Equity in Health and Health Care Utilization of the Elderly in Korea

- Is the income-related inequality more pronounced in the elderly population?

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1 Introduction 《

1. Definition of health inequality(health inequity)

Inequality is a general phenomenon that appears in all areas of capitalist society. However, while inequality in other areas is mainly concerned with the input of resources[1], it is worthy of notice that health and health care focused on out-come-relatively equal health outcome across socioeconomic classes, which are concerned as a main target of national economic development. In this sense, health inequality is related to the ultimate meanings of life, so inequality in health and health care is an irreversible and undesirable result different from the inequality in input factors(Chang-yup Kim, 2005).

Health inequality is a general term that refers to the differences, variations and disparities in health among individuals or groups, and it is distinguished from health inequity which means "avoidable" inequality resulting from unfairness or injustice(The Korean Society for Equity in Health, 2007).

Meanwhile, "socioeconomic health inequality" indicates the difference in health levels due to socioeconomic status in-

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[1] A typical example is the justice and equity suggested by Rawls, who was deeply interested in fair opportunity.

dicators rather than individual variations. Thus, health inequity refers to the socioeconomic health inequality (The Korean Society for Equity in Health, 2007)[2].

The International Society for Equity in Health defines "socioeconomic health inequality" in a rather similar way as "systematic and potentially remediable differences in one or more aspects of health across populations or population groups defined socially, economically, demographically, or geographically."

Daniels described health as the basis that enables fair 'normal opportunity range', and Sen argued health as "functioning", as well as "capability". In essence, both experts suggested that health is a fundamental prerequisite for the equity of human life, and thus, health inequality signifies a breach of justice (requoted from Dongjin Kim, 2013).

2. Necessity of the study on health inequality in the elderly

Through Korea has undergone various social changes, recently the issue of inequality is emerging as a serious social problem. Among various social changes, population structure changed by population aging and the change in family relations

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2) The term of health inequality will be mainly used in the paper rather than health equity, and here, health inequality will stand for socioeconomic health inequality.

by divorce is directly related to the inequality. The change in population structure due to aging has led to the increase in the elderly population who are not prepared for their later life. Since accumulated inequalities through lifetime intensively appear in old age, so inequality is enhanced further with the population aging(Baars, Phillipson & Walker et al., 2006; requoted from Gwangyoung Shin, 2013).

As a major portion of the middle-aged workforce lost their jobs through the process of companies' restructuring and layoff following the foreign exchange crisis, the percentage of population has had no income increased. This group now entered the old age, so the number of impoverished elderly citizens is growing. With their labor ability diminishing and job opportunity decreasing, their standard of living is destined to drop if there is no national welfare program or financial support from family. When those with 50% or less of the median income were classified as the poor, the poverty rate of the elderly aged 65 to 69 was 2.2% in Sweden, 6.6% in Norway, 7.8% in Germany, 24.7% in the United States and 30.3% in Korea, underscoring the gravity and magnitude of poverty among the Korean elderly(Suwan Kim and Yumi Cho, 2006; requoted from Gwangyoung Shin, 2013). Like in the case of an economically active population, earned income and poverty show an inverse relationship. In 2006, the average monthly income of elderly households was around half of that of non-elderly households,

and the average monthly income of elderly households without spouses was around a quarter of that of non-elderly households (Gyeongah Kim, 2008)[3].

The fall of the elderly into poverty is a new threat to Korean society. Considering that the speed of population aging is much faster than Western countries, the issue of elderly poverty evidently becomes a much more serious problem to the Korean society in the future(Gwangyoung Shin, 2013).

In addition to elderly poverty, polarization of elderly households also appears. This is because inequality accumulated during the lifetime is accentuated in this period. The Gini index of elderly household income remarkably rose from 0.4881 in 1996 to 0.6021 in 2006. This is an extremely high inequality compared to the increase in the Gini index of the non-elderly household income from 0.2987 to 0.3806 during the same period(Gyeongah Kim, 2008). Although the percentage of private income transfer from family is decreased and simultaneously public income transfer from the government is increased, it fails to compensate the recent trend that the inequality in the labor market becomes more intensified after leaving the labor market(Gwangyoung Shin, 2013).

It is widely known that poverty leads to the unmet health needs among people who are unable to pay for even essential

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3) In Korea where the labor force exit age is relatively low, the problem of the elderly poverty is related to early retirement, considering that the percentage of the elderly with earned income is very low(Gwangyoung Shin, 2013).

health care, and poverty itself involves negative effect on health.

Particularly in Korea, in particular, 83.7% of the elderly in 60s and 91.3% of those in 70s or older suffer from chronic conditions and they have three or more chronic conditions in average (Youngho Jeong, 2011; Yeongseok Shin, 2012). In relation to this, it is expected that the impact of poverty on health and health care utilization in the elderly is much more severe than in the non-elderly.

3. Purpose of this study

The study was conducted to examine the impact of income polarization and poverty on the elderly's health levels and accessibility to health care, considering that these two problems would be more serious than the non-elderly.

More specifically, this study attempted to analyze the degrees of income-related inequality considering health status and health care utilization of the elderly, which were compared to the degrees of inequality among the non-elderly.

Chapter 2
Contents and methods of study

1. Contents of study
2. Study methods

2   Contents and methods of study ≪

1. Contents of study

The subject of this study is the elderly, and the study mainly evaluates inequality in health and the health care utilization of the elderly population and compares it with inequality among the non-elderly population.

The levels of "health" examined in this study are determined by 'self-rated health' and 'health-related quality of life' in a questionnaire survey, and "health care utilization" is evaluated by 'number of visits to medical institutions' and 'medical expenses paid to medical institutions'. Especially, when evaluating the equity in health care utilization, the study team put a precondition that equity in "the result of health care utilization" is an equal treatment for equal need rather than the equity in "accessibility to health care".

Main contents of this study in details are as follows:

- ○ Income-related inequality in the health status of the elderly population(self-rated health/health-related quality of life)

- ○ Income-related inequality in the number of visits to medical

institutions(outpatient/emergency medical care/inpatient visits) of the elderly population

○ Income-related inequality in medical expenses (outpatient/emergency medical care/inpatient health care) of the elderly population

2. Study methods

1) Data and variables

A. Data

This study used the data gained from the 2010 and 2011 Korea Health Panel Survey carried out by KIHASA and the National Health Insurance Service. The Korea Health Panel Survey is mainly aimed at not only obtaining information on health care utilization and amount of medical expenses but also building a comprehensive panel data that can be used for in-depth analysis of factors that affect health care utilization and medical payment(Youngho Jeong et al., 2009), and it has been conducted jointly by the two institutions since 2008.

The Korea Health Panel was formed in 2008 with 24,616 persons in 7,866 households as a nationwide sample. Some of the subjects have dropped out in the process of carrying out follow-up surveys each year, so additional samples were added in

2012. In 2013, a total of 22,846 persons in 7,757 households are registered and maintained as of 2013(Namgyu Seo et al., 2013).

The survey examines socio-demographic characteristics of households and each household members; considering households, it investigates the number of household members, household composition, income, type of residence, private insurance status, etc. and considering household members, it looks into their age, gender, education level, job, type of health insurance as well as the use of health care services and medical expenses regarding chronic diseases and utilization of medicine, emergency care services, inpatient services, outpatient services, childbirth, etc.

The Korea Health Panel Survey is the study specialized in the field of health care. Thus, the Survey has a strong advantage to examine the equity in health and health care utilization owing to its extensive variables related to medical payment, health status and health care utilization.

In particular, by using the panel data, personal variables affecting health care utilization can be controlled rather stably, and it is relatively easy to figure out individual disease status or health status in relation to the need for health care utilization. Thus, these strengths can be utilized when analyzing the equity in health and health care utilization.

B. Variables

Since the Korea Health Panel provides a wide range of information on health care utilization behaviors and amount of medical payment, it is possible to get information on health care utilization in emergency medical care, inpatient care and outpatient care. Using the data, this study divided health care utilization into emergency care, inpatient care and outpatient care; and each variable was evaluated by the numbers of service utilization(numbers of visits to medical institutions) and medical payment. The data also include the EuroQol-5 Dimension(EQ-5D) variables indicating the self-rated health or health-related quality of life of the survey subjects and information on chronic diseases, so those two variables can be used as outcome variables.

Independent variables used in the study were those proven to be related to health or health care utilization based on existing study results. For example, Andersen & Newman(1973) proposed a health care utilization model by dividing variables that affect health care utilization into predisposing variables(e.g. gender, age), enabling variables(e.g. income) and illness variables(e.g. morbidity or health status).

