

# Medical expenditures and its determinants depending on receipt of public pension in South Korea

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## Abstract

**Background:** The objective of this study was to analyze the expenditures on medical expenses and its determinants using the Korean Retirement and Income Data conducted by the National Pension Research Institute.

**Methods:** This study utilized data from the Korean Retirement and Income Study from 2005 to 2013, which were compiled by the National Pension Research Institute. The *t* test and ANOVA were used to analyze the general characteristics and medical expenditures of subjects depending on the receipt of public pension, and logistic regression was used to identify the determinants of medical expenditures.

**Results:** The results of this study indicated that households not receiving public pension are likely to spend more on medical expenses than those receiving public pension. The analysis results showed that gross household expenditures quintiles affected medical expenditures up to 4 times. Moreover, poor physical health was a stronger influence factor of medical expenditures than good physical health.

**Conclusion:** It is necessary to prepare a pension policy that can guarantee a reasonable amount of a retirement pension to the retiree, provide health policy and financial support programs to medical services.

**Keywords:** expenditures on medical expenses, medical determinant, old-age income, public pension, retirement

## 1. Introduction

The Korean Statistical Information Service<sup>[1]</sup> reported that 12.8% of the all population of South Korea was over 65 years in 2015 and will account for 20.0%, 28.7%, and 35.6% of the population in 2025, 2035, and 2045, respectively. Moreover, it was predicted that the cost of elderly support will drastically increase from 17.5% (2015) to 65.6% (2045) of all population. These changes in the demographic structure will affect the

healthcare and welfare sectors. Specifically, old retirees generally experience a drastic decrease in economic and social activities. Some retirees adapt to their new situation by finding new jobs or new economic activities. However, some may not have such opportunities and may lose their roles in society. Consequently, they may experience psychological crises or economic difficulties. It has been reported that most retirees found new jobs before the age of 65 years, but the elderly ( $\geq 65$ ), who did not have enough assets, had difficulty in making a living and suffered financially.<sup>[2]</sup>

A secure income even in old age is a very important requirement to maintain a stable life. The pension system guarantees a certain level of income and standard of living for retirees. The National Pension Service is one of South Korea's pension systems aimed at the general public.<sup>[3]</sup> After receiving a certain amount of premium from subscribers and users, the service aims to stabilize the standard of living and promote the welfare of the people by providing various benefits for those who are exposed to social risks such as the interruption or loss of income.<sup>[4]</sup> Other public pension systems include special occupation retirement pensions (e.g., Public Officials Pension, Military Pension, and Teachers Pension) and they serve the same purpose as the National Pension Service.

The National Health Insurance Statistical Yearbook (2013) revealed that the medical expenditures of the elderly ( $>60$ ) was KRW 18,852 billion in 2013, 2.5 times more than in 2006, and the mean annual medical expenditures per person in this group was KRW 3219 thousand, more than 3 times the mean expenditures per person (KRW 1,022 thousand) in South Korea.<sup>[5]</sup> The results suggest that the increase in elderly medical expenditures may be related to the increase in the elderly

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**Table 1****Definition of variables.**

Variables	Description
Medical Expenses	0:Below average, 1: Average or more
Public Pension Income	0: Recipient, 1: Non-recipient
Gender	0: Male, 1: Female
Age	0:55-64 years old, 1:65-74 years old, and 2:74 years old or older
Highest Level of Education	0: Elementary school and below, 1: Middle school, 2: High school, and 3: Above college
Residential region	0: Seoul, 1: Metropolitan city, and 2: Province
Number of Household	0:1person, 1:2people, 2:3people, and 3:4 people and more
Household Gross Expenditure	0:First quintile, 1:Second quintile, 2: Third quintile, 3: Fourth quintile, and 4: Fifth quintile
Spouse	0: Yes and 1: No
Employment Status	0: Employed and 1: Unemployed
Life Satisfaction – Overall Life	0: Not good, 1: Average, and 2: Good
Physical Health Condition	0: Not good, 1: Average, and 2: Good
Psychological Health Condition	0: Not good, 1: Average, and 2: Good

