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บทความทางวิชาการ :

Heart Diseases in Thailand in the View of an Economist

JIRAPORN SHAWONG [1]

1. Introduction

This paper I want to survey the severity of heart diseases, direct costs and indirect costs of heart diseases and burden of illness in Thailand in the social perspective. I attempt to know in the point of view of people – what is the best way for people to mitigate loss from heart diseases, and in the view of social planner – how about public policy, the government should subsidize for health care or not?

There are 3 parts in this paper such as introduction, content, and conclusion.

2. Content

2.1 The severity of heart diseases

Heart diseases have been for many years and continue to be the top 4 leading causes of death in Thailand (Table 1). The top 4 ranking of diseases are malignant neoplasm, accident and poisonings, hypertension and cerebrovascular disease, and heart disease. Death rates from heart disease per 100,000 people decrease from 49.9 in 1999 to around 30 in 2000 and 2001, and after that from 2002 to 2006 death rates per 100,000 are more than 20. The number of deaths by heart disease is around 30,000 in 1999 and around 15,000 – 20,000 in 2000 – 2006 or death 40-55 persons per day. So, heart disease is the very important problem in healthcare in Thailand.

The number of sick people by heart diseases in Thailand increases from 138,919 in 1999 to 395,315 in 2007 (Table 2) or three times in nine years. The rates per 100,000 increase from 250.17 in 1999 to 690.78 in 2007.

The problem of heart diseases is serious if considering number of sick and rate per 100,000. Government should have policy and effective strategies to mitigate this problem.

Heart disease is a broad term for a number of different diseases affecting the heart or blood vessels. The various diseases that fall under the umbrella of heart disease include ischaemic heart disease, chronic rheumatic heart disease, coronary artery disease, heart attack, heart failure, high blood

[1] Assistant Professor, Faculty of Economics, University of the Thai Chamber of Commerce

pressure and stroke. Some heart diseases come from a genetic maladaption and some come from environmental. It is non-transferable.

Ischaemic heart diseases (reduce blood supply to the organs) is the most serious problem if compared with other heart diseases in Thailand (Table 2). It increases from 33 percent if compared with total heart diseases in 1999 to 38 percent in 2007. In 2007 the number of sick from ischaemic heart disease is as much as 150,118.

If we consider the number and percent of deaths by group of age and gender, the group that has the most serious problem is 60 years and older (more than 60 percent) and 40-59 years is the second rank (more than 20 percent) (Table 3). These two groups we can call risk group from heart diseases.

If comparing the number of deaths between males and females (Table 3), males have a higher death rate than females. Risk group from heart diseases for males are 60 years and older (more than 50 percent) and 40-59 years (more than 30 percent in 2006). Risk group from heart diseases for females are 60 years and older (more than 70 percent) and 40-59 years (more than 20 percent). Females, 60 years and older have more risk from heart diseases than males (more than 70 percent is greater than more than 50 percent).

Risk factors for heart disease which people can modify, treat or control by changing lifestyle or taking medicine.

A number of risk factors can contribute to heart disease. They include:

• **Tobacco smoke** — Smoking is hard on the heart, and the toxins in cigarette smoke cause plaques to form in the arteries, which lead to hardening of the arteries. Smokers' risk of developing coronary heart disease is 2–4 times that of nonsmokers. Cigarette smoking is a powerful independent risk factor for sudden cardiac death in patients with coronary heart disease; smokers have about twice the risk of nonsmokers. Cigarette smoking also acts with other risk factors to greatly increase the risk for coronary heart disease. Exposure to other people's smoke increases the risk of heart disease even for nonsmokers.

• **High blood cholesterol** — As blood cholesterol rises, so does risk of coronary heart disease. When other risk factors (such as high blood pressure and tobacco smoke) are present, this risk increases even more. People's cholesterol level are also affected by age, sex, heredity and diet.

• **High blood pressure** — High blood pressure increases the heart's workload, causing the heart to thicken and become stiffer. It also increases risk of stroke, heart attack, and congestive heart failure. When high blood pressure exists with obesity, smoking, high blood cholesterol levels or diabetes, the risk of heart attack or stroke increases several times.

