

Study on Hospital Care Services between Insured and Non-insured Patients for Selected Diagnoses in Korea

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Rapidly expanding health insurance programs have accompanied the rapid economic development of Korea over the past five years. Now more than thirty percent of the total population is covered by the various health insurance plans.

The objective of this study is to discover differences that may exist in medical care services in terms of quantity, length of stay, charges and quality of care in treating insured and non-insured patients. Five common diagnostic categories (namely, appendectomy, cholecystectomy, tonsillectomy, Cesarean section and respiratory tract infection) were examined.

The results confirmed the major hypotheses of the study, although some of the results were in the expected direction but not statistically significant: total hospital charges and charges per day were higher among the non-insured; volume of services was greater among the insured; length of stay was longer among the insured; quality of care did not show statistically significant differences in treatment outcomes and complications.

Key Words : Health services, Health insurance, Hospital care, Korea.

Rapidly expanding health insurance programs have accompanied the rapid economic development of Korea. Employees of firms having one hundred or more persons, government employees, and teachers and staff in private institutions from elementary school to university level, are all insured. Now more than thirty percent of the total population is covered by the various

insurance plans (Ministry of Health and Social Affairs, 1982).

Method of reimbursement to providers is a critical problem in the insurance plans. The insurance reimbursement level to the providers is determined by the government. It is lower for insured patients than self-paying patients. The non-insured, mostly rural low income people, pay average costs, while the insured, mostly high income urban people, pay less than average costs. The insured patients also complain about the quality of their medical care, which

Received March 29, 1983

This study was supported in part by the CMB-YuHan Grant 75-346 (80-3) of Yonsei University

they perceive as inferior.

The objective of this study is to discover differences that may exist in quantity of medical care services and in hospital charges between insured and non-insured patients. Also the quality of care between the two groups is compared. In doing this study, basic questions which arise concerning health insurance among the consumers, providers, and health planning decision makers, will be clarified. This topic is believed to be of the utmost importance for the health insurance program in Korea and is therefore worthwhile exploring.

Since the early 1970's the government of the Republic of Korea has strongly concentrated its attention on the health care delivery system, and the principle of "Health Care for All" has been under serious consideration (Ministry of Health and Social Affairs/WHO, 1977). In 1977, the Medical Aid Program for the indigent, the low income group, and the elderly was started, covering in total about six percent of the total population (Kim et al, 1977). Under this program, ambulatory care is free of charge to persons in any of these groups, inpatient care is free to the indigent and the elderly, while those in the low income group must pay back seventy percent of inpatient medical care fees within two years. No interest is charged and the government assumes the remaining thirty percent of costs.

Health insurance programs have also expanded. Compulsory insurance for employees of firms having five hundred or more employees started in 1977. These firms were required singly or as groups to organize non-profit, health insurance cooperatives. Premiums are shared with employees on a half and half basis. The criteria for requiring compulsory insurance organizations were lowered to include firms with one hundred or more employees in 1981 (See Appendix I).

Two additional health insurance programs were started in 1979: one for teachers and staff from the elementary school to the university level in private institutions, and the other for government employees. These two programs are managed under the same management organization named Korea Medical Insurance Corporation.

The Korean government adopted a cost reimbursement scheme that makes use of a point system. The standard reimbursement schedule (point system, relative value method) was made by the government based on fee-for-service for every procedure, drug, and accommodation provided. Briefly, the system works by adding up the total scores, and a certain figure called the unit price per point is multiplied, the result of which is the amount of the bill.

Fundamental problems in health insurance may occur in relation to the reimbursement of the provider in Korea. Insured patients have often complained about the providers saying that practising physicians and hospitals try to avoid insured patients, and the quality of care given by the doctors is inferior for them. Providers, practising physicians and hospitals, complain that the reimbursement level from third party payers is insufficient. Providers estimated that the reimbursement level under the Korean scheme was about fifty to seventy-five percent compared to that of the self-paying patients. This was supported by a financial analysis survey of hospital operations (Korea Productivity Center, 1978).

In order to bridge the gap caused by the differences between the fee schedule for the government and the individual providers, two alternatives are possible. One is to increase to a maximum the quantity of care; that is, sometimes unnecessary procedures may be performed or length of stay lengthened. The second alternative is to minimize the quantity of care

for insured patients and/or their total number. Also providers may transfer the deficit which is incurred from insured patients to non-insured patients who are, in general, self-employed, daily labourers, or low income group.

Most of the hospitals are in the private sector (Ministry of Health and Social Affairs, 1978), and the operation of the hospital is mostly dependent upon income from patients. It is quite natural that the providers are very sensitive to the reimbursement schedule issue. Clarification is required on matters related to medical care services and the reimbursement problems in health insurance. Studies in this field are needed in Korea.

REVIEW OF THE LITERATURE

Much of the literature has dealt with the utilization of medical care among the different types of insurance coverage. However, only a few studies have specifically addressed medical care services in the hospital from the provider's perspective. Studies before and after the introduction of health insurance have carried out to find out the differences in utilization patterns and the implications of health insurance (Stewart and Enterline, 1961; Lowenstein, 1971; Enterline *et al*, 1973). Utilization rate was increased after the introduction of health insurance. Health insurance effects under different types of plans were compared (Roemer *et al*, 1972; Broida, 1975; Weil, 1976) and service utilization level was lower in group practice plan. Insurance programs bring changes in hospital cost and length of stay since consumers no longer have the burden for hospital bills up to certain percentage and providers have no limitations on medical and hospital services in general (Joseph, 1972; Salkever, 1972; Hill, 1976; Lave and Leinhardt, 1976; Studnicki, 1979).

Few researchers have paid attention to the

development of methodology for the assurance of quality. Medical care process was assessed (Donabedian, 1968), and medical care outcome was reviewed (Shapiro, 1968; Williamson, 1970; Brook, 1973; Williamson, 1980). No known quality assurance study has been done in Korea. The articles reviewed above show that treatment outcomes, pre- and post-operative diagnostic accuracy and post-operative complications are used as measure for quality of care. They seem also to be applicable in comparing quality of medical care between the insured and non-insured in this study.

Insurance plans, as well as practising patterns, have certain similarities between Korea and Japan. The problems of the Japanese insurance system were reported (Jonas, 1975; Broida and Maeda, 1978).

In Korea, a few major studies have been done in hospital care services especially in the health insurance field. Hospital utilization and cost of care in a hospital at five-year intervals from 1955 to 1974 were studied (Yu *et al*, 1977). The overall length of stay decreased continuously over time and total hospital expenses per stay increased 4.4 times during the twenty year period. When the Medical Aid Program was evaluated, the hospital utilization rates of the indigent group were over three times higher than those of the low income group (Kim *et al*, 1977).

In relation to health insurance, the changes in health care utilization patterns before and after introducing health insurance (Kim, 1978; Kim *et al*, 1980). Utilization of medical care was increased after the health insurance. Hospital financial management analyses were done as requested by the Ministry of Health and Social Affairs (Korea Productivity Center, 1978, 1979, 1980, 1981) and by the Korean Hospital Association (The Management Research Institute of Korea University, 1979). The reports

revealed that for services to the insured the reimbursement level to the providers is about seventy for eighty percent of the charges to the non-insured patients.

