

Out-of-Pocket Healthcare Spending by the Poor and Chronically Ill in the Republic of Korea

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The equity and efficiency of health care systems is an important policy issue as evidenced by the 2000 World Health Report, which ranked nations according to health care system performance. According to the report, the Republic of Korea (hereafter Korea) ranked 53rd on fairness and 58th overall (out of 180); the United States ranked 54th on fairness and 37th overall.¹ However, despite these rankings, knowledge about the equity of health financing in Korea is limited.

In 1989, after about a decade of comprehensive national health reforms, Korea achieved universal health insurance coverage at a low cost to the government by offering limited benefits, charging high copayments and coinsurance rates, imposing low fees on providers, and restricting fee growth to the level of general inflation. The National Health Institute (NHI) excludes some services, including expensive diagnostic tests such as ultrasonography and magnetic resonance imaging. NHI involves significant cost sharing and requires most Koreans to pay for portions of inpatient and outpatient care through coinsurance and copayments,² which are payments for services above the health insurance premium. The cost-sharing schedules set by the Korean Ministry of Health and Welfare apply to all services and medical facilities but vary by type of service (per visit) and facility.² Moreover, there are insufficient caps on cost sharing, which ranged from 35% to 45% of the total cost per visit in 2005.³ This combination of limited benefits and high cost sharing has created gaps in coverage that burden the poor and chronically ill.^{4,5}

Previous studies have estimated the magnitude of out-of-pocket spending for high-cost items and hospital care. Kim et al. showed that patients' cost sharing on average accounted for 52% of total hospital revenues (40% for inpatient, 67% for outpatient)⁶; however, they did not identify characteristics of persons who showed high out-of-pocket spending, and they

Objectives. We estimated out-of-pocket health care spending and out-of-pocket spending burden ratio employing household equivalent income in the Republic of Korea. We examined variations in out-of-pocket spending, estimated out-of-pocket spending burden ratio employing household equivalent income, and identified factors associated with out-of-pocket spending.

Methods. We used the 1998 Korean National Health and Nutrition Survey, a nationally representative survey of 39 060 individuals. Our analyses examined out-of-pocket spending, out-of-pocket spending burden ratio, and health care use by socioeconomic status, insurance type, health care facility type, and chronic condition after we controlled for sociodemographic variables.

Results. The lowest income quintile spent 12.5% of their total income out-of-pocket on medical expenditures, which was 6 times that of the highest income quintile (2%). Among those with 3 or more chronic conditions, low-income Koreans had the highest out-of-pocket spending burden ratio (20%), which was 5 times the spending burden among high-income Koreans (4%). In multivariate analyses, the number of chronic conditions, insurance type, health care use, and health care facility type were associated with out-of-pocket spending.

Conclusions. Out-of-pocket spending in Korea is regressive, because lower-income groups pay disproportionately more of their income compared with higher-income groups. Low-income individuals with multiple chronic conditions are particularly vulnerable. (*Am J Public Health.* 2007;97:804–811. doi:10.2105/AJPH.2005.080184)

did not associate their findings with socioeconomic status, insurance type, or chronic illness. Yang studied patient medical bills from 3 general hospitals.⁷ Out-of-pocket spending was higher than that was stipulated by law because of items that were not covered by NHI: in 1996, patient out-of-pocket spending paid for 51% to 67% of inpatient services and 63% to 94% of outpatient services. Both studies were consistent with earlier work.⁸

A few studies have examined patient-reported data and found cost sharing ranged from 34% to 45% for inpatient services and 64% to 67% for outpatient services.^{9–13} However, these data were not derived from nationally representative surveys, and income and health variables were unavailable. They also did not explore variations in out-of-pocket spending by insurance and health care facility type or by individual characteristics, particularly chronic illness. Thus, previous estimates have provided an incomplete picture of the impact of health care costs on low-income chronically ill populations.

Among low-income and chronically ill groups, it is important to know the extent to which the burden of out-of-pocket spending is mitigated by Medical Aid, Korea's assistance program for the poor. According to official statistics from 1998, only 3% of the population was eligible for Medical Aid even though 12% of Koreans' income fell at or below the poverty line.¹⁴ Low-income individuals who did not have Medical Aid would be expected to have a higher burden of out-of-pocket spending compared with those who had Medical Aid; however, some of these individuals likely fell into the "other" insurance category in the 1998 Korean National Health and Nutrition Survey (KHNS).

