

Factors Affecting the Choice of National and Public Hospitals Among Outpatient Service Users in South Korea

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Abstract

The present study analyzed factors underlying outpatient service users' choice of national and public (rather than private) hospitals. Based on Andersen's Behavioral Model, we developed a framework that covered needs, enabling, and personal factors. Data of outpatient service usage were obtained from the Korean medical panel survey during 2008 to 2013. Logistic regression analyses were conducted, and results revealed that the rate of national and public hospital use was very low (5.57%), and our model adequately explained variance in service use. Specifically, several demographic factors—older age, low income, national merit and medical care, being chronically ill, and having a disability—were predictive of whether an individual is likely to choose national and public hospitals. We discuss the need to strengthen national and public hospitals' medical services in order to better manage care for low-income vulnerable groups.

Keywords

outpatient medical services, national and public hospitals, Andersen's Behavioral Model

What do we already know about this topic?

Most prior studies related to determinants of hospital choice focused on factors related to hospital marketing.

How does your research contribute to the field?

The authors expanded on choice behavior by examining a wide breadth of factors across personal, environmental, and sociocultural domains.

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

Given the decrease in public hospital service use in Korea, it appears that research geared toward understanding the reasons for that decrease are pertinent and relevant to how improvements to health care service delivery is manifested.

Introduction

People face various social dangers in their day-to-day lives, including illness and disease. In order to address the economic instability influenced by disease, developed countries began introducing medical insurance systems. In 1977, Korea introduced a medical insurance system for companies with 500 or more employees, and in 1989, all Korean citizens were covered by this system. In essence, Korea has a social insurance entity, and most people can receive coverage and medical benefits. As a result, equity in medical use is guaranteed to a certain extent, but disequilibrium in medical care use as a function institution type and region is increasing, as medical centers are concentrating in the national capital region. Here,

vulnerable populations with low incomes are the most disadvantaged, as the highest quality care is often provided by the

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private sector. To overcome these problems, national and public hospitals need to increase their caregiving role.

While the social demand for strengthening public health care has been provided, controversies remain regarding how medical industrialization is based on market and profit forces, similar to any other consumer industry. However, recently, the spread of infectious diseases due to globalization has accelerated; thus, there is a need to strengthen emergency medical support systems across the board, including vulnerable individuals within rural settings.

In Korea, where investment in public health is weaker than in other Organisation for Economic Co-operation and Development (OECD) countries, the closure of national and public hospitals is a dire social issue. In terms of medical service equity, limits to public health care for the most essential services should not be determined by geography and care costs. In spite of policies for strengthening the protection of the public health insurance system, patients are tasked with taking on a significant financial burden for their conditions. Also, due to rapid economic growth, people are expecting high-quality medical services, but several vulnerable areas are not provided such care. The public health sector lacks an emergency medical service system directly linked to each citizen, limiting both service quality and quantity. Furthermore, medical expenditures are rapidly increasing, owing to an aging Korean population, increases in chronic illness cases, and increases in income. In addition to a civilian-centered medical supply system, a fundamental reexamination of the public health care system is required, and the goals and roles of public health care need to be redefined. Based on these issues, the present study examined determinants of individuals selecting national and public hospitals rather than private hospitals for outpatient services.

Thus far, studies related to medical use have been conducted to address satisfaction and perceptions of medical service quality.^{1,2} Most prior studies related to determinants of hospital choice focused on factors related to hospital marketing.^{3,4} It is difficult to locate a study comparing determinants of patients choosing a private versus a public/national hospital. Previous studies have provided useful information regarding medical use, but there are limitations to this type of inquiry. First, comparisons can be constrained by the types of medical institutions and participants sampled. Second, prior work has only surveyed a small number of medical institutions, making it difficult to generalize findings. Third, there is a lack of comprehensive research on the factors affecting the use of health services. To overcome these limitations, the present study comprised a longitudinal analysis of the 6-year Korean medical panel data from the National Health Insurance Corporation database. Using a large sample of archival data, we specifically focused on the following factors underlying choice of public/national (instead of private) hospitals: enabling, need, and personal factors. Due to the large sample size, we were confident we

could assess a wide range of variable characteristics related to service use. We compared the public/national patient group to a large sample of private hospital outpatients. Finally, as this study is based on Andersen's Behavior Model, we controlled for medical use-related variables such as type of medical institution, travel time, and reason for visiting, which have not been discussed in previous studies.