Especially, in the study, it was necessary to make adjustment for the health care needs to evaluate the horizontal equity of health care utilization, or equal treatment for equal need.

Therefore, variables related to individual health status or morbidity were used as essential variables related to health care utilization.

a) Self-rated health and health-related quality of life

To evaluate inequality in health, the study used self-related health variables, and EQ-5D to examine self-rated quality of life. Considering self-rated health, respondents were asked to rate their health levels on the scale of very good, good, normal, bad and very bad. Like SF-36, EQ-5D is a commonly used index to evaluate health-related quality of life; subjects are requested to rate their conditions in five categories of health: exercise ability, self care management, daily activities, pain/inconvenience and anxiety/depression on the scale of 'no problems,' 'some problems' and 'serious problems'(EuroQol group, 1990)[4].

To convert the subjects' responses into measurable index, the study team used the weighted value developed by Eunjeong Kang et al.(2005).

As the number of chronic diseases affected individual's health care utilization, it was used as a control variable. People formally diagnosed by doctors with chronic diseases were regarded as chronic disease patients, and subjects were divided

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4) Based on the evaluation, 243(35) different types of health status can be obtained.

into three groups: those with no chronic diseases, those with one chronic disease, and a group with those who had two or more chronic diseases.

In addition, limited activity and disability variables were also used with other variables.

b) Health care utilization and medical payment

Considering the health care utilization, each number of out-patient visits, hospitalization and emergency room visits between January and December of each year were evaluated. Medical payment was calculated as the expenses paid at medical institution using inpatient, outpatient, or emergency care services from January to December each year. In the same way, the medical payment was also divided outpatient payment, inpatient payment, and emergency care payment.

In the case of expenses occurred in free-of-charge health care, the payments for car accidents covered by insurance or for industrial accidents covered by Workers' Compensation Insurance were calculated as zero Korean won. Emergency care payment included ambulance fees and transportation vehicle fees for transferring emergency patients.

Health care utilization related to health examination, beauty treatment, plastic surgery, or treatment of obesity was excluded from this analysis.

c) Income levels

The Korea Health Panel data provides information about whole family members' income including earned income, side-line income, property income, social/private insurance bene-fits, government/private subsidies, and other incomes. This study calculated income earned from January 1st to December 31rd of each year, added up the annual incomes of all house-hold members and divided the result with square root of num-ber of household members to obtain household income ad-justed for the number of household members.

d) Demographic, social and economic characteristics

Subjects were divided into men and women by gender. In or-der to reflect elderly population's characteristics, they were distinguished into age groups-first, an early old age(65~74) group, and next a late old age(75 and above) group. According to marital status, they were divided into those with spouses and those without spouses(unmarried, separated, divorced, and be-reaved).

Socioeconomic position was evaluated based on education levels and economic activity. Considering education levels, subjects were divided into five groups: uneducated(illiterate), elementary school education, middle school education, high

school education and college or above. Economic activity or inactivity of subjects was also distinguished.

e) Health behaviors

To evaluate health behaviors, present smoking status was examined. Smoking status was divided into present smoking, past smoking and non-smoking. Present smoking was defined as smoking 100 or more cigarettes in the past and daily or occasional smoking at present. The past smoking was defined as smoking 100 or more cigarettes in the past, but no smoking at present. Those who have smoked less than 100 cigarettes(5 packs) until now or have not smoked at all were categorized as non-smokers.

f) Types of health insurance and private insurance

Types of health insurance and subscription to private insurance were also considered because they can affect health care utilization. Regarding the types of health insurance, subjects were divided into three groups: health insurance subscribers; medical care beneficiaries/special beneficiaries; and those who didn't get health insurance or medical care benefits-non-subscribers, disqualified subscribers, and those whose insurance benefits were suspended.

In addition, status of private insurance subscription was included in the analysis. Subjects were divided into two groups based on whether the relevant household is subscribed to a private medical insurance that covering medical expenses.

Types of variable and its description used in this analysis of the equity in health care utilization and medical expenses are shown in following table.

〈Table 2-1〉 Composition of variables used in analysis

Classification	Variable	Description
Dependent variables	EQ-5D	• Health-related quality of life, between 0~1
	No. of outpatient care utilization	• Number of outpatient care used in 2010 and 2011, respectively
	No. of emergency care utilization	• Number of emergency care used in 2010 and 2011, respectively
	No. of inpatient care utilization	• Number of inpatient care used in 2010 and 2011, respectively
	Outpatient care expenses	• Outpatient care expenses paid in 2010 and 2011, respectively
	Emergency care expenses	• Emergency care expenses paid in 2010 and 2011, respectively
	Inpatient care expenses	• Inpatient care expenses paid in 2010 and 2011, respectively
Independent variables	Gender	• Male, female
	Age	• 20 years or older, with 10-year spans
	Marital status	• Married, divorced/separated/bereaved, unmarried
	Education level	• Elementary school or below, middle school, high school, college or above
	Economic activity	• Economically active or inactive
	Type of health insurance	• Health insurance subscriber, medical care beneficiary/special beneficiary, non-subscriber/disqualified/insurance benefit suspension
	Private insurance	• Subscription to private insurance(household-level)

Classification	Variable	Description
	Disability	• Disability or no disability
	Chronic diseases	• Number of chronic diseases diagnosed by doctors: none, one, two or more
	Smoking	• Present smoking, past smoking, non-smoking
	Limited mobility	• Limited mobility or full mobility
	Income	• Household income adjusted by the number of household members

2) Evaluation method of health inequality

When y_i is seen as health level, the relations among health level, income, socioeconomic variables and health behavior variables are as follows.

$$y_i = \alpha + \beta \ln(inc_i) + \sum_k \gamma_k x_{k,i} + \sum_p \delta_p z_{p,i} + \varepsilon_i$$

Meanwhile, to obtain concentration index on health level in equation(1), calculation formula using covariance can be used.

$$C = \frac{2}{y^m} \sum_{i=1}^{n} w_i (y_i - y^m)(R_i - R^m)$$

$$= \frac{2}{u} cov_w(y_i, R_i)$$

Here, y^m is the average of y, cov_w is covariance, and R_i indicates factional rank of a person according to his/her income. To statistically test the concentration index obtained here, the regression equation presented below can be used. In the equation, the estimated figure of β is the concentration index value,

and the standard error of β becomes the estimated figure of the standard error of the concentration index.

$$\frac{2\sigma_R^2}{y^m} y_i = \alpha + \beta R_i + \epsilon_i$$

3) Measurement of inequality in health care utilization

To measure equity in health care utilization, concentration index can be used. It is a curve drawn with cumulative social class distribution of the population as the horizontal axis, and cumulative share of health care utilization as the vertical axis. The concentration index value is two times the area between the curve and the diagonal line. If the value of the concentration index is positive, inequity would be favorable to the rich(those with higher income use health care services more often). On the contrary, if the concentration index value is negative, it would be unfavorable to the rich. To calculate the concentration index applying the concept of 'equal treatment for equal need(concentration factor that controls health care need)', Wagstaff et al.(2003) used the method of calculating 'concentration index for standardized health care utilization(HIwv)' by estimating health care need - using such variables as gender, age, self-rated health and existence of chronic diseases- and deducting the amount from the concentration index for health care utilization.

The horizontal inequity index, which was developed to measure equity in health care utilization, used the concentration index. It is calculated by adjusting the concentration index on actual health care use with the concentration index on need-expected health care use(health care utilization according to health care need).

In the figure presented below, the concentration curve $L_M(R)$ on actual health care use is greater than the concentration curve $L_N(R)$ on expected health care use reflecting the need for health care use. This indicates that there is inequity in health care utilization which is favorable to the poor.

In general, when the distribution of health care utilization according to income levels is examined, low-income groups tend to use health care services more often. This can be interpreted that the poor have more need for health care because they have relatively more poor health status than other social classes.