population. Previous studies revealed that people who did not retire were significantly healthier than those who did.<sup>[6,7]</sup> Moreover, when other factors were identical, the probability of being in poor health was 1.95 times higher for retirees than for non-retirees.<sup>[8-10]</sup> The results of these studies imply that the elderly, especially retirees, who lose income due to the limitation in income source and economic activities, and have a high incidence of illnesses such as chronic diseases, may experience serious disadvantage in receiving medical help.

Moreover, to achieve improvements in public health with limited resources, which is the ultimate goal, clear evidence needs to be presented regarding cost-effectiveness. It is essential to conduct “the actual status of medical use survey” or analyze “the state of medical expenditures.” It is particularly important to estimate the deductible payment expenditures associated with the health security issue precisely.<sup>[11]</sup> Consequently, it is critical to estimate the medical expenditures and analyze the determinants depending on the receipt of public pension, which is designed to guarantee income and protect the elderly from loss of income and social risks after retirement. In fact, no study evaluates the trend of medical expenditures according to the receipt of public pension. Therefore, this study aimed to review the role of the public pension system and provide baseline data regarding pension and health insurance policies by identifying the difference in the size of medical expenditures between people receiving a public pension and those not receiving a public pension, and determinants affecting the difference.

## 2. Methods and materials

### 2.1. Study subjects

This study utilized data from the Korean Retirement and Income Study (KReIS) for 2005 to 2013, which were compiled by the National Pension Research Institute.<sup>[12]</sup> The aforementioned study has been conducted every other year since 2005 to identify the need for and importance of retirement income security and establish policy to cope with these needs. The study targets households having at least 1 member equal to or older than 50, people who are equal to or older than 50, and their spouses. This study analyzed 1738 respondents among individuals who responded to the 2013 survey among the retiree in the 2005

survey after excluding non-response questionnaires and those containing missing values.

### 2.2. Measurement variables

The measurement variables and their definitions are presented Table 1.

**2.2.1. Medical expenses.** The Korean Retirement and Income Study includes items related to healthcare expenditures among household expenditures. Between 2005 and 2009, healthcare expenditures included the total costs for Western medicine, oriental medicine, health supplements, medical services, healthcare products, and medical instruments. However, since 2011, the study has asked respondents to report each individual category. This study used only the summed data to compare the data consistently.

**2.2.2. Public pension recipient.** The Korean Retirement and Income Study divides the public pension into national and special occupation retirement pensions. The national pension consists of the workplace, local, voluntary, and voluntary consecutive subscribers, while the special occupation retirement pension is composed of public officials, military, and special post office pensions. This study classified people into public pension recipients (those receiving national or special occupation retirement pension) and non-recipients (those not receiving either).

**2.2.3. Gross household expenditures.** Numerous previous studies have shown that health is affected by the socio-economic level, especially income level.<sup>[11,13-15]</sup> The Korean Retirement and Income Study includes household income and expenditures categories. Retirees tend to have considerably less income than expenditures even if they have income from economic activities. Moreover, they have to spend money to maintain a minimum livelihood.<sup>[16]</sup> Additionally, consumer's expenditures was used instead of income in previous studies<sup>[3,17-19]</sup> because the expenditures data are generally more appropriate and stable than monthly mean income data in terms of the lifetime income of a household.<sup>[20]</sup> Therefore, this study used total household expenditures, which is a proxy variable of household income, based on the data published by the Korean Statistical Information Service.<sup>[1]</sup> The data were reclassified into quintiles; the first quintile is the lowest expenditures and the fifth quintile is the highest expenditures.

