

Factors influencing class agreement and medical expenditure by age in South Korea

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Abstract

Background: There are not many studies evaluating the factors affecting medical expenditure for different age groups, income classes, and subjective social classes. Therefore, this study evaluates the agreement between income class, objective class, and subjective social class and analyzes the factors that affect medical expenditure by age group.

Methods: Multiple regression analysis and χ^2 test were conducted to evaluate the compatibility between income quintiles and subjective social classes and to identify the factors influencing medical expenditure by subjective social class and age using raw data from the 2013 Korea Health Panel (n=9,385) of the Korea Institute for Health and Social Affairs and the National Health Insurance Service.

Results: When the class compatibility between income quintiles and subjective social classes was analyzed by age group, young people in the first, second, and third income quintiles considered themselves to be in the second subjective social class while those in the fourth and fifth income quintiles considered themselves to be in the third subjective social class. Moreover, middle-aged and old people in the first, second, third, and fourth income quintile considered themselves to be in the second subjective social class while those in the fifth income quintile considered themselves to be in the third subjective social class.

Conclusion: Social support, public health approaches, and medical treatment service models are needed to eliminate comparative deprivation among individuals.

Abbreviation: OR = odds ratio.

Keywords: age group, class compatibility, income quintile, medical expenditure, subjective social class

1. Introduction

According to Le Grand and Vizard,^[1] health care does not mean simply providing the best to a limited number of people but providing good quality to many in an acceptable and affordable way, based on social justice. The level of health in human life is closely related to the economic equality of the members of a

society. Therefore, providing an appropriate medical service is essential to maintaining a society, and an equal supply of medical services to all should be guaranteed by an appropriate intervention. Consequently, equity among quality, efficiency, and equity is the most important value human society has sought for a long time.

The health insurance system in South Korea is designed to allow people to receive appropriate medical services, regardless of an individual's ability to pay, to ensure that people have access to a medical service. Moreover, the system ensures people's right to health, regardless of their income or socioeconomic status. The main objectives of the system are to promote health and improve health care. Therefore, assessing the fairness of health service utilization is important.

Healthcare utilization does not consist solely of a health status such as suffering from a disease. Rather, it is a final product, after creating personal medical demand based on the interactions among an individual's socioeconomic factors. This is the basis of medical demand theory and must be considered to identify patterns of health service utilization. Moreover, the behavioralism model reports that health service utilization is affected by disease-causing factors as well as by people's demographic, social structure, and economic factors.^[2] In particular, many studies have persistently indicated that people's level of health differs by income bracket.^[3–6] Economic barriers such as medical costs can exacerbate the health gap between income brackets, resulting in the low-income class having less accessibility to essential medical services. This difference in the accessibility of health services may increase the burden of disease on the low-income class.^[7]

On the contrary, a subjective social class is defined as the social rank to which an individual feels he or she belongs. In other

Editor: Shahrzad Bazargan-Hejazi.

Other Information: Ethics Approval and Consent to Participate: This study was a programmed evaluation and thus did not require ethical approval.

Consent for Publication: Not applicable.

Availability of Data and Material: All data and material supporting our findings are contained within the manuscript.

Funding: This work was supported by a grant from the Clinical Medicine Research Institute of the Chosun University Hospital (2015).

Conflicts of interest: The author declared no conflicts of interest with respect to the research, authorship, funding, and/or publication of this article.

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Medicine (2018) 97:40(e12681)

Received: 14 February 2018 / Accepted: 7 September 2018

<http://dx.doi.org/10.1097/MD.00000000000012681>

words, people identify their position in the social hierarchy or assign their subjective unity to a specific social class.^[8] Several studies have indicated that since social migration became active and life patterns became standardized, creating a so-called standardized society, the majority of people now consider themselves to be middle class.^[9] Adler et al^[10] argue that when evaluating people's relationship with their health, the subjective social class is a more sensitive and inclusive index than other indices such as actual socioeconomic status. However, the social survey report of the South Korean National Statistical Office revealed that the percentage of people who perceive themselves as middle class has decreased steadily, from 60.4% in 1994 to 53.4% in 2006 and 43.9% in 2013.

