

## High Out-of-pocket Expenditure: A Burden to Patients Undergoing Coronary Artery Bypass Grafting (CABG) in Sri Lanka

Sanjeewa GGC<sup>1\*</sup> and Kasthurirathne A<sup>2</sup>

<sup>1</sup>Regional Director of Health Service, Hambantota, Sri Lanka

<sup>2</sup>Department of Community and Family Medicine, Faculty of Medicine, University of Kelaniya, Sri Lanka

\*Corresponding author: Sanjeewa GGC, Regional Director of Health Service, Hambantota, Sri Lanka, Tel: 077 2 3737 66; E-mail: chamalsanjeewa@gmail.com

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### Abstract

**Background:** The healthcare system in Sri Lanka is the metaphorical “feather in the nation’s cap”. The relationship between social factors that lead to health or chronic diseases has long been recognized in Sri Lanka’s public health care delivery system [1]. The chronic nature of coronary heart disease (CHD) and high out of pocket health spending add a substantial cost burden to the economy of the households. The economic burden of Coronary Artery Bypass Grafting (CABG) care to patients and their families is large [2]. A greater understanding of the financial household cost resulting from CABG care has therefore become necessary to better inform policy [3]. This is the first study done in this research aspect in Sri Lanka.

**Objective:** To determine the demographic and socioeconomic characteristics of patients seeking in-patient services for CABG in Cardiothoracic unit of Teaching Hospital Karapitiya, and to estimate the direct and indirect costs incurred by patients, and coping mechanisms to meet CABG related health costs.

**Methodology:** This is a descriptive cross sectional hospital based study. The study was carried out at Cardiothoracic Unit of Teaching hospital Karapitiya. Data were collected using a pretested interviewer administrated questionnaire. Demographic and socioeconomic characteristics of patients undergone CABG were determined. Direct and indirect components of household costs of hospital stay were estimated with sources of financing.

**Results:** The mean number of hospitalized days was 31. The mean total monthly income of a patient’s family was Sri Lankan Rupees (LKR). 26.585 Median household cost of the total hospital stay period was LKR 50,700.00 (Its inter quartile ranged (IQR) between LKR.39.500-69.000), of which 75% were direct costs. The median direct cost was LKR 39350.00 of which majority were cost for food (16.26%). Median indirect cost was LKR 20000.00. It was 25% of total household cost (1 US dollar = RS 146.00).

**Conclusion:** The economic burden to the household was mainly due to direct costs incurred for drugs, food, travelling and accommodation. Mean total household cost exceeded the mean monthly income of the households. Hence, there is a need to established and insurance scheme to reduce the cost burden on households.

**Keywords:** Household cost; Direct cost; Indirect cost; Health insurance

### Introduction

Health is one of the most important components of an effective poverty reduction strategy, since health can increase productivity and household income, while poor health is likely to reduce output. Improvements of the health can provide poor households with the opportunity to escape poverty [4]. However, use of health services is sometimes associated with out-of-pocket (OOP) payments and it is the primary means of financing healthcare in many low-income Asian countries [5].

Sri Lanka is a country known to the world for providing cost effective health care free of direct cost to the patient. The Sri Lankan healthcare system is a combination of public health the main driver enabling universal access which is financed by general revenue sources and the private sector which is financed through fees levied for service arrangement [6]. But the emerging trend is the rising Out of Pocket

(OOP) expenditure on health. Household OOP expenditure on health in Sri Lanka rose from just Rs. 5.2 billion in 1990 to 76.1 billion in 2009. The share of OOP expenditure in Total Health Expenditure was 46% while the share of OOP expenditure in Private Health Expenditure was 89% [7].

Contrary to the epidemiologic transition in developed countries, there is recent evidence to suggest that rather than those in high income brackets, South Asian region individuals with a lower socioeconomic status are developing a higher burden of Coronary heart disease (CHD) first. The rise in CHD mortality contributes to the economic burdens in the Indian subcontinent. It has been found that unlike Caucasian and Latin American Countries, symptoms of CHD arise a whole 10 years earlier [8].

### Objectives

The paper describes the socio-demographic characteristics, sources of financing out-of-pocket expenditure and estimates the out-of-

pocket and indirect health expenditure of patients undergoing CABG at the Cardiothoracic Unit, Teaching Hospital, Karapitiya. **Household cost components and conceptual framework**

Figure 1.

