

The Relationship between Health Activity and Medical Care Cost in Japan*

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Abstract

The average life span in developed countries has been extended for the last some decades. In addition, most of us hope to be healthy for a long time. To achieve our dream, the government and other public organizations devise the measures. One of the measures is health activity implemented by Health Insurance Society. In this paper, we investigate how this activity affects the enrollees of Health Insurance Society. We show that this activity reduces medical care cost significantly. And for the sake of improvement of our life quality, we suggest that this activity should be implemented more efficiently.

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1 Introduction

Advance in medical technology and improvement of medical care system during the past some decades have extended average life span. We welcome that the average life span is extended. But most of us hope not only to live for a long time but also to be healthy for a long time. In short, improving life quality is as important as extending average life span.

Now, life-style related diseases are more serious than virus diseases in Japan. Ten percent of all deaths is due to virus diseases. The people died of life-style related diseases, for example, cancer, heart disease and apoplexy, account for over 60% of total death.(Statistics and Information Department, Minister's Secretariat, Ministry of Health, Labour and Welfare 2001) Since the end of World War II, the dynamic change in our life-style and the reduction of epidemics have induced this situation. Life-style related diseases worsen our life quality, for example, by being bedridden or dementia, and bring an early death. Therefore the government and other public organizations must devise the measures to improve our life-style.

Actually, the medical care cost of Japan has increased along with extending average life span. And it is an embarrassing issue. In the discussion of health care reform, many people search measures which reduce the cost. The government devises the measures. But it seems to be that the government is mainly concerned with financial problems.

In fact, Ministry of Health and Welfare has started National Health Promoting Campaign of 21st Century, which attempt to improve our life-style, at April 2000. This campaign is expected to reduce social burden by diseases and disability and establish energetic and sustainable society by having people be healthy for a long time. And from individual perspective, the campaign may prevent our early death and disability and improve our life quality.

One of the legal bases of the campaign is Health Promotion Act. This act asks insurers of the public medical care insurance system to maintain and improve the health of their enrollees. Health Insurance Societies, which are ones of the insurers, implement health guidance, health screening, mental health, improvement of physical condition and establishment and operation of lodges. These activities are called health activities and may encourage a preventive action. Health Insurance Societies implement health activities positively and effectively, since they can cooperate with employers of their enrollees easily. So, we focus on Health Insurance Societies and their health activities.

Health Promotion Act also asks the government to carry out the evidence-based health promoting policy. However, we have not seen the study on how much the activity affects the cost and the quality yet. In this paper, we investigate how their health activities affect their enrollees.

Some people may believe that only consumers can choose the preventive action and that others can not ask them maintain and improve their health. In fact, there are a few studies to investigate the demand for the preventive action, for example, Yamada (2000) and Ii and Ohkusa (2001). These studies suggest that the action is not chosen by consumers but affected by their circumstance, for example, types of public medical care insurance coverage, firm size and occupation.

The remainder of this paper is organized as follows. Some people to read this paper may not be familiar with the public medical care insurance system of Japan. Thereby, the next section provides the overview of the system. Section 3 shows the model. Section 4 presents data sources and descriptive statistics. Section 5 shows the empirical result. Section 6 concludes the paper.

2 An overview of the public medical care insurance system of Japan

The public medical care insurance system of Japan has been universal coverage since 1961. And almost all inhabitants can not select their insurer. Public servants, teachers and employees of private schools and their dependents must be insured with Mutual Aid Associations. Seamen and their dependents must be insured with Seamen's Insurance. Other employees and their dependents must be insured with Health Insurance. And others must be insured with community-based insurance (National Health Insurance).

Health Insurance is operated by the government and by Health Insurance Societies. Employers and their employees can establish Health Insurance Society if they have the approval of the Ministry of Health, Labor and Welfare. This approval is only accorded to individual workplace with at least 700 people and, in case of jointly run Societies, those with at least 3,000 employees (National Federation of Health Insurance Societies 2003). The government by means of Social Insurance Agency manages health insurance for workplace where Health Insurance Societies are not organized.