[Figure 2-1] Concentration curves of actual health care use and need-expected use
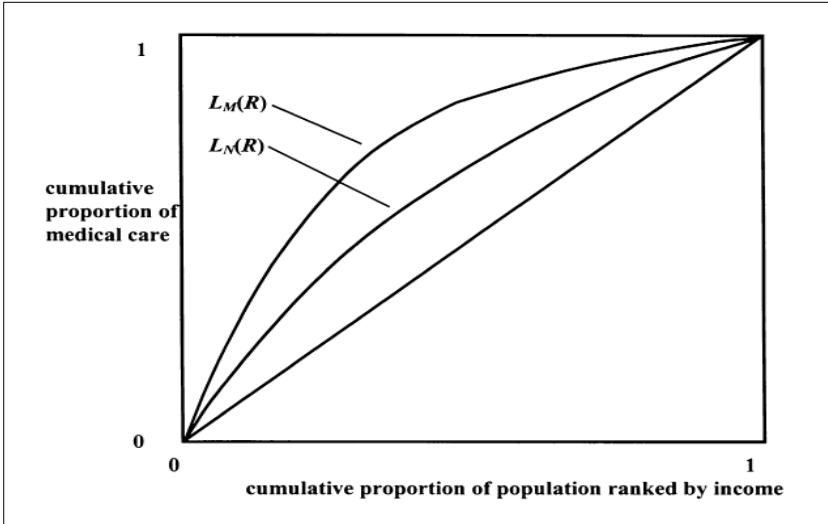
Source: van Doorslaer and Wagstaff, et al, 2000; requoted from Dongjin Kim et al., 2011

Equity in health care utilization is calculated specifically in the following way.

$$HIwv = 2 \int_0^1 \left[L_N(R) - L_M(R) \right] dR = C_M - C_N$$

Here, C_M shows the concentration index of actual health care use, and C_N shows the concentration index of need-expected use.

Meanwhile, to calculate an index that applies the concept of 'equal treatment for equal need' (concentration index that controls health care need), Wagstaff et al.(2003) used the method

of calculating 'horizontal inequity index(HIwv)' by estimating health care need - using variables such as gender, age, self-rated health and existence of chronic conditions of individuals - and deducting the amount from the concentration index for health care utilization.

The horizontal inequity index(HIwv) has the following benefits compared to other equity measuring methods. Above all it can be used to measure equity in health care utilization reflecting socioeconomic conditions. Furthermore, unlike the method of only comparing the highest income group and the lowest income group, the method using concentration index draws the index value from entire sample population. What's more, it is more sensitive to the changes in population distribution of income groups, and the index can be shown in diagram form. Finally, the measured index can be examined for its statistical significance using regression analysis.

Chapter 3
Status of inequality in health and health care utilization in the elderly

Status of inequality in « health and health care utilization in the elderly

Numerous studies have proven that gaps in health status exist among different socioeconomic classes. It has been already recognized that relatively higher income group, or higher educated group enjoys higher health levels compared to other socioeconomic groups(Veugelers & Yip, 2003; Dongjin Kim, 2012). On the other hand, it has been also well-known that comparatively lower income group or lower educated group use more health care utilization; this is partially due to their relatively lower health status compared to wealthier group's health status. Under this situation, some argue that the lower socioeconomic group's unmet needs of health care utilization considering their high demands for health care.

Now we will review the trends of existing studies on the equity of health status, and health care utilization in the elderly.

1. Health equity

Edvinsson et al.(2013) investigated the cause-specific mortality in the elderly between 65 and 74 according to income levels using Sweden's national statistical data. They showed that even Sweden, which is known as the country with the least inequal-

ity, appeared to have similar health-related inequality with other countries having a higher inequality level. In the elderly population between 65 and 74, there was a significant relationship between income inequality and the risk of death in each autonomous province in Sweden. In the province having higher inequality level than other Swedish provinces, the income inequality and excess mortality rate was relatively high.

The study conducted by Youngseon Kim(2012) analyzed the equity in health and health care utilization in the elderly in different age groups and income groups using the concentration index(CI) and Le Grand index. In all elderly age groups, health gaps existed as unfavorable to low income groups, and this inequity tendency seemed to be more striking in the early old age. All CI indices including self-rated health, number of chronic diseases, degree of limited mobility and degree of depression had negative values indicating disadvantage to the elderly in the low income groups. Especially, the degree of depression had a higher CI value than other health indicators, showing a remarkable gap in mental health between the high and low income groups. The CI value of the number of inpatient care turned out to be negative, showing an advantage to the low income groups, but the CI value for total medical expenses was positive; it indicated that the health inequality seemed to be favorable to the high income groups. The analysis of equity in health care utilization reflecting health status using

the Le Grand index showed that the measured values of the number of inpatient care were negative, indicating that the low income groups used health care more often than the high income groups. On the contrary, values of the Le Grand index regarding the payment of inpatient care expenses turned out to be positive, suggesting that the high income groups spent more medical expenses compared to other groups with the same health status.

The study by Jingu Kim(2011) examined the equity in health and health care utilization based on socioeconomic positions of the elderly using the CI and Le Grand index. Considering the CI of physical and mental health indicators, the values were all negative, indicating that the health inequality was favorable to the elderly in the high income groups; and the inequality in mental health appeared to be even higher to the elderly in the low income groups. Considering the limited mobility due to chronic diseases, and self-rated health, the low income groups appeared to have a disadvantage than other socioeconomic groups. The CI values of the amount of health care utilization were either negative or close to 0; it indicated that there was little difference among different income groups, or inequality was favorable to the low income groups. However, the CI values of medical expenses appeared to be extremely positive, showing an advantage for the high income groups in the aspect of the quality of health care. The analysis using the Le Grand

index produced mostly positive values regarding not only the medical expenses but also the amount of health care utilization; it suggested that the health inequality was favorable to the high income groups when health care need was controlled. The elderly in the low income groups used health care frequently while those in the high income groups spent more money on medical care services. This situation could be interpreted that those in the high income groups used more high quality health care services.

The study by Hosung Shin et al.(2008) used the data from the Korea National Health and Nutrition Examination Survey carried out in 1998, 2001 and 2005. This study examined health inequality based on self-rated health status and EQ-5D health valuation weights. Regarding self-rated health inequality, the impact of income accounted for 30% or more of the overall health inequality. The self-rated health inequality related with income which had a connection with gender and age was biased toward the low income groups, but avoidable health inequality regarding socioeconomic factors was strongly biased toward the high income groups; eventually, it said that health inequality was favorable to the high income groups. This demonstrates that the self-rated health inequality is contributed by socioeconomic factors. The result of resolving equation on the health inequality using the 2005 data suggested that the rise in education level and local government's financial independence

had positive(+) effect on health inequality; it meant that income had a great impact on health equity.

Grundy et al.(2003) analyzed the health equity in the elderly aged in 65 to 84 years old based on the 1993-1995 data of the UK health survey. Even after controlling various factors, the study showed that poverty in the old age was closely related to ill health. Socioeconomic positions of the elderly, especially whether they received income support(similar to the national basic livelihood security in Korea), appeared to have a close relationship with ill health. The influence of gender and smoking was interrelated with prevalence of two or more chronic diseases and number of drugs regularly taken in the case of men, and prevalence of two or more diseases in the case of women. Education levels of the elderly were closely linked to the prevalence of mental diseases. Education is related to the development in growth period, and it helps people to obtain the ability to deal with various stress factors. The elderly with low education levels are deprived of this opportunity to learn how to maintain suitable mental health, and thus they seem to be more susceptible to the risks involving mental health. Marital status and social support also appeared to heavily affect mental health.

Beckett(2000) advocated the hypothesis that health gaps would be decreased due to socioeconomic factors reduced in the elderly by analyzing the outcomes of the US health survey.

Social gaps in health appeared extensively in the young and the middle-aged, but it was decreased as the subjects entered the old age group. One reason is that the prevalence of chronic diseases increases with aging. However, especially in the U.S., it seemed that the health gap due to socioeconomic positions decreased; this is because people becoming 65 years old or older would achieve Medicare benefits, they could have wider accessibility to health care services. The researcher asserted that medical security system had the most important role in alleviating inequality in health.