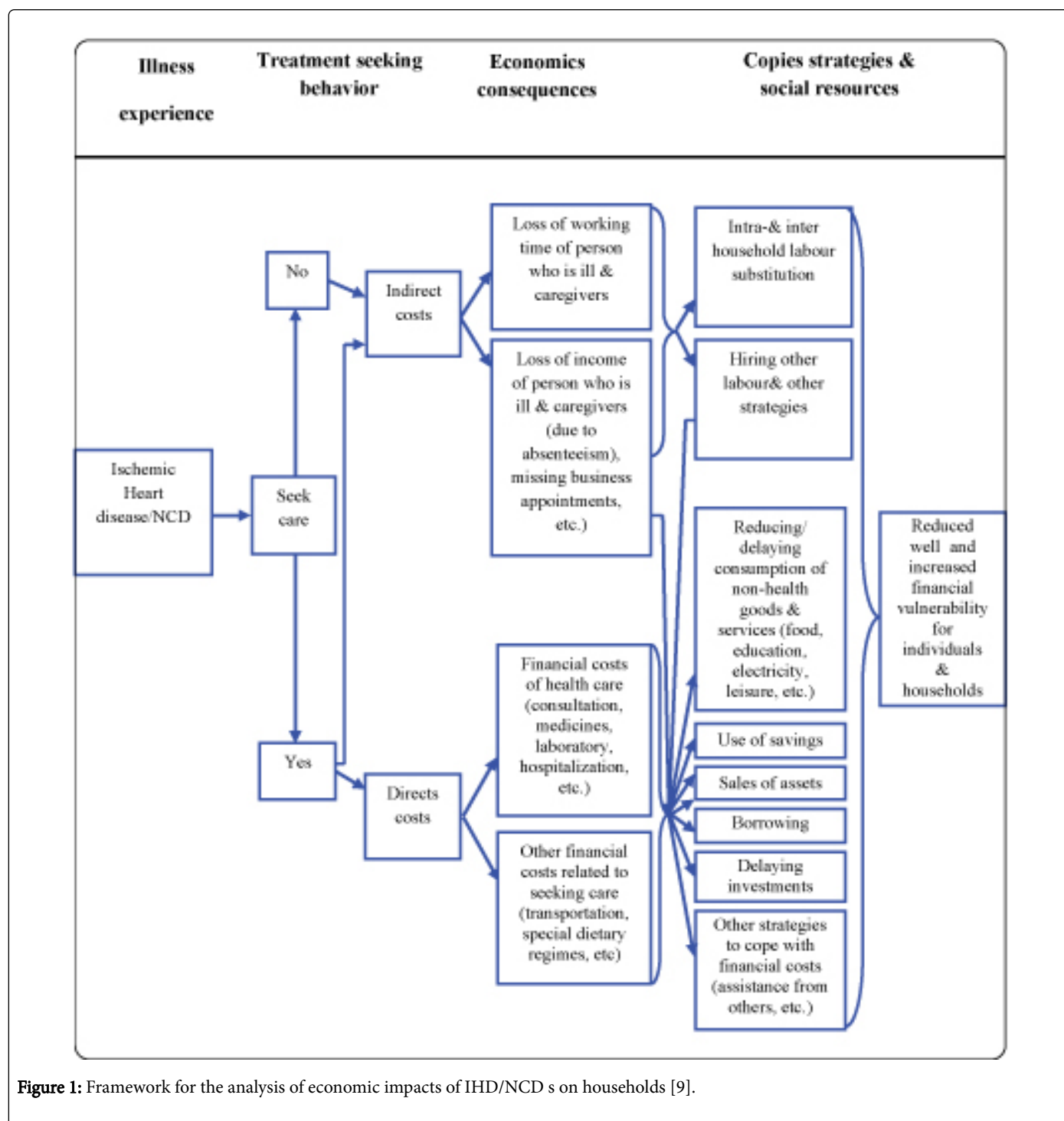


Figure 1: Framework for the analysis of economic impacts of IHD/NCD s on households [9].

**Increasing health financing: three dimensions**

There are different views expressed on how to increase 'room' for public health financing in the country. These are summarized in Figure 2.