Several studies on health insurance have been done: comparison of hospital charges and length of stay of the insured and the non-insured (Jung and Kim, 1979), development of per-case payment system (Kim *et al*, 1980), relationship between geographical accessibility and the use of ambulatory care (Oh, 1979), and some other studies (Cho, 1980; Suh, 1980).

HYPOTHESES

A. Hypotheses

In general, there is a difference in quantity (volume) of medical care services and charges (bill) for medical care between the insured and the non-insured patients. Because reimbursements to the provider per procedure for the insured is far less than the present fee for the paying patient, providers may tend to provide greater number of services to the insured in order to get greater reimbursement, although as a consequence, profit margin per procedure is definitely smaller for insured patients. In addition, either insured patients may ask for more laboratory tests and X-rays or the physicians may do so in order to rule out disease entities, because the economic burden becomes lighter for patients due to insurance coverage.

If the reimbursement level for insured patients is really below the actual costs, providers would tend not to see insured patients, would not increase hospital bed capacity, or even close the hospitals because most hospitals have no income sources other than fees paid by patients. However, some hospitals have increased their bed capacity during the last three years because hospital beds are in short supply, and

some of the larger hospitals are building branch hospitals in other areas. These increases are inconsistent with the reductions indicated by reduced reimbursement levels where many patients are insured.

The hypotheses are as follows:

Hypothesis 1: Total charges billed by the provider are not different between the insured and the non-insured.

Hypothesis 2: Quantity of medical care given by the provider is not different between the insured and the non-insured.

Hypothesis 3: Length of hospital stay is not different between the insured and the non-insured.

Hypothesis 4: There is no significant difference in the quality of medical care between the insured and the non-insured.

It is anticipated to reject the hypotheses 1, 2, and 3.

B. Definition of the Terms

1. Health Insurance, Category 1: Nationwide compulsory health insurance for employees of firms having one hundred or more employees and their dependents. These firms organize non-profit health insurance cooperatives singly or as groups. The central organization is the Federation of Korean Medical Insurance Societies

2. Health Insurance for Government Employees, and Teachers and Staff: Nationwide compulsory health insurance for government employees, and teachers and staff in private institutions from elementary school to the university level and their dependents. A single management corporation (Korea Medical Insurance Corporation) was established for reimbursement to providers, cost review, and other insurance management.

3. The Insured: Those who are enrolled either in Health Insurance Category I or Health In-

insurance for Government Employees, and Teachers and Staff.

4. Point (System): The standard reimbursement scheme (relative value method) based on fee-for-service prepared by the government. Points are added up and multiplied by an index called the unit price per point, the product of which is the amount of the bill. The costs of any medical care service and hospital days are computed under this system for the insured.

5. Type of Accommodation: Type of room where the patient stays during hospitalization. Accommodations are grouped into two types: ward, where three to six patients stay together, and private (including semi-private) rooms.

6. Charges: The total amount of bills charged by the provider including medication, laboratory tests, X-rays, daily charges, operation fees, doctor's fees, and so on.

METHODOLOGY

A. The Design

The study was designed to test the aforementioned hypotheses for differences in charges and services between insured and non-insured patients. The method of matching was applied to control for major demographic differences, insofar as possible, between these groups. The data were analyzed to identify any difference arising therefrom.

Four major categories were compared: (1) hospital charges, (2) volume of medical care services (by conversion to standard points of relative value, hereafter called "point(s)"), (3) length of hospital stay, and (4) quality of medical care.

Additionally, all hospital deaths and all deliveries during the study period were reviewed to determine case fatality rate and Cesarean section rate differences between the insured

and the non-insured.

B. Variables

Variables selected for consideration in this study were constrained by the availability of data from hospital records. Therefore use of information on education and income levels was precluded.

Study variables include:

Independent variable

insurance coverage (pay status)

Control variable

age

sex

Intervening variables

type of accommodation

diagnosis

date of discharge

admission route (via emergency room or outpatient department)

staff in charge of patient's care

Dependent variables

charges

total

medication and related therapies, i.e., drug, injection, etc.

laboratory tests

X-rays

volume of services (in points)

medication and related therapies

laboratory tests

X-rays

length of stay

agreement in pre- and post-operative diagnoses*

complication*

outcome of treatment*

* Measures of quality of care did not prove to be valuable.

C. Definition of the Population to be Studied

1. Selection of the hospital and diagnoses for inclusion in the study

The study hospital is located in Seoul, Korea. Selection was based upon the fact that this institution has well kept and available medical care records. The collected data and analyses made therefrom are not intended to be wholly representative of all hospitalized population but rather to be at least moderately representative of professional patient care modes found in teaching hospitals. In an effort to reduce personal bias of the researcher in hospital selection, ten health professionals were asked to complete a questionnaire regarding their opinions of the selected study hospital. The uniformity of response was such that the consensus of opinion was clearly that this institution was representative of the care given in a university hospital setting.

In order to compare the variables between the insured and the non-insured, specific diagnoses were chosen so as to prevent a different case mix between the two groups of patients, thereby making comparison difficult.

Five common diagnostic categories were selected because there were enough number of discharged cases for analysis and these diagnoses could serve as possible proxy for other less common diagnoses. Additionally, modes of treatment for these entities are generally uniform.

The five diagnostic categories and their International Classification of Diseases codes (ninth edition, WHO, 1977) applied in this study are as follows: (a) Acute appendicitis, operated (540-542); (b) Cholecystitis, operated (575) and cholelithiasis, operated (574); (c) Tonsillitis and adenoiditis, operated (474); (d) Cesarean section (669.7); (e) Acute upper respiratory tract infection (465), acute bronchitis

and bronchiolitis (466), and acute pneumonia (480-482). (Hereafter, these will be referred to as appendectomy, cholecystectomy, tonsillectomy, C-section and respiratory tract infection, respectively.)

Among these categories, category (e) was limited to pediatric patients because of the preponderance of cases in this age group. For Cesarean section, primary C-section only was studied.

2. Study period

The health insurance for employees of firms of five hundred workers or more commenced in July 1977. However, the period from July 1977 to June 1978 was excluded from the study because the number of insured patients discharged was not sufficient for matching with non-insured patients and the insurance management was not stabilized during this period. (The percentage of the insured patients among the total discharged patients were 11.9 percent in 1978 and 39.5 percent in 1979.) Therefore, those patients who were admitted to the hospital during a two-year period beginning July 1978 and discharged with an appropriate diagnosis were studied.

3. Determination of the number of pairs

Complete information was not available to decide the number of pairs needed to test hypotheses. Since several studies as reviewed show that total charges are highly correlated to the length of stay, length of stay was used to estimate the number of pairs needed.

Although means and variances of length of stay differ from disease to disease, region to region, hospital to hospital, the author used the U.S. data (CPHA, 1973), because Korean data was not available by diagnosis.

Number of pairs for insured and non-insured patients were estimated and the formula (Dixon and Massey, 1969; Snedecor and Cochran, 1978)

$$N = \left(\frac{Z_{\alpha} + Z_{\beta}}{\frac{\mu_1 - \mu_2}{\sqrt{2\sigma}}} \right)^2$$

where:

- N: number of pairs needed
 Z_{α} : normal deviate to significance level α
 Z_{β} : normal deviate to significance level β
 μ : mean of population
 σ : standard deviation of population

was applied with three alternatives.