• **Physical inactivity** — An inactive lifestyle is a risk factor for coronary heart disease. Regular, moderate-to-vigorous physical activity helps prevent heart and blood vessel disease. The more vigorous the activity, the greater people's benefits. However, even moderate-intensity activities help if done regularly and long term. Physical activity can help control blood cholesterol, diabetes and obesity, as well as help lower blood pressure in some people.

• **Obesity and overweight** — People who have excess body fat — especially if a lot of it is at the waist — are more likely to develop heart disease and stroke even if they have no other risk factors. Excess weight increases the heart's work. It also raises blood pressure and blood cholesterol and triglyceride levels, and lowers HDL ("good") cholesterol levels. It can also make diabetes more likely to develop. Many obese and overweight people may have difficulty losing weight. But by losing even as few as 10 pounds, you can lower your heart disease risk.

• **Diabetes mellitus** — Diabetes seriously increases risk of developing cardiovascular disease. Even when glucose (blood sugar) levels are under control, diabetes increases the risk of heart disease and stroke, but the risks are even greater if blood sugar is not well controlled. About three-quarters of people with diabetes die of some form of heart or blood vessel disease.

Symptoms

The symptoms can vary from no symptoms at all, to severe chest discomfort or pain, upper body pain, stomach pain, shortness of breath, anxiety, lightheadedness, sweating, nausea and vomiting, and tiredness, which can lead to a heart attack and sudden death if proper treatment is not administered.

Heart attack symptoms demand emergency help. Getting treatment quickly improves people's chance of survival and minimizes damage from heart attack.

Prevention

Heart disease is often avoidable. Following a heart-healthy lifestyle does not have to be complicated, and it does not mean that people need to live a life of self-deprivation. Instead, find ways to incorporate heart-healthy habits into each lifestyle.

5 strategies to prevent heart disease are

1. Do not smoke or use tobacco products.
2. Get active and get regular exercise.
3. Eat a heart-healthy diet such as fruits, vegetables, whole grains and low-fat dairy products can help protect people's heart. Legumes, low-fat sources of protein and certain types of fish also can reduce risk of heart disease.
4. Maintain a healthy weight
5. Get regular health screenings in high blood pressure and cholesterol level.

Medication

People who get sick must go to hospitals and have treatment urgently. If not they will die.

2.2 Data Sources

The data used in this paper analysis come from several sources. Prevalence of heart diseases come from Health Information Unit, Bureau of Health Policy and Strategy. Table 1 and 2 analyzed by this unit, but table 3, I got raw data and I classified and group them to compare in group and between groups.

The etiology I got data from:

http://www.americanheart.org/

http://www.bangkokheart.com/

http://www.fauxpress.com/kimball/med/heart/h3/smoking.htm

http://www.mayoclinic.com/health/heart-disease/HB99999

http://en.wikipedia.org/wiki/Heart_disease

Direct cost I got data from Bangkok Heart Hospital, Yanhee Hospital, and Ramathipbodee Hospital. Cost of treatment in China I got from The Ministry of Foreign Affairs. Direct cost and indirect cost I got data from Pongchai, A., Piyamitr, S., and Yot, T., 2006. Cost of lifetime Treatment of Acute Coronary Syndrome at Ramathibodi Hospital. Thai Heart Journal, Vol.19, No.4. Models that I used to analyze the best way for people to mitigate loss and public policy are Basu, R., and Rosenman, R. Role of Healthy Lifestyle on Individual Decision Making for Disease Prevention to analyze self protection, self-insurance and market insurance, and Rosenman, R. The Public Policy of Healthcare Subsidies.

2.3 Direct Costs and Indirect Costs

From Ponchai, A., Piyamitr, S., and Yot, T., (2006), average health care costs which are the direct costs of medical goods and the services paid by government and households are 120,298 baht for the first year. Average indirect costs which are the cost of lost productivity due to morbidity, excluding costs of hospitalization at hospital and follow up costs for the first year are 30,477 baht. So, the direct costs plus the indirect costs for the first year are 150,775 baht.