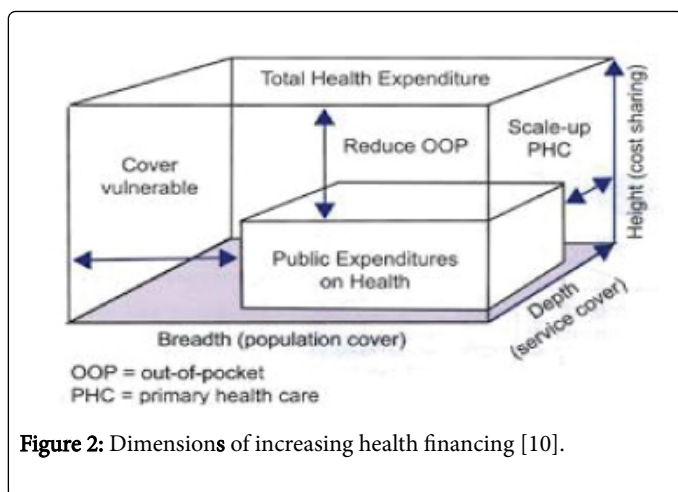


Figure 2: Dimensions of increasing health financing [10].

**Breadth of coverage (Dimension 1):** The breadth of the box in Figure 1 shows the proportion of the population covered from public health services. In Sri Lanka, people who are in under-served areas are not able to even access private care because they are located in rural areas.

**Depth of coverage (Dimension 2):** Sri Lanka has a large health service network through primary, secondary and tertiary care institutions for promotion, prevention, curative and rehabilitative care services.

**The height of coverage (Dimension 3):** The height of coverage shows the 'cost sharing' element. Insufficient public health expenditure results in higher individual out-of-pocket expenditure (OOPE) and lower population coverage.

## Methodology

This is a descriptive cross sectional hospital based study describing the household cost of Coronary Artery Bypass Grafting (CABG). The study was carried out at cardiothoracic unit, Teaching Hospital Karapitiya, Galle Sri Lanka. The study was carried out from 01<sup>st</sup> of April to 30<sup>th</sup> June. The study population consisted of all the patients of the Cardiothoracic Unit who underwent the surgery during the study period. Both male and female patients included. Sample size was 146 eligible patients with 5% added to minimize the possible drop outs.

Patients with Co-morbidities that require regular treatment or hospitalization (diabetes, hypertension) and its related complications like stroke/peripheral vascular disease and other associated complicated heart surgeries and reoperation patients were excluded.

## Data collection

Pretested and validated interviewer administrated questionnaire was used to collect the data. Final questionnaire was constructed with the instructions of the supervisor and the flow of the questions was maintained from simple questions too difficult to keep the respondent comfortable. The questionnaire was administered by a group of enumerators including the main investigator. The group of data collectors consisted of three medical students and the main investigator.

Data collection was done after obtaining informed written consent from the patients. Patients were consecutively recruited. On admission,

basic data was collected to obtain complete cost data. The patients and family members were interviewed several times during hospital stay. Further data were collected while in the ward, and before discharge to complete the questionnaire.

## Data analysis

All data collected were treated as highly confidential. All possible measures were taken to obtain complete data. The hard copy of the questionnaire was preserved under the custody of the principal investigator. (PI) Data entry was done by the principal investigator using Microsoft Excel 2007. Data processing was also done by principal investigator including data cleaning and appropriate conversion of continuous data into categorical data.

Since most of the household cost data were numerical data, quantitative analysis was applied after screening for possible errors. Descriptive statistics were used. Median and inter-quartile range was used to present cost data. Percentages were used to describe categorical data (1 US Dollar=140 Sri Lankan rupees).

## Cost components

Figure 3

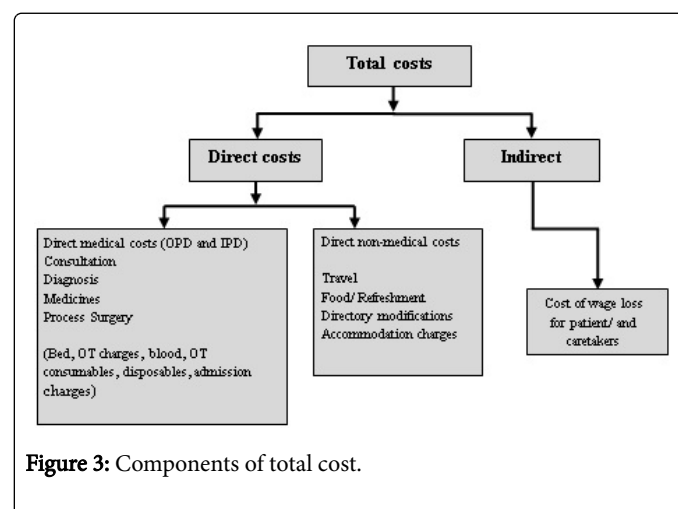


Figure 3: Components of total cost.

## Ethical clearance

Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, Karapitiya. Permission to conduct the study was obtained from the administration of Teaching Hospital, Karapitiya.