Previous studies focus on categorizing the income class, which is an objective status, based on which they discuss health service utilization and health status.^[3,5-6] However, few studies categorize the subjective social class, distinguishing between the statuses of people's circumstances.^[4] Age can modify the effects of income on health service utilization, and interaction effects between income and age are possible.^[11] The factors affecting medical expenditure may differ by age group as well as by income class or subjective social class. However, very few studies have evaluated the simultaneous effects of these factors. Specifically, no study has evaluated the relation between the income class and the subjective social class by age group.

Therefore, the objectives of this study are as follows: to confirm the extent of the agreement between the income class (an actual social class) and the subjective social class (a type of belonging) by age group, to determine which factors affect medical expenditure by age group, and to provide baseline data for the development of a health insurance policy and a healthcare service suitable for each age group and social class.

2. Methods and data

2.1. Study subjects

This study was conducted by analyzing the 2013 Korea Health Panel data, which were collected by Korea Institute for Health and Social Affairs and National Health Insurance Service. The data contain information regarding medical use pattern and the size of medical expenditure. The data estimate the medical expenditure of individuals and households to identify South Korean health service utilization, medical expenditure, and finance as well as provide baseline data on healthcare utilization, medical expenditure level, health status, and health behavior. The Korea Health Panel survey uses 90% of the data from the 2005 Population and Housing Census as a sampling framework to ensure representativeness at the national level. The 2013 Korea Health Panel data consist of 5284 households (15,263 persons). This study excluded the data of people who were 19 years or older and paid medical expenditure to medical institutions due to automobile accidents and industrial accidents. Therefore, this study analyzed 9385 persons (4260 male subjects (45.4%) and 5125 female subjects (54.6%)).

2.2. Measurement variables

2.2.1. Medical expenditure (dependent variables). Medical expenditure is measured as the sum of emergency medical expenses at medical institutes higher than a doctor's office, hospitalization costs, and outpatient medical expenses resulting from personal disease, excluding industrial accidents and car accidents. This study excluded medical expenditure due to

automobile accidents and industrial accidents, which are not covered by the South Korean national health insurance system, one of the South Korean social security systems. In other words, this study selected the medical expenses paid to medical institutes for medical treatment due to diseases or injuries that occurred during daily lives. Emergency medical expenses and outpatient medical expenses indicate the medical examination fee and cost of prescribed medicine at a pharmacy. The hospitalization cost refers to the payment made when being discharged from a medical institute.

The mean annual medical expenditure is KRW 409,000, 481,000, and 957,000 for the young, middle-age, and old-age groups, respectively. Therefore, each group is divided into 2 groups, namely those below (low class) and those above (high class) the mean medical expenditure: young group: low class (0) \leq KRW 409,000, high class (1) $>$ KRW 409,000; middle-age group: low class (0) \leq KRW 481,000, high class (1) $>$ KRW 481,000; and old-age group: low class (0) \leq KRW 957,000, high class (1) $>$ KRW 957,000.

2.2.2. Subjective social class perception (Parameter). In terms of health inequality, psychological causes are more powerful determinants of health than physical causes, and the subjective social class is a stronger deciding factor on health than the objective social class. In the Korea Health Panel data, a person's subjective social class is estimated by the question "what is my social status in South Korean society?" A respondent can choose a value between 1 (lowest) and 10 (highest). This study restructures the 10 classes into 5 classes: the first, second, third, fourth, and fifth quintiles, representing the lowest, low, middle, upper, and highest social class perceptions, respectively. The questionnaire asked a respondent about the subjective social class of the person in the whole population

2.2.3. Income quintiles (independent variables). Many previous studies have indicated that income quintiles are related to medical expenditure or health service utilization.^[5-6,12] The income class of this study followed the total annual household income quintile of Korea Health Panel. The total household income was the sum of total earned income and total assets income.