	Alternative		
	1	2	3
α (type I error)	.05	.05	.05
$1 - \beta$ (power)	.8	.9	.8
difference/mean	.2	.3	.3

Matching the age and sex between insured and non-insured patient was planned. Matching by type of accommodation was not possible because the total number of cases were not sufficient for each diagnostic category.

The number of matching pairs estimated were as follows.

Diagnostic Category	Alternative ¹⁾			Alternative ²⁾		
	1	2	3	1	2	3
Appendectomy	107	64	48	84	52	38
Cholecystectomy	75	45	34	59	37	26
Tonsillectomy	278	166	124	219	135	97
C-section	90	53	40	71	43	31
Respiratory tract infection	152	90	68	120	74	53

1) Applying two-sided test

2) Applying one-sided test* (Joseph, 1972)

*One-tail test is applied because hypothesized effect of insurance is that it will increase the length of stay

4. Matching

All the cases falling within one of the five

diagnostic categories during the study period were retrieved from the hospital records and divided into insured and non-insured classes. Within each six-month period (January to June, July to December), age and sex were matched. The insured were matched with the non-insured for exact age, or within five years if the exact same age was not available; except for cholecystectomies, in which the insured were matched with the non-insured within ten years age group because the number of cases were insufficient and these age differences were seen as trivial.

After matching age and sex within each six-month period, matching by type of hospital accommodation was attempted. It was not strictly adhered to due to small study numbers. (Matching age and sex in each six-month period was done perfectly and also in sixty to seventy-four percent by type of accommodation.)

In summary, all the insured patients during the study period were matched on age and sex for each six-month period, and additionally type of accommodation was matched as closely as possible.

5. Deaths and deliveries

Total hospital deaths and all deliveries during the two-year study period were counted in order to compute and compare the case fatality rate and the Cesarean section rate between the insured and the non-insured.

D. Data Collection Sources and Methods

1. Quality of data

The data collection procedure was supervised and scrutinized by physicians with research experience. Medical records were abstracted by physicians who were blind in terms of the pay status (insurance coverage) of the patient. Any categorization such as complication of a study illness was confirmed by another physician. In cases of any disagreement, a third

physician reviewed the case.

For determination of insurance status, double verification was made with the Department of Admission and Discharge and the Department of Health Insurance in the hospital. This had to be carried out as a separate investigation because insurance status is not marked anywhere on medical or hospital records.

2. Sources and methods

Among the discharged patients during the study period, those falling into one of the five diagnostic categories were identified by the Medical Record Department. The hospital numbers of these patients were listed and categorized by pay status. Non-insured cases were matched with insured cases.

Medical care services for medications, laboratory tests and X-rays for non-insured patients were transformed into the standard relative value points applicable to all insured patients prepared by the government which came into effect after July 1979. The points for the insured before June 1979 were transformed also using the new relative value system.

After collecting the raw data, they were edited, coded and critically analyzed.

E. Data Collection Procedures

1. In the Medical Record Department, index cards for each diagnosis by month and International Classification of Diseases codes by ninth edition were available. The hospital number of patients discharged with one of the five study diagnoses were thereby identified and listed.

2. In order to ascertain patients' insurance status, several references were checked because, as previously noted, neither medical nor hospital records indicated payment status. Admission and discharge record and daily revenue summary sheets at the Department of Admission and Discharge and Department of Health Insurance

in the hospital were reviewed manually. The uncollected bill record at the Department of Health Insurance was checked supplementarily.

3. Those patients who were identified had their insurance status listed. Their medical records were pulled and diagnoses were reviewed to determine whether they met the requirements for study inclusion.

4. The identified medical records were divided into the insured and non-insured group. In matching between the two groups, age, sex and time of discharge were the main criteria. Breakdown of matching categories were as follows: age, sex, time of discharge, and type of accommodation.

5. Necessary information was abstracted from the medical and hospital records onto prepared sheets as follows:

(a) Medical information was abstracted by physicians on separate monitoring forms in order to check pre- and post-operative diagnoses, and to ascertain whether or not there were complications. Criteria classifying complication as well as standard of good medical care were set up previously. Outcome of treatment was identified from the discharge summary note of patients. The coded results were transferred to main summary sheets. Other medical information including diagnoses, admission routes (emergency room or outpatient department), and outcomes of treatment were transferred from the discharge summary on the sheets.

(b) The staff of the Department of Health Insurance transformed the services of the non-insured into the standard relative value points of the insured patients, which was applicable to all the insured patients from July 1979. It usually took twenty to thirty minutes per discharged patient to calculate the points for the insured patients when the bill was requested from third parties. In addition, about half of

Table 1. Charges, volume of services, and length of stay for all diagnostic categories combined

	Non-insured	Insured		Non-insured	Insured
<u>Total charges</u>			<u>Volume of services*</u>		
Mean	3,754	3,108	Mean	8,660	11,178
S.E.	191	171	S.E.	755	933
(Difference)			(Difference)		
Mean		646	Mean		-2,518
S.E.		255	S.E.		1,083
P-value		p<0.001	P-value		p<0.001
<u>Charges per day</u>			<u>Length of stay</u>		
Mean	621	467	Mean	6.76	7.42
S.E.	27	23	S.E.	0.34	0.36
(Difference)			(Difference)		
Mean		154	Mean		-0.66
S.E.		36	S.E.		0.48
P-value		p<0.001	P-value		p<0.001
<u>Charges per point*</u>					
Mean	22.4	9.3			
S.E.	1.2	0.2			
(Difference)					
Mean		13.1			
S.E.		1.2			
P-value		p<0.001			

* Total of medication, laboratory and X-rays.

less than the non-insured. Thus hypotheses one to three of this study are proven. (Charges, volume of services and length of stay are totalled by weighting the total number of discharged patients for each diagnosis during the study period with the same weight for both insured and non-insured patients: appendectomy 691, cholecystectomy 345, tonsillectomy 385, Cesarean section 473, and respiratory tract infection 357.)

The measures of quality of care do not show statistically significant differences in quality of treatment outcomes and complication rates between insured and non-insured; thus, supporting hypothesis four of the study.

B. Statistical Consideration

1. Results of matching

Results of matching the cases between the insured and the non-insured reveal the following. Mean ages are same for the insured and the non-insured with mean age differences between the two groups less than 0.4 year which is not statistically significant for any diagnostic category (See Table 2). There are about two times more male pairs for tonsillectomy and greater than three times more for respiratory tract infection. There are a greater number of female pairs for cholecystectomy. About the same number of male and female pairs are listed for appendectomy.

Age and sex are matched perfectly within

Table 2. Mean age and distribution by sex

	Appendectomy		Cholecystectomy		Tonsillectomy		C-section		Pneumonia*	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Age (in years)										
Mean	30.9	30.6	49.0	49.4	7.6	7.8	26.4	26.7	1.2	1.3
S.E.	1.4	1.4	1.3	1.3	0.3	0.4	0.3	0.3	0.2	0.2
(Difference)										
Mean	0.3		-0.4		-0.2		-0.3		-0.1	
S.E.	0.7		0.9		0.3		0.2		0.1	
P-value	not sig.		not sig.		not sig.		not sig.		not sig.	
Sex (in pairs)										
Male	69		32		59		0		68	
Female	66		44		31		126		20	
Total	135		76		90		126		88	

* Respiratory Tract Infection (hereafter called "Pneumonia" in tables).

each six-month period. In addition, the agreement in matching the type of accommodation ranges from sixty percent in respiratory tract infection to seventy-four percent in cholecystectomy. However, the difference in the type of accommodation between the insured and the non-insured is not statistically significant at the five percent level for any diagnosis although type of accommodation was not strictly matched. Therefore, the effects due to different type of accommodation is excluded from the analysis.

