### *Variables*

To compare medical use behavior, which was the main purpose of this study, the private health insurance (independent variable) was categorized as either non-purchaser of indemnity-type private health insurance (2014-2015 for 2 years) or purchaser of indemnity-type private health insurance (2014-2015 for 2 years). The Korea Health Panel classifies the types of private health insurance purchasers as fixed-benefit, indemnity, or mixed (ie, fixed-benefit + indemnity). In this study, we included the mixed type purchaser in the indemnity type group, because based on existing research<sup>13</sup> we assumed that people who purchase mixed type insurance would be influenced by the indemnity type insurance. Demographic characteristics, socioeconomic status characteristics, and health-related characteristics were used as control variables. The demographic variables included gender, age (20-29, 30-39, 40-49, 50-59, 60-64), marital status (married, divorced), education level (elementary school or below, middle school to high school graduation, college education), and residential area (Special Metropolitan City and Metropolitan city, Province). Socioeconomic status characteristics included whether or not currently employed, annual household income in quintiles (1=*low* to 5=*high*), and type of medical care (National Health Insurance, Medical Aid program). Health-related characteristics included the presence of chronic diseases and subjective health status (0=*good*, 1=*moderate*, 2=*poor*). In the survey, diseases corresponding to chronic diseases are hypertension, diabetes, dyslipidemia, arthrosis, tuberculosis, ischemic heart disease, and cerebrovascular disease, and those that persisted for more than 3 months and

were diagnosed by a doctor as these diseases were defined as the presence of chronic diseases. The dependent variables were medical use, its frequency, and medical expenses (inpatient, outpatient) for 2015. To understand the moral hazard caused by the private health insurance purchases, the medical expenses were the sum of the copayments and the non-reimbursable medical expenses, covered by private health insurance. We analyzed the association between the purchase of private health insurance and medical expenses using both total medical expenses incurred per year and medical expenses incurred per medical visit as dependent variables.

### Statistical Analysis

*T*-tests and chi-square tests were conducted to determine the presence of differences in demographic characteristics, socioeconomic status, health-related characteristics, and medical expenditures depending on the purchase of private health insurance. Logistic regression models were used to determine medical use, and a negative binomial regression model was used to determine medical visits.

Multiple linear regression analysis was performed in which the medical expenses for inpatient care and the medical expenses for outpatient care served as the dependent variables. Total medical expenses and medical expenses per medical visit were log-transformed, and the control variables were included in the regression analysis model to determine differences in inpatient and outpatient utilization behaviors according to private health insurance. SAS 9.4 was used for the statistical analysis of these data. We set the significance level for all analyses at  $P < .05$ .

### Results

Table 1 shows the characteristics of the 5622 participants according to their purchase of private health insurance. Among the 5622 participants, 2034 (36.2%) individuals did not purchase private health insurance, while 3588 participants (63.8%) purchased private health insurance. There were no statistically significant differences between the 2 groups in residential areas and the presence of chronic diseases. In the purchasers' group, the proportion of women ( $n=2088$ , 58.2%) was higher than that of men ( $n=1500$ , 41.8%), but in the non-purchasers' group, the proportion of men ( $n=1123$ , 55.2%) was higher than that of women ( $n=911$ , 44.8%). Regarding age, the percentage of older adults aged 60 to 64 was 7.7% ( $n=276$ ) in the purchasers' group. The proportion of participants who answered "married" in the purchasers' group was 74.7%, but 62.9% in the non-purchasers' group, and this difference was statistically significant. Regarding education level, 51.0% ( $n=1828$ ) of the purchasers had graduated from college, while 46.6% ( $n=947$ ) of the non-purchasers had graduated from college. The proportion of those receiving medical aid between the two groups showed a statistically significant difference, which was 0.7% ( $n=25$ ) in the

purchasers' group and 5.5% ( $n=111$ ) in the non-purchasers' group. The percentage of people currently employed accounted for more than half of the respondents in both the purchasers' and non-purchasers' groups, but the proportion was higher in the purchasers' group ( $n=2535$ , 70.7% in the purchasers' group vs  $n=1381$ , 67.9% in the non-purchasers' group). The proportion of participants in the fourth and fifth quintiles with high household income was 28.8% ( $n=1032$ ) and 30.0% ( $n=1076$ ) in the purchasers' group, respectively, but 23.3% ( $n=474$ ) and 19.5% ( $n=397$ ) in the non-purchasers' group, respectively. Among the health-related characteristics, the proportion of participants who answered that the subjective health status was "poor" was 7.0% in the purchasers' group, but 10.1% in the non-purchasers' group.