Korean Health System

Outpatient services refer to medical care provided without being admitted to a hospital. Generally, outpatient care is provided for relatively mild conditions. A large proportion of a typical doctor's medical practice will comprise outpatient care. Given that individuals receiving outpatient care are in a less serious condition and, theoretically, have more freedom to choose where they receive their care, they are a desirable group for which to investigate service choice behaviors.

Medical services include characteristics such as asymmetry of information and external effects. When there is a market failure, such as a supply-demand mismatch due to information asymmetry or a lack of profitability due to external effects, they can negatively affect the amount of socially desirable services available. Therefore, public mediation and intervention is needed to ensure adequate resource allocation and equity in health care service provision.⁵

In Korea, medical institutions are largely divided into national/public and private. National and public hospitals are those established and run by public organizations/governments, including National University Hospitals, National Medical Centers, Police Hospitals, Provincial Hospitals, Health Medical Centers, Provincial Medical Centers, Veterans Hospitals, and National City and Provincial Mental Hospitals. Private medical centers include private hospitals (which are established and operated by private nonprofit corporations such as medical corporations, school corporations, foundation corporations, corporate corporations, social welfare law corporations, religious corporations, etc.) and private clinics established and operated by private citizens.⁶ As of December 2015, there were 3715 public health medical institutions, which comprised 5.6% of all medical institutions (83 512), 9.2% of the total number of beds, and 11.2% of the physicians employed.

Even if there is little to no difference between public and private medical institutions in terms of the services provided and abilities in terms of the types of patients serviced (as well as cost), the types of patients that choose public versus private hospitals do differ. One key difference is publicity. While civil hospitals do not solely focus on profitability, national and public hospitals should be more public. National and public hospitals place more of an emphasis on public health services than do private hospitals. Second, the budget and rigidity of business operations also differ. For instance, the National Rehabilitation Hospital and Seoul Medical

Center are operated under budgets from the Korean national and Seoul metropolitan governments. Furthermore, the Seoul National University Hospital is subject to budgetary control by the Seoul National University Board of Education, which is under the purview of the Ministry of Education (and even the Korea National Assembly). As a result, there are few economic incentives available to attract competent personnel, except in very special cases (e.g., Seoul National University Hospital). Third, due to the public aspect, hospitals focus on procedures and processes related to organizational management rather than purposeful goal achievement; these organizations are governed by legal provisions that are bound by regulations. Thus, environmental adaptation can be low. However, benefits to public and national hospitals include consistency, reliability, and equity in care. Fourth, an emphasis on procedural rationality for budgetary rigidity and organizational management also makes it difficult to attract competent specialists. Finally, national and public hospitals are distributed throughout each region; however, about 50% of private hospitals are concentrated in metropolitan areas, and operations are not possible in areas with small population densities.

Theoretical Background

Several studies related to hospital and medical service selection have been conducted for purposes of focusing on economic, demographic, and marketing aspects. Characteristics of previous studies are as follows. First, research on hospital selection factors has been regarded as an important problem in areas where specialized medical systems can meet patient needs.⁷ Second, most investigations as to selection determinants have been focused on supplier, rather than patient, needs and desires. Additionally, many studies have reported that hospital choice is determined by patient socioeconomic characteristics. Third, the most widely known model for hospital selection is Andersen's Behavioral Model.⁷⁻¹⁶ Andersen's Behavioral Model was the first model developed to help our understanding as to why health care services are used. The initial research goal was to find out the conditions that enable (or delay) medical use. The first determinant identified was sociodemographic (i.e., age and gender). The second was social, including education level, occupation, and race. The third factor was psychological, including attitudes toward health, values, and knowledge regarding one's own health and available wellness services. These factors were identified as affecting future awareness regarding health service use. However, several social psychologists criticized this framework as not conceptualizing people's beliefs about health, and too few studies were available that tested this framework. However, more recent work has widely used this model to predict health service use worldwide. To wit, Andersen's Behavioral Model has been used in many studies conducted in the United Kingdom

and the United States.¹⁷⁻²² These studies have examined the use of general health services,^{23,24} outpatient services,^{25,26} primary health care services,^{27,28} inpatient health services,²⁹ tertiary care,³⁰ mental health services,³¹ and local health services.³²