2. Number of pairs

When the study was designed, the number of pairs needed to test the hypotheses was estimated using the length of stay. However, it was recognized later that this estimation had no practical effect because the number of insured patients discharged during the study period was so small that all the insured patients who met the diagnostic criteria had to be included in the study.

The results reveal that relative standard

error (RSE = S.E./Mean) values are mostly less than ten percent for quantity of services, length of stay, and hospital charges. Several of them are between ten and twenty percent and only one value of RSE (X-ray charges for the non-insured in respiratory tract infection, RSE=21%) exceeds twenty percent. RSEs for any continuous dependent variables are less than twenty-one percent, and the number of pairs for all diagnoses are adequate to test the hypotheses.

3. Method for testing hypotheses

The paired t-test was adopted for testing the null hypotheses that there are no differences between the insured and the non-insured in terms of hospital charges, volume for medical care services and its components, and length of stay (at the five percent significance level).

As mentioned, matching has been done by age and sex, and the type of accommodation is found not to be different between the two groups. Although other independent variables are not controlled, the paired t-test is believed sufficient to test the null hypotheses that the

mean differences between the insured and the non-insured are equal to zero. (Snedecor and Cochran, 1978; Nie *et al*, 1975).

$$H_0: \mu_D = 0$$

$$t = \frac{\bar{D} - 0}{\sqrt{\text{Var}(\bar{D})}}$$

where:

H_0 : null hypothesis

μ_D : mean difference of population

\bar{D} : observed mean difference

$\text{Var}(\bar{D})$: variance of \bar{D}

Degrees of freedom are equal to one less than the number of pairs between the two groups.

C. Hospital Charges

Costs of care given by doctors are included in charges made for the study hospital. (Similar to most other hospitals in Korea.) The doctors are employed on full-time basis and paid monthly salary. The "doctor's fees" are fees charged to patients for their in-hospital medical specialists.

Hospital charges are studied for a two-year period. A nominal charge comparison is not accurate because of inflation. In order to control for the inflation factor for the hospital charges in each period, charges are deflated every six-month period (January to June, July to December) proportionate with changes in the Consumer Price Index (CPI). CPIs for medical care (Economic Planning Board, 1980), for all cities in Korea, are applied by averaging the monthly indices for each six-month period using 1978 (July to December) as a base of 100. Constant Won marked down on the tables denotes the charges adjusted with these CPIs. (One U.S. dollar is equivalent to about six hundred eighty Korean Won as of March 1981).

General CPIs for all items in the entire nation

are also available. However, use of the medical care CPI is more appropriate, and use of the general index does not affect the significance of results. Therefore, only the specific medical care CPI is used.

Since the members of every matched pair incurred charges in the same six-month period, direct comparison without adjusting with CPIs is also shown. Current Won denotes the non-adjusted charges in the tables.

The total hospital charges for the non-insured are higher for all the five diagnoses combined and are significantly higher for each individual diagnosis except cholecystectomy. Furthermore, individual components of medication, laboratory tests and X-rays are all significantly higher except cholecystectomy (Testing hypothesis one).

In cholecystectomy, total charges and charges for laboratory and X-ray are higher among the insured than the non-insured. The fact that the length of stay for cholecystectomy is significantly longer among the insured may account for total hospital charges being higher among the insured (Table 3). Per day charges are also significantly higher among the non-insured than the insured for all diagnoses including cholecystectomy (p value less than 0.05 for cholecystectomy and less than 0.001 for any other diagnosis).

The charges per point for medication, laboratory tests and X-rays are calculated. Since relative value points indicate the quantity of medical care services provided, charges per point are the charges per unit volume of services, and this represents the unit reimbursement level to the provider. The charges per point are higher among the non-insured than the insured for all diagnoses and services, and the differences are statistically significant except those for laboratory tests in cholecystectomy (Table 4). This bears out that the non-insured, mostly

Table 3. Hospital charges, 1978 constant Won*
(money amounts in hundreds of Won)

	Appendectomy		Cholecystectomy		Tonsillectomy		C-Section		Pneumonia	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Total charges										
Mean	3,817	2,815	7,558	7,848	1,929	1,610	3,939	2,748	1,678	1,186
P-value	p<0.001		not sig.		p<0.001		p<0.001		p<0.001	
Charges per day										
Mean	571	437	677	533	930	758	539	378	436	265
P-value	p<0.001		p<0.05		p<0.001		p<0.001		p<0.001	
Medication										
Mean	1,001	566	2,910	2,558	368	197	1,078	574	447	207
P-value	p<0.001		not sig.		p<0.001		p<0.001		p<0.001	
Laboratory										
Mean	230	154	496	612	**	**	279	145	274	173
P-value	p<0.001		not sig.				p<0.05		p<0.001	
X-ray										
Mean	99	56	365	443	**	**	50	28	102	44
P-value	p<0.001		not sig.				p<0.001		p<0.01	

* One hundred Won is equivalent to about 15 U.S. cents as of March 1981.

** Omitted due to 0 values for more than 90% of cases.

Table 4. Hospital charges per point*, 1978 constant Won
(money amounts in Won**)

	Appendectomy		Cholecystectomy		Tonsillectomy		C-Section		Pneumonia	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Medication										
Mean	23.2	9.1	16.5	9.7	23.9	9.4	30.8	9.3	35.2	9.3
P-value	p<0.001		p<0.001		p<0.001		p<0.001		p<0.001	
Laboratory										
Mean	18.1	8.8	11.8	10.1	***	***	30.2	9.3	19.0	9.3
P-value	p<0.001		not sig.				p<0.05		p<0.001	
X-ray										
Mean	17.1	8.3	26.5	9.9	***	***	15.1	7.0	19.9	8.7
P-value	p<0.001		p<0.001				p<0.001		p<0.005	
Total										
Mean	20.6	9.1	14.8	9.8	23.6	9.4	29.3	9.3	23.0	9.4
P-value	p<0.001		p<0.001		p<0.001		p<0.001		p<0.001	

* Point: relative value point (See the Definition of Terms)

** One U.S. dollar is equivalent to about 680 Korean Won as of March 1981.

*** Omitted due to 0 values for more than 90% of cases.

low income patients, subsidize the insured, mostly middle and high income patients for hospital services.

Analyses without adjusting CPIs (i.e., current Won) show the same results as the analyses using constant Won (adjusted with CPIs). Only slight changes of the significance level at the third digit from the right of the decimal point which have no influence at all on p value at the one percent level.