We compared the medical expenses for inpatient and outpatient services for patients covered by uninsured payments (eg, non-reimbursable medical expenses + copayments). For inpatient care, there was no difference between the private health insurance purchasers and non-purchasers in both total medical expenses and medical expenses per visit. While there was no significant difference in the total insured payments for the outpatient service use, there was a difference in the uninsured payments per use of outpatient services ( $t=-2.50$ ,  $P < .05$ ).

Table 2 shows the results of the analysis of the association between private health insurance and inpatient care utilization. The odds of using inpatient services by those who purchased private health insurance was 87% higher (OR=1.87, 95% CI=1.52-2.30) than those who did not purchase private health insurance. Other significant factors for the inpatient care utilization were being female (OR=1.22, 95% CI=1.00-1.47), being married (OR=1.40, 95% CI=1.08-1.81), living in metropolitan cities (OR=0.81, 95% CI=0.68-0.97), insured in National Health Insurance (OR=0.47, 95% CI=0.28-0.79), currently employed (OR=0.81, 95% CI=0.66-0.99), having a presence of chronic diseases (OR=1.44, 95% CI=1.17-1.76), moderate health status (OR=1.33, 95% CI=1.10-1.62), and poor health status (OR=2.70, 95% CI=2.04-3.57). There was no difference in the number of hospitalizations according to the private health insurance, and the only variable that had a significant association with the number of hospitalizations was those insured in NHI ( $P < .05$ ).

Table 3 shows the results of the analysis of the association between private health insurance and outpatient care utilization. The odds of using outpatient services by those who purchased private health insurance was 79% higher (OR=1.79, 95% CI=1.52-2.10) than those who did not purchase private health insurance. Among the variables that had a significant association with the use of outpatient services, the possibility of using services was high for women (OR=2.45, 95% CI=2.08-2.89), people aged 60 to 64 years (OR=2.13, 95% CI=1.30-3.49), married (OR=2.60, 95% CI=2.12-3.18), having a presence of chronic disease (OR=4.45, 95% CI=3.66-5.42), moderate health status (OR=1.42, 95% CI=1.20-1.68), and poor health status (OR=2.62, 95% CI=1.64-4.19).



**Table 1.** Comparison of the Characteristics between Private Health Insurance Purchasers and Non-Purchasers.

Characteristics	Total n (%)	Non-purchasers n (%)	Purchasers n (%)	$\chi^2$	P-value
Gender				93.7	<.0001
Male	2623 (46.7)	1123 (55.2)	1500 (41.8)		
Female	2999 (53.3)	911 (44.8)	2088 (58.2)		
Age Group				56.1	<.0001
20-29	813 (14.5)	283 (13.9)	530 (14.8)		
30-39	1170 (20.8)	397 (19.5)	773 (21.5)		
40-49	1681 (29.9)	600 (29.5)	1081 (30.1)		
50-59	1401 (24.9)	473 (23.3)	928 (25.9)		
60-64	557 (9.9)	281 (13.8)	276 (7.7)		
Marital Status				86.5	<.0001
Married	3958 (70.4)	1279 (62.9)	2679 (74.7)		
Divorced/Widowed/Unmarried	1664 (29.6)	755 (37.1)	909 (25.3)		
Educational Level				42.0	<.0001
Elementary School or Below	370 (6.6)	190 (9.3)	180 (5.0)		
Middle/High School	2477 (44.1)	897 (44.1)	1580 (44.0)		
College or Above	2775 (49.4)	947 (46.6)	1828 (51.0)		
Public Health Financing				124.6	<.0001
NHI (National Health Insurance)	5486 (97.6)	1923 (94.5)	3563 (99.3)		
Medical Aid	136 (2.4)	111 (5.5)	25 (0.7)		
Residential Area				0.0	.8865
Province	3100 (55.1)	1119 (55.0)	1981 (55.2)		
Metropolitan City	2522 (44.9)	915 (45.0)	1607 (44.8)		
Currently Employed				4.7	.0308
Yes	3916 (69.7)	1381 (67.9)	2535 (70.7)		
No	1706 (30.4)	653 (32.1)	1053 (29.4)		
Annual Household Income Quintile				270.8	<.0001
Q1 (low)	370 (6.6)	259 (12.7)	111 (3.1)		
Q2	981 (17.5)	418 (20.6)	563 (15.7)		
Q3	1292 (23.0)	486 (23.9)	806 (22.5)		
Q4	1506 (26.8)	474 (23.3)	1032 (28.8)		
Q5 (high)	1473 (26.2)	397 (19.5)	1076 (30.0)		
Chronic Disease				0.1	.8113
No	2777 (49.4)	1009 (49.6)	1768 (49.3)		
Yes	2845 (50.6)	1025 (50.4)	1820 (50.7)		
Subjective Health Status				19.1	<.0001
Good	2801 (49.8)	965 (47.4)	1836 (51.2)		
Moderate	2363 (42.0)	863 (42.4)	1500 (41.8)		
Poor	458 (8.2)	206 (10.1)	252 (7.0)		