Burns and Wholey conducted a study on factors underlying hospital selection in the Phoenix (AZ, USA) area.³³ Although differences in hospital quality and costs predicted selection, physician characteristics were the strongest determinants. Andaleeb, in a study on the determinants of hospital service quality within public and civil hospitals in Bangladesh, showed that only 1% of the population receives primary care services, and service quality is quite low.³⁴ Demographic characteristics and perceptions of service quality were important determinants of hospital selection. Hospitality quality is often related to income, and civil hospitals do not receive subsidies from the state in the same way as public hospitals in Bangladesh, thus limiting service quality. In a study in Turkey, Taner and Antony reported that physicians, nurses, and support services were the main determinants for service choice.³⁵ Furthermore, patients were more satisfied with service quality within civil relative to public hospitals. Adams and Wright conducted a survey of more than 12 000 Medicare beneficiaries in the rural areas of Minnesota, North Dakota, and South Dakota (the United States) and found that 60% of these beneficiaries selected their nearest hospital, regardless of size, while 30% of the sample transferred to a city hospital due better medical staff and personal characteristics.³⁶

Recently, Andersen's model has been used in Korea to assess use of limited medical services,³⁷ including dental,³⁸ modest health care,³⁹ and mental health services.⁴⁰ In a study by Cho et al, relatively nonemergency medical care (such as outpatient or dental care) is a more important determinant for service selection than quality.⁴ However, for inpatient services, qualitative factors were more important. Kim observed that choice of medical institution was determined by medical ability, kindness, and accessibility for mild illnesses; treatment efficacy, facilities, reputation, and expense were more important for severe illnesses.³ For chronic diseases, such as hypertension and diabetes mellitus, the survey revealed that choice was determined most by treatment efficacy, facilities, hospitality, and expenses, with treatment efficacy as the most important.

Lee observed that hospital selection was most predicated on service speed and proximity to one's residence, particularly when choosing medium and small-sized hospitals.² However, for university hospitals, professionalism, reliability, tradition, and social relations were the most influential. In regards to large hospitals, service comfort, speed, and convenience were noted as most impactful. Finally, when choosing general hospitals, patients tend to prefer tertiary institutions due to their focus on tradition, appearance, and advertising.¹

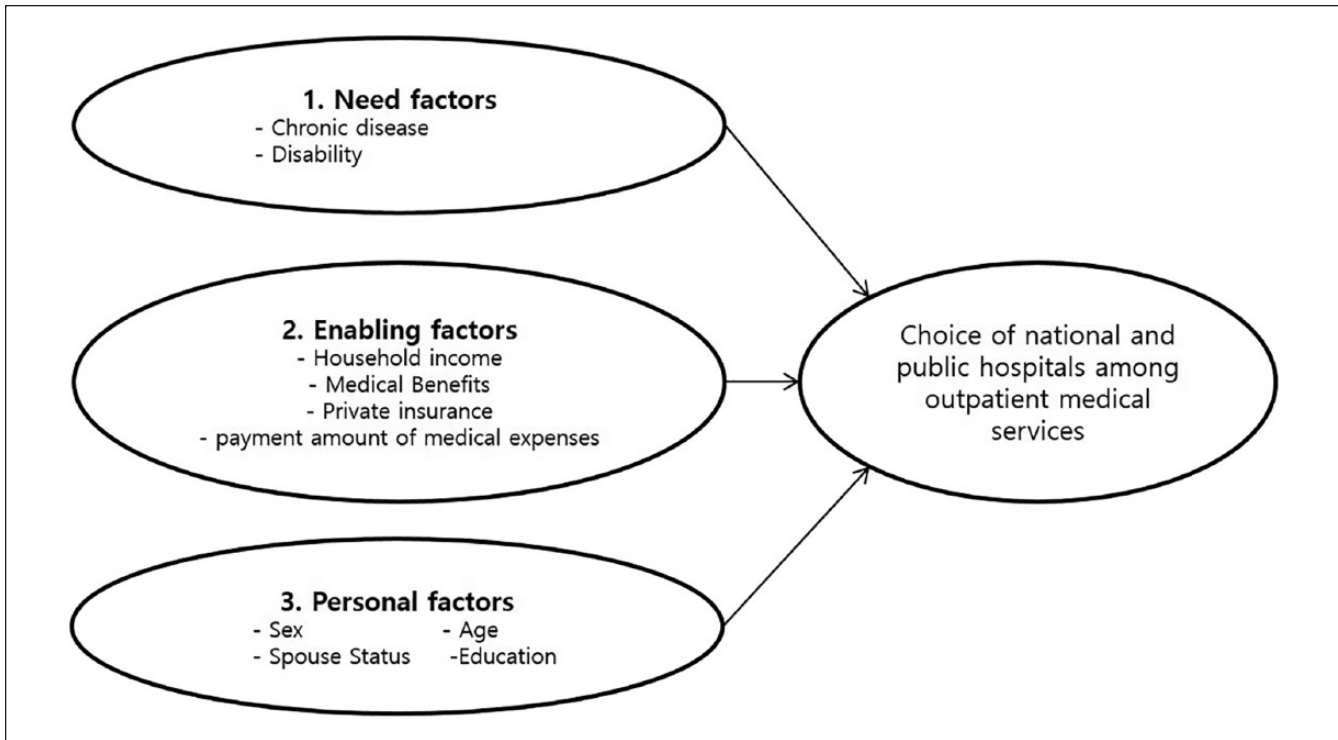


Figure 1. Research model.