The hospital charges for the non-insured are freely determined by hospitals themselves, and the charges for the insured is a fixed price where government intervention is imposed. Therefore, the former is determined on the basis of market consideration. The percentage difference of charges between the two prices is calculated with full charges determined by hospitals as the denominator. The difference of total charges range from seventeen percent in tonsillectomy to thirty percent in Cesarean section, while the per day charges range from nineteen percent in tonsillectomy to thirty-nine percent in respiratory tract infection. The differences in total charges mean that if the insured is admitted, the hospital is reimbursed seventeen to thirty percent less than the price

Table 5. Percentage* that the insured charges are less than the non-insured charges, 1978 constant Won

	Total Charges	Charges Per Day
Appendectomy	26.3	23.5
Cholecystectomy	-3.8**	21.3
Tonsillectomy	16.5	18.5
Cesarean Section	30.2	29.9
Respiratory Tract Infection	29.3	39.2
Total	17.2	24.8

$$* \% = \frac{\text{Charges for (the non-insured - the insured)}}{\text{Charges for the non-insured}}$$

** Total charges are higher among the insured.

charged the non-insured patients except for a minus figures (-3.8) in cholecystectomy. (See Table 5 and Figure 1).

Whereas the length of stay is significantly longer among the insured in cholecystectomy, total charges are a little higher among the insured; however, per day charges is twenty-one percent less among the non-insured.

The results in Table 5 show that the insured patients are charged only seventy to eighty-four percent of regular hospital price (charges

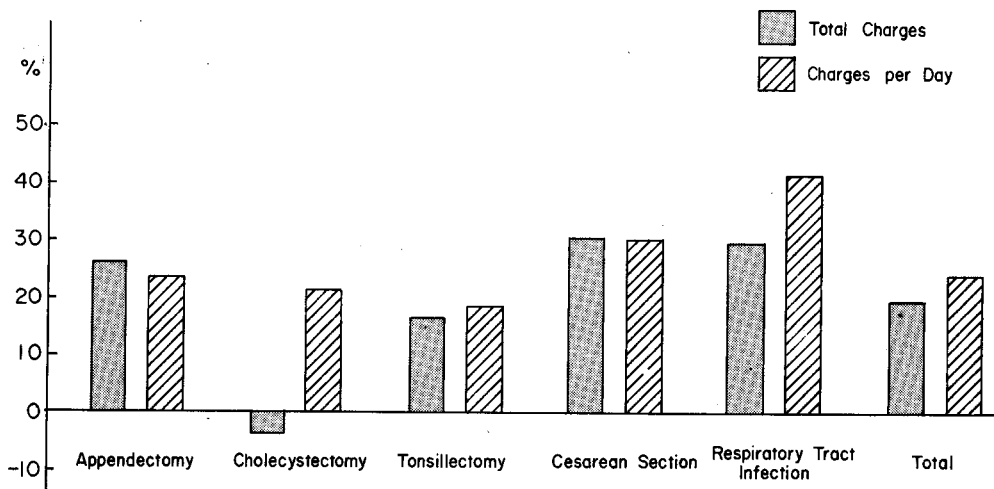


Fig. 1. Percentage that the insured charges are less than the non-insured charges, 1978 constant Won.

Table 6. Quantity of medical care services (in points)*

	Appendectomy		Cholecystectomy		Tonsillectomy		C-Section		Pneumonia	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Medication										
Mean	5,682	6,189	20,749	26,794	1,430	2,105	3,721	6,131	1,452	2,186
P-value	not sig.		p<0.005		p<0.001		p<0.001		p<0.001	
Laboratory										
Mean	1,468	1,727	4,223	6,403	**	**	1,091	1,524	1,888	1,825***
P-value	not sig.		p<0.001				p<0.001		not sig.	
X-ray										
Mean	615	621	3,314	4,687	**	**	281	298	564	477***
P-value	not sig.		p<0.01				not sig.		not sig.	
Total										
Mean	7,765	8,537	28,286	37,884	1,473	2,156	5,094	7,953	3,904	4,487
P-value	not sig.		p<0.001		p<0.001		p<0.001		not sig.	

* Point: relative value point (See Definition of the terms)

** Omitted due to 0 values for more than 90% of cases.

*** Less than the non-insured.

Table 7. Percentage* of excess services for the insured

	Medication and related therapies	Laboratory	X-ray	Total
Appendectomy	(8.9)	(17.6)	(1.0)	(9.9)
Cholecystectomy	29.1	51.6	41.4	33.9
Tonsillectomy	47.2	**	**	46.4
Cesarean Section	64.8	39.7	(6.0)	56.1
Respiratory Tract Infection	50.6	(-3.3)	(-15.4)	(14.9)
Total	45.6	30.4	23.9	29.1

* % = $\frac{\text{Volume of services for (the insured - the non-insured)}}{\text{volume of services for the non-insured}}$

** Omitted due to 0 values for more than 90% of cases.

() Those percentages in parentheses are not statistically significant.

for the non-insured). When the hospital financial management was analyzed with 1978 expenses (Korea Productivity Center, 1978), it was reported that reimbursement level for the insured patients were sixty-four to eighty-four percent of actual costs incurred in 1978.

Although both the reimbursement level

(21% in January 1979, 10% in July 1979, and 19% in May 1980) and Consumer Price Index level for medical care (123.7 to 185.4) increased approximately fifty percent, the base for the insurance reimbursement level was much lower than the base for Consumer Price Index. Therefore absolute difference between charges increas-

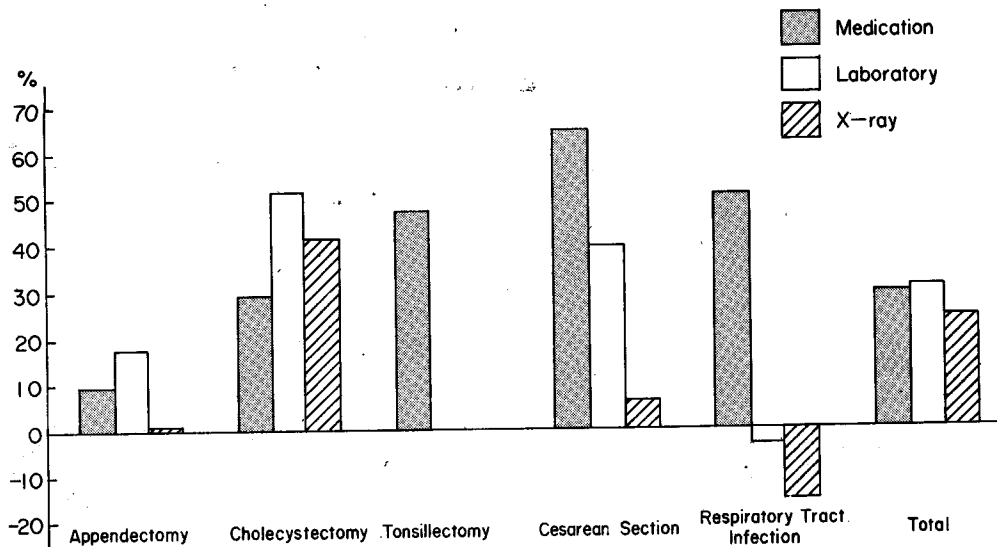


Fig. 2. Percentage of excess services for the insured.

ed, i.e., the reimbursement has not kept up with inflation.

The Korea Productivity Center studied the hospital financial management in late 1980 at the request of the government (Korea Productivity Center, 1981). The government plans to increase the reimbursement level based on this report, which recommended increasing the reimbursement to hospitals.