2. Equity in health care utilization

Yongjae Lee(2011) argued that cancer patients who were beneficiaries of Korean Medical Care used higher total medical expenses through more frequent outpatient visits and longer hospitalization than the other patients who are subscribed to the national health insurance. Outpatient medical expense per episode and inpatient medical expense per day were higher in the case of health insurance subscribers than in the case of the Medical Care beneficiaries; among elderly stomach cancer patients, Medical Care beneficiaries visited 0.41 more an outpatient center, stayed 5.11 days more in an inpatient center, and spent 75,787 won more total medical expense; whereas health care subscribers spent 33,472 won more in outpatient

care payment, 187,881 won more in inpatient care payment, and 40,664 won more in medical expense per inpatient day. The same pattern appeared to the patients having liver cancer, colorectal cancer, or other chronic diseases. This suggested that health care subscribers more often used expensive and high quality medical services. The result of the analysis of the impact about the types of medical security(health insurance and Medical Care) on the elderly cancer patients' health care utilization showed that total medical expense, inpatient care payment, number of outpatient visits, and hospitalized days showed a statistically significant increase in the elderly Medical Care beneficiaries than the health insurance subscribers. However, there was no statistical significance in the outpatient care payment. Outpatient care expenses per ep-isode and inpatient care payment per day were higher in the case of health insurance subscribers. Elderly cancer patients who were Medical Care beneficiaries tended to be longer hos-pitalized, and spent more inpatient care expense and total medical expense; on the other hand, outpatient visits and in-patient care expense per day were higher in the case of health insurance subscribers. Medical Care beneficiaries seemed to use more health care services because they couldn't afford to pay the excessive out-of-pocket expense. Thus, they resorted to outpatient care services, and inpatient care services which require no out-of-pocket expense. On the other hand, the eld-

erly cancer patients who subscribed to health insurance re-
ceived sufficient medical services including non-covered serv-
ices, alternative medicine through direct payment, or private
insurance benefits; so they did not need frequent outpatient
visits or long-term hospitalization. Therefore, health insurance
subscribers who use high quality medical services can complete
their treatment early, so they spend fewer expenses. While
Medical Care beneficiaries who cannot receive expensive med-
ical services are forced to use services longer periods, so they
tend to spend more medical expenses. This means that elderly
cancer patients who are Medical Care beneficiaries use health
care services more frequently than health insurance holders not
because of their moral hazard to squander benefits on medical
services that they don't pay for, but because they have little
choice other than using outpatient care services with less eco-
nomic burden than hospitalization; as a result, their diseases
became worse due to a failure to receive appropriate treat-
ment, it led to long-term hospitalization.

In the study of Kim et al.(2011), the research team analyzed
the amount of inequality in health care utilization of the eld-
erly using the CI and horizontal inequity index(HIwv) with the
Korea Health Panel data. This study argued that clear in-
come-related inequality appeared in the health care utilization
of the elderly. Income was the most important determinant in
the health care utilization of the elderly, and the inequality was

favorable to the rich elderly in both inpatient care and out-patient care. Notably, the inequality was more outstanding in the case of inpatient care; in the HIwv adjusted for health care needs, the utilization of inpatient care services in the low in-come groups appeared to be higher. Factors that contributed the most to the inequality in health care utilization of the eld-erly were education levels, income levels and existence of chronic diseases, and the elderly with higher income, and high-er prevalence of chronic diseases appeared to have higher health care need, as well as higher level of health care utilization.

Allen et al.(2009) analyzed the existence of health care in-equality according to the economic status of the elderly by comparing the national survey data in the United States and European countries. They showed that the inequality in health care utilization based on income levels existed in the mid-dle-aged and elderly population in the United States and most European countries; the inequality in health care utilization in the United States, Sweden, Greece, and Italy was two to three times higher than in the other European countries. In the United States and Australia, health care utilization was in-creased according to the growth of income level, and in the case of dental care, the number of visits to the dentist made by the elderly was significantly as their income level and asset were increased in most countries. The middle aged population

in Greece, Spain, Sweden and the United States visited doctors more often as their education level increased; in Belgium, France, the Netherlands and the United States, subscription to health insurance appeared to increase the number of visits to the doctor. Particularly, in the United States and Sweden, subscription to private insurance increased the number of visits remarkably. The research team suggested that the assets among other socioeconomic status factors were the most sensitive index to measure health care utilization of the elderly. They also proposed that the assets of the elderly should be used as key indicator in future international studies on the inequality in health care utilization of the elderly.

Laporte et al.(2008) studied how families and personal social resources represented by local social resources - including the local community and neighbors influence to individual's health care utilization. The study result showed that a high level of local social resources increased the number of visits to general practitioners(GP), and induced less visits to hospitals. On the contrary, a low level of personal social resources decreased GP visits, and increased hospital visits. This tendency was more noticeable in the elderly; this is because their colleagues, neighbors and family members actively recommended GP visits, and helped them access necessary medical services in the early stage of diseases. Personal social resources acted as a kind of complementary goods in health care utilization, so it provides

the means of transportation to access medical services. The local social resources played the role of substitutional goods to GP's consultation and care services for the elderly. However, in the case where diseases progressed to more serious stages, the levels of private social resources and local social resources did not have much relationship with hospital utilization.

Allen et al.(2006) reported that inequality in senior's medical service utilization existed and that it is favorable for the high income groups based on the analysis of the elderly population data from the 1997-2003 British Household Panel Survey. Although in good health, the elderly in the high income groups surpassed those in the low income groups in terms of doctor visits, outpatient visits, and dental checkups. It indicated that income was the most important factor for health care utilization of the elderly. Health status(self-rated health, limited mobility, retention of diseases, disabilities) was closely related to the utilization of services at medical institutions, but the elderly with high socioeconomic status were found to have much more frequent utilization of these services. Those in the high income groups made more GP visits, and used more often the outpatient care services; it led to significant income-related inequality in the NHS system. Factors such as smoking, gender, marital status and private insurance subscription also affected the frequency of GP visits; women appeared to make more GP visits, and men appeared to be hospitalized more often.

Individuals who earned high income, had private insurance, and lived in Scotland tended to use more inpatient care services. Inequality was obviously favorable to the high income groups in dental checkups, and those with high education levels seemed to more often take dental checkups. In terms of age, the younger elderly(65-69) turned out to use dental checkups more frequently than the older.

Yongjae Lee(2005) analyzed the utilization of health insurance benefits, and said that the CI for elderly subscribers to both community-based insurance and health insurance appeared to be positive. The researcher also showed that the utilization of insurance benefits was concentrated on those in the high income groups. The result of the comparison of average insurance benefits of the elderly among different income groups showed that those in the high income groups had higher average benefits than those in the low income groups. Considering the difference between the shares of total insurance benefits compared to the shares of the elderly insurance subscribers in different income groups, negative values were produced in the high income groups, and positive values were produced in the low income groups; this situation indicated that those in the high income groups had more total health insurance benefits. All the CI values regarding self-rated health, number of chronic conditions per year, and health care need based on the number of acute diseases for two weeks

turned out to be negative, showing that health care need was concentrated on the elderly in the low income groups, who also had poorer health status, so more health care needs than those in the high income groups. As a result of calculating the Le Grand index through using the difference between the CI of insurance benefits of the elderly health insurance holders, and the CI of their health care need was highly positive, suggesting that senior insurance holders did not utilize health insurance benefits sufficiently compared to their health care needs.

Chu et al.(2005) analyzed medical expenses based on out-of-pocket payments using the household panel survey data in Taiwan. They found that people in the high income groups made large amount of out-of-pocket payments regardless of medical insurance throughout all age groups, and the elderly tended to make more out-of-pocket payments than younger age groups. In Taiwan, the elderly, women, married people, the jobless, those with high education levels, and heads of large households appeared to make more out-of-pocket payments.

Chapter 4
Results of study

Results of study 《

1. General status of study subjects

Final subjects selected for the study were 13,437 per-sons(2,871 elderly and 10,616 non-elderly) for 2010 and 12,946 persons(2,910 elderly and 10,036 non-elderly) for 2011. The characteristics of the elderly subjects are as follows.

In terms of gender, 56.01% of the 2010 and 55.95% of the 2011 subjects were women, and considering age, over 50% of the elderly subjects were in their 70s. Regarding marital status, 67% of the subjects were married. Considering education levels, those who were uneducated or didn't finish elementary school took up 62 to 63% of the elderly subjects, showing a marked difference compared to the non-elderly subjects. Among the elderly, only 36% in 2010 and 33% in 2011 were engaged in economic activities. About 11% of the elderly were Medical Care beneficiaries, and more than 70% subscribed private in-surance policies.

Between 70~80% of the elderly subjects had two or more chronic diseases, and 15~16% of them were smokers, which was lower than in the case of the non-elderly subjects. About

16% in 2010 and 14% in 2011 had limited ability to activity, and 15.8% of the 2010 subject and 17.3% of the 2011 subjects had disabilities. The EQ-5D score representing the health-related quality of life was around 0.79, and it was much lower than in the case of the non-elderly subjects.

Considering health care utilization, 95% of the elderly subjects had outpatient care experiences, 12% had emergency care experiences, and 21% had inpatient care experiences. The average amount of medical expenses paid at medical institutions was 360,000 to 380,000 won for outpatient care, 80,000 to 90,000 won for emergency care and more than 1,500,000 won for inpatient care.

When comparing the characteristics of the elderly and non-elderly subjects, significant differences appeared between the two groups regarding the most variables with the exception of emergency care expenses in 2010 and inpatient care expenses in 2011. This seems to suggest that socioeconomic factors can affect the health status, health care utilization, and the equity in health or health care utilization of the two groups.

