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COST INCURRED FOR THE TREATMENT OF CARDIOVASCULAR PATIENTS IN COIMBATORE CITY: AN ECONOMETRICS ANALYSIS

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Abstract

Good health is an important factor in the provision of regular supply of labor as it avoids the disruptions caused by sickness and resulting absenteeism. Good health not only promotes high morale and labour productivity but also produces a positive environment of economic growth. Health has been declared as a fundamental human right. The recent World Health Organization Report of the Commission on Macroeconomics and Health has provided authoritative support for the evidence linking health, disease and economic development, and has recommended a scaling-up of financial resources directed at essential health interventions that are cost-effective. Even though its focus is mainly on communicable diseases afflicting the developing world, it also categorically states that "many of the non-communicable diseases, including cardiovascular disease, diabetes, mental health and cancer, can be effectively addressed by relatively low cost interventions, especially using preventative actions relating to diet, smoking and lifestyles. (Dele Abegunde, 2006).

Keywords: *labour productivity, fundamental human right, non-communicable diseases, Cardiovascular Disease, hypertension, changing lifestyles*

Cardiovascular Disease

Cardiovascular disease refers to any disease that affects the cardiovascular system, principally cardiac disease, vascular diseases of the brain and kidney, and peripheral arterial disease. The causes of cardiovascular disease are diverse but atherosclerosis and/or hypertension are the most common. In addition, with aging come a number of physiological and morphological changes that alters cardiovascular function and lead to increased risk of cardiovascular disease, even in healthy asymptomatic individuals. Cardiovascular diseases (CVDs) were once thought to be impacting the rich and affluent, but it is now well established that they afflict the poor as well.

While changing lifestyles, unhealthy eating habits and declining physical activity are the key reasons for high incidence rates in the rich population, the issues of access and affordability account for higher mortality amongst the urban poor and rural population. These diseases impact not only the well being, but can also hold back the economic growth of the country due to increased healthcare expenditure and diminished productivity. India is projected to lose approximately USD 236 billion between 2005-2015 due to CVDs and diabetes. (Robert Beaglehole,(2001)

Directs Costs

Direct costs to individuals and their families include medical care, drugs, and other supplies. Patients may also have to bear other personal costs, such as increased payments for health, life and automobile insurance. Direct costs to the healthcare sector include hospital services, physician services, lab tests and the daily management of Cardiovascular Disease. Costs range from relatively low-cost items, such as primary-care consultations and hospital outpatient episodes, to very high-cost items, such as long hospital inpatient stays for the treatment of complications.

Costs of Lost Production (Indirect Costs)

A number of Cardiovascular Disease patients may not be able to continue working or work as effectively as they could before the onset of their condition. Sickness, absence, disability, premature retirement or premature mortality can cause loss of productivity.

Intangible Costs

Pain, anxiety, inconvenience and other factors which decrease quality of life are intangible costs, which are just as heavy. Some activities may have to be foregone in favour of treatment, discrimination may be experienced in the workplace, obtaining jobs may be more difficult, and professional life may be shortened because of complications leading to early disability and even death. Personal relationships, leisure and mobility can also be negatively influenced.

Table 1: Costs of Cardiovascular Diseases

Direct Costs		Indirect Costs	Intangible Costs
Medical	**Non Medical**		
Consultation Investigation Medication Management Hospitalization Treating complications Health programs	Transportation Time utilized for care	Man days lost Low productivity Disability payment Social security Depression	Reduced life expectancy Pain and discomfort Stress Anxiety Insecurity Inconvenience Lower quality of life

(Source: Anil Kumar 2007)