Among individuals with incomes in the lowest-income quintiles, it is also important to know how the burden of out-of-pocket spending differs between those who use public versus private medical facilities, because public facilities are expected to charge lower unregulated prices for benefits not covered by NHI, and they are not allowed to demand

“informal treatment charges.”¹⁵ Compared with private facilities, public health centers vaccinate children at roughly one third the price, treat ambulatory patients at half to one third the cost, and hospitalize patients with chronic diseases at about one fifth the cost.¹⁵

We studied aspects of equity in health financing in Korea with the nationally representative 1998 KHNS.¹⁶ Specifically, we estimated out-of-pocket spending in Korea by income group, level of chronic illness, and we also examined variations in spending by insurance type, occupation, and health care use and facility type, and we identified factors associated with out-of-pocket spending. We also estimated out-of-pocket spending burden ratio employing household equivalent income. Because of the recent strong interest in universal health insurance coverage in the United States and in middle- and low-income countries that are pursuing health financing and insurance reform, lessons learned from Korea may provide insights for policymakers worldwide.

METHODS

Data Source and Sample

The 1998 KHNS was conducted from November 1 through December 31, 1998. It was sponsored by the Korean Ministry of Health and Welfare and is the most comprehensive nationally representative data set on health care use and expenditures. The KHNS had 4 components: the Health Interview Survey, the Health Examination Survey, the Health Behavior Survey, and the Nutrition Survey. The Health Interview Survey and the Health Behavior Survey estimated the national prevalence of selected diseases and risk factors with data from household interviews about morbidity, limitation of activity, health care use, and health behaviors. The Health Examination Survey estimated national population reference distributions of selected health parameters, and the Nutrition Survey collected information on dietary practices and nutrition intake.

The KHNS used a stratified multistage probability sampling design (including sample stratification and clustering). As a result, we needed a sampling weight for unbiased national estimates, and all of our estimates have been weighted (per KHNS specifications) to

represent national estimates. We calculated standard errors with Stata version 7.0 (Stata Corp, College Station, Tex) survey modules that could accommodate the complex survey design.

The 1998 KHNS samples were collected from the general population (excluding island residents), which included 13 523 households and 39 060 household members. The average response rate was 91% and ranged from 87% (Nutrition Survey) to 95% (Health Behavior Survey).

Definitions and Measurement

The KHNS definition of a chronic condition was taken from the 1995 US National Health Interview Survey and included 14 disease diagnostic-code variables. The clinical classification system defined a chronic condition as one that lasted or was expected to last 3 or more months. Because individuals could have as many as 14 chronic conditions, the number of conditions was aggregated for each respondent.

The KHNS collected information on 7 types of health care facilities as defined by Korean medical law: general professional hospital, general hospital, hospital, clinic, Oriental clinic, public health center, and pharmacy.¹⁷ Different facilities provide different services; for example, Oriental medical facilities provide Oriental treatments such as herbal medicine and acupuncture, which are mostly not covered by NHI except for inexpensive services, such as acupuncture.¹⁷ The KHNS also collected data on the number of outpatient visits and inpatient hospitalizations.

The KHNS categorized the type of NHI into 5 groups: government employee and teacher insurance (offered by a single health insurer; approximately 9% of the population covered), private employee insurance (offered by multiple private insurers; approximately 34% of the population covered), self-employed regional insurance (offered by multiple private insurers; approximately 53% of the population covered), Medical Aid (part of the Korean public assistance system that offers free insurance to eligible poor individuals; benefits are the same as NHI; approximately 2% of the population covered), and other (those who do not receive any type of NHI or Medical Aid coverage; approximately 1% of the population

covered).¹⁸ Individuals must meet income and asset criteria to be eligible for Medical Aid; therefore, people who fall below the poverty line for income but have assets (e.g., a truck used for work) may be excluded. The “other” category is a catchall for those who are poor but not eligible for Medical Aid, many of whom fail to pay premiums and are at risk of losing their coverage.

The KHNS provided high-quality data on household income, so we further categorized individuals into 5 quintiles ranked by their monthly household income. The lowest quintile (0%–20%) is the 20% of the population with the lowest household income in 1998. The highest quintile (80%–100%) is the 20% of the population with the highest household income. To determine household equivalent income, which reflects total income and the number of adults and children in the household, we used the Organisation for Economic Co-operation and Development Equivalence Scale, which equals $1 + 0.7(N_a - 1) + 0.5N_c$, where N_a = number of adults and N_c = number of children; a weight of 1 was attached to the household head. In recent years, this measure has been used for international comparisons of poverty and income inequality¹⁹ but has had limited use in health care studies.