All of these insurers, including Health Insurance Societies are legal public associations or governments. Therefore, most of their activities are constrained with law and governments' regulation. For example, contents of medical care, benefit ratios, medical fees, drug price standard and method of calculation of insurance premium are determined not by insurers but by the law or national government. Some insurers can provide additional benefits for alleviating the burden of patient cost-sharing upon receipt of statutory benefits. Insurers can determine the contents of additional benefits themselves. But it is prohibited that they provide special ward or medical care not sanctioned under statutory benefits.

Besides, the function to examine the medical bills from hospitals or clinics is restricted. By Health Insurance Act, hospitals or clinics can submit detailed medical bill to the insurers directly. However, in order to avoid the complex procedures, the Ministry of Health, Labor and Welfare made the payment of remuneration by the insurer to hospitals or clinics through the Social Insurance Medical Fee Payment Fund. This fund examines the medical bills and undertakes payment functions on behalf of the insurers. Even if the insurer finds the error in these bills, the insurer can not make a claim for damages against hospitals or clinics directly. If the insurer wants to claim against them, the insurer has to ask the fund. After the fund recognizes the claim, the insurer can recover this damage.

Some people think that these restrictions of insurer's function lead to the increase of the medical cost. So, enhancing insurer's function is discussed as one of practical measures for this reform.

The primary definition of the insurer's function is providing insurance coverage for its enrollees in a continuous and stable way while balancing financial results (Matsubara 2002). As mentioned above, the function to balance financial results is restricted under the public health insurance scheme. But, they can implement health activity without strong regulation. Health activity may contribute to balancing the results by maintaining and improving the health of the enrollees. In short, health activity is implemented not only for society or enrollees but also for Health Insurance Society. And the cost and the contents of health activity is decided not by the government but by Health Insurance Society. This paper may suggest how enhancing insurer's function affects on the medical care cost.

Most of people can not choose their insurer. We call the people that must be insured with Health Insurance Compulsorily Insured Persons. But, some

people can choose their insurer. If they are insured with Health Insurance, we call them Voluntarily Insured Persons. They have the right not to quit public medical insurance. If they do not want to be covered by Health Insurance, they must be covered by National Health Insurance. We explain two groups of Voluntarily Insured Persons.

Persons who, having forfeited their eligibility for coverage due to retirement or for other reason, have been insured continuously for at least two months prior to the forfeiture, can in principle upon application retain their eligibility as insured persons for two more years. We call them Voluntarily and Continuously insured persons.

Health Insurance Society is allowed to implement medical care programs for their retirees if it has the approval of the government. The retirees are Special-Case Retired Insured Persons. Only about 70 Societies have the approval.

They do not have obligation to be insured with Health Insurance. And they are not employees but the self-employed or non-workers. Perhaps, most of them may be non-workers. Therefore, their opportunity cost of visiting a doctor may be lower than Compulsorily Insured Persons’.

3 Model

We focus on an insured person ¹. Let us assume the health capital of insured person j ,

$$h_j = h(a_j, i_{j,a_j}, i_{j,a_j-1}, \dots, i_{j,0}) \quad (1)$$

a_j represents the age of insured person j . And $i_{j,t}$ represents j 's benefit from health activities when he was t years old. We assume the benefit expense for insured person j depends on his health capital h_j , labor income s_j , the

¹This means that we exclude the dependents.

opportunity cost of visiting a doctor c_j and other variables of his type z_j . We thereby denote benefit expense for insured person j p_j by $p(h_j, s_j, c_j, z_j)$.

We want to examine the effect on the medical care cost by health activity by estimating the benefit expense p_j for insured person j by $p(h_j, s_j, c_j, z_j)$. We assume that the Society consists of its representative individuals, since we use not the patient-level data but the insurer-level data. Therefore, we use the average p_j, h_j, s_j, c_j and z_j .