## Response rate

All the recruited patients participated in the study, Therefore response rate was 100%.

## Results

In our sample 69.9% were male patients. Median age of males ranged from 52 years to 67 years, whereas the median age of females ranged from 51 years to 59 years. The largest age group (41.8%) was 50 to 59 years, followed by 40-49 years (28.8%). Majority of participants were Sinhala (82.9) and Buddhist (78.8), most participants (94.5%) were married. Tamil were 10.3% and Hindu were 8.3% of the sample 6.8% Muslim patients and 8.2% of Islam patients were there (Table 1).

Variable		Frequency	Percentage (%)
Sex	Male	102	69.9%
	Female	44	30.1%
Age	30-39	9	6.2%
	40-49	42	28.8%
	50-59	61	41.8%
	60-69	31	21.2%
	>70	3	2.1%
Ethnicity	Sinhala	121	82.9%
	Tamil	15	10.3%
	Muslim	10	6.8%
Religion	Buddhist	115	78.8%
	Hindu	13	8.9%
	Christian	6	4.1%
	Islam	12	8.2%
Marital status	Unmarried	2	1.4%
	Married	138	94.5%
	Separated	5	3.4%
	Divorced	1	0.7%

**Table 1:** Frequency distribution of the demographic profile of participants (n=146).

Out of the 146 participants of the study, 99 were actively engaged in income earning. This group had 87 males (39.5%) and 12 females patients (8.2%).Fifteen males and 32 females were not employed. There were 6 male (4.10%) and 2 female CABG patients who were professionals, while 42 males (28.76%) and 2 females were employed in associated professions (teachers, nurses etc.) and retail trades. Twenty three male patients were employed in agriculture and fisheries industry. Out of all the patients 16 male patients and 3 female patients were self-employed. In the full sample there were 12 pensioners who drew their pension salary. Among the female patients 26 were housewives and they did not earn any income (Table 2).

Variable	Male Number (%)	Female Number (%)
Income generation		
Yes	87 (59.5%)	12 (8.2%)
No	15 (10.3%)	32 (22%)
Total	102 (69.9%)	44 (30.1%)

**Table 2:** Income generation and Occupation of the patients (n=146).

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For getting a CABG in this unit, the patients who were examined in the clinic are admitted to the hospital about a week before, and after the operation too they have to be in the ward for about 10 to 20 days. 50.7% of patients stay in the hospital for 32 to 37 days. 21.9% patients stay in the hospital for 20 to 25 days, of 26 to 31 days. The mean number of hospitalized days was 31 and if the number of days were increased more the direct and indirect expenses too will be increased in parallel (Table 3).

Cost component	Valid Count	Average	Percentage
Direct cost			
Medical cost			
Drugs cost	146	6769.86	12.43
Surgical cost	146	1705.48	3.13
Investigations cost	146	3510.25	6.46
Sub total	146	11985.59	22.04
Non-medical cost			
Food (Patient)	138	6565.07	11.42
Food (Care giver)	89	4318.49	4.84
Travelling	146	5986.64	11.02
Accommodation	88	9669.18	10.72
Hiring a care giver	74	6263.7	5.83
Miscellaneous	146	4818.49	8.86
Sub total	146	37622.07	52.69
Total Direct cost	146	49607.66	74.73
Indirect Cost			
Lost employment cost	68	20410.96	17.49
Substitution cost	46	7826.09	4.53
Income lost -no pay leave	8	7187.5	0.73
Lost income to care giver	32	6250	2.52
Total Indirect cost	146	24903.23	25.27
Total Cost	146	54367.24	100

**Table 3:** Total out-of-pocket and indirect cost profile.

The median total household cost incurred by a person during the hospital stay was LKR 50750 Mean total cost was LKR. 54 367.24 with an IQR was between LKR.39 500-69 000. A patient who admitted for CABG had to spend 74.7% as total direct cost, out of the total expenditure and the remaining 25.3% as indirect cost, Out of this cost,

maximum percentage of 11.42% was spent as the food cost of the patient and 4.8% as food cost of the caregiver. Another 11.0% was spent as transport expenses and 5.8% of the whole expenditure was spent to pay the care giver.

Out of the total expenditure, 22.0% was spent on medical services. Of that, 12.43% was spent on medicine. Out of the whole expenditure 6.5% was spent on laboratory tests. During the hospitalized period, lost income amounted to 25.3% of the sample, 17.5% of patients lost their income, as they were out of work. No pay leave amounted to 0.7% of the total cost. On behalf of the patient, when a substitute was occupied the lost income amounted to 4.5%. Care giver lost income of 2.5% of total household cost.