Meanwhile, regarding public health financing, those who were insured in NHI were less likely to use outpatient services than those receiving medical aid (OR=0.26, 95% CI=0.11-0.60). In the analysis of the number of outpatient visits, private health insurance did not show any significant association within the significance level of 0.05. In addition, factors that increase the frequency of outpatient use were being female, people aged 50 to 59 years, those aged 60 to 69 years, having a presence of chronic diseases, moderate health status, and poor health status. On the contrary, the frequency of outpatient use for those insured through NHI decreased compared to those receiving medical aid, and the frequency of outpatient service use by

those who were currently employed was significantly less than those who were currently unemployed.

Supplemental Table 4 shows the results of the analysis of the association between private health insurance and total inpatient care expenses, and private health insurance and inpatient care expenses per visit. There was no statistically significant association between private health insurance and inpatient medical expenses. Among other variables, NHI and chronic disease were the variables that were related to inpatient medical expenses. Compared to those without chronic diseases, total inpatient expenses and per-visit inpatient expenses increased significantly, and those insured in

**Table 2.** Association between Private Health Insurance and Inpatient Utilization.

Variables	Any inpatient care use (n = 5617)		No. of inpatient admissions (n = 108)		
	OR (95% CI)	P-value	Coef	S.E.	P-value
<b>Gender</b>					
Male (Ref.)	–		–		
Female	1.216 (1.007-1.468)	.0425	0.1239	0.1823	.4966
<b>Age Group</b>					
20-29 (Ref.)	–		–		
30-39	1.420 (0.975-2.070)	.0679	0.4180	0.5456	.4436
40-49	0.719 (0.478-1.083)	.1143	0.3526	0.5158	.4942
50-59	1.016 (0.671-1.539)	.9404	0.3742	0.5065	.4600
60-64	1.247 (0.782-1.987)	.3535	0.2620	0.5134	.6099
<b>Marital Status</b>					
Divorced/Widowed/Unmarried (Ref.)	–		–		
Married	1.397 (1.079-1.808)	.0111	0.0848	0.2830	.7645
<b>Educational Level</b>					
Elementary School or Below (Ref.)	–		–		
Middle/High School	0.950 (0.675-1.336)	.7683	0.0041	0.2587	.9874
College or Above	0.777 (0.528-1.142)	.1987	0.0195	0.3130	.9503
<b>Residential Area</b>					
Province (Ref.)	–		–		
Metropolitan City	0.809 (0.677-0.968)	.0204	-0.2624	0.1841	.1540
<b>Public Health Financing</b>					
Medical Aid (Ref.)	–		–		
NHI (National Health Insurance)	0.471 (0.282-0.787)	.0040	-0.9408	0.3661	.0102
<b>Currently Employed</b>					
No (Ref.)	–		–		
Yes	0.809 (0.664-0.987)	.0365	0.1222	0.2028	.5469
<b>Annual Household Income Quintile</b>					
Q1 (low; Ref.)	–		–		
Q2	0.986 (0.655-1.485)	.9461	0.2920	0.3382	.3880
Q3	1.029 (0.679-1.561)	.8919	0.1823	0.3967	.6459
Q4	1.004 (0.661-1.525)	.9836	0.1509	0.3794	.6909
Q5 (High)	1.082 (0.708-1.652)	.7164	0.2443	0.3925	.5337
<b>Chronic Disease</b>					
No (Ref.)	–		–		
Yes	1.438 (1.173-1.763)	.0005	0.1832	0.2529	.4689
<b>Subjective Health Status</b>					
Good (Ref.)	–		–		
Moderate	1.333 (1.098-1.619)	.0037	-0.0175	0.1985	.9296
Poor	2.695 (2.037-3.566)	<.0001	-0.1778	0.2518	.4803
<b>Private Health Insurance</b>					
No (Ref.)	–		–		
Yes	1.867 (1.515-2.300)	<.0001	0.2477	0.2592	.3393
Constant			0.3747	0.6517	.5653
Goodness of fit	H-L $\chi^2 = 10.664$ (P = .222)		Log likelihood = -78.621		