2.2.4. Age group (Independent variables). Subjects are divided into young, middle-age, and old-age groups. In South Korea, "young" is defined as being between the ages of 15 and 29, 9 and 24, and 19 and 39 by the National Statistical Office, the Youth Act, and the Presidential Youth Commission, respectively. Levinson^[13] defines middle age as being between the ages of 40 and 60 in his adult development model. He states that this is a turning point in life, when we look back at the past and prepare for old age as well as being particularly aware of our social responsibility. Further, he defined old age as being older than 60 in the South Korean Welfare of the Aged Act and older than 65 in the Act on Long-Term Care Insurance for the Aged. Therefore, this study defines the 3 age groups as being between 19 and 39, 40 and 60, and 61 and over, respectively. The old-age group is defined as being 61 and over to avoid creating an economic activity and pension gap.

2.3. Analytical method

A frequency analysis and descriptive statistical analyses are conducted to identify the demographic characteristics of subjects, using SPSS 22.0 (IBM Corp., Armonk, NY). First, a χ^2 test is used

to analyze the relationship between the income quintiles and subjective social class. Then, a linear regression analysis is conducted, using a dummy variable to identify the factors affecting the subjective social class perception and medical expenditure by age group. Medical expenditure, the dependent variable, is log-transformed to satisfy the homoscedasticity and normality assumptions. Moreover, Model 1 (demographic characteristics) and Model 2 (demographic characteristics, income, and subjective social class perception) are used to analyze the effects of the income quintiles and subjective social class perceptions in more detail. The level of statistical significance is set at $P = .05$, with a 95% confidence interval.

3. Results

3.1. Demographic characteristics

The results of the sociodemographic analysis show that 55.6% of subjects are female, 34.5% have higher than a college education, 71.4% are married, 40% have 4 or more family members, 95.9% have national health insurance as a health insurance type, 72.0% own a home, 60.2% are economically active, and 74.4% do not have private health insurance. In terms of subjective health status, 43.7% of subjects identified themselves as being in normal (i.e., average) health, 92.9% do not have a disability, and 66.6% suffer from a chronic illness (see Table 1).

3.2. Social class agreement by age group

A comparison of the income quintiles and subjective social class shows that young people in the first, second, and third income quintiles consider themselves to be in the second subjective social class while those in the fourth and fifth income quintiles consider themselves to be in the third subjective social class. Thus, only the second quintile agrees with the subjective social class. For the middle aged and elderly, people in the first, second, third, and fourth income quintiles consider themselves to be in the second subjective social class while those in the fifth income quintile consider themselves to be in the third subjective social class. Once again, only the second quintile agrees with the subjective social class (see Fig. 1 and Table 2).

3.3. Factors affecting medical expenditure by age group

The results of the factors affecting medical expenditure by age group showed that, in the young age group, female subject spent

Table 1

Demographics and characteristics.

Classification	People	(%)
Gender		
Male	4260	45.4
Female	5125	54.6
Highest level of education		
≤ Middle school	3240	34.5
High school	2904	30.9
≥ College	3214	34.5
Marital status		
Other (e.g., divorced or widowed)	1220	13.0
Single	1467	15.6
Married	6698	71.4
Number of family members		
1	806	8.6
2	2778	29.6
3	2049	21.8
4	3309	35.3
≥ 5	443	4.7
Medical insurance type		
National health insurance	9004	95.9
Medical care assistance	381	4.1
Housing type		
Own	6758	72.0
Other (e.g., lease on deposit basis and monthly rent)	2627	28.0
Economically active		
Yes	5649	60.2
No	3736	39.8
Private pension and life insurance		
No subscription	6985	74.4
Only private pension	375	4.0
Only life insurance	1593	17.0
Both	432	4.6
Subjective health condition		
Bad	1405	15.0
Average	4097	43.7
Good	3883	41.4
Disability		
Yes	667	7.1
No	8718	92.9
Chronic disease		
Yes	6248	66.6
No	3137	33.4
Total	9385	100.0