Need for the Study and Statement of the Problem

The economic implications of Cardiovascular Disease are vast. In developing countries, heart disease has historically affected the more educated and higher socioeconomic groups, but this is changing. What researchers are finding is that in developing countries, cardiovascular disease disproportionately affects working-age adults from lower socioeconomic groups. Also, people from lower socioeconomic groups are worse if they develop heart disease; their mortality after a heart attack is higher than someone

from a high socioeconomic group. This has led researchers to claim that if the global epidemic of heart disease continues it will have an impact on the viability of a number of countries' economies. There is a serious gap between the knowledge gained from over 50 years of Cardiovascular Disease epidemiology and its application to policy and action. Economic globalization and the associated international trading rules and regulations constrain the ability of countries and national-health services to respond adequately to health problems. India is experiencing an accelerated epidemiological transition with a consequent increase in the burden of Cardiovascular Disease risk factors both in community-based studies and in industrial populations. The researcher planned to conduct her survey in Coimbatore city. This city has a multi-cultural society, most of cosmopolitan nature. Its inhabitants are largely conservative and traditional, retaining their roots in their native villages.

Objectives of the Study

1. To Examine the Socio Economic Background of the Sample Patients
2. To Analyze the Choice of Health Care Services and Cost Incurred for the Treatment of Cardiovascular Disease

Data Sources and Methodology

The present study constitutes area of the study, sample design, source of data collection, period of the study and statistical tool used.

Tools used for Data Collection

For achieving the aims and objectives to the level best by all means, Survey method was used to collect due information from sample cardiovascular patients, for which an interview schedule was prepared based on the objectives of the study. Most of the questions in the interview schedule were structured as close-ended questions. The interview schedule consists of three major headings based on the objectives of the study in mind. The following are the different sections of the proposed interview schedule.

- Socio-Economic background of the sample respondents.
- Cost incurred for the treatment of the cardiovascular patients.
- Choice of health care services among sample respondents.

Pilot-study

The interview schedule was prepared based on the objectives of the study and at the outset it was pre-tested with 25 cardiovascular patients.

Data Collection Process

The design of the study called for the purposive selection of 250 heart disease victims, from male and female between the ages of 30 and 60 and living in Coimbatore. The reasons for limiting the study to heart patients in this group is heart disease is the leading

cause of death among males after the age of 30.Two hospitals would be asked to cooperate in furnishing a list of patients who had been hospitalized for cardiac treatment during the reference period. Upon securing the names of the patients, their physicians will be contacted later and permission will be requested to interview the patients.

Limitations of the study

- The data was collected only from the patients who were undergoing treatment in the English Medicines (Allopathic) only. The data was not collected from the patients who are taking alternative Indian Medicines like Siddha, Homeopathy, Ayurvedha etc.,
- The study is based on patient interviews; it is not possible to verify and confirm the information provided by them through cross checking with relevant medical care records.

Sampling Frame and Sampling Size

In order to examine the socioeconomic characteristics of the sample respondents and to analyze the cost incurred in treating the Cardiovascular Disease, an attempt is made by the researcher to study the sample patients at Coimbatore City by taking two leading hospitals, one each from private as well as public sector, namely K.G. Hospital and Coimbatore Medical College Hospital (CMCH) in the heart of Coimbatore City. In order to select representative Cardiovascular Disease population receiving treatment in these two hospitals, it was felt an empirical inquiry would be apt. Due to time and resource constraint, the researcher was able to collect samples from each of the hospitals and contacted 250 Sample respondents. Within each of the hospital, the sample patients were selected based on Convenience Sampling Method (i.e.) whom so ever comes forward to give information to the researcher. A convenience sample is simply one where the ***units*** that are selected for inclusion in the ***sample*** is the ***easiest to access***. This is in stark contrast to probability sampling techniques, where the selection of ***units*** is made ***randomly***. In this example of the cardiovascular patients in the two hospitals, the researcher was only interested in achieving a ***sample size*** of 250 patients who would take part in her research. As such, she would continue to invite patients to take part in the research until her ***sample size*** was reached. Since the aim of convenience sampling is ***easy access***, the researcher simply choose to stand at one of the waiting rooms for consultation where it would be easy to ask questions to the cardiovascular patients about their ill health.