Note. OR = odds ratio; CI = confidence interval; B = unstandardized regression coefficient; Ref = reference group; SE = standard error.

NHI had more medical expenses per hospitalization than those who received medical aid.

Supplemental Table 5 shows the results of the analysis of the association between private health insurance and total outpatient medical expenses, and private health insurance and per visit outpatient medical expenses. Compared to non-purchasers' group, private health insurance purchasers' total outpatient medical expenses increased by 19.7% ((exp(B=0.18)-1) ×

100=19.7), and per-visit outpatient medical expenses increased by 18.5% ((exp(B=0.17)-1) × 100=18.5), all of which were statistically significant. In addition, being insured in NHI and having poor health status significantly increased the total outpatient medical expenses and per-visit outpatient medical expenses, and per-visit outpatient medical expenses for women decreased compared to men. However, compared to those without chronic diseases, total outpatient medical expenses

**Table 3.** Association between Private Health Insurance and Outpatient Utilization.

Variables	Any outpatient care use (n = 5617)		No. of outpatient visits (n = 1608)		
	OR (95% CI)	P-value	Coef	S.E.	P-value
<b>Gender</b>					
Male (Ref.)	–		–		
Female	2.454 (2.084-2.891)	<.0001	0.1392	0.0415	.0008
<b>Age Group</b>					
20-29 (Ref.)	–		–		
30-39	1.023 (0.793-1.320)	.8609	0.2268	0.1076	.0351
40-49	0.973 (0.733-1.292)	.8502	0.1509	0.1076	.1608
50-59	1.361 (0.982-1.885)	.0639	0.3491	0.1089	.0013
60-64	2.128 (1.297-3.489)	.0028	0.4471	0.1149	.0001
<b>Marital Status</b>					
Divorced/Widowed/Unmarried (Ref.)	–		–		
Married	2.597 (2.122-3.179)	<.0001	–0.0579	0.0563	.3031
<b>Educational Level</b>					
Elementary School or Below (Ref.)	–		–		
Middle/High School	1.091 (0.679-1.751)	.7195	–0.0213	0.0648	.7427
College or Above	1.279 (0.782-2.093)	.3263	–0.1365	0.0766	.0749
<b>Residential Area</b>					
Province (Ref.)	–		–		
Metropolitan City	0.959 (0.820-1.122)	.6032	–0.0593	0.0395	.1339
<b>Public Health Financing</b>					
Medical Aid (Ref.)	–		–		
NHI (National Health Insurance)	0.257 (0.110-0.603)	.0018	–0.4540	0.1163	<.0001
<b>Currently Employed</b>					
No (Ref.)	–		–		
Yes	0.845 (0.696-1.027)	.0914	–0.1712	0.0443	.0001
<b>Annual Household Income Quintile</b>					
Q1 (low; Ref.)	–		–		
Q2	1.249 (0.846-1.843)	.2631	0.0825	0.0869	.3426
Q3	1.151 (0.785-1.687)	.4712	0.1047	0.0882	.2356
Q4	1.384 (0.943-2.031)	.0970	0.1933	0.0893	.0303
Q5 (high)	1.630 (1.101-2.412)	.0146	0.1600	0.0902	.0760
<b>Chronic Disease</b>					
No (Ref.)	–		–		
Yes	4.454 (3.660-5.421)	<.0001	0.5199	0.0479	<.0001
<b>Subjective Health Status</b>					
Good (Ref.)	–		–		
Moderate	1.421 (1.201-1.680)	<.0001	0.1664	0.0421	<.0001
Poor	2.618 (1.635-4.192)	<.0001	0.5763	0.0632	<.0001
<b>Private Health Insurance</b>					
No (Ref.)	–		–		
Yes	1.790 (1.524-2.102)	<.0001	–0.0707	0.0421	.0930
Constant			2.7340	0.1547	<.0001
Goodness of fit	H-L $\chi^2 = 13.550$ (P-value = .094)		Log likelihood = 87 738.154		

Note. OR = odds ratio; CI = confidence interval; B = unstandardized regression coefficient; Ref = reference group; SE = standard error.

increased in participants with chronic diseases, but the results from the analysis of per-visit expenses were opposite.