The aforementioned evidence provides several factors underlying the selection of medical institutions; however, most prior work has been limited to specific diseases, types of institutions, or location. There is a lack of domestic and international research using Andersen's Behavioral Model to better determine the multitude of factors affecting outpatient medical service use. In particular, prior studies have not sufficiently addressed the factors influencing whether an individual chooses a public/national hospital instead of a private hospital. Thus, the present study employed Andersen's Behavioral Model to fill the gap in the literature regarding how Korean outpatient service utilization is determined.

Methods

Research Model

Andersen's Behavioral Model was used as a framework for the present study in order to determine whether population characteristics, external environmental factors, social psychological factors, and institutional factors affect medical service use choices (see Figure 1). The first set of factors included personal characteristics, mainly sex, age, marital status, race, education level, and employment status. This factor also includes medical beliefs and attitudes. Enabling factors included individual and community resources for available health care, including health care resources such as income and insurance coverage. The last category

reflects necessity and disease factors, which comprise an individual's health condition (i.e., disease and disability). Among the three factors proposed by Andersen, these "need" factors are the most direct and relevant for health services use.^{41,42}

Hypotheses

Need factors reflect those related to the individual's pain, illness, and symptoms and are the most direct predictor of medical service use.²⁹ Poor physical health status has been reported as an important factor for seeking health care services.^{27,29} In particular, inpatient and outpatient cases increase as a function of chronic disease and disability status.^{43,44} Jeong reported that the number of medical service visits among individuals with disabilities is rather high.⁴⁵ People with serious illnesses often choose hospitals based on quality of care, rather than cost, as their main priority is healing. Thus, it is possible that people with chronic diseases and disabilities are less likely to choose national and public hospitals rather than private hospitals:

Hypothesis 1: Need factors (the presence of a chronic disease or disability) will be negatively related to national and public hospital service usage.

Many scholars have argued that enabling factors affect medical care choices from an economic standpoint.²⁹ Individuals with higher incomes are more likely to utilize available

services.^{28,29,46} For instance, one study observed that health care use was mostly predicated on monthly income, education, private insurance status, and age.⁴⁶ Furthermore, individuals with health insurance are more likely to use health services.^{25,26} Additionally, health care service use is more likely when there is a separate source for financial support.^{23,27,29} Finally, Seo and Lee reported a difference in health care use by type of medical care, and medical care recipients (fully covered by nation) spent longer days compared to those covered by general health insurance.⁴⁷ In this context, enabling factors are reflected by household income, medical benefits, private insurance, and medical expenses. People with a high household income, good medical benefits, and private insurance are more likely to seek private hospitals rather than public medical institutions. However, even when comparing individuals at the same income level, the person who has higher medical expenditures is the one who is more likely to choose a nationally funded medical institution that is cost-effective:

Hypothesis 2: Enabling factors (household income, medical benefits, private insurance, medical expenses) will be related to national and public hospital choice.

Several studies have observed various demographic factors influencing hospital choices. For one, there is a significant relationship between sex and health care use,^{25,27} with women engaging services more than men. Older adults are also more likely to use health services than are younger individuals; furthermore, individuals who are married, less educated, have a blue collar occupation, and are unemployed (i.e., housewife) are more likely to use a local medical center.⁴⁸ Im and Ryu also investigated factors affecting health care use among older adults with low incomes, revealing older age was predictive of a higher frequency of medical service use.⁴⁴ Married women are also more likely to receive regular screenings than unmarried women.²³ Hammond et al also reported that less educated individuals are less likely to undergo regular health screenings.²³

Hypothesis 3: Personal factors (sex, age, marital status, education level) will affect national and public hospital choices.