The researcher approached a systematic sample of these patients and, following a brief description of the purpose of the survey, asked individuals to participate. A sample of those who agreed for further participation was contacted to arrange for an interview at a time and place convenient for them. It was decided to collect 250 samples with the optimum in mind at 4:1 ratio both from the K.G. Hospital and Coimbatore Medical College Hospital respectively.

Table 2: Demographics & Cost Incurred for the Treatment of Cardiovascular Patients

S.No	Variables	Category	No. of Respondents	Percentage
1	Gender	Male	154	61.6
		Female	96	38.4
2	Age Group	Below 30	4	1.6
		31-40	41	16.4
		41-50	58	23.2
		51-60	61	24.4
		Above 60	86	34.4
3	Educational Qualification	Illiterate	83	33.2
		Primary	48	19.2
		Middle school	61	24.4
		Secondary	37	14.8
		Higher secondary	9	3.6
		Degree/diploma	9	3.6
		Certificate course (ITI)	3	1.2
4	Total Monthly Income	Below Rs.20000	130	52.0
		Rs.20001 - Rs.40000	98	39.2
		Rs.40001- Rs. 60000	20	8.0
		Above Rs.60000	2	0.8
5	Choice of hospital	Government hospital	40	16.0
		Private hospital	210	84.0
6.	Admission fee	Rs.300.00	210	100.0
7.	Medical cost	Below Rs.35000	8	3.2
		Rs.35001- Rs.40000	47	18.8
		Rs.40001- Rs.45000	63	25.2
		Above Rs.45000	92	36.8
8.	Diagnostic Tests	Below Rs.16000	78	37.1
		Rs.17001- Rs.18000	131	62.4
		Above Rs.19000	1	0.5
9	Surgery	Rs.25000	1	10.0
		Rs.30000	9	90.0
10	Expenditure Incurred in ICU	Rs.30000.00	6	60.0
		Rs.45000.00	4	40.0
11	Room Rent	Rs.1200.00	73	34.8
		Rs.1600.00	30	14.3
12	Total Direct Medical	Below Rs.50000	5	2.0
		Rs.50001-Rs.100000	195	78.0

	Expenses	Above Rs.100000	10	4.0
13	Transport Charges	Below Rs.500	88	35.2
		Rs.501-Rs.1000	109	43.6
		Rs.1001-Rs.1500	27	10.8
		Above Rs.1500	26	10.4
14	Food Expenses	Below Rs.500	103	41.2
		Rs.501-Rs.1000	10	4.0
		Rs.1001-Rs.1500	7	2.8
		Rs.1501-Rs.2000	62	24.8
		Above Rs.2000	68	27.2
15	Total direct non Medical Expenditure	Below Rs.1000	78	31.2
		Rs.1001- Rs.2000	35	14.0
		Rs.2001- Rs.3000	66	26.4
		Rs.3001- Rs.4000	29	11.6
		Above Rs.4000	42	16.8
16	loss of Household Income Incurred	No	60	24.0
		Yes	190	76.0
17	Total of both direct & Indirect Costs	Below Rs. 50000	40	16.0
		Rs.50001- Rs.100000	200	80.0
		Rs.100001- Rs.150000	8	3.2
		Above Rs.150000	2	0.8

Source: primary Data

From the above data it is clear that among the 250 respondents, A majority of male respondents (61.6 percent) were affected by cardiovascular disease and remaining 38.4 per cent are female respondents. It means that there is a positive correlation between age and the onset of diseases. About 24 percent of them belong to the category of 41-50 years of age. Around 24.4 percent of them have middle school education. Majority of 52 per cent had a monthly family income of below Rs.20000. (84 per cent) reported that they took treatment in private hospitals, and only 40 patients said that they took treatment in government hospital. it can be seen that 210 patients are hospitalized from among the total of 250 respondents and they spent only Rs.300 as admission fees on an average.25.2 percent spent Rs.40001 to 45000 for medicine charges. 25.2 percent spent Rs.40001 to 45000 for diagnostic charges. Only 10 percent of the patients underwent surgery at a rate of Rs.25000 and nine patients spent Rs.30000 for the same. It is found that 60 percent of the respondents spentRs.30000 and remaining 40 percent of them spent Rs.45000 for expenses on incentive care unit.34.8percent of the hospitalized patients spent Rs. 1200 for room

rent. Whereas only 14.3 percent of the respondents spent 1600 as room rent in the hospital where they are taking treatment.