KHNS survey respondents were asked about their spending for outpatient services during the past 2 weeks and during the past year for inpatient services. We estimated individuals’ annual out-of-pocket spending with the following equation: annual out-of-pocket spending = inpatient services expense during the past year + outpatient services expense during the past 2 weeks $\times 2.2 \times 12$; this method has been used in other studies.^{20,21} Thus, reported out-of-pocket spending is total expenditures that inpatients and outpatients paid directly to hospitals and other facilities. It includes coinsurance, copayments, and all cash payments for services, pharmaceuticals, supplies, and items not covered by NHI. It does not include health insurance premiums, deductibles, or expenses such as medical home care or items not related to health.

We also computed the out-of-pocket spending burden ratio to assess equity among subgroups of the population. Out-of-pocket spending burden ratio is the ratio of average

out-of-pocket spending to household equivalent income and is estimated as the mean of the ratios between the 2 numbers for each individual (as opposed to the ratio of the mean of out-of-pocket spending to the mean of income). Income was defined as the individual's share of household income (household equivalent income). We did not cap individual out-of-pocket spending at 100% of income primarily because preliminary analysis suggested that such spending may exceed 100%.

Statistical Analysis

We used bivariate and multivariate analyses to examine variations in out-of-pocket spending according to independent variables, including socioeconomic factors, health care service use (e.g., outpatient visits, inpatient hospitalizations), health care facility type, insurance type, and number of chronic conditions. We used linear multivariate regression to assess multivariate associations between independent variables and out-of-pocket spending. For multivariate analyses, we modeled the natural logarithm of household income and out-of-pocket spending, because the respective distributions of these variables were skewed and required log transformation. Although different specifications were used, a double-logarithmic regression model (for income and out-of-pocket spending) that included age, chronic conditions, insurance type, health care service use, and health care facility type best fit the data. We ran 2 regression models with and without control for health care service use to measure the direct effects of insurance type, health status, and income. We used the following software to conduct analyses: Excel 2000 (Microsoft Corp, Redmond, Wash), SAS version 8.2 (SAS Institute Inc, Cary, NC), and Stata version 7.0.

RESULTS

Respondent Characteristics and Number of Chronic Conditions

Table 1 shows respondents' age, gender, insurance type, occupation, household income quintile, and number of chronic conditions. The prevalence of chronic conditions increased with age, except after age 80 years. A higher percentage of women had 3 or more chronic conditions, and a higher percentage of

TABLE 1—Respondent Characteristics by Number of Chronic Conditions: Korean National Health and Nutrition Survey (KNHS), 1998

Characteristics	Number of Chronic Conditions, %				
	Total Population	None	1	2	≥3
Total population	100	33.7	30.4	18.0	17.9
Age, y					
0-19	18.9	52.4	34.6	9.7	3.3
20-44	49.4	38.0	31.1	18.5	12.4
45-65	18.4	19.8	28.2	21.1	31.0
66-79	12.1	9.0	24.6	24.0	42.5
≥80	1.2	13.3	34.5	22.7	29.5
Gender					
Male	48.2	36.4	32.1	17.6	13.8
Female	51.8	30.9	29.0	18.4	21.8
Insurance type					
Government employees and teachers	9.2	28.4	33.2	19.8	18.6
Private employees	34.4	35.9	30.9	17.3	15.9
Self-employed	53.2	33.5	29.9	18.3	18.3
Medical Aid	2.1	20.8	22.9	16.2	40.2
Other ^a	1.1	33.7	37.2	13.1	16.0
Occupation ^b					
Professional and management	5.6	38.2	33.5	18.5	9.8
White collar	7.8	41.0	31.8	18.2	8.9
Sales	13.5	31.4	30.7	21.6	16.3
Farming and fishery	7.3	13.0	24.1	22.8	40.2
Labor	15.2	29.1	29.3	21.0	20.7
Military	0.2	44.3	37.7	18.0	0.0
Student	12.3	55.7	31.1	9.4	3.8
Other	38.2	30.6	31.2	17.3	20.9
Household income quintile					
1 (0-20%)	20	22.2	26.2	19.5	32.2
2	20	36.5	28.3	17.9	17.3
3	20	34.1	30.3	19.7	15.9
4	20	36.3	33.4	16.7	13.7
5 (80-100%)	20	37	33.4	16.7	12.9

^aOther comprises those who do not receive any type of NHI or Medical Aid coverage; they are approximately 1% of the population.