### 2.3. Analysis methods

The *t* test and ANOVA were conducted to evaluate the effects of the receipt of public annuity on the general characteristics and the subjects' expenditures on medical expenses (SPSS 22.0). Moreover, logistic regression was carried out to identify the determinants of the expenditures on medical expenses by the public pension income and non-income of retirees. All statistical significance was determined at  $P = .05$ .

## 3. Results

### 3.1. Sociodemographic characteristics of subjects

The sociodemographic characteristics of subjects indicated that there were more male subjects in both the recipient group (82.0%) and non-recipient group (62.3%). The age composition of the recipient group was 55 to 64 years (66.0%) and 65 to 74 years (32.3%), and that of the non-recipient group was 55 to 64 years (49.2%) and 65 to 74 years (43.6%). The recipient's highest level of education was elementary school and below (46.2%) and high school (21.6%), while the non-recipient's highest level of education was elementary school and below (59.4%) and middle school (17.1%). The recipient's residential regions were province (63.5%) and metropolitan city (20.2%), while the non-recipient's residential regions were province (56.9%) and metropolitan city (25.8%) (Table 2).

### 3.2. Expenditures on medical expenses

The analysis results showed that, in 2005, people who received public pension spent an average of KRW 103 thousand on medical expenses and those who did not receive public pension spent an average of KRW 87 thousand (KRW 16 thousand less than the former). Additionally, the results indicated that recipients of public pension spent KRW 13 thousand, 93 thousand, 31 thousand, and 19 thousand more than non-recipients when they were male, 75 years or older, with college higher level of education, and living in Seoul, respectively. Furthermore, the results revealed that

recipients spent KRW 30 thousand, 66 thousand, 4 thousand, and 29 thousand more than non-recipients when they were living with 2 other household members, gross household expenditures was in the fourth quintile, they were married, and they were unemployed, respectively. Moreover, the results indicated that recipients spent KRW 23 thousand, 28 thousand, and 26 thousand more than non-recipients when their life satisfaction was not good, their physical health condition was average, and their psychological health condition was poor, respectively.

The analysis results of the study showed that, in 2013, people who received public pension spent KRW 154 thousand and non-recipients spent on average KRW 117 thousand on medical expenses, which was KRW 37 thousand less than the former. Moreover, the results indicated that recipients spent KRW 37 thousand, 91 thousand, 54 thousand, and 125 thousand more than non-recipients when they were male, 75 years or older, with college and higher level of education, and living in a province, respectively. Furthermore, the results revealed that recipients spent KRW 105 thousand, 142 thousand, 316 thousand, and 51 thousand more than non-recipients if they were living alone, gross household expenditures was in the fifth quintile, they were married, and they were employed, respectively. Additionally, the results indicated that recipients spent KRW 52 thousand, 70 thousand, and 93 thousand more than non-recipients when their life satisfaction was average, physical health was good, and psychological health was good, respectively (Table 3).

### 3.3. Factors determining medical expenses

The determinants of medical expenditures were analyzed for public pension recipients in 2005 and the results indicated that those aged between 65 and 74 were likely to spend more on medical expenses than those aged between 55 and 64 years (OR = 1.776 [95% CI = 1.175–2.684]) and people living in Seoul were likely to spend more medical expenses than people living in metropolitan cities (OR = .493 [95% CI = .270–.902]) and provinces (OR = .501 [95% CI = .296–.849]). In the case of public pension non-recipients, people who had at least college level education were likely to spend more on medical expenses than those who graduated from elementary school or below (OR = 1.817 [95% CI = 1.074–3.072]). The likelihood of spending more on medical expenses was higher when living with 1 (OR = 1.781 [95% CI = 1.064–2.982]) or 2 persons (OR = 1.751 [95% CI = .986–3.110]) than when living alone. Moreover, it was higher when gross household expenditures was in the fifth quintile (OR = 1.8037 [95% CI = 1.048–3.103]). Additionally, it was higher when a subject was married (OR = .411 [95% CI = .238–.710]).