Data and Measurement

Korean medical panel data, from 2008 to 2013, were sampled for the present study. The first survey was conducted with 24 616 patients from 7866 households in 2008. A total of 5521 households, and 15 263 patients, were still available in 2013 (retention rate = 65.78%). Korean medical panel data was extracted from the 2005 Population and Housing Census (90%). Participants were selected by a two-step probability-proportional stratified cluster extraction based on 17 different geographical regions (metropolitans and provinces) and Dong/Eup/Myeon (small administrative units). The data included information regarding types of

medical services, household members, medical expenditures, and private insurance.

The unit of analysis was a medical use case from a participant who visited an outpatient health service during the 6-year study period. Individuals under the age of 18 were excluded from the analyses, as these individuals are less likely to have an actual choice in which hospital they visit (i.e., the choice was likely made by a parent or guardian).

The main dependent variable was national and public hospital choice. Independent variables were based on Andersen's Behavioral Model: need factors, enabling factors, and personal factors. The need factors included the presence of a chronic disease or disability. A score of 1 was used to denote the presence of any chronic condition (such as hypertension, diabetes, and arthritis), and 0 was used for nonchronic conditions. The presence or absence of a disability was also scored as a 1 or 0, respectively. Enabling factors included household income, medical benefits, private insurance, and payment for medical expenses. Monthly income was divided into quintiles. The first quintile was the lowest income group and (with a score of 1), and the fifth quintile was the highest income group (with a score of 5). For medical benefits, 1 was used to denote general health insurance, 2 for medical benefits that cover all expenses, and 3 for special beneficiaries (i.e., national merit). The presence of private insurance was measured as 0 for no participation and 1 for participation. A total annual value for medical expenses was used as the metric for this variable. Sex, age, marital status, and education level were selected as personal factors. Sex was a nominal variable coded as 0 for women and 1 for men. Age was divided into 18 to 20s (1), 30s (2), 40s (3), 50s (4), 60s (5), and above 70s (6). Marital status was measured as 0 for married but separated, separated, divorced, or unmarried. The presence of a spouse was scored as a 1. Education level was measured as 1 (middle school graduate or below), 2 (high school graduate), and 3 (university graduate or above).

The present study also included economic activities, receipt of basic national security, medical expenses with financial compensation, reasons for the medical visit, traffic time, region, and year as control variables. For economic activities, participation in any economic activity (i.e., current work or temporary leave) was included: 0 for no participation and 1 for participation. Receiving basic national security was measured as 0 if no basic national security was received and 1 if it was received. Medical institutions were classified into five categories: tertiary hospitals, general hospitals, hospitals, clinics, and others. Tertiary hospitals are the most specialized hospitals, as they must have more than 20 medical courses and specialists. General hospitals must have more than 100 beds. Other hospitals must have more than 30 beds. Clinics and other institutions do not meet these aforementioned standards. The standard category was set as a comprehensive specialized hospital. Medical expenses with financial

Table 1. Use of National and Public Hospitals by Outpatients (Unit: Case, %).

	2008	2009	2010	2011	2012	2013	Sum
Year	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Sex							
Female	115 087 (63.45)	118 503 (63.31)	124 145 (62.97)	130 985 (62.78)	132 040 (62.02)	131 398 (62.31)	752 158 (62.78)
Male	66 285 (36.55)	68 685 (36.69)	72 997 (37.03)	77 641 (37.22)	80 860 (37.98)	79 473 (37.69)	445 941 (37.22)
Publicity							
Private hospitals	167 510 (92.36)	175 384 (93.69)	186 346 (94.52)	198 273 (95.04)	202 923 (95.31)	200 873 (95.26)	1 131 309 (94.43)
National and public hospitals	13 862 (7.64)	11 804 (6.31)	10 796 (5.48)	10 353 (4.96)	9977 (4.69)	9998 (4.74)	66 790 (5.57)

compensation were measured as 0 when the insurance company, nonliving family, or relatives received no compensation; 1 was used if compensation was received. Reasons for the medical visit were categorized as 1 in the case of an accident or addiction, 2 for disease treatment, and 3 for another diagnostic category. Traffic time was divided into 6 categories for the time required to arrive at the hospital: 0 minute to 9 minutes was categorized as 1, 10 minutes as 2, 20 minutes as 3, 30 minutes as 4, 40 minutes as 5, and more than 50 minutes as 6. Region was divided into 17 categories of cities/provinces. The standard category was the Seoul region. Year of the visit was measured from 2008 to 2013, and the standard category was set at 2008.

Results

Descriptive Statistics

A total of 1 198 099 outpatient services were used during the panel data period (see Table 1). Among these cases, 752 158 (62.78%) were women, and 445 941 (37.22%) were men. Most outpatient services were conducted by private hospitals (1 131 309; 94.43%) in comparison to national and public hospitals (66 790; 5.57%). The percentage of national and public hospitals selected in 2008 was 7.64%, but this rate decreased to 5.48% in 2010 and 4.74% in 2013, demonstrating a gradual decline in public service usage during the study period.