The dependent variable AVGEXP is each insurer's average health care expenditure ² of insured persons except for the elderly.

One of the most important explanatory variables is h_j . We assumed $h_j = h(a_j, i_{j,a_j}, i_{j,a_j-1}, \dots, i_{j,0})$. But we do not use this equation for empirical analysis. It causes multicollinearity because i_{j,a_j} correlates with i_{j,a_j-1} . Hence, we make health activity costs per capita in this year(HEALTH), i_{j,a_j} represent the activity costs per capita from i_{j,a_j-1} to $i_{j,0}$. And we use the average age(AVGAGE), a_j

The average labor income is not documented. Therefore, we use the average standard monthly remuneration(AVGSMR). It formed the basis for calculating the premium. It was subdivided into grades from 1 (¥ 98,000) to 39(¥ 980,000) and each insured person's remuneration ³ was classified under one of these grades. It roughly equaled monthly salary. Wage rate is more suitable variable about the opportunity cost of visiting a doctor than standard monthly remuneration. Because labor time is not available, we are not able to calculate wage rate.

The other factor of the opportunity cost of visiting a doctor c_j is the

²We define health care expenditure as expenditure of medical care benefit and medical care expenses.

³Remuneration as stipulated for health insurance included the total received by the insured person from the employer as compensation for work, excluding bonuses and any other compensation received at intervals of more than three months.

type of insured persons. In principle, insured persons are employed. But Voluntarily and Continuously Insured Persons and Special-Case Retired Insured Persons are no longer employed ⁴. Therefore, their opportunity cost of visiting a doctor is different from the employed's cost. The variables reflecting this difference are Voluntary and Continuously Insured Persons rate (VOLCON) and Special-Case Retired Insured Persons rate (SCRIP).

We set explanatory variables joint dummy (JOINT), public servants dummy (PUBLIC), women rate (WOMEN) as the other variables of his/her type z_j . JOINT=1 if the society is run jointly and JOINT=0 otherwise. We expect the society run jointly is managed more inefficient than the other.

PUBLIC=1 if the society consists of public servants and PUBLIC=0 otherwise. In principle, public servants are insured with Mutual Aid Association. However, some local governments established Health Insurance Society before the law made them establish Mutual Aid Association. The law allows these Society to persist ⁵.

When the situation that the increase of expenditure is more than that of financial resources goes on, the Society is bankruptcy and does not have any choice but dissolution. If the Society is dissolved, public servants are insured with Mutual Aid Association but the employees except for public servants are insured with Government-managed Health Insurance.

In general, Mutual Aid Association provides additional benefits, however, Government-managed Health Insurance does not provides additional benefits. In other words, the insured persons' cost of dissolution is different between public employees' and the other employees'. We call the deliberative organ of society Society Committee. The half of Society Committee

⁴The definition of standard monthly remuneration for them is different from one for employed.

⁵The law prohibits local governments have newly established the Society.

members are elected by insured persons ⁶. These Committee members of the society made up of public employee have less incentive to manage the society efficiently than those of the society made up of the other employees. It may cause that the society made up of public employee is managed more inefficient than the other.

Women rate is the number of insured women divided by that of the insured persons. The reason why we set the dummy on an explanatory variable is not because women can bore children. Health care expenditure, which is dependent variable, does not include the benefit of normal pregnancy. The reason is that there is a difference of disease between gender. For example, only female suffer from breast cancer and cervical cancer. In contrast, only male suffer from prostate cancer. This difference may influence health care expenditure.

We have the following empirical specification:

$$AVGEXP^i = \alpha_0 + \alpha_1 AVGAGE^i + \alpha_2 JOINT^i + \alpha_3 PUBLIC^i + \alpha_4 HEALTH^i + \alpha_5 VOLCON^i + \alpha_6 SCRIP^i + \alpha_7 WOMEN^i + \alpha_8 AVGSMR^i + \epsilon^i \quad (2)$$

There is a difference of the number of the insured in Societies. Some Society has only 21 insured persons. ⁷ Some Society has more than 280,000 insured persons. Since the central limit theorem may work, we use the method of Weighted Least Square.