The determinants of medical expenditures were analyzed for public pension recipients in 2013 and the results showed that people living in Seoul were likely to spend more on medical expenses than those living in provinces (OR = .480 [95% CI = .280–.825]). Moreover, medical expenditures were likely to be higher when gross household expenditures was in the second (OR = 3.804 [95% CI = 2.323–6.228]), third (OR = 3.736 [95% CI = 1.453–9.604]), fourth (OR = 5.068 [95% CI = 1.950–13.172]), and fifth quintiles (OR = 7.604 [95% CI = 2.328–24.837]). Additionally, the likelihood of spending more on medical expenses was higher when the physical health condition was below average (OR = .577 [95% CI = .343–.969]) and when the psychological health condition was not good (OR = .373 [95% CI = .185–.754]). In the case of non-recipients, those aged between 65 and 74 were likely to spend more on medical expenses than

**Table 2**  
Sociodemographic characteristics of study subjects.

Classification	Recipient		Non-recipient	
	N	%	N	%
Gender				
Male	483	82.0	716	62.3
Female	106	18.0	433	37.7
Age				
55–64	389	66.0	565	49.2
65–74	192	32.3	501	43.6
≥75	8	0.7	83	7.2
Highest Level of Education				
Elementary school and below	272	46.2	682	59.4
Middle school	107	18.2	196	17.1
High school	127	21.6	189	16.4
College and higher	83	14.0	82	7.1
Residential Region				
Seoul	96	16.3	199	17.3
Metropolitan City	119	20.2	296	25.8
Province	374	63.5	654	56.9
Total	589	100.0	1,149	100.0

**Table 3**  
**Expenditure of medical expense.**

Unit: KRW

Classification	2005		2013	
	Recipient M (SD)	Non-Recipient M (SD)	Recipient M (SD)	Non-Recipient M (SD)
Gender				
Male	113 (187)	100 (119)	171 (241)	134 (163)
Female	66 (69)	63 (84)	94 (154)	91 (143)
Age				
55–64	97 (169)	84 (97)	150 (215)	126 (181)
65–74	115 (181)	91 (119)	171 (259)	114 (135)
≥75	183 (148)	90 (114)	176 (133)	85 (77)
Highest Level of Education				
Elementary school and below	94 (188)	83 (112)	119 (171)	101 (140)
Middle school	108 (195)	92 (116)	160 (243)	132 (180)
High school	94 (84)	86 (91)	190 (242)	138 (181)
College and higher	147 (189)	116 (90)	228 (320)	174 (158)
Residential region				
Seoul	116 (102)	97 (111)	159 (231)	158 (190)
Metropolitan City	94 (142)	80 (96)	104 (50)	53 (132)
Province	104 (195)	88 (112)	237 (327)	112 (155)
Number of Household				
1	57 (71)	56 (72)	190 (287)	85 (171)
2	106 (158)	104 (127)	127 (163)	125 (127)
3	126 (240)	96 (113)	142 (218)	116 (178)
≥4	103 (135)	87 (87)	183 (177)	153 (212)
Household Gross Expenditure				
First quintile	93 (178)	84 (115)	195 (326)	87 (81)
Second quintile	108 (151)	89 (84)	302 (467)	173 (196)
Third quintile	139 (254)	93 (125)	209 (138)	110 (271)
Fourth quintile	141 (134)	75 (55)	316 (220)	213 (458)
Fifth quintile	116 (178)	93 (113)	397 (581)	255 (261)
Spouse				
Yes	115 (189)	101 (118)	239 (273)	136 (146)
No	58 (67)	58 (77)	405 (496)	89 (168)
Employment Status				
Employed	100 (180)	90 (112)	173 (237)	123 (154)
Unemployed	112 (157)	83 (101)	113 (193)	106 (159)
Life Satisfaction				
Not good	104 (243)	81 (128)	142 (208)	94 (109)
Average	105 (166)	90 (108)	171 (247)	119 (169)
Good	103 (165)	87 (92)	132 (210)	124 (151)
Physical Health Condition				
Not good	99 (156)	91 (119)	164 (242)	128 (203)
Average	114 (190)	86 (100)	152 (216)	116 (120)
Good	103 (180)	82 (95)	174 (245)	104 (112)
Psychological Health Condition				
Not good	118 (256)	92 (135)	133 (174)	105 (154)
Average	91 (95)	83 (85)	167 (259)	116 (159)
Good	105 (163)	87 (102)	217 (320)	124 (158)
M (SD)	103 (173)	87 (108)	154 (221)	117 (158)