D. Volume (Points) of Medical Care Services

Quantity of medical care services is greater among the insured than the non-insured for every diagnosis for every service except laboratory and X-rays for respiratory tract infection. The paired t-test for hypothesis two reveals that the differences are significant, except those for appendectomy, and X-rays in Cesarean section (Testing hypothesis two). Significance levels are shown in Table 6.

For tonsillectomies, X-rays and laboratory tests are mostly done at the outpatient department before admission. More than ninety percent of the cases show no laboratory tests and X-rays taken during the admission. So the comparisons for these are omitted in the tables. For appendectomies, medication, laboratory

tests and X-rays are used more (but not statistically significantly) by the insured.

In order to determine the differences in volume (points) of medical care services for the insured and the non-insured, percentages of differences in services for the insured are calculated. (% = volume of services difference between the insured and the non-insured divided by volume of services for the non-insured). The excess percentages for medication for the insured range from nine percent in appendectomy to sixty-five percent in Cesarean section. Since quantity of services for laboratory and X-rays in respiratory tract infection is less among the insured, those percentages show minus figures. (See Table 7 and Figure 2.)

Jung and Kim's study (Jung and Kim, 1979) also showed that the insured receive more medication (59% more). Points vary with more expensive medication receiving more points than less expensive. It is understandable that either the physician uses more expensive drugs for the insured or insured patients ask the physician to use expensive ones since the third party pays seventy percent of the bill. Laboratory tests and X-rays in respiratory tract infection are more for the non-insured, as seen in Table 6.

Table 8. Length of stay (in days)

Length of Stay	Appendectomy		Cholecystectomy		Tonsillectomy		C-Section		Pneumonia		Total	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Mean	7.05	7.01	13.00	16.20	2.11	2.23	7.38	7.42	4.36	5.34	6.76	7.42
S.E.	0.33	0.36	0.66	0.66	0.04	0.08	0.12	0.11	0.26	0.38	0.34	0.36
(Difference)												
Mean		0.04		-3.20		-0.12		-0.04		-0.98		-0.66
S.E.		0.44		0.96		0.09		0.15		0.38		0.48
P-value		not sig.		p<0.001		not sig.		not sig.		p<0.05		p<0.001

A possible explanation is that non-insured patients have more severe illnesses.

E. Length of Stay

Average length of stay is greater among the insured except for appendectomy (Table 8). However, only cholecystectomy and respiratory tract infection are statistically significant in difference in length of stay. (Testing hypothesis three).

Length of stay for both insured and non-insured patients became shorter than in 1974 (studied by Yu, Yang and Kim in the same hospital which was used in this study), when there was no nationwide health insurance program in Korea. As described in review of the literature, length of stay for the insured is known to be longer than that of the non-insured, although not always statistically significant. Except for several hospitals of good quality, hospital bed occupancy rates were low, approximately forty to sixty percent (Ministry of Health and Social Affairs, 1978) before the nationwide insurance program. But now hospital administrators are concerned about shortage of beds. Therefore, it is thought that the tendency toward decreasing length of stay is partly due to higher occupancy rate, encouraging hospitals to promote a faster turnover rate of hospital beds.

When analyzed in terms of complication, length of stay is found to be significantly greater when complicated. This finding is true for both insured and non-insured groups and we see here no difference in care favoring the non-insured over the insured. Length of stay is longer when complicated but not statistically significant for the non-insured in cholecystectomy and Cesarean section. Tonsillectomy and respiratory tract infection are omitted from the table because of an insufficient number of complicated cases.

There is no consistent pattern of differences in length of stay between the two groups when considering type of accommodation. There is also no significant difference, except for the insured Cesarean section cases which have only a 0.4 day difference in length of stay but which is significant at the five percent level.

Therefore, it can be concluded that type of accommodation does not affect the length of stay.

F. Quality of Medical Care Services

It is important to evaluate quality of medical care but this study is not designed to develop a potential measure of quality of care. In this study, diagnostic procedures and treatment outcome variables are reviewed to identify any

Table 9. Complication and outcome of treatment

	Appendectomy		Cholecystectomy		Tonsillectomy		C-Section		Pneumonia	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Complication										
Complicated	29	32	16	10	0	0	22	16	1	3
Non-complicated	106	103	60	66	90	90	104	110	87	85
Total	135	135	76	76	90	90	126	126	88	88
Treatment Outcome										
Improved	133	134	75	75	90	89	126	126	86	86
Not improved	2	1	1	1	0	1	0	0	2	2
Total	135	135	76	76	90	90	126	126	88	88

differences between the two groups. Consumer satisfaction is one of these measures (Williamson, 1978) but which is not addressed in this study.

No previous studies on quality of medical care have been done in Korea; this kind of study is not well conceptualized by the professionals. In addition, medical record keeping is not sufficient at present, and where records are kept, they are frequently influenced by subjective biases. As a result, the criteria for quality health care are neither well defined nor susceptible to accurate measurement. The quality criteria used in this study, treatment outcome, did not differ for the insured and the non-insured. Prospective study design is suggested.

Pre- and post-operative diagnostic agreement is compared for insured and non-insured for appendectomy and cholecystectomy. Since only four cases for the non-insured and two cases for the insured in appendectomy, and two cases for the non-insured and one case for the insured in cholecystectomy, differ in pre- and post-operative diagnosis, pre- and post-operative diagnostic agreement is not a useful measure of quality of care. As the numbers are too small to draw valid conclusion. Also, the number of cases of pre-operative diagnoses of appendicitis and cholecystitis/cholelithiasis that are not

proven post-operatively is not known, i.e., the false positives are unknown.

The difference in complication rates between the insured and non-insured show no statistical significance for any diagnosis (See Table 9).

For the treatment outcome, all diagnoses show from zero to two cases as not improved when the patients are discharged, both among the insured and the non-insured. Patients are not usually discharged until they are improved or recovered, and this is reflected already in the length of stay. As a result, the treatment outcome does not differentiate the insured and the non-insured.

G. Intervening Variables

Admission through the outpatient department is significantly higher among the insured than the non-insured for appendectomy and Cesarean section (p value less than 0.005) while there are no significant differences between the two groups in admission route for other diagnoses.

There are no significant differences between the two groups of staff in charge for appendectomy, cholecystectomy and respiratory tract infection; however, junior staff in charge is higher for insured tonsillectomy patients (p less than 0.005) and senior staff in charge is

Table 10. Age and sex distribution of total patients and hospital deaths, 1978 to 1979

Age	Total Patients				Deaths				Age-specific Death Rates (%)	
	Non-insured		Insured		Non-insured		Insured		Non-insured	Insured
	Male	Female	Male	Female	Male	Female	Male	Female		
0 - 4	4,051	2,635	1,793	1,351	100	68	16	10	2.22	0.78
5 - 9	1,343	717	459	242	19	7	3	1		
10 - 19	1,786	1,071	429	272	28	16	1	3		
20 - 29	2,074	3,970	529	2,140	34	27	2	4	1.50	0.55
30 - 39	1,973	2,600	550	904	48	24	6	3		
40 - 49	1,952	1,695	399	590	45	35	8	5		
50 - 59	1,814	1,483	463	453	45	29	10	11	2.62	2.27
60 - 69	1,024	859	336	345	34	14	9	6		
70 +	340	400	88	118	22	11	1	4		
Total	16,357	15,430	5,046	6,415	375	231	56	47	1.91	0.90

Source: Medical Record Department of the study hospital.

higher for insured Cesarean section (p less than 0.05).