Because I consider the burden of heart diseases in a social perspective, I use the direct costs and the indirect costs at 150,775 baht. I do not use heart treatment costs from private hospitals because they include profits which are not the costs in our country. Nevertheless, there are some limitations because these estimates of costs based on only 1 government hospital (Ramathibodi hospital) and based on the assumption that all patients are treated by using Thai local made drugs. So, these costs may be lower than the actual costs which some patients are treated by high cost original drug regimens.

Table 1 : Number of Deaths and Death Rates per 100,000 Population by Leading Causes of Death, 1999 – 2006

Causes of Death	1999		2000		2001		2002		2003		2004		2005		2006	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Total	362,607	589.0	365,741	592.1	369,493	595.1	380,364	608.1	384,131	610.3	393,592	629.5	395,374	635.7	391,127	624.6
Malignant neoplasm, all forms	36,091	58.6	39,480	63.9	42,497	68.4	45,834	73.3	49,682	78.9	50,818	81.3	50,622	81.4	52,062	83.1
Accident and poisonings	29,845	48.5	32,401	52.5	31,579	50.9	34,568	55.3	35,804	56.9	36,855	58.9	35,818	57.6	37,433	59.8
Hypertension and cerebrovascular disease.	9,618	15.6	11,663	18.9	15,221	24.5	16,640	26.6	21,734	34.5	21,756	34.8	18,171	29.2	15,284	24.4
Disease of the heart	30,697	49.9	19,708	31.9	18,807	30.3	15,361	24.6	17,462	27.7	16,766	26.8	17,539	28.2	17,775	28.4
Pneumonia and other diseases of lung	9,444	15.3	9,286	15.0	11,163	18.0	13,185	21.1	15,074	23.9	16,462	26.3	13,946	22.4	13,766	22.0
Nephritis, nephrotic syndrome and nephrosis	6,745	11.0	9,091	14.7	10,139	16.3	10,587	16.9	12,110	19.2	11,616	18.6	12,591	20.2	12,884	20.6
Human immunodeficiency virus (HIV) disease	n.a		n.a		n.a		15,597	24.9	16,892	26.8	11,473	18.3	7,949	12.8	6,550	10.5
Suicide, homicide and other injury.	9,256	15.0	8,631	14.0	8,431	13.6	8,237	13.2	9,315	14.8	7,341	11.7	7,342	11.8	6,971	11.1
Disease of liver and pancrease.	6,395	10.4	6,736	10.9	7,761	12.5	8,025	12.8	8,202	13.0	7,492	12.0	9,061	14.6	9,002	14.4
Tuberculosis, all forms	5,265	8.6	6,246	10.1	6,284	10.1	6,751	10.8	6,906	11.0	6,076	9.7	5,534	8.9	5,214	8.3
Other	219,119	355.9	222,396	360.0	217,284	349.9	220,912	353.2	207,708	330.0	206,937	331.0	216,801	348.6	214,184	342.0

Collected and Analyzed by : Health Information Unit, Bureau of Health Policy and Strategy, 2008.

Note : Accident and poisonings Exclude Suicide (X60-X84) and Homicide (X85-Y09)

Table 2 : Number of Sick by Heart Diseases and Rate per 100,000 1999-2007

Panel A 1999-2003

Disease	1999		2000		2001		2002		2003	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Heart Diseases	**138,919**	**250.17**	**160,976**	**291.84**	**172,859**	**317.67**	**214,855**	**391.45**	**252,712**	**451.45**
- Chronic rheumatic heart diseases	10,745	19.35	13,747	24.92	15,518	28.52	17,067	31.09	21,241	37.95
- Ischaemic heart diseases	45,488	81.92	54,071	98.03	60,470	111.13	77,323	140.88	92,733	165.66
- Other heart diseases	82,686	148.90	93,158	168.89	96,871	178.02	120,465	219.48	138,738	247.84

Source : Health Information Unit, Bureau of Health Policy and Strategy, 2008.