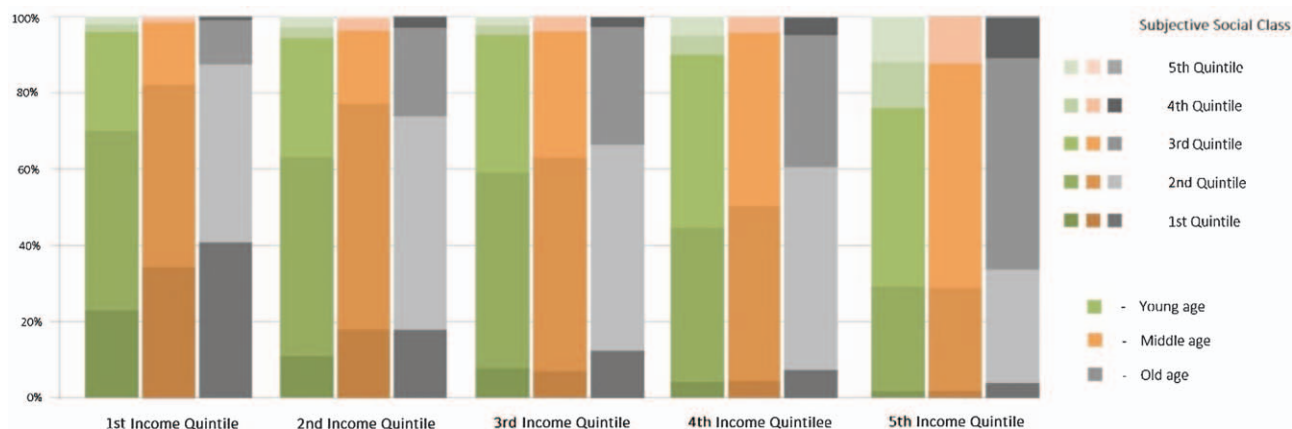


Figure 1. Proportion of income quintile and subjective social class.

Table 2**Characteristics of income quintiles and subjective social class.**

Subjective social Class		Income quintile*					Total	P-value
		First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile		
Young	First quintile	24 (23.0)	28 (11.0)	35 (7.8)	21 (4.2)	12 (1.7)	120 (6.0)	<.001
	Second quintile	49 (47.1)	132 (52.0)	232 (51.2)	203 (40.4)	189 (27.4)	805 (40.1)	
	Third quintile	27 (25.9)	80 (31.4)	164 (36.2)	229 (45.4)	324 (46.9)	824 (41.1)	
	Fourth quintile	2 (2.0)	7 (2.8)	11 (2.4)	25 (5.0)	83 (12.0)	128 (6.4)	
	Fifth quintile	2 (2.0)	7 (2.8)	11 (2.4)	25 (5.0)	83 (12.0)	128 (6.4)	
Middle-aged	First quintile	78 (34.4)	100 (18.2)	56 (7.1)	45 (4.5)	22 (1.9)	301 (8.1)	<.001
	Second quintile	108 (47.6)	324 (59.0)	443 (55.8)	457 (45.8)	306 (27.0)	1638 (44.3)	
	Third quintile	37 (16.3)	105 (19.1)	263 (33.1)	453 (45.4)	663 (58.6)	1521 (41.1)	
	Fourth quintile	3 (1.3)	17 (3.2)	31 (3.9)	43 (4.3)	141 (12.5)	235 (6.4)	
	Fifth quintile	1 (0.4)	3 (0.5)	1 (0.1)	0 (0.0)	0 (0.0)	5 (0.1)	
Old	First quintile	495 (40.8)	168 (18.0)	89 (12.6)	40 (7.9)	18 (4.0)	810 (21.3)	<.001
	Second quintile	565 (46.6)	520 (55.7)	381 (53.9)	267 (52.9)	133 (29.7)	1866 (49.0)	
	Third quintile	140 (11.6)	217 (23.3)	218 (30.8)	174 (34.5)	248 (55.4)	997 (26.2)	
	Fourth quintile	8 (0.7)	25 (2.7)	18 (2.6)	23 (4.6)	47 (10.5)	121 (3.2)	
	Fifth quintile	4 (0.3)	3 (0.3)	1 (0.1)	1 (0.2)	2 (0.4)	11 (0.3)	

*The results are expressed by number (% column).