⟨Table 4-1⟩ General status of study subjects

Variable	2010				2011			
	Sum	Elderly	Non-elderly	p-value	Sum	Elderly	Non-elderly	p-value
Total	100.0 (13,437 persons)	100.0 (2,871 persons)	100.0 (10,616 persons)		100.0 (13,437 persons)	100.0 (2,871 persons)	100.0 (10,616 persons)	
Gender								
Male	47.81	43.99	48.82	0.000	47.71	44.05	48.76	0.000
Female	52.19	56.01	51.18		52.29	55.95	51.24	
Age								
20-29	13.92	-	17.61	0.000	13.36	-	17.24	0.000
30-39	19.01	-	24.06		17.47	-	22.54	
40-49	21.31	-	26.98		21.30	-	27.48	
50-59	17.06	-	21.60		17.48	-	22.55	
60-69	15.70	38.11	9.75		15.53	33.95	10.19	
70-79	10.52	50.09	-		11.94	53.13	-	
80 or above	2.48	11.80	-		2.90	12.92	-	
Marital status								
Married	70.48	66.64	71.50	0.000	69.72	66.84	70.56	0.000
Divorced/separated/bereaved	11.63	33.14	5.92		12.05	32.96	5.99	
Unmarried	17.89	0.21	22.58		18.23	0.21	23.46	
Education levels								
Elementary school or below	21.51	63.42	10.37	0.000	21.45	61.96	9.71	0.000
Middle school	11.12	14.68	10.17		11.11	15.33	9.88	
High school	31.49	14.71	35.95		31.01	15.40	35.53	

Variable	2010				2011			
	Sum	Elderly	Non-elderly	p-value	Sum	Elderly	Non-elderly	p-value
College or above	35.89	7.20	43.50		36.44	7.32	44.88	
Economic activity								
Economically active	59.43	36.05	65.64	0.000	59.15	33.13	66.70	0.000
Economically inactive	40.57	63.95	34.36		40.85	66.87	33.30	
Health insurance								
Health insurance	94.83	88.12	96.61	0.000	95.01	88.90	96.78	0.000
Medical care beneficiary/special beneficiary	5.10	11.80	3.32		4.95	11.10	3.17	
Non-subscriber/disqualified/insurance benefit suspended	0.07	0.07	0.08		0.04	-	0.05	
Private insurance								
Non-subscriber	66.98	25.81	77.92	0.000	67.53	28.45	78.86	0.000
Subscriber	33.02	74.19	22.08		32.47	71.55	21.14	
Disability								
No disability	93.47	84.12	95.96	0.000	92.63	82.68	95.52	0.000
Disability	6.53	15.88	4.04		7.37	17.32	4.48	
Chronic disease								
None	42.84	7.98	52.10	0.000	39.45	6.12	49.11	0.000
1	19.57	14.39	20.95		19.56	12.30	21.66	
2 or more	37.59	77.63	26.95		40.99	81.58	29.22	
Smoking status								
Present smoker	23.34	16.52	25.18	0.000	22.53	15.14	24.71	0.000
Past smoker	16.03	24.27	13.81		16.38	24.98	13.84	

Variable	2010				2011			
	Sum	Elderly	Non-elderly	p-value	Sum	Elderly	Non-elderly	p-value
Non-smoker	60.63	59.21	61.01		61.09	59.88	61.45	
Limited mobility								
Limited mobility	5.76	15.82	3.22	0.000	5.26	13.93	2.70	0.000
No limited mobility	94.24	84.18	96.78		94.74	86.07	97.30	
EQ-5D score	0.8870	0.7809	0.9160	0.000	0.8958	0.7990	0.9248	0.000
Outpatient care utilization								
No experience	18.66	4.01	22.55	0.000	18.48	4.57	22.52	0.000
Experience	81.34	95.99	77.45		81.52	95.43	77.48	
Average no. of outpatient care utilization	17.86	32.38	13.08	0.000	19.56	35.19	13.97	0.000
Emergency care utilization								
No experience	92.10	88.66	93.02	0.000	92.45	87.29	93.94	0.000
Experience	7.90	11.34	6.98		7.55	12.71	6.06	
Average no. of emergency care utilization	1.36	1.49	1.31	0.021	1.38	1.66	1.21	0.000
Inpatient care utilization								
No experience	87.95	79.37	90.23	0.000	88.00	78.28	90.82	0.000
Experience	12.05	20.63	9.77		12.00	21.72	9.18	
Average no. of inpatient care utilization	1.54	1.77	1.41	0.000	1.61	1.85	1.44	0.000
Average outpatient care expense	323,416	361,408	310,902	0.002	343,870	385,253	329,092	0.000
Average emergency care expense	84,866	93,520	81,129	0.524	71,818	85,265	63,634	0.009
Average inpatient care expense	1,194,079	1,480,367	1,033,405	0.000	1,366,011	1,529,148	1,254,065	0.086

2. Inequality in the health of the elderly

The Gini index and concentration index were used to exam-ine the degree of health inequality in the elderly and non-eld-erly, and the result is shown in Table 4-2 below. In general, as the Gini index is calculated to figure out the degree of income concentration, in the process of measuring health inequality, the Gini index calculated by using EQ-5D score that represents health-related quality of life instead of income variables can show health concentration, in other words, total health in-equality within a population group.[5]

Health concentration of the elderly group calculated using the Gini index decreased somewhat in 2011 from 2010, but it was still quite high compared to the non-elderly group.

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[5] Total health inequality is not measured based on specific variables such as income or education levels but inherent health inequality in the subject population group. Thus, total health inequality and health inequality measured using socioeconomic variables can be compared to analyze the impact of each variable on health inequality(Hosung Shin and Dongjin Kim, 2008).

〈Table 4-2〉 Health inequality indicators(Gini index, concentration index) of the
        elderly

Year	Classification	Elderly		Non-elderly	
		Index	t-value	Index	t-value
2010	Total health inequality(Gini index)(A)	0.1440		0.0681	
	Socioeconomic health inequality (Concentration index)(B)	0.0227	7.00	0.0143	13.23
	B/A(%)	15.8		21.0	
2011	Total health inequality(Gini index)(A)	0.1367		0.0621	
	Socioeconomic health inequality (Concentration index)(B)	0.0256	8.15	0.0126	12.26
	B/A(%)	18.7		20.3	

Note: Plus/minus sign of concentration index indicates the status of concentration in
      each social stratum(negative value: pro-poor, positive value: pro-rich) and the
      absolute value refers to the amount of concentration.

The amount of total health inequality was mitigated in 2011 compared to 2010 in both the elderly and the non-elderly groups.

The concentration index measured using income variables, and the EQ-5D score can be seen to show socioeconomic health inequality unlike in the case of the Gini index. The measurement of concentration index of EQ-5D score also indicated that health inequality was greater in the elderly group than in the non-elderly group.

Notably, the concentration index of health inequality in the non-elderly group in 2011 appeared to have improved from 2010, but health inequality in the elderly in 2011 appeared to have aggravated further.

This suggests that socioeconomic health inequality in the elderly population did not improve in 2011 although total

health inequality improved from 2010. In addition, the percentage of social health inequality in total health inequality in the elderly group rose from 15.8% in 2010 to 18.7% in 2011.

Jingu Kim(2011) who analyzed the data from the Korea National Health and Nutrition Examination Survey, and Youngseon Kim(2012) who analyzed the data from the Actual Living Condition of the Elderly and Welfare Need Survey reported the existence of health gaps unfavorable for the low income groups among the elderly. The result of this study which examined socioeconomic health inequality also coincided with their conclusion.

3. Inequality in the health care utilization of the elderly

Health care utilization by the elderly and non-elderly population was classified into outpatient care services, emergency care services, and inpatient care services. This study examined the achievement of horizontal equity in each medical service area. The horizontal equity means whether equal treatment is being provided to each population group which has an equal need of health care.

In Korea, it is known that the low income groups tend to use health care more frequently than the high income groups. However, the reason may not be the moral hazard of the low income groups but their higher need of health care utilization.

Thus, it is necessary to make adjustment for the need of health care to analyze the equity in health care utilization.

To this end, the study used the Horizontal Inequity index, which is calculated by deducting the CI of need-expected use from CI of actual health care use.

Also in the study, health care utilization was analyzed according to the use of health care services and medical expenses paid at medical institutions. In Korea, assessment to health care has improved since the National Health Insurance was implemented in 1989; nevertheless, due to relatively high out-of-pocket expenses including legal out-of-pocket expenses and uncovered health service expenses, a lot of people in the low income groups still feel heavy burden. In particular, high-priced diagnosis, tests, and treatment using new medical technology are not covered by the national health insurance; so this would make other differences in access to health care by different income groups. For this relation, in this study, the health care utilization stands for the quantitative level of health care utilization, and medical expenses signify the qualitative level of health care utilization.