^bOccupation categories were those used by the KNHS.

men had none. The prevalence of 3 or more chronic conditions was significantly higher (40%) among those with Medical Aid than among those with other types of insurance. The prevalence of 3 or more chronic conditions was similar among those with government employee and teachers insurance (19%) and self-employed insurance (18%), but it was slightly lower among those with private employee insurance (16%).

The lowest income quintile also had a disproportionately high prevalence of 3 or more

chronic conditions (32%), whereas the highest quintile had the lowest prevalence (13%). This pattern continued for the second-lowest quintile, which had the second-highest prevalence of 3 or more chronic conditions (17%).

Out-of-Pocket Spending and Out-of-Pocket Spending Burden Ratio

In 1998, the mean annual out-of-pocket spending per person was 215 700 won (Table 2), or roughly US \$179. On average, out-of-pocket spending by low-income

TABLE 2—Mean Annual Out-of-Pocket Spending (OPS) and Percentage of Out-of-Pocket Spending Burden Ratio (OPBR) by Socioeconomic Characteristics and Number of Chronic Conditions: Korean National Health and Nutrition Survey (KNHS), 1998

Characteristic	Total Population		Number of Chronic Conditions							
	OPS	OPBR, %	None	1	2	≥3	None	1	2	≥3
Total population	215 700	4.8	68 000	1.1	231 400	4.5	261 500	5.6	419 300	11.4
Age, y										
0-19	92 900	2.3	36 600	0.8	162 500	4.0	102 600	2.3	226 700	7.8
20-44	214 200	4.6	85 900	1.7	237 500	4.5	273 700	7.0	460 100	10.5
45-65	274 100	6.5	75 700	1.6	240 800	6.2	322 100	7.4	398 600	9.4
66-79	321 500	8.2	29 200	0.7	300 000	9.7	257 000	6.5	432 200	10.0
≥80	253 700	3.5	5 500	0.1	490 900	3.1	109 100	4.0	199 800	5.2
Gender										
Male	188 000	4.5	42 000	0.8	234 200	5.6	219 200	5.8	425 600	10.1
Female	241 500	5.4	96 600	2.0	228 500	4.8	299 300	7.1	415 600	9.6
Insurance type										
Government employees and teachers	302 600	6.0	69 500	0.9	316 400	4.9	269 300	7.4	670 000	14.4
Private employees	201 200	4.1	55 100	1.0	213 500	4.3	268 900	6.0	433 100	8.3
Self-employed	216 900	5.5	78 400	1.7	234 700	6.0	262 200	6.7	395 100	10.3
Medical Aid	125 600	3.8	33 400	1.2	126 600	2.7	159 500	4.9	159 000	5.2
Other ^a	53 900	1.8	30 700	1.2	48 200	1.2	46 700	2.3	121 700	4.1
Occupation ^b										
Professional and management	250 400	7.0	86 900	1.5	424 000	12.2	313 600	10.4	174 900	4.5
White-collar	206 000	4.0	64 000	1.2	249 200	5.0	209 300	4.3	699 700	12.7
Sales	212 100	5.0	59 300	1.4	204 900	5.2	359 000	9.4	325 000	5.5
Farming and fishery	221 500	9.2	36 700	1.3	175 900	9.1	217 600	7.6	310 700	12.8
Labor	192 300	3.8	52 200	1.2	180 300	2.9	176 700	4.0	421 900	8.5
Military	155 500	2.6	10 500	0.1	373 900	6.2	55 400	2.3	0	0.0
Student	121 700	2.9	78 500	1.4	185 100	5.0	112 400	3.4	258 300	7.2
Other	252 800	5.2	71 700	1.5	247 900	4.5	300 900	6.4	485 400	10.7
Household income quintile										
1 (0-20%)	228 500	12.5	56 000	1.6	218 400	11.7	216 400	11.8	362 800	19.5
2	225 000	5.6	101 600	1.9	164 000	4.1	293 800	7.7	514 300	13.4
3	167 000	3.3	63 100	1.1	139 200	3.0	208 800	3.9	390 600	7.8
4	223 000	3.1	49 000	0.6	324 500	4.6	178 500	2.5	491 400	7.0
5 (80-100%)	232 800	2.0	65 600	0.6	274 700	2.3	413 900	3.5	369 200	3.5

Note. Values were weighted in accordance with Korean National Health and Nutrition Survey specifications. OPS in 1000 won.
^aOther comprises those who do not receive any type of NHI or Medical Aid coverage; they are approximately 1% of the population.
^bOccupation categories were those used by the KNHS.