## Discussion

The purpose of this study was to analyze the association between private health insurance with inpatient and outpatient medical utilization using the 2014 to 2015 Korea Health

Panel data. We attempted to identify the moral hazard of individuals with private health insurance by comparing the medical utilization between those who had purchased private health insurance and those who had not. This study differs from previous studies in that it compared medical use within the same disease group (ie, musculoskeletal disease). Since there was a difference in medical use according to disease type, understanding the differences between disease groups

needs to be considered. In addition, we limited our target to musculoskeletal disease by focusing on the results of the previous analysis, which found that private health insurance payments focused on musculoskeletal diseases that were likely to cause over-treatment and moral hazard.<sup>25</sup> According to the Korea Insurance Development Institute, when the insured medical insurance payments for the 3 years from 2013 to 2015 were classified by disease, 27.4% of the total payments were identified as covering musculoskeletal diseases.<sup>25</sup> This implies that certain diseases disproportionately affect the expenditure of medical expenses among the total paid claims.

As a result of the analysis, there was no association between the purchase of private health insurance with inpatient use. However, in outpatient use, the amount of total medical expenses and per-visit medical expenses by the purchasers demonstrated a statistically significant increase compared to those who did not purchase private health insurance.

The proportion of purchasers of private health insurance was higher among women, married people, well-educated people, and those with high household income, which are similar to those reported in previous studies.<sup>16-18,20</sup> As a result of the analysis of the average medical expenses by the purchase of private health insurance, there was no difference between the purchasers' and non-purchasers' groups in inpatient care. However, medical expenses per visit for outpatient care were higher in the purchase group than the non-purchasers' group. This suggests that the physicians and patients in the purchasers' group have an increased likelihood of using expensive and costly procedures, as the economic constraints are relaxed since the private health insurance pays a portion of the purchaser's medical expenses. In particular, for musculoskeletal disorders, patients with indemnity insurance and their healthcare providers may select treatments that are costly and not covered by NHI instead of opting for cheaper treatment options.

The results of the multiple regression analysis examining the association between the purchase of private health insurance with medical payments also showed some differences in the inpatient and outpatient groups. After controlling for control variables, the purchase of private health insurance had no significant association with inpatient utilization but did have a significant association with outpatient utilization behavior. The results of this study suggest that private health insurance increased outpatient utilization more than inpatient utilization, which is generally consistent with the results of the other studies.<sup>6,19</sup> For inpatient services, it is difficult to arbitrarily increase the amount of inpatient service utilization by the purchase of insurance as the admission decision, and the amount of medical use is determined by the medical provider rather than the patient, as is commonly done with outpatient services.<sup>19</sup> However, it has been shown that private health insurance increases spending on outpatient expenditures. Since the patients who are covered by private health insurance have almost no economic constraint on the use of

outpatient services, there is an incentive to get more expensive treatments for more accurate diagnoses or treatment. Even if the purchaser has high payments for medical expenses to the medical institution, the insurance company will pay the remaining amount, minus the deductible. In other words, since the medical service is nearly free of charge because it is covered by private health insurance, purchasers are willing to seek out these medical services, leading to their receipt of high-quality care and treatment. At the same time, the medical provider may invite or attract the uninsured service depending on whether the patient is covered by private health insurance, which can create further problems.<sup>22</sup>

However, when the analysis results were comprehensively reviewed, purchasing private health insurance increased total outpatient medical expenses and per-visit outpatient expenses, but did not increase the number of outpatient visits. Considering that purchasing private health insurance increases the possibility of inpatient and outpatient services, there is a need to use high quality and expensive medical services rather than the need to increase the frequency of medical use by increasing medical access through private health insurance.