Table 2 shows sample characteristics as a function of whether outpatients chose national and public hospitals. Chi Square (χ^2) tests were conducted, first revealing a statistically significant relationship between choice of national and public hospitals for chronic diseases and disability. In relation to chronic diseases, 5.99% of those with chronic diseases and 2.75% of those without chronic diseases selected national and public hospitals. Regarding disability, 6.61% of those with disabilities and 5.42% of those without disabilities selected national and public hospitals.

Second, enabling factors, such as household income, type of health insurance, and private insurance, were significantly associated with selecting national and public hospitals. For instance, 8.09% in the first quintile, 6.55% in the second quintile, 4.99% in the third quintile, 3.59% in the fourth quintile, and 2.82% in the fifth quintile chose national and public hospitals. In other words, 97.18% of outpatients in the highest income bracket chose private hospitals. According to type of medical care, 12.34% of national merit, 5.59% of medical benefits, and 5.47% of health insurance recipients chose national and public hospitals. With regards to private insurance, in addition to public health insurance, 3.98% of people with private insurance chose national and public hospitals, whereas 6.88% of people without private insurance chose national and public hospitals.

Finally, sex, age, marital status, and education level were statistically related to selecting national and public hospitals. For instance, 6.36% of men and 5.11% of women selected national and public hospitals. As for age, national and public hospitals were selected based on the following age brackets: 8.18% of those in their 70s, 6.66% in their 60s, 3.85% in their 50s, 2.64% in their 40s, 1.88% in their 30s, and 1.83% in their 20s. There was no significant difference as a function of marital status. As far as education level, 7.20% of public hospital outpatients were middle school graduates or lower, 3.89% were high school graduates, and 2.34% were university graduates or higher.

Logistic Regressions Results

Predictors of choosing a public/national hospital for outpatient services are presented in Table 3. Most variables related to the use of outpatient services supported our research hypotheses. First, the presence of chronic disease or disability was negatively related to choosing a public or national hospital. Specifically, the presence of a chronic disease decreased the likelihood of choosing a national or public hospital decreased by 34% compared to those without

Table 2. Chi-Square Analysis of Factors Determining Selection of National and Public Hospitals (Unit: Case, %).

Category	Selection of hospitals				χ^2	P-value
	Private hospitals		National and public hospitals			
	Frequency	(%)	Frequency	(%)		
Chronic diseases						
No	150 758	(97.25)	4258	(2.75)	2700	.000
Yes	980 551	(94.01)	62 532	(5.99)		
Disability					370.99	.000
No	982 888	(94.58)	56 290	(5.42)		
Yes	148 421	(93.39)	10 500	(6.61)		
Household income					8600	.000
First quintile	285 508	(91.91)	25 146	(8.09)		
Second quintile	253 995	(93.45)	17 811	(6.55)		
Third quintile	215 208	(95.01)	11 306	(4.99)		
Fourth quintile	190 274	(96.41)	7079	(3.59)		
Fifth quintile	182 111	(97.18)	5288	(2.82)		
Medical assistance					1500	.000
Health insurance	1 011 886	(94.53)	58 513	(5.47)		
Medical benefits	104 672	(94.41)	6200	(5.59)		
National meritorious	14 751	(87.66)	2077	(12.34)		
Private insurance					49.06	.000
Purchase	614 370	(93.12)	45 381	(6.88)		
No-purchase	516 939	(96.02)	21 409	(3.98)		
Sex					835.19	.000
Female	713 736	(94.89)	38 422	(5.11)		
Male	417 573	(93.64)	28 368	(6.36)		
Age					13 000	.000
18–29 years	46 607	(98.17)	871	(1.83)		
30s	91 724	(98.12)	1758	(1.88)		
40s	146 725	(97.36)	3984	(2.64)		
50s	207 374	(96.15)	8311	(3.85)		
60s	286 007	(93.34)	20 418	(6.66)		
70s or older	352 872	(91.82)	31 448	(8.18)		
Spouse					10.08	.001
No	305 835	(94.32)	18 431	(5.68)		
Yes	825 474	(94.47)	48 359	(5.53)		
Education					1500	.000
Middle school or less	636 621	(92.80)	49 388	(7.20)		
High school graduate	291 792	(96.11)	11 805	(3.89)		
University graduate or more	202 796	(97.31)	5 597	(2.34)		

chronic diseases. In the case of disability, the likelihood of choosing national and public hospitals decreased by 4% compared to those with no disability. In terms of household income, the second quintile was related to a 12% decrease in choosing national and public hospitals as compared to the first quintile. The third quintile decreased by 25%, the fourth quintile decreased by 40%, and the fifth quintile decreased by 50%. As for health insurance type, outpatients with medical benefits were 9% less likely to select national and public hospitals than recipients of general health insurance. In the

case of private insurance, compared to nonprivate insurance, private insurance recipients were 10% less likely to choose national and public hospitals.