H. Comparison of Rates

1. Case fatality rate

The age and sex of the total admitted patients and deaths are adjusted with the distribution of the insured as a standard population. Age and sex adjusted case fatality is calculated. Again, the number of admission and deaths are the sum of those in 1978 and 1979 for the insured and the non-insured, respectively.

The case fatality rate is more than two times higher among the non-insured than the insured. Z-test shows statistical significance at 0.001 level. When age and sex are adjusted to the distribution of the insured as the standard population, the case fatality rate does not change.

Since the number of deaths is not enough for each five-year age cell as seen in Table 10, three age groups (zero to nine, ten to forty-nine, and fifty or over) are used. The first two age groups show a significant difference at 0.001 level between the insured and the non-insured.

The differences in the oldest group are not significant. The higher case fatality in the non-insured may be due to a difference in care, or more likely to sicker patients being admitted. Another study is indicated to examine this phenomenon.

According to the study of hospital utilization done by Yu, Yang and Kim (1977), case fatality rate has been decreasing continuously during the last twenty-five years in the study hospital. It was 5.8% in 1955, 5.0% in 1960, 2.9% in 1965, 2.8% in 1970 and 2.0% in 1974. The rate in 1978 to 1979 was 1.6% for total of both insured and non-insured. The decrease in the rate itself every year is thought partly due to the case mix and severity of disease. Severity of disease at the admission may be generally less severe, or patients may be coming to the hospital earlier than before. It is thought that the significant difference in case fatality rates between the insured and the non-insured is due to severity of disease and the time of hospitalization, i.e., poor non-insured patients are hospitalized usually when their sickness becomes severe or apparent and at the later stage of disease process.

Table 11. Age distribution of total deliveries and Cesarean section, 1978 to 1979

Age	Total Deliveries		C-Section		Age-specific C-Section Rate (%)	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
- 24	420	200	97 (14.4)	67 (20.6)	23.1	33.5
25 - 29	1,427	904	336 (49.8)	163 (50.0)	23.5	18.0
30 - 34	602	321	180 (26.7)	75 (23.0)	29.9	23.4
35 +	185	56	62 (9.2)	21 (6.4)	33.5	37.5
Total	2,634	1,481	675 (100.1)	326 (100.0)	25.6 (25.2)*	22.0

(*)*: Adjusted rate (adjusted to the distribution of the insured as standard population)

Source: Master file of the delivery room in the study hospital

2. Cesarean section rate

When the age of women who have deliveries is adjusted, the age distribution of deliveries of the insured is used as a standard population, and the adjusted Cesarean section rate is calculated for non-insured patients. The number of deliveries and Cesarean section are the sum of those in 1978 and 1979 for the insured and the non-insured, respectively. Age-specific Cesarean section rates are compared and tested between the two groups.

The Cesarean section rates among the total deliveries for a two-year period are 25.6% for the non-insured and 22.0% for the insured. The age-adjusted rate is slightly decreased to 25.2% for the non-insured (See Table 11).

Kim (1980) reported that Cesarean section rate has been increasing from twelve percent in 1972 to twenty-four percent in 1979 in the same hospital in which this study was conducted. Why Cesarean section rate is high both among the insured and non-insured is not clear. In the United States, the rates reported were only about five to fifteen percent (Jones, 1976; Hibbard, 1976; Haddard and Lundy, 1978) although the rate has tended to increase, while

the rate of Cesarean section at Mayo Clinic has remained at a relatively low (3.7%) and constant (Aard and Farhad, 1975). Cesarean section rates depend on the type of patients of the individual hospital. Further study to explain the high rate in Korea and determine if there is unnecessary surgery or overutilization for medical and non-medical reasons is indicated.

Age-specific Cesarean section rates reveal that the rates are higher in the insured than in the non-insured (16% higher overall) in the oldest and youngest age groups. Z-test results show that the differences in Cesarean section rates are statistically significant for every age group except the group of thirty-five or over. (P values for total of all age groups and under 24 are less than 0.005, 25 to 29 less than 0.001, and 30 to 34 less than 0.05, respectively.)

It is difficult to explain why the Cesarean section rates differ by age groups between the insured and the non-insured. The younger and older groups may be at greater risk than the two middle age groups and possibly the insured for these groups may be more willing to have Cesarean section as they pay only thirty percent of the charges.

**Table 12. Summary of volume of services, length of stay, and charges in constant Won
(volume in points, charges in hundreds of Won)**

	Appendectomy		Cholecystectomy		Tonsillectomy		C-Section		Pneumonia	
	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured	Non-insured	Insured
Volume of Services										
Medication	5,682	6,189	20,749 *	26,794	1,430*	2,105	3,721 *	6,131	1,452 *	2,186
Laboratory	1,468	1,727	4,223 *	6,403	**	**	1,091 *	1,524	1,888 >	1,825
X-ray	615	621	3,314 *	4,687	**	**	281	298	564 >	477
Length of stay	7.05 >	7.01	13.00 *	16.20	2.11	2.23	7.38	7.42	4.36 *	5.34
Charges										
Total	3,817 *	2,815	7,558 <	7,848	1,929 *	1,610	3,939 *	2,748	1,678 *	1,186
Per day	571 *	437	677 *	533	930 *	758	539 *	378	436 *	265
Medication	1,001 *	566	2,910	2,558	368 *	197	1,078 *	574	447 *	207
Laboratory	230 *	154	496 <	612	**	**	279 *	145	274 *	173
X-ray	99 *	56	365 <	443	**	**	50 *	28	102 *	44

* Statistically significant (p less than 0.05).

** Omitted due to 0 values for more than 90% of cases.

SUMMARY AND IMPLICATIONS

A. Summary of Study Implications

In general, the major hypotheses of the study are confirmed although some of the results are in the expected direction but not statistically significant (See Table 12 for summary).

Total hospital charges are higher among the non-insured except for cholecystectomy; however, per day charges and charges per point are higher among the non-insured for all diagnoses. Volume of services is greater among the insured except for laboratory tests and X-rays for respiratory tract infection. Length of stay is longer among the insured except for appendectomy. Quality of medical care is not distinguished by difference in treatment outcome or complication rates.

As seen below, charges are greater among the non-insured while volume of services and

length of stay are greater among the insured, when all diagnoses are totalled.

	Non-insured	Insured
1. Total charges (in hundreds of Won)	3,754 (100)	3,108 (83)
2. Charges per day	621 (100)	467 (75)
3. Charges per point (in Won) for medication, laboratory, X-rays	22.4(100)	9.3(41)
4. Volume of services (in points) for medication, laboratory, X-rays	8,660 (100)	11,178 (129)
5. Length of stay (in days)	6.8(100)	7.4(110)

*Figure in parentheses: index numbers.

The fact that volume of services is more among the insured, but total charges and charges per point are higher among the non-insured appears inconsistent. However, there is an apparent rationale. The main reason is direct

government intervention in the hospital reimbursement structure. That is, government reimbursement level of approximately seventy percent of charges is inadequate to cover costs, unless a high volume of services lowers costs through economies of scale.

Below is a hypothetical example that may describe the relationship.