1) Inequality in outpatient care utilization

The number of outpatient care utilization for the whole survey year was examined, and the result is provided below.

Negative values were earned regarding the actual health care use and need-expected use in both the elderly and non-elderly population groups. This indicates that the low income groups had higher actual health care use in both groups, and also higher need of health care use.

The horizontal inequity index adjusted for health care need was negative, which means that the low income groups still had more health care utilization even after adjustment for health care need.

Compared to the non-elderly, the elderly group had larger absolute value of horizontal inequity index, implying that the elderly had stronger concentration on the low income groups in outpatient care utilization. In 2011, the concentration index on the low income groups was mitigated among the elderly compared to 2010, while it was aggravated among the non-elderly.

Outpatient care payment refer to the total medical expenses paid at medical institutions when using outpatient care services, and the result of the equity analysis on the outpatient care payment is as follows.

In the elderly group, the analysis based on medical expenses showed a concentration index of positive value as compared to the analysis based on the use of health care services, indicating that the wealthier groups spend more to medical services. The concentration index of need-expected medical expenses was

still negative, suggesting that the low income groups had higher need of health care. In conclusion, the concentration index adjusted for need-expected health care use has highly positive value.

When the result was compared to that of the non-elderly group, the absolute value of the concentration index of the elderly was greater than that of the non-elderly, which showed that the elderly in the high income groups spent more on health care. The inequality in medical expenses appeared to have worsened in 2011 compared to 2010 in the elderly group, whereas it improved in the non-elderly group during the same period.

〈Table 4-3〉 Horizontal inequity in outpatient care utilization

Classifi-cation	Year	Classification	Elderly				Non-elderly			
			CI	95% confidence interval		t-value	CI	95% confidence interval		t-value
				Lower limit	Upper limit			Lower limit	Upper limit	
No. of health care use	2010	Actual health care use	-0.0631	-0.0872	-0.0390	-5.14	-0.0847	-0.1020	-0.0666	-9.13
		Need-expected use	-0.0265	-0.0349	-0.0182	-6.22	-0.0558	-0.0631	-0.0485	-15.02
		Need-adjusted use(HI)	-0.0366	-0.0595	-0.0137	-3.13	-0.0289	-0.0453	-0.0126	-3.47
	2011	Actual health care use	-0.0593	-0.0830	-0.0357	-4.92	-0.0833	-0.1021	-0.0646	-8.73
		Need-expected use	-0.0233	-0.0302	-0.0164	-6.61	-0.0536	-0.0613	-0.0458	-13.61
		Need-adjusted use(HI)	-0.0360	-0.0587	-0.0133	-3.12	-0.0298	-0.0461	-0.0134	-3.57
Medical expenses	2010	Actual health care use	0.1039	0.0544	0.1533	4.12	0.0736	0.0446	0.1025	4.98
		Need-expected use	-0.0101	-0.0169	-0.0033	-2.93	-0.0335	-0.0391	-0.0280	-11.82
		Need-adjusted use(HI)	0.1140	0.0651	0.1629	4.57	0.1071	0.0788	0.1353	7.43
	2011	Actual health care use	0.1225	0.0820	0.1630	5.93	0.0670	0.0399	0.0941	4.85
		Need-expected use	-0.0011	-0.0078	0.0057	-0.31	-0.0315	-0.0372	-0.0258	-10.80
		Need-adjusted use(HI)	0.1236	0.0835	0.1637	6.04	0.0985	0.0720	0.1250	7.29

Note: 1) Health care expenses refer to total amounts of payment.
2) Plus/minus sign of concentration index indicates the status of concentration in each social stratum(negative value: pro-poor, positive value: pro-rich) and the absolute value refers to the amount of concentration.

2) Inequality in emergency care utilization

The number of emergency care utilization for the entire sur-
vey year was examined, and the result is shown below.

In the elderly group, the value of the need-adjusted horizon-
tal inequity index appeared to be positive in 2010, but it be-
came negative in 2011. Also, there was a lack of consistency,
which was demonstrated by the reversal of the positive/neg-
ative signs of the actual health care use values or the need-ex-
pected health care use values; the results failed to produce any
statistically significant result. Therefore, it can be concluded
that statistically, the utilization of emergency care is being
made equitably in the elderly group.

In the non-elderly group, all values were negative excluding
the horizontal inequality index in 2011, but there was a lack of
statistical significance with the exception of the CI of need-ex-
pected health care use. Thus, it can be concluded that health
care use is also equitable in this group.

The analysis of equity in medical expenses paid for emer-
gency care showed a lack of statistical significance in both
groups as well, indicating that the payment of emergency health
care was made equitably regardless of their income levels.

However, in the case of emergency care, the values of the
concentration index or horizontal inequity index were often
positive when the measurement was based on medical expenses
than when it was based on the use of health care services.

〈Table 4-4〉 Horizontal inequity in emergency care utilization

Classification	Year	Classification	Elderly				Non-elderly			
			CI	95% confidence interval		t-value	CI	95% confidence interval		t-value
				Lower limit	Upper limit			Lower limit	Upper limit	
No. of health care use	2010	Actual health care use	0.0492	-0.0674	0.1659	0.83	-0.0259	-0.0571	0.0054	-1.63
		Need-expected use	-0.0105	-0.0418	0.0207	-0.66	-0.0224	-0.0314	-0.0134	-4.90
		Need-adjusted use(HI)	0.0598	-0.0447	0.1643	1.13	-0.0034	-0.0326	0.0258	-0.23
	2011	Actual health care use	-0.0458	-0.1452	0.0537	-0.91	-0.0046	-0.0249	0.0157	-0.44
		Need-expected use	0.0342	-0.0003	0.0688	1.95	-0.0192	-0.0246	-0.0139	-7.06
		Need-adjusted use(HI)	-0.0800	-0.1726	0.0126	-1.70	0.0146	-0.0055	0.0348	1.42
Medical expenses	2010	Actual health care use	0.1056	-0.0252	0.2365	1.59	0.0484	-0.1273	0.2241	0.54
		Need-expected use	-0.0116	-0.0327	0.0095	-1.08	-0.0930	-0.1346	-0.0513	-4.38
		Need-adjusted use(HI)	0.1172	-0.0097	0.2442	1.82	0.1414	-0.0398	0.3226	1.53
	2011	Actual health care use	0.0960	-0.0337	0.2257	1.46	0.0168	-0.0617	0.0953	0.42
		Need-expected use	0.0165	-0.0119	0.0449	1.15	0.0074	-0.0017	0.0166	1.60
		Need-adjusted use(HI)	0.0795	-0.0501	0.2091	1.21	0.0094	-0.0673	0.0861	0.24

Note 1) Health care expenses refer to total amounts of payment.
   2) Plus/minus sign of concentration index indicates the status of concentration in each social stratum(negative value: pro-poor, positive value: pro-rich) and the absolute value refers to the amount of concentration.

3) Inequality in inpatient care utilization

The number of inpatient care utilization during the whole survey year was examined, and the result is presented below.

In 2010, the values of the CI and horizontal inequity index of inpatient care utilization were both positive in the elderly group, but there was no statistical significance. However, in 2011, the values of the CI and horizontal inequity index of actual health care use were negative, indicating that those in the low income groups used inpatient care more frequently.

The values related to actual inpatient care utilization were negative for the non-elderly group both in 2010 and 2011, while the need for inpatient care appeared to be higher in the low income groups. Although the value of horizontal inequity index was positive, it was lacked in statistical significance. The result showed that the number of inpatient care utilization was more concentrated on the elderly's low income groups.

The analysis of inequality in inpatient service payment showed a common and consistent tendency in both the elderly and non-elderly groups. The value of the CI of actual medical payment was positive whereas the CI value of need-expected medical expense was negative. This tendency indicates that the need of medical service payment was higher in the low income groups, but actual spending in medical services was higher in the high income groups.

As a result, the horizontal inequity index adjusted health care need has a positive value with a greater absolute value which is bigger than the CI of actual health care spending.

Comparison by year shows that the absolute values were bigger in 2011 than in 2010 in both the elderly and non-elderly group; it means that inequality in inpatient care payment was more serious.

When comparing the elderly group and non-elderly group, the horizontal inequity index of the elderly group was smaller in absolute value than the index of non-elderly group; it was only due to the difference in the -CI values of need-expected health care payment. However, the CI of actual health care spending, the inequality in actual medical expenses, was greater in the elderly group.