Koreans accounted for a significant percentage of income. Although Koreans spent an estimated 215 700 won (5% of total income) on average on health care, Koreans in the lowest income quintile spent 228 500 won (13% of total income). This out-of-pocket spending burden ratio was 6 times that of

the highest quintile (2% of total income). Mean out-of-pocket spending increased with additional chronic conditions from 68 000 won for no chronic condition to 419 300 won for 3 or more conditions (Table 2). The out-of-pocket spending burden ratio rose at an increasing rate for each additional

chronic condition and ranged from 1% for no chronic conditions to 11% for 3 or more conditions.

Low-income Koreans with chronic conditions had an even higher spending burden that increased with the number of conditions. The second-lowest income quintile spent an average of 225 000 won (6% of total income) on health care. As shown in Table 2, the lowest income quintile with 3 or more chronic conditions spent an average of 362 800 won (20% of total income) annually for health care. Moreover, the second-lowest income quintile with 3 or more chronic conditions spent 514 300 won on average on health care, and although their spending as a percentage of total income (13%) was less than that of the lowest income quintile, it was 3 times the percentage of the highest quintile (4%). The Gini coefficient for out-of-pocket spending on health care in Korea was 0.7, whereas the coefficient for income was 0.3, which suggests regressive financing (data not shown).

The level and burden of out-of-pocket spending varied by type of health insurance (Table 2). Mean out-of-pocket spending and out-of-pocket spending burden ratio were lowest among the “other” group (poor Koreans who did not receive Medical Aid; 53 900 won, or 2% of annual income) and the Medical Aid group (125 600 won, or 4% of annual income). It was highest among those with government employee or teacher insurance (302 600 won, or 6% of annual income) and private employee insurance (201 200 won, or 4% of annual income). Those with regional self-employed insurance spent 216 900 won, or 6% of their annual income. Medical Aid appears to have helped offset some of the costs incurred by the poor and chronically ill Koreans. Nonetheless, out-of-pocket spending burden ratio of 4% to 5% suggest persistent gaps in coverage.

Use Rates and Out-of-Pocket Spending by Health Care Facility Type

Although low-income individuals had a higher out-of-pocket spending burden ratio, their use rates were similar to those in other categories for nearly all types of health care facilities, except public health centers, which were used by 3% of the lowest income

TABLE 3—Health Services Use and Out-of-Pocket Spending Burden Ratio (OPBR), by Income Quintile and Number of Chronic Conditions and Type of Health Care Facility: Korean National Health and Nutrition Survey, 1998