Charges		Costs	
<u>Non-insured</u>	<u>Insured</u>	AT VOLUME OF SERVICES FOR Only Non-insured Patients	Non-insured and Insured patients (assuming economies of scale)
100	70-80	80	70

Further study to clarify this relationship is indicated.

This study covers only five diagnostic categories for a two-year period in the university hospital but the methods can be applied to other diagnoses and other hospitals. For example, health insurance administrators and government officials/researchers may apply this study methodology to small hospitals. Or the methodology may be helpful to develop "per case" payments which may cut the administrative cost for reviewing all the bill requests to the health insurance management corporation. The volume of services given by the providers is one of the most controversial issues relative to cost reimbursement and might be better controlled by "per case" payments.

B. Policy Implications and Recommendations

This study has several policy implications for the government, providers, clients, third parties, and researchers in health services.

1. Government

There are significant differences between the insured and the non-insured in total charges and charges per point. This phenomenon forces the lower income class without health insurance to

carry a greater burden because the high or middle income classes are covered by insurance. This inequity should be corrected as soon as possible.

The government is going to increase the reimbursement level by about twenty percent in the spring of 1981, since insufficient reimbursement to the providers for insured patients was created financial pressures on the hospitals and influence administrators to transfer the deficit to the non-insured, who are frequently poorer than the insured.

Since a financial analysis (Korea Productivity Center, 1980) as requested by the Ministry of Health and Social Affairs, revealed that the reimbursement level was below the actual cost, the government should set fair reimbursement level.

On the other hand, the government needs to pay attention to the increment in the volume of the medical care services rendered to the insured by providers. It is quite natural that quantity of services for the insured becomes higher because a third party pays seventy percent of the bill. The government should recognize that providers may gain more reimbursement by increasing the volume of services and that patients may ask for more services of the physician.

Therefore, when patients have no economic disincentives, policy makers should consider measures which would encourage a change from the current pattern of payment to eliminate waste of national resources on health in the form of unnecessary laboratory tests, X-rays and drugs, longer hospital stays and so on. Therefore, a more efficient system which lessens the national medical care expenditure is warranted.

Additionally, the government should have a public relations campaign emphasizing that the insured are not less well cared for than the non-insured. By doing so, misconceptions or prejudices of the insured or the insured-to-be will be

offset, and they will recognize that the health insurance will not result in less services, or any other disadvantage to the enrollees.

The results shown here could be a reference for public relations programs and further planning and adjustments of reimbursement. Also the methodology could be applied in future studies.

2. Providers

Providers also recognize the difference in practice and service patterns as well as reimbursement level for insured versus non-insured patients. This may be a basis and rationale for requesting adequate reimbursement for their practices and/or considering ways to improve their efficiency in providing services.

It is quite obvious that hospital administrators have found it difficult to maintain financial solvency since the insurance program started and the government intervened in the area of hospital charges. Prior to insurance coverage, there was no direct regulation by the government for cost control, although nominal increments in the charges of any hospital were to be approved by the government. Now the situation is changing. The more insured patients that are admitted, the worse the hospital financial situation.

The government is planning to reduce the hospital price level for the non-insured to the same level as the insured in the near future, which means hospital costs will be controlled by the government, and no longer by other means. Therefore, hospital managers should be keen to improve their internal hospital management by increasing productivity and efficiency of hospital administration. Top hospital managers in Korea are mostly physicians, and hospital administration experts other than physicians are very rare. This lack of expertise in finance and management should be filled by persons competent in financial, administrative as well as medical skills.

3. Clients

The insured complain that the medical care level is inferior for them, and that they are receiving less care from the providers. However, findings of this study failed to find any differences in quality of care between the insured and the non-insured, although this investigation is limited in exploring the quality of care issues.

Also this study shows that quantity of medical care for the insured is not less, but more, and length of stay is longer for the insured patients. Such findings could and should be explained to clients to assist in understanding and satisfaction on the part of the insured.

4. Third party

For third party, experience in insurance management is very limited. Now, the third party reviews bills one by one. It is necessary to develop a continuous cost monitoring and review system. A control mechanism for the cost and quality of care is urgently needed now in Korea.

5. Researchers

Up to now, very few studies have been done in the health insurance fields, and hospital cost containment. Researchers have just begun to turn their attention to it. It is hoped that researchers will not only analyze aggregated insurance statistics data, but will study the issues in depth. There may be little difference in charge for insured and non-insured patients in ambulatory care, but differences in inpatient care expenses are much greater than for outpatient care. Therefore, hospital inpatient care studies are far more important at this time. Since reimbursement to the provider is the most problematical and controversial issues in the health field in Korea, these issues should be clarified by the health service researchers.

Several research areas were suggested while this study was in progress, one of which is a

utilization study in relation to insurance status, socioeconomic status and accessibility. Another is a follow-up study of the different rates between the insured and the non-insured, such as case fatality rate; i.e., whether the significant difference in case fatality rate is due to case mix or severity of illness upon admission.

Hospital cost studies are needed, too. Very few in-depth studies have been done in Korea on this topic and an undertaking of this kind may lead to ways to improve managerial efficiency in the hospital.

Development of a methodology for measuring quality of care is recommended. Since there is no known research on the quality of care in the context of Korea health institutions and practices, development of study designs applicable to the Korean health scene is needed.

C. Limitations of the Study

During the implementation of this study, several limitations were confronted. First, the percentage of the insured utilizing the hospital services has been growing rapidly and about half of the in-patients were insured by late 1980. During the study period, July 1978 to June 1980, the percentage of the insured was lower and the number of matched pairs in the study were all that could be matched. Ideally the study period would have been from 1980 to 1981 with more cases.

Secondly, this study did not intend to develop the methods for evaluation of quality in medical care. However, some variables in quality of care were included to compare possible differences between the insured and the non-insured. The results are not conclusive. Quality of

Appendix I. Medical aid and health insurance plans, beneficiaries and population coverage

Plan	Year Established	Beneficiaries	Population Coverage	Governing Organization
Medical Aid Program	Jan. 1977	Indigent, low income group, and the elderly	2 million	Central government
Health Insurance (Category I)	July 1977	Employees of firms having more than 500 persons		
	July 1979	Expanded; employees of firms having more than 300 persons		
	Jan. 1981	Expanded; employees of firms having more than 100 persons	5.9 million	Independent cooperatives
Health Insurance for Government Employees, and Teachers & Staff	Jan. 1979	Government employees, teachers and staff from elementary school to the university level in private institutions	3.6 million	Single management organization
Voluntary Health Insurance (Category II)	1963	Those who hold the policy voluntarily	63 thousand	Eight local independent cooperatives
	Jan. 1981	Expanded; to demonstration projects in 3 counties		
	July 1982	Expanded; to another demonstration projects in 1 city and 2 counties		

medical care is an important issue which urgently needs to be addressed in Korea.

Lastly an attempt was made to remove any methodological and systematic biases throughout the study. However, since the selected hospital is a university hospital of good quality, the results may differ from other hospitals especially profit-seeking hospitals. In addition, this study is dealing with only five common diagnoses, which could serve as possible proxy for other less than common diagnoses. Therefore, when results are applied, this should be taken into account.

ACKNOWLEDGEMENT

The author is grateful to Professor Timothy D. Baker at the Johns Hopkins School of Hygiene and Public Health for his comments and advice.

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