4 Data sources and descriptive statistics

The data for this paper is obtained from the Annual Report on Health Insurance Societies for 2000 (fiscal year)(in Japanese, Heisei 12 Nendo Kenkou

⁶The other half are appointed by employers.

⁷This Society had more than 700 insured persons. It got the approval of establishment then. Even if it has less than 700 insured persons after it got the approval, it can persist.

Hoken Kumiai Zigyo Nempo) (National Federation of Health Insurance Societies 2002a). It has insurer-level data, including the numbers of insured men, women and dependents, expenditure of medical care benefit, medical care expenses⁸, childbirth and childcare lump-sum grant. However, the data on the average age of insured persons is not available from this report. Only this data is obtained from the Present Condition of Health Insurance Societies on 31 March 2001(in Japanese, Kenkou Hoken Kumiai no Gensei -Heisei 13 Nen 3 Gatsu 31 Niti Genzai) (National Federation of Health Insurance Societies 2002b).

In this paper, we except the elderly. This reason is that the implementing body for their medical care is not Health Insurance Societies but the municipalities even if they are insured with Health Insurance.

Public medical care insurance system of Japan is fee-for-service payments system. In the case of the insured, 80% of the medical care cost was provided by the insurer and the remainder of the cost was borne by the patient in 2000. We exclude benefit by labor accident insurance and the cost when the patients did not use public insurance.

Albeit the data is not patient-level, the advantage of this data is its broad coverage. We use the data of all Societies that had existed during throughout the fiscal year⁹.

Descriptive statistics of the valuables to use in this paper is showed in Table 1.

⁸The distinction between expenditure of medical care benefit and medical care expenses is not essential but purely legal. The former is provided as benefits-in-kind and the latter is provided as benefit-in-cash.

⁹Part of the data of the Societies established or dissolved in the middle of fiscal year is missing.

5 Empirical result

Table 2 reports the results of Weighted Least Square. *AVGAGE*, which is one of variables that represent health capital, is significantly positive. It may show that the health capital decreases as the person becomes older. *JOINT* and *PUBLIC* are significantly positive. Perhaps, Society run jointly or consisting of public employee is managed inefficiently. In fact, almost all Societies run jointly consist of small-size firms. There is possibility that *JOINT* is influenced by the difference of firm's scale. *VOLCON* and *SCRIP* are significantly positive. Presumably, these groups visit a doctor more frequently than the other because their opportunity cost of visiting a doctor is low. *AVGSMR* is significantly positive, too. The increase of salary may increase the opportunity cost and the consumption of goods. The former decreases health care expenditure, but the latter increases it. This result suggests that the latter effect is more than the former effect.

Now, we estimate the most important variable in this paper, *HEALTH*. The estimated coefficient is -0.113460 and this is significantly negative. Therefore, we conclude that the health activity reduces health care expenditure.

6 Concluding Remarks

We can say that the health activity reduces medical care cost. But we do not find the evidence the activity is implemented by Health Insurance Society highly cost-effectively. The reason is that the estimated coefficient is -0.113460 which contradicts what Societies are profit-maximizing agencies.

However, the research by Yamada (2000) says that the health check-up is highly cost-effective as preventive medical care for the population in the long run. He focuses on the demand for Health Check-up and the effect on

the medical cost. Using sample data from the 1995 Comprehensive Survey of Living Conditions of the People on Health and Welfare, he finds a number of socioeconomic and demographic factors to the determinants of the health check-up among the 30-60 age group. For example, he finds that people with the Society-managed Health Insurance and those with the Mutual Aid Associations Insurance have more health check-ups than those covered by other types of health insurance. This symptom may reflect that the employees themselves may face some peer pressure not to excuse themselves for a day off for their health check-ups.