Number of Chronic Conditions	General Professional Hospital		General Hospital		Hospital		Clinic		Oriental Clinic		Public Health Center		Pharmacy	
	Use Rate, %	OPBR	Use Rate, %	OPBR	Use Rate, %	OPBR	Use Rate, %	OPBR	Use Rate, %	OPBR	Use Rate, %	OPBR	Use Rate, %	OPBR
Quintile 1 (0-20%)														
0	0.0	65.2	0.2	24.9	0.2	23.3	1.0	20.0	0.0	8.6	0.1	6.7	1.2	6.0
1	0.2	119.4	0.5	31.4	0.7	38.5	1.3	40.8	0.2	10.4	0.3	3.2	1.7	22.6
2	0.3	14.1	0.5	58.0	0.7	48.0	1.3	31.6	0.1	53.9	0.6	16.8	1.3	27.4
≥3	0.5	81.0	0.8	48.6	1.4	79.4	2.9	35.2	0.2	200.1 ^a	1.6	12.5	2.7	37.7
Total	1.1	68.8	2.0	46.4	2.9	56.8	6.4	34.6	0.5	104.7 ^a	2.6	11.7	6.7	28.1
Quintile 2														
0	0.1	10.7	0.4	15.6	0.4	8.1	2.0	10.0	0.0	370.3 ^a	0.1	0.4	2.1	4.8
1	0.4	23.6	0.4	19.3	0.6	12.0	1.6	9.9	0.2	10.9	0.2	1.5	2.2	5.8
2	0.2	49.6	0.3	9.4	0.5	11.5	1.1	18.5	0.2	62.3	0.2	19.8	1.4	14.3
≥3	0.4	23.3	0.4	29.8	0.8	23.7	1.5	18.4	0.1	107.7 ^a	0.3	8.2	1.7	14.3
Total	1.1	28.7	1.5	20.5	2.4	13.3	6.2	14.6	0.6	83.1	0.8	7.6	7.4	9.2
Quintile 3														
0	0.1	13.1	0.5	5.7	0.5	13.0	2.6	5.0	0.0	11.6	0.1	2.8	2.2	2.1
1	0.3	22.8	0.4	31.7	0.7	9.6	1.9	9.9	0.4	2.5	0.2	2.1	2.0	3.2
2	0.2	45.2	0.3	15.8	0.5	14.5	1.2	12.0	0.2	3.0	0.2	2.1	1.2	7.9
≥3	0.2	37.0	0.4	37.3	0.6	16.0	1.2	12.3	0.2	64.3	0.3	6.6	1.5	9.2
Total	0.7	27.8	1.7	28.0	2.2	13.3	6.9	10.0	0.8	35.3	0.7	4.1	7.0	5.4
Quintile 4														
0	0.2	7.5	0.4	5.3	0.4	10.7	2.6	4.1	0.1	13.3	0.1	1.4	2.3	2.1
1	0.5	39.1	0.4	15.7	0.6	9.2	1.8	11.4	0.4	66.6	0.1	2.8	2.3	6.4
2	0.3	31.6	0.2	35.8	0.4	14.6	0.9	5.9	0.2	12.3	0.1	2.2	1.3	3.5
≥3	0.2	27.0	0.2	15.0	0.6	7.2	1.0	7.5	0.1	51.3	0.1	3.7	1.2	9.7
Total	1.2	31.1	1.3	16.2	1.9	10.5	6.4	7.6	0.7	49.3	0.3	2.8	7.1	5.3
Quintile 5 (80-100%)														
0	0.2	3.3	0.5	6.5	0.5	7.9	2.6	3.8	0.1	40.4	0.1	0.6	2.3	1.4
1	0.2	10.0	0.5	5.4	0.7	13.5	2.0	7.6	0.4	24.1	0.1	10.9	2.0	3.3
2	0.2	16.9	0.3	13.0	0.5	15.2	1.1	4.6	0.3	16.9	0.0	2.4	1.2	4.9
≥3	0.2	13.2	0.2	10.6	0.4	10.2	0.9	6.4	0.1	4.1	0.1	4.3	1.1	3.9
Total	0.9	11.8	1.5	7.8	2.1	11.4	6.6	5.9	0.9	16.4	0.4	4.2	6.4	3.1

Note. Health care facilities are listed by type as defined by Korean medical law. Values are weighted in accordance with Korean National Health and Nutrition Survey specifications. 0.0% means no person in the income group used the specific health service. Use rate represents the percentage of people who used services, including inpatient and outpatient services.

^aRepresents spending on outpatient services during the previous 2 weeks; in oriental clinics, people visit to purchase tonics for general, rather than urgent treatments, so type of purchase may affect this percentage.

quintile but were used by only 0.4% of the highest quintile (Table 3). Among those with 3 or more chronic conditions, the lowest-income individuals were about 16 times more likely to use public health centers compared with the highest quintile (Table 3).

Among the lowest income quintile, the out-of-pocket spending burden ratio for health care services was highest at Oriental

clinics (104.7% of income), followed by general professional hospitals (69%). It was lowest at public health centers (12%; Table 3). Out-of-pocket spending among the lowest income quintile for oriental clinic and hospital facilities was approximately 6 times as burdensome (in terms of the out-of-pocket spending burden ratio) compared with the highest quintile. The burden of out-of-pocket

spending, therefore, was spread unevenly among income groups. Oriental clinics had the highest out-of-pocket spending burden ratio among the lowest-income Koreans with 3 or more chronic conditions (200% of income) and represented the largest difference in the out-of-pocket spending burden ratio between low-income and high-income Koreans.

TABLE 4—Multivariate Analysis of Out-of-Pocket Spending: Korean National Health and Nutrition Survey, 1998