〈Table 4-5〉 Horizontal equity in inpatient care utilization

Classification	Year	Classification	Elderly				Non-elderly			
			CI	95% confidence interval		t-value	CI	95% confidence interval		t-value
				Lower limit	Upper limit			Lower limit	Upper limit	
No. of health care use	2010	Actual health care use	0.0187	-0.0365	0.0739	0.66	-0.0296	-0.0546	-0.0045	-2.32
		Need-expected use	0.0055	-0.0083	0.0194	0.78	-0.0417	-0.0524	-0.0311	-7.70
		Need-adjusted use(HI)	0.0131	-0.0402	0.6657	0.48	0.0122	-0.0119	0.0363	0.99
	2011	Actual health care use	-0.0376	-0.0715	-0.0037	-2.18	-0.0322	-0.0690	0.0047	-1.71
		Need-expected use	0.0070	-0.0020	0.0161	1.52	-0.0468	-0.0638	-0.0299	-5.43
		Need-adjusted use(HI)	-0.0446	-0.0768	-0.0124	-2.72	0.0146	-0.0210	0.0503	0.81
Medical expenses	2010	Actual health care use	0.0724	0.0056	0.1393	2.13	0.0346	-0.0439	0.1132	0.86
		Need-expected use	-0.0144	-0.0283	-0.0006	-2.04	-0.0681	-0.0870	-0.0493	-7.09
		Need-adjusted use(HI)	0.0869	0.0202	0.1535	2.56	0.1028	0.0294	0.1761	2.75
	2011	Actual health care use	0.0837	0.0133	0.1541	2.33	0.0829	-0.0607	0.2264	1.13
		Need-expected use	-0.0106	-0.0279	0.0068	-1.20	-0.0239	-0.0426	-0.0052	-2.51
		Need-adjusted use(HI)	0.0942	0.0260	0.1625	2.72	0.1068	-0.0313	0.2448	1.52

Note : 1) Health care expenses refer to total amounts of payment.
2) Plus/minus sign of concentration index indicates the status of concentration in each social stratum(negative value: pro-poor, positive value: pro-rich) and the absolute value refers to the amount of concentration.

Through the above results, this research team analyzed health care inequality in -the elderly and non-elderly group, dividing outpatient care, emergency care and inpatient care area.

Horizontal inequality index adjusted health care need showed that the inequality in outpatient care payment was the greatest to the elderly group, followed by the inequality in inpatient care payment. The CI value of the emergency care payment was also positive, though not statistically significant.

In addition, the negative value of the CI or HI changed into the positive value, or the absolute value of the CI or HI increased when the measurement was processed based on health care payment rather than on the use of health care utilization. This suggests that income-related inequality in health care utilization became more pronounced when health care payment than the number of health care use. The relationship suggested that when measuring or monitoring inequality in health care utilization in Korea, researchers should consider not only quantitative level of health care inequality based on the health care utilization, but also qualitative level of health care inequality based on health care spending.

Chapter 5

Conclusion

5

Conclusion «

The study examined the equity in health and health care utilization of the elderly population, and the results are as follows.

First of all, both the total health inequality through Gini index, and income-related health inequality evaluated by concentration index showed that health inequality was much more serious in the elderly population than the non-elderly population. Particularly, total health inequality has been improved, but social health inequality has been aggravated. This result suggested that social and political concern would be needed to health and health care inequality in elderly population.

In addition, various studies would be needed to clarify the part of the mechanism of total health inequality in the elderly which cannot be explained based on income-related inequality. In the case of the elderly, a variety of different kinds of inequalities accumulated throughout their lifetime is concentrated and revealed during their old age, so, a lot of studies should be conducted to this area.

Secondly, when the inequality in health care utilization was evaluated using the amount of health care utilization, the

health care use appeared to be concentrated on the low income groups or to be equitable in general. However, when the measurement was made according to health care payments, the medical spending would be concentrated on the high income groups. In particular, the inequality in the medical payment of was most severe in outpatient care services, followed by inpatient care services.

Furthermore, we need to take notice that most of the CI values of the need-expected medical payments appeared to be negative. This implies that the health status of the low income groups is relatively poor, so they have higher need to spend health care expenses. However, actual payment of health care expenses was concentrated in the high income groups; it indicated that the relative deprivation experienced by the low income groups whenever using health care services could be bigger than measured value it seems.

The above results analyzing the elderly populations' inequality in health and health care utilization was conducted using same population, so it could be interpreted as the followings; in Korea, the inequality in the health care for the elderly is greater than for the non-elderly, and the income-related health inequality showed a gap in health status according to income levels. In addition, the elderly in the low income groups maintained low level of health care spending compared to those in the high income groups, in spite of their higher need of health

care utilization. Particularly, under Korean national health insurance system where out-of-pocket payment accounts for considerable amount of total medical expenses, it is not easy for the elderly in moderate or the low income groups to pay such a high medical expenses. Therefore, this problem can gradually increase the elderly's unmet needs in health care utilization.

In many advanced countries, the absolute number and percentage of the elderly population are rising due to a decrease in birth rates and an increase in average life expectancy. Although Korea does not belong to this group, population aging is steadily progressing like other middle income countries. Furthermore, if the current trend is maintained, the percentage of the elderly population is expected to grow to more than 30% after 20 to 30 years. To prepare for this future change, we would make two suggestions to solve inequality in the health and health care utilization of the elderly.

The first suggestion is regarding the accessibility of health care utilization including the health insurance coverage. Economic barriers represented health care payments incurred at the time of health care utilization tend to widen health gaps between different social classes. This is because the health care payments could diminish the accessibility to essential health care by those of vulnerable group including the elderly and low socioeconomic groups(Dongjin Kim et al., 2011).

For this reason, as political goal, many countries emphasize equity in the accessibility to health care along with efficiency in the delivery of health care services as political goals. In theory, accessibility to health care means the opportunity to health care when it is needed, and it would be regarded as a basic right because accessibility to health care guarantees the freedom and ability to achieve so called the function of health(Sen, 1999; requoted from Dongjin Kim et al., 2011).

Through the implementation of the National Health Insurance in 1989, Korean has improved accessibility to health care in general. Nevertheless, economic barriers such as out-of-pocket payments using health care services remain to affect the equity in health care utilization in different income groups(Yoon et al, 2011; requoted from Dongjin Kim, 2011). As a result, it is necessary to promote accessibility to essential health care for vulnerable groups including at least the elderly, and make an effort to solve inequality in health care utilization and health in general.

As the second suggestion, we need to increase social interest to solve health inequality, and connect the social interest to the development of relevant policy alternatives.

According to the model proposed by Whitehead(1998), the stages of a society's approach to health inequality are as follows.

〔Figure 5-1〕 Stages of activities to reduce health inequality
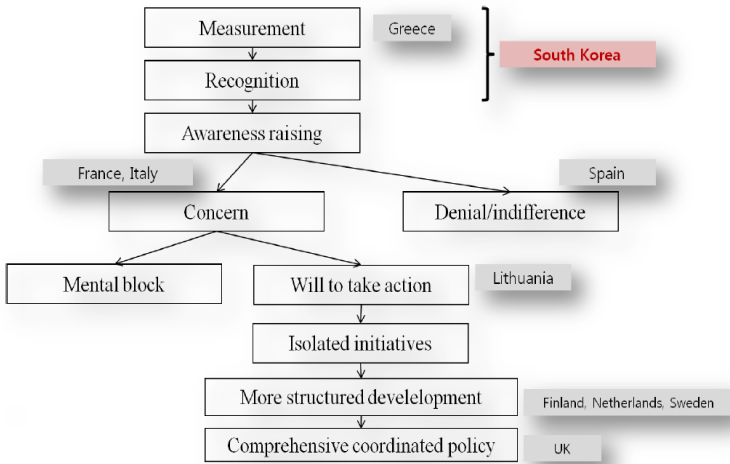
Source: Whitehead(1998); The Korean Society for Equity in Health(2012); and Source
     Book for Spring Symposium

The model is not linear or sequential, but it involves a uni-
versal fact that the initial stage for the solution of health in-
equality should be "measurement". Considering the experi-
ences of the West, the starting point of the response to health
inequality was measurement, and then establishing the basis on
health inequality. Comprehensive and extensive monitoring of
health equity and development an equity index can be the
foundation of investigating and understanding of a nation's
health inequality. Although awareness of a problem is not real-
ized only through measurement, this stage of revelation of a

problem can be the basis of policy agenda that creates social interest and trigger policy measures(requoted from Dongjin Kim, 2013). In Korea, social interest toward health inequality has come to the fore since the mid-2000s.[6] However, the interest has not yet progressed into political efforts to solve the problem of health inequality.