Note: 1,161 KRW=1 US; M=Mean, SD=Standard Deviation.

those aged between 55 and 64 years (OR=1.554[95% CI=.1.113–2.170]). Moreover, the likelihood of spending more on medical expenses was higher when gross household expenditures was in the second (OR=3.841[95% CI=2.575–5.731]), third (OR=6.126[95% CI=3.119–12.033]), fourth (OR=9.390[95% CI=3.949–22.325]), and the fifth quintiles (OR=8.663[95% CI=3.712–20.219]). Furthermore, medical expenses were likely to be higher when the physical health condition was not good. In the case of recipients, the determinants of medical expenses were significantly affected by

residential area, gross household expenditures, physical, and psychological health. On the other hand, in the case of non-recipients, the determinants of medical expenses were significantly affected by age, gross household expenditures, and physical health (Table 4).

#### 4. Discussion

The objective of this study was to identify the size and determinants of medical expenditures by dividing subjects into

**Table 4**  
**Factors determining medical expenses.**

Classification	2005		2013	
	Recipient OR (95% CI)	Non-Recipient OR (95% CI)	Recipient OR (95% CI)	Non-Recipient OR (95% CI)
Gender				
Male (Ref)	1	1	1	1
Female	2.209 (.741-6.583)	1.151 (.759-1.745)	1.077 (.383-3.034)	.726 (.448-1.176)
Age				
55-64 (Ref)	1	1	1	1
65-74	1.776** (1.175-2.684)	1.272 (.939-1.723)	1.449 (.932-2.252)	1.554* (1.113-2.170)
≥75	5.356 (.883-2.502)	1.014 (.575-1.786)	.889 (.170-4.657)	.618 (.296-1.288)
Highest Level of Education				
Elementary school and below (Ref)	1	1	1	1
Middle school	1.237 (.746-2.050)	1.074 (.741-1.557)	1.452 (.833-2.531)	.881 (.580-1.337)
High school	1.246 (.742-2.093)	1.220 (.832-1.789)	1.397 (.798-2.445)	.753 (.488-1.162)
College and higher	1.402 (.749-2.626)	1.817* (1.074-3.072)	1.430 (.790-2.800)	1.132 (.635-2.020)
Residential region				
Seoul (Ref)	1	1	1	1
Metropolitan City	.493* (.270-.902)	.841 (.563-1.256)	.819 (.441-1.520)	.647 (.412-1.017)
Province	.501** (.296-.849)	.841 (.584-1.210)	.480** (.280-.825)	.789 (.530-1.173)
Number of Household				
1 (Ref)	1	1	1	1
2	1.897 (.799-4.503)	1.781* (1.064-2.982)	1.094 (.350-3.416)	1.168 (.635-2.148)
3	2.381 (.937-6.053)	1.751* (.986-3.110)	.868 (.244-3.092)	.935 (.455-1.922)
≥4	1.805 (.637-5.113)	1.505 (.803-2.822)	.804 (.206-3.138)	.874 (.394-1.936)
Household Gross Expenditure				
First quintile (Ref)	1	1	1	1
Second quintile	1.396 (.879-2.216)	1.144 (.807-1.622)	3.804*** (2.323-6.228)	3.841*** (2.575-5.731)
Third quintile	1.203 (.626-2.311)	1.237 (.729-2.099)	3.736*** (1.453-9.604)	6.126*** (3.119-12.033)
Fourth quintile	1.560 (.623-3.906)	1.172 (.640-2.145)	5.068** (1.950-13.172)	9.390*** (3.949-22.325)
Fifth quintile	1.253 (.635-2.473)	1.803* (1.048-3.103)	7.604** (2.328-4.837)	8.663*** (3.712-20.219)
Spouse				
Yes (Ref)	1	1	1	1
No	.352 (.112-1.104)	.411** (.238-.710)	.375 (.098-1.434)	.588 (.300-1.151)
Employment Status				
Employed (Ref)	1	1	1	1
Unemployed	1.536 (1.014-2.327)	1.371 (.998-1.883)	.951 (.616-1.468)	1.087 (.785-1.503)
Life Satisfaction				
Not good (Ref)	1	1	1	1
Average	1.092 (.530-2.248)	1.278 (.889-1.837)	1.038 (.446-2.419)	.855 (.516-1.416)
Good	.852 (.383-1.894)	1.196 (.755-1.895)	1.253 (.519-3.024)	.772 (.432-1.378)
Physical Health Condition				
Not good (Ref)	1	1	1	1
Average	1.388 (.839-2.295)	.750 (.524-1.074)	.577* (.343-.969)	.814 (.563-1.177)
Good	.842 (.506-1.400)	.624 (.423-.921)	.636 (.359-1.129)	.447*** (.289-.691)
Psychological Health Condition				
Not good (Ref)	1	1	1	1
Average	.625 (.359-1.090)	.961 (.675-1.370)	.568 (.293-1.100)	1.190 (.762-1.858)
Good	.799 (.458-1.392)	.853 (.573-1.270)	.373** (.185-.754)	1.144 (.710-1.845)
Waldχ <sup>2</sup>	72.817***	107.964***	119.066***	175.4808***
-2LogL	715.227	1397.834	645.891	527.887