Most of the (195) patients spending Rs.50001 to 100000. Majority of (43.6 percent) of the hospitalized patients spent Rs.501 to Rs.1000. Around 103 patients spent below Rs.500 for food expenses. Out of 250 patients 78 patients spent below Rs.1000, 66 patients were spending Rs.2001 to Rs.3000, 42 patients spent above Rs.4000, 35 patients spent Rs.1001 to Rs.2000 and only 29 patients spent within Rs. 3001 to Rs.4000 for their non medical expenses. 76 percent of the respondents lose their household income because of the patient's health condition. Around 80.0 percent of the patients spent Rs. 50001 to Rs.100000 and about 16 percent of patients spent below Rs.50000, 3.2 percent of the patients spent Rs.100001 to Rs.150000 remaining 0.8 percent of the patients above Rs.150000.

Table 3: ANOVA Results for Health Care Expenditure

Variables	Mean	Std. Deviation	N
Sex of the respondent	1.3840	.48733	250
age	3.7360	1.14523	250
Marital Status	1.9920	.08926	250
Type of Family	1.7120	.47956	250
Religion	1.0720	.30196	250
Social Background	2.1200	.81748	250
Nativity of the Respondent	1.6200	.48636	250
Education	2.5240	1.46493	250
Total Monthly Income	4.1960	1.52278	250
Valid N (list wise)			250

Variables		Sum of squares	Mean square	f	Sig.
Gender	Between Groups	5.286	.230	.965	.512
	Within Groups	53.850	.238		
	Total	59.136			
Age	Between Groups	42.203	1.835	1.458	.087
	Within Groups	284.373	1.258		
	Total	326.576			
Marital Status	Between Groups	.529	.560	3.577	.000
	Within Groups	1.455	.196		
	Total	1.984			
Type of Family	Between Groups	12.872	.560	2.849	.000
	Within Groups	44.392	.196		
	Total	57.264			
Religion	Between Groups	6.594	.287	4.022	.000
	Within Groups	16.110	.071		
	Total	22.704			
Social Backward	Between Groups	15.308	.666	.996	.472
	Within Groups	151.092	.669		

	Total	166.400			
Nativity of the Respondents	Between Groups Within Groups Total	13.152 45.748 58.900	.572 .202	2.825	.000
Education	Between Groups Within Groups Total	183.636 350.720 534.356	7.984 1.552	5.145	.000
Total monthly income	Between Groups Within Groups Total	236.625 340.771 577.396	10.288 1.508	6.823	.000

The following ANONA table explains statistical significance model. This is significant at one percent level.

$Y= \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \ldots\ldots\ldots + + \beta nXn + e$

Y=total health care expenditure

X=The socio-economic and demographic characteristics.

E=a random error term

The descriptive table estimate the determinants of the cardiovascular patients annual health care expenditure across the socio- economic variables. The results indicates that the above 50 years age group patients are comparatively higher than the other age group. (10 percent level). The nativity of respondents in urban area mean value is higher than the rural areas; the significant level of nativity is one percent level. The level of education and the family monthly income are also influencing the total annual health care expenditure at one percent level. It implies that the awareness about cardiovascular disease is high due to increase in the educational level and also with level of income. This analysis shows that every cardiovascular patient is aware about their disease and take treatments so that the amount of healthcare expenditure for them is increasing.