Panel B 2004-2007

Disease	2004		2005		2006		2007	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Heart Diseases	**279,966**	**503.10**	**300,137**	**530.75**	**352,227**	**618.53**	**395,315**	**690.78**
- Chronic rheumatic heart diseases	19,158	34.43	17,435	30.83	24,032	42.20	18,265	31.92
- Ischaemic heart diseases	103,352	185.72	112,352	198.68	132,500	232.68	150,118	262.32
- Other heart diseases	157,456	282.95	170,350	301.24	195,695	343.65	226,932	396.54

Source : Health Information Unit, Bureau of Health Policy and Strategy, 2008.

Table 3 : Number and Percent of Deaths by heart diseases classified by group of age and gender 2002-2006

	2002		2003		2004		2005		2006	
	Numbers	**Percent**	**Numbers**	**Percent**	**Numbers**	**Percent**	**Numbers**	**Percent**	**Numbers**	**Percent**
Total, 0-14	374	2.43	311	1.78	229	1.37	240	1.37	230	1.29
Total, 15-39	1,410	9.18	1,181	6.76	1,301	7.76	1,228	7.00	1,215	6.84
Total, 40-59	3,932	25.60	4,269	24.45	4,406	26.28	4,631	26.40	4,588	25.81
Total, 60 and older	9,604	62.52	11,654	66.74	10,805	64.45	11,378	64.87	11,684	65.73
Don't know age	41	0.27	47	0.27	25	0.15	62	0.35	58	0.33
Total	**15,361**	**100.00**	**17,462**	**100.00**	**16,766**	**100.00**	**17,539**	**100.00**	**17,775**	**100.00**
Males, 0-14	192	2.24	148	1.53	125	1.33	128	1.31	134	1.52
Males, 15-39	928	10.81	797	8.22	896	9.51	825	8.42	815	9.27
Males, 40-59	2,469	28.77	2,719	28.04	2,799	29.71	3,019	30.82	3,008	34.20
Males, 60 and older	4,973	57.94	6,012	62.00	5,591	59.35	5,794	59.15	4,816	54.75
Don't know age	21	0.24	21	0.22	10	0.11	29	0.30	23	0.26
Total males	**8,583**	**100.00**	**9,697**	**100.00**	**9,421**	**100.00**	**9,795**	**100.00**	**8,796**	**100.00**
Females, 0-14	182	2.69	163	2.10	104	1.42	112	1.45	96	1.24
Females, 15-39	482	7.11	384	4.95	405	5.51	403	5.20	400	5.16
Females, 40-59	1,463	21.58	1,550	19.96	1,607	21.88	1,612	20.82	1,580	20.39
Females, 60 and older	4,631	68.32	5,642	72.66	5,214	70.99	5,584	72.11	5,637	72.75
Don't know age	20	0.30	26	0.33	15	0.20	33	0.43	35	0.45
Total females	**6,778**	**100.00**	**7,765**	**100.00**	**7,345**	**100.00**	**7,744**	**100.00**	**7,748**	**100.00**

Source : Health Information Unit, Bureau of Health Policy and Strategy, 2008.

Table 4 : Heart Treatment Packages from Bangkok Heart Hospital

Heart Treatment Packages	PRICE (TH BAHT)
Coronary Angiography	39,000
Percutaneous Transluminal Coronary Angioplasty (PTCA or Balloon)	125,000
Coronary Angiography + PTCA	138,000
Electrophysiologic study with ablation	115,000
CT Coronary Angiogram + Calcium score	15,000
Coronary Artery Bypass Graft (condition apply) Set A	480,000
Coronary Artery Bypass Graft (condition apply) Set B	590,000
Mitral or Aortic Valve Replacement (1 mitral or aortic valve included)	590,000

Source : Bangkok Heart Hospital, 2008.

Table 5 : Heart Treatment Packages from Yanhee Hospital

Heart Treatment Packages	PRICE (TH BAHT)
Valvular Replacement Surgery	300,000
Coronary Artery Bypass Surgery	280,000
Congeital Heart Disease	Start from 150,000

Source : Yanhee Hospital, 2008.