Previous studies have shown conflicting results compared to our findings. Dae Hwan Kim<sup>4</sup> analyzed the short- and long-term effects of private health insurance on medical expenses. The study concluded that there was no increase in short- and long-term costs due to private health insurance coverage for either inpatient or outpatient use and that no moral hazard was found for increased medical demand due to private health insurance coverage. Similarly, Young Dae Kwon and colleagues<sup>13</sup> analyzed the copayment per inpatient and the copayment per outpatient visit as dependent variables to consider the treatment strength and showed that private health insurance had no statistically significant effect on the copayments per outpatient visit. However, it did have a significant effect on the amount of copayment per inpatient visit. The differences in these results may be due to the difference in target diseases and the year of analysis of the data sources.

In the present study, only the musculoskeletal disorders were analyzed. Considering the overall severity of the disease group, the moral hazard of the purchasers in the outpatient use group showed an increase in medical demand due to private health insurance. This may be because people with known disabilities are more likely to purchase private insurance to acquire better care as well as cover the additional costs associated with care. The Korea Insurance Development Institute<sup>25</sup> analyzed the data of insurance claims paid between 2013 to 2015. According to the analysis, M51 ranked first in the total payment claims at 7.3%, followed by M54 (3.3%), M75 (2.6%), S33 (2.4%), and M50 (2.4%). Of the total diseases, the top 10 diseases accounted for 25.7% of the private (indemnity type) health insurance payments, and all of the diseases, except 3 (dislocation, sprain and strain of joints and ligaments of lumbar spine and pelvis; malignant neoplasm of breast; and dislocation, sprain, and strain of joints and



ligaments of knee), were musculoskeletal diseases. This finding indicates that patients with mild illnesses, such as musculoskeletal disorders, heavily utilize the financing of private health insurance compared to those with severe medical conditions, such as cardiovascular disease and cancer. Treatment and treatment materials for disease such as disk disorders, dorsalgia, and shoulder lesions included as research target diseases are notified of standardized codes and names at the national level, but medical institutions are not forced to use them or control the cost of treatment. Mostly, the use of the name and the cost of treatment are left to the volition of the medical institution. Therefore, even though the disease is the same, the code and name charged for each medical institution are different, and the number of treatment trials and the treatment unit cost are greatly different, so the control is not properly controlled. In addition, these treatment items such as MRI, ultrasound imaging, manual therapy, and extracorporeal shock wave treatment, are the items with the highest number of non-payment claims.<sup>25</sup> Therefore, increases in indiscriminate reimbursement payments for these conditions with lower morbidity and mortality is a challenge for public insurance financing and the expansion of health insurance coverage.

In the past decades, South Korea has made efforts to enhance public health insurance coverage, but the coverage rate in 2016 was 62.6%, well below the Organization for Economic Cooperation and Development (OECD) national average coverage rate of 73.6%.<sup>1,26</sup> To supplement the low coverage of public health insurance, people have increased their coverage through private health insurance. The use of medical services has increased as the lowered burden of medical expenses for those who have purchased private health insurance. Those with private health insurance not only have the reduced cost of NHI-covered services with fixed costs that are reimbursed, but they also have the ability to utilize services that are not covered by NHI, which have unregulated costs with wide ranges in their costs. Providers may be willing to increase the number of uninsured medical procedures for patients with private insurance, thereby increasing the overall expenses that are reimbursed by both NHI and private health insurance. To cover such an increase in public expenditure, the NHI imposes additional premiums on all who are covered and not covered by private health insurance. Therefore, this problem will eventually affect the finances of both private and NHI.<sup>27</sup> Finally, in the effort to expand the coverage of public health insurance, private health insurance has led to a sharp increase in non-reimbursement payments, which continues to suppress the expansion of public health insurance coverage rates.

In conclusion, in this study, it was confirmed that the coverage of private health insurance for medical treatment of musculoskeletal diseases increased the use of medical care, which further burdened the NHI financially, and could ultimately increase the burden of medical expenses for the population. The problem of managing the copayments and

non-reimbursement payments is deeply connected to the problem of increasing coverage rates for the NHI. Thus, it is critical to ensure that private health insurance improves access to health care services, rather than increasing meaningless medical demands. In addition, it will be necessary to improve the product structure so that the proportion of insurance payments to patients with serious illnesses, who actually need insurance, can be increased. At the same time, efforts to alleviate demand that is encouraged by physicians should be supported.