2.72 times more than male subject, married people spent 3.56 times more than others, households with one member spent more than households with 4 members or with over 5 members, people not economically active spent 1.69 times more than people economically active, people who had only private pension spent 1.39 times more than people who had no pension, people who were in subjectively bad health conditions spent more medical expenditure than people who were in subjectively better health conditions, people who had disabilities and chronic diseases spent more medical expenditure than people who did not have disabilities and chronic diseases, people in the fourth income quintile spent 2.00 times more than those in the first income quintile, people in the fifth income quintile spent 2.22 times more than those in the first income quintile, people in the second subjective social class spent 1.72 times more than those in the first subjective social class, people in the fourth subjective social class spent 2.24 times more than those in the first subjective social class, and people in the fifth subjective social class spent 7.03 times more than those in the first subjective social class.

In the case of the middle age group, female subjects spent 1.19 times more medical expenditure than male subjects, people whose highest level of education was middle-school graduate spent more medical expenditure than those graduated from high school or college and up, others spent more medical expenditure than single, households with one member spent more medical expenditure than households with over 5 members, people with medical insurance spent more medical expenditure than people receiving medical care assistance, people who owned housing spent more medical expenditure than people who lived lease on deposit basis and monthly, people who were not economically active spent 1.22 time more medical expenditure than those who were economically active, people who had only private pension spent 1.78 times more than people who had no pension, people who were in subjectively bad health conditions spent more medical expenditure than people who were in subjectively average or good health conditions, people who had disabilities and chronic diseases spent more medical expenditure than people who did not have disabilities and chronic diseases, people in the fourth income quintile spent 1.66 times more than those in the first income quintile, and people in the fifth income quintile spent 2.00 times more than those in the first income quintile.

In the case of the old age group, male subjects spent more medical expenditure than female subjects, people whose highest level of education was middle school graduate and under spent more medical expenditure than those graduated from high school, households with 1 member spent more medical expenditure than households with 4 members or over 5 members, people with medical insurance spent more medical expenditure than people receiving medical care assistance, people who were not economically active spent 1.28 time more medical expenditure than those who were economically active, people who had only life insurance spent 1.24 times more than people who had no pension, people who were in subjectively bad health conditions spent more medical expenditure than people who were in subjectively average or good health conditions, people who had disabilities and chronic diseases spent more medical expenditure than people who did not have disabilities and chronic diseases, people in the second income quintile spent 1.27 times more than those in the first income quintile, people in the third income quintile spent 1.43 times more than those in the first income quintile, people in the fourth income quintile spent 1.32 times more than those in the first income quintile, people in the fifth income quintile spent 1.83 times more than those in the first income quintile, and people in the fifth subjective social class spent 2.43 times more than those in the first subjective social class (see Table 3).

4. Discussion

The objectives of this study were to analyze the relation between income quintiles (the objective social status of an age group) and the subjective social class perception (how people distinguish themselves from others in daily life) as well as to identify the factors affecting medical expenditure.

The main findings are as follows. The analysis of the relation between income quintiles by age group and the subjective social class perception showed that young people in the first, second, and third income quintiles consider themselves to be in the second subjective social class while those in the fourth and fifth income quintiles believe they are in the third subjective social class. Moreover, middle-aged and old people in the first, second, third, and fourth income quintiles consider themselves to be in the

Table 3
Factors influencing medical expenditure by age group.