Atrial fibrillation-AF cost for surgery is 100,000 Thai baht – Source : Ramathipbodee Hospital

Heart diseases treatment (include surgery) in China is 300,000 Thai baht – Source : The Ministry of foreign affairs

2.4 Burden of Illness

If I times number of sick by heart diseases in 2007 with this direct plus indirect costs (395,315 × 150,775), they are 59,603,619,125 baht or around 60 billion baht. The direct costs (395,315 × 120,298) are 47,555,603,870 baht. The indirect costs (395,315 × 30,477) are 12,048,015,255. The burden of heart diseases are around 60 billion baht which is a lot of money in Thailand, so Thai people should try to mitigate this problem and Thai government should try to find a policy and effective strategies to mitigate this problem.

2.5 Discussions

In the view of individual – what should they do?

Many people who have heart disease can die because they do not get help immediately or if they do not die, they have to pay a lot of money to be cured. So, in this point of view they should prevent themselves from heart disease by changing their lifestyle to be healthy people. How can they mitigate loss from heart disease?

From the study of Basu, R., and Rosenman, R. (2007), we know the effective of self-protection, self-insurance, and market insurance.

Self-Protection

People can have self-protection by investing in health which mitigates against the probability of getting sick in the future. If they are sick, utility are lowered in two ways. First is a decrement in overall utility or utility loss. Second is financial loss when they get sick because they cannot work and they have to pay a lot of money to be cured. So, people will invest in health and get the optimal level of investment in health when marginal benefit (utility difference between healthy state and being ill state) equal to marginal cost of investing in healthy lifestyle.

Self-Insurance and Self-Protection

People can have self-insurance by savings which can mitigate the financial loss if they get sick. Self-protection will mitigate the probability of getting sick, but self-insurance does not. Instead, it changes only the consequences of getting sick. Self-protection and self-insurance can be substitutes or complements. They are complements because there are two types of risk which are utility risk and financial risk. Self-protection by investing in health lowers both types of risk and self-insurance by savings lowers only financial risk. So, self-insurance is some part complement with self-protection.

Market Insurance and Self-Protection

Market insurance mitigates the financial, but not physical, impacts of the disease. Insurance pays a subsidy, which offsets part or all of the financial cost of the disease, but pays only when people get sick. Market insurance redistributes income towards the adverse state while self-protection reduces the probability of the state. By the study, they show that spending on self-protection is more beneficial at the margin than market insurance to mitigate the financial consequence of disease onset in the future.

So, the best way for people to mitigate loss from heart disease is self-protection by investing in health.

How about public policy, the government should subsidize for health care or not?

From the study of Rosenman, R. (2008) if the government tax the healthy wealthy to subsidize the sick poor, both the healthy wealthy and the sick poor will decrease investment in health (self-protection). The result is that people will get more heart disease. So, the government should not tax the healthy wealthy to subsidize the sick poor.

In Thailand, the government tax people to subsidize the sick poor in the program "30 baht cure all diseases", but the treatment is for basic remedy and does not cover some diseases that have high costs for treatment such as heart disease, leukemia, etc. So, in the case of heart disease which the government does not subsidize, people will have self-protection by investing in health. There is no distortion in public policy of heart disease subsidies.

The government of Thailand should give information and promote self-protection to people to mitigate loss of being sick and try to find the effective strategies to reduce sick people by heart disease. From the past to nowadays (2000-2006), although the number of deaths increase not so much, but the number of sick people increase more than two times (160,976 to 395,315) from 2000 to 2007.

3. Conclusions

The purpose of this paper is to find the best way of people and the best policy of the social planner to mitigate loss of heart disease. I find that the best way for people to mitigate loss from heart disease is self-protection by investing in health. For about public policy, the government should not tax the healthy wealthy to subsidize the sick poor because both groups will decrease investment in health (self-protection) and they will get more heart disease, but the government should give information and promote self-protection to people to mitigate loss of being sick.

The direct costs and the indirect costs of heart diseases in Thailand are around 60 billion baht. The direct costs are around 48 billion baht and the indirect costs are around 12 billion baht. ✍

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