Predictor	Model 1			Model 2 ^a		
	Standardized Coefficient (95% CI)	t	P	Standardized Coefficient (95% CI)	t	P
Demographics						
Women	0.011 (-0.011, 0.068)	1.4	.161	-0.001 (-0.046, 0.044)	-0.06	.954
Age	0.064 (0.003, 0.005)	6.46	<.001	0.045 (0.001, 0.004)	4.05	<.001
Health service use						
Visit days	0.376 (0.208, 0.226)	47.08	<.001
Hospitalization days	0.265 (0.027, 0.031)	33.08	<.001
Health status						
No. of chronic conditions	0.105 (0.097, 0.140)	10.87	<.001	0.154 (0.149, 0.197)	14.19	<.001
Household income						
Household income (log)	0.071 (0.088, 0.145)	8.06	<.001	0.052 (0.054, 0.118)	5.28	<.001
Insurance type						
Government employees	0.125 (0.360, 0.699)	6.13	<.001	0.077 (0.134, 0.515)	3.34	.001
Private employers	0.185 (0.333, 0.655)	6.01	<.001	0.111 (0.116, 0.477)	3.21	.001
Self-employed	0.177 (0.288, 0.605)	5.53	<.001	0.090 (0.049, 0.405)	2.50	.013
Other	0.025 (0.107, 0.705)	2.66	.008	0.002 (-0.304, 0.368)	0.19	.852
Medical Aid (reference)						
Health care service type						
Hospital and clinic	0.149 (0.355, 0.500)	11.59	<.001	0.178 (0.428, 0.590)	12.28	<.001
Oriental clinic	0.037 (0.202, 0.528)	4.39	<.001	0.043 (0.242, 0.608)	4.54	<.001
Pharmacy	0.084 (0.152, 0.284)	6.47	<.001	0.088 (0.153, 0.302)	6.00	<.001
Public health center (reference)						
R ²	0.248			0.049		
Adjusted R ²	0.247			0.048		
F	303.69		<.001	56.15		<.001

Note. Models show analysis of individuals' estimated annual out-of-pocket spending for health care services.

^aModel 2 shows the impact of health and income variables without including control for health service use.

An out-of-pocket spending burden ratio greater than 100% does not necessarily mean an individual spent more than their income for a medical service. Because of the financial burden, actual use rate is low. For instance, the use rate for Oriental clinics, where most services are not covered, appears to be less than 1%.

Multivariate Results

Table 4 shows standardized coefficients and partial multivariate coefficients of determination for the multivariate linear regression models. We examined possible collinearity issues by calculating variance inflation factors for each variable (results of 1 and 1.4 confirmed collinearity were not a problem).

Model 1 explained 24.7% ($P < .001$) and Model 2 explained 5% ($P < .001$) of the adjusted variance in the dependent variable ($P < .0001$). Regression coefficients of income and insurance type in Model 2 were significantly lower compared with Model 1. Among the independent variables in Model 1, outpatient visits were most strongly associated with out-of-pocket spending. One additional visit day for outpatient services increased out-of-pocket spending by 37%. Inpatient hospitalization days also had highly significant effects on the dependent variable, even after we adjusted for age, health, and economic conditions. One additional hospitalization day increased out-of-pocket spending by 26%. Patients who used hospitals, pharmacies, and

Oriental clinics had higher out-of-pocket spending compared with patients who used public health centers. In Model 2, the number of chronic illnesses was more strongly associated with out-of-pocket spending than was insurance type.

DISCUSSION

Korea achieved universal coverage at low cost by offering limited benefits, by requiring high copayments and coinsurance rates, imposing low fees on providers, and by restricting fee growth to the level of general inflation.^{18,22} Consequently, the health care system leaves many citizens relatively unprotected. Financial barriers to access of care can become insurmountable among those with low incomes, particularly among patients with multiple chronic conditions.^{4,5,23} High cost sharing, high fees for uninsured services, and the widespread practice of informal treatment charges can constrain the ability to afford necessary care. According to the National Health Insurance Corporation, the out-of-pocket spending for outpatient services accounts for 65% of total expenditures, and about one half of the patient's share (34%) is non-insurance charges—18% for legal and 16% for illegal informal treatment charges.²⁴

Medical Aid covers roughly 2% to 3% of the population. Medical Aid recipients and those in the lowest income quintiles have a significantly higher burden of illness on average compared with other groups. Because the Korean NHI uses cost sharing and a restricted benefits package to reduce health care spending and control costs, it is important to examine the impact of these policies on vulnerable populations.

Our findings show that, on average, both the annual out-of-pocket spending and the out-of-pocket burden spending ratios increase with the number of chronic conditions. This association persisted even after we controlled for a number of factors. Moreover, the average out-of-pocket spending burden ratio was 6 times higher among Koreans in the lowest income quintile (13%) compared with those in the highest quintile. Low-income individuals with 3 or more chronic conditions had the highest out-of-pocket spending burden ratio

(20%) compared with their high-income counterparts with 3 or more chronic conditions (4%). Studying the effect of health insurance on those with 3 or more chronic conditions showed that those with Medical Aid had lower out-of-pocket spending burden ratios compared with all other insurance groups, with the exception of the “other” category. Nevertheless, Medical Aid recipients experienced an out-of-pocket spending burden ratio of up to 5% on average, which was more than that of highest-income quintile. Employing household equivalent income, which incorporates size and composition of households, enables more accurate estimates of this burden.