Findings

Heart disease remains the leading cause of death in both men and women in India. But, common knowledge among the medical community is that women are less prone to heart disease until the age of 55 years, whereas, men can suffer from heart disease at a much earlier age. In the current study, among a total of 250 respondents, a majority are (61.6 percent) male patients who were affected by cardiovascular disease and the remaining 38.4 percent are females. Only 2 per cent of sample respondents belong to the category of below 30 years of age. It means with increase in age, people require a wide range of health care services. A majority 33.2 per cent of the sample respondents are illiterates. It is assumed that they are not at all aware about the existing health care facilities. Most of the patients are illiterate, most of whom with primary level and middle level. Most of the patients reported that they have discontinued their school education because of their family situation and poor economic conditions and also such they are forced to seek

employment for supplementing in family income. It is interesting to note that almost all the patients had general education.

Most of the cardiovascular patients (84 percent) reported that they took treatment in private hospitals, and only 40 patients said that they took treatment in government hospital. It can be seen from the analysis that 210 patients are hospitalized and they spent only Rs.300 as admission fees on an average. A majority of (36.8 percent) spent Rs.45,000 to buy medicine and only 3.2 percent of the respondents spent below Rs.35,000 as medicine charges which include tablets, injections or both depending on the health condition. From a total of 210 hospitalized patients, it is observed that the Diagnostic Tests vary depending upon the health conditions for the patients. The data shows that 62.4percent of the patients paid Rs.17001-Rs.18000 for diagnostic tests. Only 10 percent of the patients underwent surgery at a rate of Rs.25,000 and one patient spent Rs.30,000 for the same. 34.8 percent of the hospitalized patients spent Rs.1200 for room rent, whereas only 14.3 percent of the respondents spent Rs.1600 as room rent in the hospital where they are taking treatment. Apart from the direct medical cost spent for treatment, the patients have to incur the direct non medical cost like the transportation cost. It is found that 43.6 percent of the hospitalized patients spent Rs.501-Rs.1000 and the remaining 35.2 percent of the respondents spent below Rs.500 and 10.8 percent of the respondents spent Rs. 1001 to Rs.1500 and only 10.4 percent of the respondents spent above Rs.1500 for transportation. 31.2 percent spent below Rs.1000, 66 patients were spending Rs.2001 to Rs.3000, for their non medical expenses.

A majority of the patients going to private hospitals select the hospital based on the performance of the doctors. This may be because many of the private hospitals are promoted by well-qualified and experienced doctors. These hospitals use the services of some of the best doctors in the state as well as in the country. These doctors are specialists and super specialists in specific health problems and have the expertise of using the most advanced technology and are exposed to the latest developments in medical and health care field through attending and participating in national and international workshops, seminars and conferences. Moreover, these doctors are generally referred to the patients by their friends, relatives and other doctors, especially in case of long-standing and complex health problems. When the researcher enquired about the reasons for choosing a particular health care system, around 26 per cent of the respondents stated that they select the health care system mainly for its timely attention. From our analysis it is clear that quality of health care services is playing a vital role in choosing the type of health facilities by the patients.

Conclusion

The present study analyzed the cost of cardiovascular disease in Coimbatore city and found that heart disease is one of the major diseases in Coimbatore city which has a

very good registration of cases. In patients with cardiovascular disease, higher costs are associated with socioeconomic factors, coronary interventions, risk stratum and medical history. The current study found that cardiovascular disease is the most costly of the disease with productivity and informal care costs considerably exceeding direct health. A majority of the patients going to private hospitals select the hospital based on the performance of the doctors. This may be because many of the private hospitals are promoted by well-qualified and experienced doctors. These hospitals use the services of some of the best doctors in the state as well as in the country. Our results show that the rising burden of chronic disease will be especially severe in low income and middle- income households. The current analysis in Coimbatore revealed a huge burden of cardiovascular disease, one-third of which comes from treatment costs alone. Cardiovascular disease in Coimbatore has recently been the cause of worry to many in the country due to the rapid spread of cardiovascular disease into all age groups. however, technology and aging are not yet the main problems. Consistent public under investment in health — barely above 1% of GDP — is a major reason why health care is so unaffordable for so many people. This puts us near the bottom of all countries for this measure. Around 70% of total health spending is out of pocket, and around 70% of that is on drugs. Poor people go less and less to public facilities to which they would go earlier because they almost never have the free drugs they are supposed to provide.

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