Moreover, he estimates how much the health check-up reduced medical cost. On an individual basis, the reduction in hospitalization by about 1.8 months or 2.2 months due to a one percentage point increase in health check-up is equivalent to a reduction in hospital expenditures of about 360,000 yen or 1,210,000 yen. The health check-up costs a total of about 36,500 yen. Hence, his empirical evidence strongly supports that the health check-up is highly cost-effective as preventive medical care for the population in the long run.

Yamada (2000) and also our research estimate the reduction of medical care cost. However, the former uses individual-level data but the latter uses the insurer-level data. Differences take place because this paper can not use the data about Health Check-up Rate and health guidance after health check-up.

Previous researches, including medical researches, show many evidences that the health check-up is significant and improve our life quality. To make health activity highly cost-effective, it may need the rise of Health Check-up Rate and substantial health guidance after health check-up.

Health Insurance Society implements as health activities not only health

guidance and health screening, but also mental health, improvement of physical condition and establishment and operation of lodges. We will estimate how each activity affects the medical care cost and the life quality of the enrollees. This remains for the future research.

Table 1: Descriptive Statistics

	Mean	Standard deviation	Minimum	Maximum
AVGEXP	96144.84	17409.49	38623	169342
N	8670.761	18297.75	21	280221
AVGAGE	40.47272	3.542656	24.6	52.6
JOINT	0.194064	0.395591	0	1
PUBLIC	0.023402	0.151219	0	1
HEALTH	21216.35	17199.42	104.48	407436
VOLCON	0.03516	0.031599	0	0.65
SCRIP	0.00267	0.015008	0	0.1916
WOMEN	0.250753	0.154304	0.0143	0.9536
AVGSMR	366068	68089.04	205641	729635

Table 2: Regression Results

Explanatory variables	Estimated Coefficient	Standard Deviation	t-value
AVGAGE	3720.56	65.7201	56.6123
JOINT	2682.41	379.008	7.55238
PUBLIC	17360.7	1082.01	16.0449
HEALTH	-0.113460	.033689	-3.36785
VOLCON	112018.	11666.5	9.60170
SCRIP	173054.	7993.49	21.6494
WOMEN	15085.0	1145.70	13.1666
AVGSMR	.024537	.381486E-02	6.43197
Constant	-71333.8	2765.01	-25.7987

Number of observations is 1752

$R^2 = 0.785699$

t-statistics: the critical value at 1% significance level =2.579;

the critical value at 0.5% significance level =2.811;

the critical value at 0.1% significance level =3.296.

References

- [1] Ii,M. and Ohkusa,Y. (2001) “Economic Analysis of the Demand of Medical Service” (in Japanese: “Iryo saabisu zyuyo no keizai bunseki”), Nihon keizai Shinbunsha.
- [2] Matsubara,Y. (2002) “Health Care Service Supply System and Payer’s Function” (in Japanese: “Iryo teikyo taisei to hokensya kino”), Journal of Health Care and Society(in Japanese: Iryo keizai kenkyu),Vol.12,pp.27-36.
- [3] National Federation of Health Insurance Societies (2003) “Health Insurance, Long Term Care Insurance and Health Insurance Societies in Japan 2003.”
- [4] National Federation of Health Insurance Societies (2002a) “The Annual Report on Health Insurance Societies for 2000(fiscal year)”(in Japanese: ”Heisei 12 Nendo Kenkou Hoken Kumiai Zigyō Nempo”).
- [5] National Federation of Health Insurance Societies (2002b) “The Present Condition of Health Insurance Societies on 31 March 2001(in Japanese: ”Kenkou Hoken Kumiai no Gensei -Heisei 13 Nen 3 Gatsu 31 Niti Genzai”).
- [6] Statistics and Information Department, Minister’s Secretariat, Ministry of Health, Labour and Welfare (2001) “Vital Statistics of Japan 1999, Volume 1,3.”

- [7] Yamada, T. (2000) "The Demand for Health Check-up and Uncertainty", Discussion Paper Series No.849, University of Tsukuba, Institute of Policy and Planning Sciences.