Thus, our estimates show that although Medical Aid provides financial protection for a small percentage of low-income NHI beneficiaries, most low-income Koreans experience a significant burden of medical expenses. As a result, many low-income and chronically ill Koreans have high out-of-pocket spending on health care. Analysis of health care service use patterns suggests that, despite significant economic burdens, low-income and chronically ill Koreans may sustain use rates by incurring significant debt to obtain care, because uncovered costs exceed annual income. Our first model found that health care service use variables, insurance type, and the number of chronic conditions explained a great deal of the variability in health expenditures, whereas the number of chronic conditions was a more important variable in our second model.

Limitations

Our study has some limitations. First, it might be biased because of failures to respond to the survey and missing values, although previous studies of the KHNS have not detected bias.^{25,26} Second, household income was self-reported and prone to error, although it was confirmed by other household members. Third, personal interviews were conducted at the end of 1998, just after the Asian economic crisis; household income may have been significantly lower than normal and may thus have increased out-of-pocket spending burden ratios. Fourth, the out-of-pocket spending in our study did not reflect the 9% increase in medical fees allowed by the government beginning in mid-2000. Fifth, we did not consider nonmedical out-of-pocket

spending costs, which might be considerable among patients with multiple chronic illnesses.

Conclusions

Our results compare favorably with studies of out-of-pocket spending in the United States,^{27,28} which also found increased out-of-pocket spending associated with the number of chronic conditions.²⁹ Moreover, in 1997 low-income older Americans who were not enrolled in Medicaid and traditional Medicare spent 30% of their income out-of-pocket for health care compared with 23% among those who were enrolled in a Medicare health maintenance organization.²⁷ Compared with other Organisation for Economic Co-operation and Development countries, Korea, the United States, and Mexico have the highest private share (percentage) of total health care expenditures.³⁰

Out-of-pocket payments in Korea, which represent almost half of overall health financing, are regressive for at least 3 reasons.³¹ First, payments are high and are unrelated to the ability to pay, particularly for uncovered services. Recent efforts to address this issue were implemented in July 2004. Since then, individuals' payments on covered services that cost more than 3 000 000 won within a 6-month period can be reimbursed by the National Health Insurance Corporation. These measures require evaluation. Second, cost sharing on NHI-covered services is waived only for Medical Aid first-grade beneficiaries, who are a small percentage of the population. Third, cost-sharing rates have no annual cap, although they are cut by 50% for high-cost claims.²⁸ Social insurance contributions—the second largest financing source—are related to income, although contributions are proportional to income only up to a ceiling (25 million won per month). Our analysis shows that many low-income individuals may not receive Medical Aid protection. As a result, many people with low incomes pay a substantial share of their incomes out-of-pocket for health care. Thus, strategies for reform should include (1) setting caps for low-income individuals' financial burden, (2) determining premiums and copayments on the basis of income levels, (3) expanding benefits, (4) removing informal treatment charges, (5) changing NHI's cost-sharing structure, and (6) making upward

adjustments in fee schedules and premiums for system sustainability.³¹ Empowering low-income and chronically ill individuals to become involved in health system design and operation is a critical step.³²

We found that low-income individuals with multiple chronic conditions were especially vulnerable to cost sharing and coverage restrictions because they need and use more services, including those individuals with limited coverage. Further research is necessary for better understanding the association between out-of-pocket spending, insurance type, and access to care among those with significant health problems. It would be especially useful to assess the impact over time of health status on health care service use and out-of-pocket spending, particularly the degree to which low-income and chronically ill Koreans are forgoing health care or are becoming indebted because of costs. These findings offer lessons for the United States and middle-income and low-income countries that are pursuing health financing and insurance reform, particularly in the Middle East (e.g., Morocco) and in Latin America (e.g., Mexico). ■

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Contributors

Both authors originated the study, contributed to the study design, and wrote the article. H.J. Kim managed the data and completed the statistical analyses, with input from J.P. Ruger. H.J. Kim had full access to the data.

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Human Participant Protection

No protocol approval was needed for this study.

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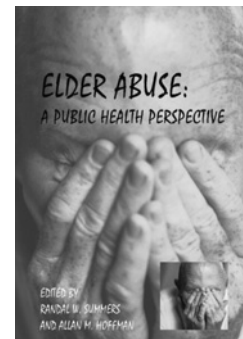
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