Individual researchers and policy makers can come up with diverse research projects to deal with health inequality; however, the most urgent issue related to produce the source for making a policy is to develop a proper index to measuring inequality, which is also used in monitoring(Tchoe et al., 2004).

There should be two premises for the model of establishing the area of health inequality indices. First of all, the mechanism for the generation of health inequality should be defined clearly. To solve the health inequality, it is also necessary to inform the distal and proximal causes of health inequality properly. Secondly, there should be a connection with existing health policies to enable political approach to solve health inequality. In other words, the model should be developed to provide specific measures to prevent or reduce the factors generating health inequality, and then, the health inequality model or health inequality indices established in the future have its

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6) In 2006, The Hankyoreh newspaper ran a series of feature articles on regional health inequality which raised social interest. In response, the Ministry of Health and Welfare announced a development of pan-governmental policy measures to solve health gaps, but specific budget plans or programs were not provided.

significance.

The Commission on Social Determinants of Health(CSDH) of the World Health Organization(WHO) has proposed a model on social determinants of health in the report titled "Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health" published in 2008, and following the report titled "A conceptual framework for action on the social determinants" published in 2010.

The goals of the CSDH's model about social determinants of health were to discover social determinants and health inequality factors to solve health inequality situation, and examine the relationship among major determinants; simultaneously, the goal of the model would define the mechanisms how social determinants have generated health inequality. Key elements of the model include socioeconomic and political context, structural factors and social determinants of health inequities, and mediating factors[7] and socioeconomic determinants of health inequality.

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7) Mediating factors include health care system.

[Figure 5-2] Mechanism of health inequality suggested by WHO
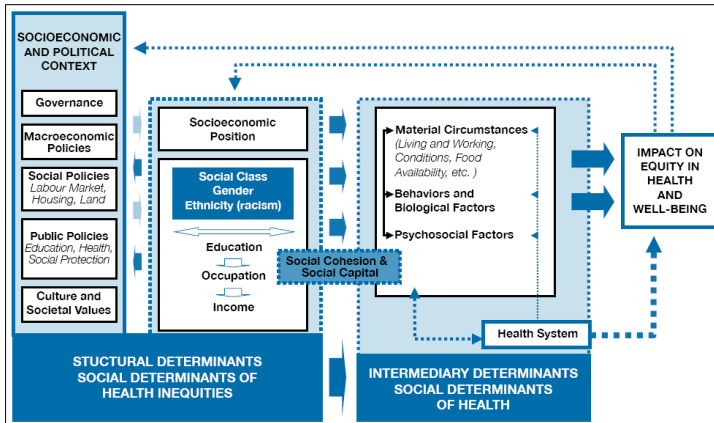
Source: World Health Organization (2010). A conceptual framework for action on the social determinants of health. p.6.

Woodward et al. claimed that there were four reasons to reduce health inequality; first, it is unfair; second, it affects all people; third, inequality can be avoided; last, it is often true that attempts to reduce inequality are cost effective(Youngjeon Shin et al., 2009).

Solving the inequality in health care utilization may not be enough to promote health equity, and to improve health levels of the elderly. However, even if it takes a significant amount of time and expenses before a tangible outcome is achieved, continued social attention and policy efforts should be conducted to make our society much healthier.

References

Chang-yup Kim(2013). The Right to Health: Health Justice and Democracy, Humanitas.

Chang-yup Kim(2005). Inequality in Health and Health Care, presented at the Department of Sociology, Chung-ang University.

Dongjin Kim et al.(2011). Study on Horizontal Equity in Health Care Utilization in Korea, Korea Institute of Health and Social Affairs(KIHASA).

Dongjin Kim(2012). Measurement of Horizon Equity in Health Care Utilization Using Korea Health Panel Data. Health-welfare Policy Forum, KIHASA.

Dongjin Kim et al.(2013). Korean Health Inequalities Indicators and Policy Implications, KIHASA

Youngseon Kim(2012). Equity in Health Status and Health Care Utilization by Income: Analyzing Different Population in Old Adults. Health and Social Science;31; 55~81.

Jingu Kim(2011). Equity in Health Levels and Health Care Utilization of Elderly People in Korea. Social Science Research Review;27(2); 65~87.

Namgyu Seo et al.(2013). A Report on the Korea Health Panel Survey of 2011(1), National Health Insurance Service, KIHASA.

Suin Sohn, Yeongjeon Shin, Chang-yup Kim(2010). Factors Influencing Household Catastrophic Health Expenditure of the Poor. Health and Social Welfare Review;30(1); 92~110.

Gwangyoung Shin(2013), A Study on Inequalities in the Korean Society, Humanitas.

Youngseok Shin et al.(2012). Tasks of Future Health and Welfare

Policy. KIHASA.

Youngjeon Shin et al.(2009). Health Promotion Strategies and Program Development for Health Inequalities Alleviation. Management Center for Health Promotion.

Hosung Shin and Dongjin Kim(2008). Health Inequality Measurement in Korea Using EuroQol-5 Dimension Valuation Weights. Journal of Preventive Medicine and Public Health, 41(3), 165~172.

Yongjae Lee(2005). Equity in Utilization of National Health Insurance by an Old Persons' Income Class. Study on Welfare for the Aged;30; 7~27.

Yongjae Lee(2011). Differences of Cancer Patients' Health Care Utilizations between Medical Aid Program and National Health Insurance in the Elderly. International Journal of Contents;11(5); 270~279.

Hangyeong Jeon(2010). Impact of Income Levels on Health Care Spending of the Elderly. Third Korea Health Panel Symposium; 467~480.

Youngho Jeong et al.(2009). A Report on the Korea Health Panel Survey of 2008, KIHASA and National Health Insurance Service.

Allin, Sara., Masseria, Cristina., and Mossialos, Elias(2006). Inequity in health care use among older people in the United Kingdom: An analysis of panel data(The London School of Economics and Political Science health working paper) Retrieved May 8, 2014, from http://eprints.lse.ac.uk/19262/

Allin, Sara., Masseria, Cristina., and Mossialos, Elias(2009). Measuring socioeconomic differences in use of health care services by wealth versus by income. American Journal of Public

Health;99(10); 1849~1855. I

Baars, Dannefer, Phillipson, and Walker eds(2006), Aging Globalization and Inequality: The new critical gerontology, New York: Baywood.

Beckett, Megan(2000). Health inequalities in later life-an artifact of mortality selection. American Sociology Association;41(1); 106~119.

Chen, Alex Y., and Escarce, José(2004). Quantifying Income-related Inequality in Healthcare Delivery in the United States. Medical Care;42; 38~47.

Chu, Tu-Bin., Liu, Tsai-Ching., Chen, Chin-Shyan., Tasi, Yi-Wen., and Chiu, Wen-Ta(2005). Household out-of-pocket medical expenditures and national health insurance in Taiwan: income and regional inequality. BMC Health Services Research;5(60); 1~9.

Edvinsson, Soren., Lundevaller, Erling Haggstrom., and Malmberg, Gunnar(2013). Do unequal societies cause death among the elderly? A study of the health effects of inequality in Swedish municipalities in 2006. Global Health Action; 6; 1~9.

EuroQol group. EuroQol: a new facility for the measurement of health-related quality of life. The EuroQol Group. Health Policy 1990;16(3):199~208.

Grundy, Emily, and Sloggett, Andy(2003). Health inequalities in the older population: the role of personal capital, social resources and socio-economic circumstances. Social Science&Medicine;56; 935~947.

Huisman, Martijin., Kunst, Anton E., and Mackenbach, Johan P(2003). Socioeconomic inequalities in morbidity among the elderly; a European overview. Social Science & Medicine;57; 861~873.

Kim, Dongjin, Shin, Hosung and Kim, Chang-yup(2011). Equitable access to health care for the elderly in South Korea: is income-related inequality in health care utilization more pronounced?. Research on Aging;1~22.

Sen Amartya K(1999). Development as freedom. New York:Knopf.

Veugelers, PJ and Yip AM(2003). Socioeconomic disparities in health care use: Does universal coverage reduce inequalities in health?, J Eipdemiol Community Health;57; 424~428.

Wagstaff, A., E. van Doorslaer and N. Watanabe(2003). On decomposing the causes of health sector inequalities, with an application to malnutrition inequalities in Vetnam. Journal of Econometrics;112(1);219-227.

WHO Commission on Social Determinants of Health(2008). Closing the gap in a generation: health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health. World Health Organization.

World Health Organization(2010). A conceptual framework for action on the social determinants of health. Social Determinants of Health Discussion Paper 2. World Health Organization.