As for sex, men were 34% more likely to choose national and public hospitals than were women. As for marital status, having a spouse led to a 2% higher likelihood of choosing public and national hospitals as compared to those without a spouse. In terms of education level, choosing national and public hospitals decreased by 23% for high school graduates compared to middle school graduates or less, and this

Table 3. Logistic Regression Analysis for Predicting Selection of National and Public Hospitals Among Outpatient Service Users.

Outpatient service selection variable	Selection of national and public hospitals				
	B	SE	Odds ratio	z	P> z
<Need factors>					
Chronic disease (criterion: no disease)	-0.423	0.01	0.654	-21.07	.000***
Disability (criterion: no disability)	-0.049	0.012	0.951	-3.66	.000***
<Enabling factors>					
Household Income (criterion: first quintile low-income earners)					
Second quintile	-0.128	0.011	0.879	-10.07	.000***
Third quintile	-0.287	0.011	0.750	-19.41	.000***
Fourth quintile	-0.510	0.010	0.599	-29.48	.000***
Fifth quintile	-0.69	0.009	0.497	-35.73	.000***
Medical Benefits (criterion: health insurance)					
Medical benefits	-0.101	0.026	0.903	-3.48	.001**
National merits	0.102	0.031	1.10	3.58	.000***
Private insurance purchase	-0.111	0.01	0.894	-9.81	.000***
Payment amount of medical expenses	-9.10	2.17	0.999	-42.17	.000***
<Personal factors>					
Sex (criterion: male)	0.294	0.014	1.34	27.40	.000***
Age	0.029	0.00	1.0	53.78	.000***
Spouse	0.022	0.011	1.02	1.94	.052 [†]
Education level (criterion: middle school graduation or less)					
High school graduate	-0.263	0.010	0.768	-19.37	.000***
University graduate	-0.41	0.012	0.663	-21.43	.000***
<Control variables>					
Economic activity (criterion: no economic activity)	0.382	0.015	1.4	36.08	.000***
Receiving basic national security	0.036	0.030	1.03	1.27	.206
Medical institutions (criterion: tertiary hospital)					
General hospitals	0.316	0.030	1.37	14.11	.000***
Hospitals	-1.89	0.005	0.151	-54.63	.000***
Clinics	-6.10	0.000	0.002	-86.33	.000***
Others	0.89	0.052	2.45	42.13	.000***
Medical expenses financial compensation	0.059	0.018	1.06	3.46	.001**
Reason for visit (criterion: accident, poisoning)					
Disease treatment	0.910	0.094	2.48	23.87	.000***
Other hospital diagnosis	2.93	0.769	18.8	71.85	.000***
Traffic time	-0.0	0.000	0.99	-29.91	.000***
By region (criterion: Seoul)					
Busan	-0.468	0.016	0.625	-17.62	.000***
Daegu	-0.549	0.017	0.577	-18.65	.000***
Incheon	0.155	0.032	1.16	5.54	.000***
Gwangju	-0.346	0.026	0.707	-9.16	.000***
Daejeon	0.508	0.043	1.66	19.30	.000***
Ulsan	-1.38	0.015	0.250	-22.52	.000***
Gyeonggi	-0.00	0.019	0.993	-0.32	.750
Gangwon	0.351	0.041	1.42	12.06	.000***
Chungbuk	0.886	0.068	2.42	31.41	.000***
Chungnam	0.931	0.061	2.53	38.25	.000***
Jeonbuk	0.841	0.052	2.32	37.32	.000***
Jeonnam	0.662	0.041	1.9	30.81	.000***
Kyungbuk	0.552	0.03	1.73	24.50	.000***
Gyeongnam	0.67	0.041	1.96	32.14	.000***
Jeju	0.379	0.046	1.4	11.94	.000***
Year (criterion: 2008)					
2009	-0.304	0.011	0.737	-19.35	.000***
2010	-0.631	0.008	0.531	-39.32	.000***

(continued)

Table 3. (continued)

Outpatient service selection variable	Selection of national and public hospitals				
	B	SE	Odds ratio	z	P> z
2011	-0.747	0.007	0.47	-46.59	.000***
2012	-0.841	0.00	0.430	-52.06	.000***
2013	-0.958	0.006	0.383	-58.67	.000***
Constant	-4.30	0.060	-	-70.92	.000***
N			1 196 685		
Model χ^2			217 4290.30***		
LL			-148 290.71		
Model hit ratio			95.11%		

Note. LL = log likelihood.