CI = confidence interval, OR = odds ratio, Ref = reference.

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

households with and without public pension income. The results indicated that, in 2005 and 2013, households receiving public pension spent KRW 16 thousand and 37 thousand more than those not receiving public pension, respectively. The medical expenditures of households not receiving the public pension increased from KRW 87 thousand (2005) to KRW 117 thousand (2013), an increase by 34%, while that of households receiving the public pension increased from KRW 103 thousand (2005) to

KRW 154 thousand (2013), an increase by 50%. The results revealed that people receiving the public pension (i.e., special occupation retirement pension and national pension) spent an average of KRW 120 thousand more on medical expenses.<sup>[3]</sup>

The results of the determinants of medical expenditures in 2005 showed that age and residential region were significantly different among households receiving the public pension and number of household members, gross household expenditures,

and marital status were significantly different among households not receiving the public pension. In 2013, there were significant differences in residential region, gross household expenditures, physical, and psychological health condition among households receiving the public pension. Moreover, in 2013, there were significant differences in age, gross household expenditures, and physical health condition among households not receiving the public pension. These results confirmed those of previous studies showing that expenditures on medical expenses increased when people were older<sup>[2,20]</sup> and living in Seoul, and households had higher gross household expenditures.<sup>[3,8]</sup> Retirees are exposed to a higher risk of chronic illness, various diseases, and accidents but they have difficulty in securing regular income through economic activities. The constraints regarding economic activities can eventually lead to serious disadvantage regarding medical use. Specifically, in terms of gross household expenditures, households not receiving the public pension were more likely to spend money on medical expenses than those receiving the public pension.<sup>[21]</sup> Moreover, the results revealed that, depending on the gross household expenditures quintile, it affected medical expenses up to 4.322 times (the fourth quintile) and as low as .04 times (the second quintile). Additionally, it acted as a stronger influence factor on the medical expenditures when physical health was poor compared to when it was good. The results of this study implied that the role of public pension is critical in securing income and access to healthcare in the and there is a crisis associated with an aging population and the resulting decline or loss income.