Classification	Young OR (95% CI)*	Middle-aged OR (95% CI)	Old age OR (95% CI)
Gender			
Male	1	1	1
Female	2.72 (2.30–3.20) [§]	1.19 (1.06–1.34) [‡]	.86 (.76–.96) [‡]
Highest level of education			
≤Middle school	1	1	1
High school	1.94 (.61–6.12)	.71 (.60–.82) [§]	.86 (.75–.98) [†]
≥College	1.54 (.48–4.84)	.69 (.58–.81) [§]	1.03 (.86–1.24)
Marital status			
Other (e.g., divorced or widowed)	1	1	1
Single	2.04 (.595–.058)	.53 (.37–.74) [§]	.23 (.51–1.01)
Married	3.56 (1.03–12.26) [†]	.87 (.68–1.11)	1.01 (.884–1.20)
Number of family members			
1	1	1	1
2	.79 (.51–1.22)	1.01 (.68–1.48)	.82 (.67–1.02)
3	.77 (.51–1.17)	.79 (.54–1.18)	.81 (.64–1.02)
4	.47 (.31–.71) [§]	.74 (.50–1.09)	.74 (.56–.96) [†]
≥5	.26 (0.15–0.46) [§]	.60 (.37–.94) [†]	.60 (.43–.82) [‡]
Medical insurance type			
National health insurance	1	1	1
Medical care assistance	.40 (0.13–1.19)	.49 (.30–.81) [‡]	.15 (.09–.23) [§]
Housing type			
Own	1	1	1
Other (e.g., lease on deposit basis and monthly rent)	1.05 (.89–1.24)	.86 (.76–.97) [†]	1.09 (.95–1.24)
Economically active			
Yes	1	1	1
No	1.69 (1.44–1.98) [§]	1.22 (1.07–1.8) [‡]	1.28 (1.12–1.40) [§]
Private pension and life insurance			
No subscription	1	1	1
Only private pension	1.39 (1.00–1.93) [†]	1.78 (1.47–2.15) [§]	1.19 (0.82–1.72)
Only life insurance	1.12 (0.93–1.35)	1.01 (0.90–1.15)	1.24 (1.01–1.52) [†]
Both	1.05 (0.77–1.43)	1.07 (0.89–1.30)	.71 (0.42–1.20)
Subjective health condition			
Bad	1	1	1
Average	.52 (0.37–0.72) [§]	.37 (0.31–0.45) [§]	.46 (.40–.51) [§]
Good	.45 (0.33–0.63) [§]	.29 (0.24–0.34) [§]	.30 (.26–.034) [§]
Disability			
Yes	1	1	1
No	.48 (0.24–0.95) [§]	.73 (0.54–0.96) [†]	.84 (.72–.98) [†]
Chronic disease			
Yes	1	1	1
No	.55 (0.47–0.64) [§]	.41 (0.36–0.46) [§]	.36 (.27–.47) [§]
Income quintile			
First quintile	1	1	1
Second quintile	1.16 (.72–1.83)	1.05 (.76–1.44)	1.27 (1.09–1.47) [‡]
Third quintile	1.50 (.95–2.32)	1.31 (.97–1.78)	1.43 (1.22–1.69) [§]
Fourth quintile	2.00 (1.28–3.11) [‡]	1.66 (1.22–2.23) [‡]	1.32 (1.09–1.58) [‡]
Fifth quintile	2.22 (1.43–3.34) [§]	2.00 (1.47–2.70) [§]	1.83 (1.50–2.22) [§]
Subjective social class			
First quintile	1	1	1
Second quintile	1.72 (.95–3.08) [†]	1.01 (.74–1.38)	1.12 (.93–1.36)
Third quintile	1.56 (.868–2.80)	1.14 (.83–1.56)	1.17 (.95–1.44)
Fourth quintile	2.24 (1.20–4.15) [†]	.94 (.66–1.33)	1.03 (.77–1.38)
Fifth quintile	7.03 (2.00–4.58) [‡]	.32 (.24–.47)	2.43 (.32–4.45) [‡]

* The results are presented as odds ratios (ORs), with a 95% confidence interval (CI).

[†] $P < .05$.

[‡] $P < .01$.

[§] $P < .001$.

second subjective social class while those in the fifth income quintiles believe they are in the third subjective social class. The results show that most respondents perceive that their subjective social class is lower than their practical income quintile. Previous studies have reported that most people in the first and second

actual income quintiles consider themselves to be in the low- or middle-/low-income classes.^[14] Moreover, 60.1% of people in the fourth income quintile and 39.0% of people in the fifth income quintile perceive themselves to be in the low- or middle-/low-income classes. In addition, 51.8% of people in the fifth income

quintile perceive themselves to be in the middle-income class. These patterns are similar to the results of this study, which implies that the polarization of the class structure in South Korea is due mainly to changes in the subjective perception rather than to changes in the objective condition. Moreover, the subjective social class perception tends to be lower than the actual income quintile, which could be because people have a lower expectation of upward mobility and suffer from comparative deprivation.^[8,15] Among young people, women, those with fewer family members, those who own a house, those who are economically active, those who have bought a private pension and life insurance, and those who suffer from a chronic illness have higher health expenses. Among the middle aged, women, those who are separated by death or divorce, those who own housing, those who are economically active, and those who suffer from a chronic illness have higher medical expenses. In the old-age class, men, those with fewer household members, those who are economically active, and those who suffer from a chronic illness have higher medical expenses.