†P < .1. *P < .05. **P < .01. ***P < .001.

decrease was 33% for university graduates or higher when compared to middle school graduates or less.

In terms of region and year, rural provinces tended to choose national and public hospitals more than urban provinces. Compared with Seoul, Chungnam had the highest likelihood of choosing national and public hospitals (153%), followed by Chungbuk (142%), Jeonbuk (132%), Gyeongnam (96%), Gyeongbuk (73%), Daejeon (66%), Gangwon (42%), Incheon (16%), Jeonnam (9%), and Jeju (4%). However, compared with Seoul, the likelihood of choosing national and public hospitals was lower in Ulsan (75%), Daegu (42%), Busan (37%), and Gwangju (29%). In terms of year of service use, the likelihood of choosing national and public hospitals decreased to 61% in 2013, 57% in 2012, 53% in 2011, 46% in 2010, and 26% in 2009.

Discussion

Overall, the present study revealed several factors related to choosing public and national hospitals throughout Korea. First, in terms of chronic illness or disability (need factors), we observed that individuals with a chronic illness or disability were less likely to choose a public hospital. These results are in line with previous studies revealing that health service use behaviors are dependent on specific physical conditions.^{27,29} Second, in analyzing the enabling factors, household income, national basic insurance, private insurance, and payment amount for medical expenses were predictive of selecting national and public hospitals. If outpatients' income level is high, they are more likely to choose private hospitals than national and public hospitals. In the present study, payment amount for medical care expenses was negatively associated with selecting national and public hospitals. These results support findings suggesting that health services use behaviors vary according to a patient's economic situation.^{28,29} According to types of medical care, medical care and national merit recipients were more likely to choose national and public hospitals than private hospitals as compared to individuals with health

insurance. Thus, individuals are less likely to choose national and public hospitals as a function of medical reimbursement. These results are in line with findings showing that health service use behaviors vary depending on whether an individual is insured.^{25,26}

Men were more likely to select national and public hospitals than private hospitals. This is supported by previous studies.^{25,27} Age had a positive effect on the selection of national and public hospitals, which is in line with work suggesting that older aged individuals are more likely to select public and national hospitals.^{25,28} Individuals with a spouse were more likely to choose national and public hospitals than private hospitals, similar to what has been observed in previous studies.^{23,31} Finally, higher education status was predictive of a decreased likelihood in choosing national and public hospitals, which is also in line with previous work.^{23,31}

Overall, we observed that outpatient service users choose national and public hospitals predominantly due to the medical resources provided and/or economic reasons. In other words, individuals at the lower end of the socioeconomic spectrum, older adults, and medical care recipients are choosing national and public hospitals more often than private hospitals. Therefore, in order to better manage appropriate medical use among low-income vulnerable groups, it is necessary to strengthen primary medical care within national and public medical institutions. We must also incorporate the environmental differences between urban and rural areas into medical policies. Balanced regional health care facilities must be provided in order to allow all individuals the opportunity to receive professional medical services in areas with low accessibility, namely individuals with low incomes, experiencing disability, and living in agricultural and rural areas. One alternative is to determine ways in which to expand existing public hospitals into offering offer universal health care services, instead of having these institutions only service low-income or vulnerable groups. Additionally, a medical delivery system that allocates the functions and roles of medical institutions needs to be established so that the needs of vulnerable classes can be reflected adequately.

As the medical system in Korea has been growing toward centering on private medical institutions, the proportion of public medical institutions is quite low. For this reason, private hospitals are more accessible providers of outpatient services. However, it is noteworthy that economically vulnerable individuals are still using national and public hospitals despite difficulty with accessibility. Our results suggest that Korea should make efforts toward strengthening the means by which individuals select national and public hospitals.

The present study is meaningful in that it included the use of a large data set on a national scale to better understand determinants for health service use. A more comprehensive analysis as to the myriad factors influencing service use choices was employed, which improves upon past research in this area. We hope that this study can be used as a basic resource for preparing rational health care policies.

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