Several limitations to this study are worth noting. First, we could not find long-term trends of medical use resulting from the purchase of private health insurance. Second, for more rigorous analysis, we need to compare the use of medical services within the same diagnosis by considering the degree of severity according to disease. We were unable to do this due to the data characteristics and the number of subjects. Third, in the analysis process, we did not adjust for the main coverage of the insurance product. We classified medical use into inpatient and outpatient services, but did not precisely distinguish whether the coverage of the indemnity-type private health insurance by each purchaser was an inpatient or outpatient medical expense. As such, there are some limitations in interpreting and explaining the given results. Fourth, in this study, the diagnosis included in each analysis was different because it compared the medical use behavior for the same diagnosis in each inpatient and outpatient medical service. The difference in the findings of inpatient and outpatient analyzes may be partly due to the differences in target diseases.

Considering the results of this study, additional empirical analysis of private health insurance in South Korea is needed for specific diseases. It is necessary to understand the patient's usage behavior over a long period of time and to deal with various challenges to solve the problem of private health insurance.

## Conclusion

In conclusion, our results showed that the private health insurance coverage for the medical treatment of musculoskeletal diseases increased the expenditures on the outpatient medical services, but not inpatient medical services. This indicates that the expansion of private health insurance further burdened the NHI financially and could ultimately increase the burden of medical expenses for the population. It is recommended to ensure that private health insurance improves access to health care services, rather than contribute to meaningless and indiscriminate medical needs.

## Abbreviations

FSS: Financial Supervisory Service; KCD: Korean Classification of Diseases; NHI: National Health Insurance; OECD: Organization for Economic Cooperation and Development; PID: Physician-Induced Demand

## Authors' Contributions

YS (the first author) designed the study, analyzed and interpreted the data, and wrote the paper. YE, DS and M participated in the statistical analysis. JH provided assistance in the interpretation of the data and preparation of the manuscript. SJ (the corresponding author) directed this study as the corresponding author. All authors read and approved the final version of the manuscript.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.



## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (Ministry of Science and ICT) (No. 2017R1A2B4005876). The funding agency had no role in the study design, analysis and interpretation of the data, or the preparation of the manuscript.

## Ethics Approval and Consent to Participate

This study used publicly available data from the Korea Health Panel Survey 2014 to 2015 and did not include any identifiable personal information. Ethical approval was given by the Institutional Review Board of Korea University, Seoul, Korea (IRB No. KUIRB-2019-0049-01).

## ORCID iDs

Radnaabaatar Munkhzul  <https://orcid.org/0000-0003-4968-5031>  
Seok-Jun Yoon  <https://orcid.org/0000-0003-3297-0071>

## Availability of Data and Material

The data used in this article is available in <https://www.khp.re.kr:444/>. Detailed information on the survey design and data characteristics are provided at <http://www.khp.re.kr/>.

## Supplemental Material

Supplemental material for this article is available online.