Second, the factors influencing medical expenditure were analyzed by age group. The results showed that the factors affecting young people are gender, marital status, number of family members, economic activity, private pension and life insurance, subjective health condition, disability, chronic disease, income quintile, and subjective social class. The results for the middle-age group show that gender, highest level of education, marital status, number of family members, medical security type, housing type, economic activity, private pension or life insurance, subjective health condition, and chronic disease are influential factors. Then, the factors affecting the elderly are gender, highest level of education, number of family members, medical security type, economic activity, housing type, private pension or life insurance, subjective health condition, chronic disease, and income quintile. These results agree with those of previous studies that analyze differences in health service utilization by income group, which report that the gap in health service utilization is larger for old people than it is for the young or middle aged.^[16] The results of this study also agree with those of a previous study that evaluated health service utilization by age group and income class, which finds that medical expenditure increases in the high-income class and that the gap is larger in the old group than it is in the young and middle-age groups.^[5] Among young people, women, those who are married, those with fewer family members, those who are economically active, those with a personal pension, and those with a higher subjective social class perception are more likely to have higher medical expenses. Among the middle aged, women who are not well educated, are divorced or separated by death, own a house, are economically active, and receive a personal pension are more likely to have higher medical expenses. In the old group, men, those who are not well educated, those with fewer household members, those who are economically active, those with life insurance, and those with a higher subjective social class perception are more likely to have higher medical expenses. Particularly, the findings confirm that the effects of income class and the subjective social class perception on medical expenditure vary by age class. These results suggest that medical expenditure differs by age group and is affected by income class and the subjective social class perception. Thus, research on the relationships among “age group–income quintile–medical expenditure” and “age group–subjective social class–medical expenditure” is necessary in addition to evaluating medical expenditure by subjective social class. Adults have and experience different personal values, social

roles, life patterns, life satisfaction, and physical changes. Specifically, people evaluate their subjective social class and make social comparisons based on their interactions with others of a similar age or with people in close proximity as well as using information in daily life. According to Bottero, “If social comparison is meaningful to people in a routine way, then it is liable to be so with reference to those closest to them, not to abstract distant others.”

The study has the following limitations: it does not fully reflect the characteristics of panel data because it is based on single-year data on one country; it does not consider various factors influencing medical expenditure; it does not analyze differences in medical expenditure according to the size of the discrepancy between classes; and the subjective social class of each age class was the perceived class in the whole population, not the perceived class in the age class. Therefore, the results should be interpreted carefully and the lack of previous studies of income quintiles, subjective social class, and medical expenditure by age group make it difficult to interpret the results. Thus, we expect further studies on this topic.

5. Conclusion

The present study indicates that most people consider their subjective social class to be lower than their actual income, the objective standard of judgment because people expect to live better than their actual income allows them to do. Thus, we propose that South Korea should strengthen its social security policies and gain social support through education and advertising to eliminate comparative deprivation among individuals. Moreover, because the factors affecting medical expenditure differ by age and subjective social class, it is necessary to analyze and evaluate current health policies by considering these categories, represent different social experiences and characteristics, reinforce and monitor the social health system, support medical subsidies, and develop a health and medical treatment service model.

Author contributions

Ryoung Choi: writing/editing the manuscript, analysis and interpretation of data.

Hyun Goo Kang: writing/editing the manuscript, study concept, or design, accept responsibility for conducting of research and final approval.

Conceptualization: Ryoung Choi.

Data curation: Ryoung Choi.

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Funding acquisition: Hyun Goo Kang.

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