There are 2 systems guaranteeing income in old age: an unofficial system that is adopted within a family that includes income transfer and an official system that prepares individuals for retirement by saving money using the financial market or by becoming an annuity member. However, people can face financial hurdles because of the failure of the insurance market caused by the imbalance of information or insufficient lifetime income.<sup>[22]</sup> The government is directly involved in the system due to the problem of failure to secure income in old age despite the existence of various systems. The top priorities in the recommendation of International Labor Organization (ILO) pension reform are to identify the minimum salary level to be provided to the public and the minimum targets of application. Moreover, it recommends applying the pension system to all countries and emphasizes the responsibility of the government in ensuring an adequate level of pension benefit and toward the pension system.<sup>[3]</sup> Canada established a 3-way public pension system, comprising a universal fixed amount pension system, an asset-based pension system, and a proportional (earnings-related) pension system. It utilized a mechanism for recovering the pension payment through the tax system.<sup>[17,23]</sup>

Despite the various opinions on the public pension, the results of this study revealed that recipient households spent more on medical expenditures than those not receiving the public pension. The results of this study indicated that households not receiving the public pension would experience unfair medical use even though it was not enough for satisfying the original purpose of the pension system or practicing it such as reducing the pension receipts or lowering the function of the income guarantee.<sup>[24–27]</sup> Due to the rapid aging of the population and changes in family relations, the income activities of the elderly population in the market have significantly reduced and the unofficial income transfer mechanism has been gradually weakened.<sup>[17,28]</sup> Moreover, the method of making the old-age social security system

fully dependent on the market is not efficient due to commonly mentioned problems such as short-sightedness, failure of the insurance market, and inadequate and uncertain means of saving.<sup>[29]</sup> The public pension system is indispensable to distribute and reduce the risks of individual citizens at the national level, secure income for a stable life for the elderly, and secure the right to healthcare for maintaining and promoting health in old age. Therefore, it is necessary to inform the public regarding the appropriateness and necessity of the public pension system. Additionally, in the realm of public health science, measures should be taken, like developing a pension policy for ensuring the appropriateness and reasonable pension payment plan and the health policy for securing the right to healthcare and the equitable use of medical care for retirees in old age.

This study has the following limitations. First, it could not consider other incomes such as financial (e.g., the interest of installment savings and stock dividend), real estate related (e.g., rent and difference in premium), and private transfer incomes (e.g., pocket money and living expenses). Second, it was challenging to discuss the findings because no previous study evaluated the effects of the receipt of public pension, although many investigated expenditures on medical expenses. Third, although this study utilized representative nationwide data, it was difficult to assume that the results represent the opinion of all South Koreans. Fourth, this study could not consider the health-related characteristics of the household members while identifying the expenditures on medical expenses.

Nevertheless, the significance of this study is as follows. The results of this study are of interest to policy makers and academics because it identifies the determinants of medical expenditures and whether an equity problem exists. However, few studies have been conducted to evaluate the aforementioned issues. Therefore, the results of this study are meaningful because it presents the determinants of the size of medical expenditures regarding recipients of the public pension.

## 5. Conclusion

The results of this study indicated that households receiving public pension spent more on medical expenditures than those not receiving it. The results implied that households not receiving public pension would experience unequal medical usage more often than those receiving it. Therefore, it is necessary for public health policy to publicize the need for a public pension plan to ensure it is perceived as a universal system and commonly applied, and to secure stability in old age and the access to healthcare at the national level.

## Author contributions

**Conceptualization:** Ryoung Choi, Hyun Goo Kang.

**Data curation:** Ryoung Choi.

**Formal analysis:** Ryoung Choi.

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