## References

1. National Health Insurance Service. *National Health Insurance Patient Medical Expenses Survey Yearbook*. National Health Insurance Service; 2006-2016.
2. Choi KC, Lee HB. The proper role of National Health Insurance and private health insurance. *Health Welf Policy Forum*. 2017;248:30-42.
3. You CH, Kang SW, Choi JH, Oh EH, Kwon YD. The effect of private health insurance on health care utilization: evidence from Korea Health Panel (2008-2010). *Korean J Health Serv Manag*. 2014;8(2):101-113.
4. Kim DH. Effects of fee-for-service health insurance on medical consumption. *Korean Insur J*. 2014;98(3):61-90.
5. Financial Services Commission. C1999. Insurance policy. Published December 20, 2016. Accessed February 11, 2019. [https://www.fsc.go.kr/policy/ply\\_insr\\_list.jsp?menu=7310500&bbsid=BBS0030&sword=&sch1=&sch2=&sch3=&strt\\_dt=&end\\_dt=&page=5](https://www.fsc.go.kr/policy/ply_insr_list.jsp?menu=7310500&bbsid=BBS0030&sword=&sch1=&sch2=&sch3=&strt_dt=&end_dt=&page=5)
6. Yun H. Effects of private insurance on medical expenditure. *KDI J Econ Policy*. 2008;30(2):99-128.
7. OECD. *Private Health Insurance in OECD Countries*. The OECD Health Project. OECD Publishing; 2004. doi:10.1787/9789264007451-en
8. Kim KO, Shin YJ. Effects of buying a medical insurance for actual expense on medical cost. *J Crit Soc Welf*. 2017;54:305-334.
9. Shin KC. Discussions on the empirical study on health care consumptions by private health insurance policyholders. *Health Soc Welf*. 2015;35(4):5-34. doi:10.15709/hswr.2015.35.4.5
10. Kim DH, Lee CW, Lee SW, Kim DG, Kim MH. *Organic Cooperation Plan of Public and Private Health Insurance According to Population Aging*. Financial Services Commission; 2012.
11. Financial Supervisory Service. C1999. Press releases. Published October 4, 2018. Accessed February 11, 2019. [http://acct.fss.or.kr/fss/kr/promo/bodobbs\\_view.jsp?s\\_kind=&s\\_title=&page=&seqno=21761](http://acct.fss.or.kr/fss/kr/promo/bodobbs_view.jsp?s_kind=&s_title=&page=&seqno=21761)
12. Health Insurance Review & Assessment Service. C1999. Policy trends. Published July 23, 2018. Accessed February 11, 2019. <http://www.hira.or.kr/bbsDummy.do?pgmid=HIRAA030096000000>
13. You CH, Kang S, Kwon YD, Oh EH. The effects of supplementary private health insurance on healthcare utilization and expenditures: indemnity versus fixed-benefit. *Korean Soc Sec Stud*. 2011;27(1):277-292.
14. You CH, Kwon YD, Choi JH, Kang S. Analysis of effect of indemnity private health insurance on medical utilization using instrumental variable regression. *J Korea Contents Assoc*. 2018;18(1):268-276.
15. Kim DH, Lee BJ. An analysis on adverse selection in fee-for-service health insurance. *Korean Insur J*. 2013;96(2):25-50.
16. Yoon TH, Hwang IK, Sohn HS, Koh KW, Jeong BG. The determinants of private health insurance purchasing decisions under national health insurance system in Korea: the expanding of private health insurance market, for the better or worse. *Korean J Health Policy Adm*. 2005;15(4):161-175.
17. Lee HB, Hyun KR. A study for characteristics and factors of private health insurers. *Korean Soc Sec Stud*. 2011;27(1):217-240.
18. Kim SM, Ahn E, Shin H. How does private health insurance affect dental care utilization? *J Korean Acad Dental Health*. 2014;38(4):203-211.
19. Jung KT. An empirical study on the relationship between private health insurance and moral hazard. *Korean Insur J*. 2006;75(0):1-25.
20. Baek IR, Park HS, Byun SS. The determinants and medical care utilization behavior of private health insurance. *J Korea Contents Assoc*. 2012;12(7):295-305.
21. Jeon BY, Oh JH, Kwon SM. The effect of changes in private health insurance status on health care expenditure. *Korean Soc Sec Stud*. 2013;29(2):261-288.
22. Kang S, Kwon YD, Choi JH, You CH. Literature review on private health insurance in Korea for the last 20 years. *Korean Health Econ Rev*. 2017;23(3):1-36.
23. Korea Health Panel Survey. C2009. Survey contents. Accessed February 18, 2019. <http://www.khp.re.kr/eng/survey/contents.do>

24. Korea Credit Information Service. C2015. Notice. Published October 4, 2018. Accessed February 22, 2019. <http://www.kcredit.or.kr/content/pressView.do?contentNo=351&searchData=startDt%3D2016.11.01.%26endDt%3D2016.11.31.%26searchField%3Dtitle%26typeSearch%3D%26searchWord%3D%25EB%25B9%2585%25EB%258D%25B0%25EC%259D%25B4%25ED%2584%25B0>
25. Korea Insurance Development Institute. Standardization plan of uninsured medical expenses covered by indemnity private health insurance. Published November 16, 2016. Accessed February 11, 2019. <https://t1.daumcdn.net/cfile/tistory/274A49465924F65B32?original>
26. OECD Health Statistics 2018. Published June 28, 2018. Updated November 8, 2018. Accessed February 22, 2019. <http://www.oecd.org/els/health-systems/health-data.htm>
27. Shin HW. *Rational Development Plan of National Health Insurance and Private Health Insurance*. Korea Institute for Health and Social Affairs; 2015.