## Discussion

The study assessed the direct and indirect costs incurred by coronary artery bypass grafted (CABG) patients and the socioeconomic level of the patients with coping mechanisms to meet CHD related health costs of patients underwent coronary artery bypass grafting surgery at Teaching Hospital – Karapitiya. The results obtained in this study are from the costs of CABG in elective, non-emergency patients, with no other associated heart conditions throughout the hospitalization period, until discharged [11]. There were no previous cost studies done on any surgical procedures related to Coronary Artery Diseases in Sri Lanka. There were some international cost studies on health system cost related to CABG surgery. Due to this reason, it was not possible to get comparative data from Sri Lankan or international contexts on household cost of CABG patients. In Sri Lanka, there were several cost studies done on various other disease patterns or interventions. Some of those findings were used to compare the costs.

In our sample, 69.9% were male patients and 30.1% were female patients. It indicates that more male patients undergo CABG than female patients. When examining the statistics of heart operations done in Cardio- thoracic unit of the Karapitiya Hospital over the last four year period, more male patients had undergone CABG than female patients. There is a homogeneous pattern of admission throughout the year observed.

Our study revealed that mean age of the patients was 52.3 years (52.7 for females and 51.6 for males). Out of the whole sample, 70.6% patients were between the age range of 40 to 59 years. This shows that many economically productive individuals have to undergo cardiac operation and is a serious problem. There were 87 male and 12 female patients who were direct income generators. As a result of this, the economic level of the patients' families gets deteriorated. Thereby socioeconomic burden to family will aggravate poverty and affect the rest of the family members. This finding was compatible with study by Kasturiratne et al. (2005). It mentioned that prevalence of NCD increases with advancing age. The 66% in the 15-59 years age group were economically active and cause a large economic burden as indirect cost due to earning loss

In the sample, 34.2% patients had a single dependent at home. Another 34.2% and 27.9% had two and three dependents, respectively at home. When the patients were admitted to the hospital for a CABG, these dependents have to face economical problems. Uncertainty of the return of income from the farming and laboring could affect the stability of their income negatively [12]. The majority of patients in this study were from middle and low income households, probably due to

the study setting being a public sector establishment that provides free health care.

Total mean travelling cost was 9.1% of the total direct cost. According to our study 56.2% patients have got hospitalized from remote places more than 100km away 11% of patients are hospitalized from places more than 200km away. Out of the participants most percentage of patients (44.5%) hired vehicles. Some patients, who were from Jaffna, Anuradhapura, Trincomalee, Batticaloa and Puttlam etc. returned home by train. Its percentage was 8.3%. Percentage of patients that exceed Rs. 5000 for travelling expenses was 36%. Travelling cost of our study was relatively low compared to the previous Sri Lankan cost studies because majority of the patient's (88) relations stayed near the hospital during the hospital stay.

Kasturiratne et al. (2005) found that mean travelling cost was 35.6% of total cost with a mean of Rs.538.70 and it was the major component of the total household cost. Although most patients use public transport to come to the hospital, when they return after the operation a motor car or van was hired for convenient travelling [13]. Sharma and Sharma (2015) mentioned that among the components of direct non-medical cost transport cost had the largest share (77.3%) of household cost of coronary heart disease patients in India also.

Total direct cost came with summation of total direct medical cost and total non-medical direct cost. Its mean total direct cost was 49 607.70 per patient during hospital stay period. This accounted for 74.73% of the total household cost. There were other studies showing that direct cost was the major proportion of the household cost. The household survey carried by Attanayake (2005) on, the economic cost of five common disease in Sri Lanka, was also found that direct cost has major impact on chronic disease (hypertension, bronchial asthma and ischemic heart disease).

Kasthurirathne et al. (2005) has found that 70% percent of cost hospital stay was borne by the direct cost. It was proven that direct cost borne by receiver has considerable impact on chronic disease management. According to Sharma and Sharma (2015) shows direct costs constituted 62.9% of total house hold cost of coronary heart disease (CHD) patients in India. That was also compatible with our study.

Indirect cost component of our study was 25.27% of total household cost. It was relatively small than direct cost. De Silva et al. (2012) shows that the indirect cost of many illnesses is small in Sri Lanka.

With respect to loss of income for paid person, similar to Ratnapriya (2005) the loss of income was considered as number of loss of working days due to illness of the patient multiplied with average day pay. But for monthly payers it was considered 1/20 of monthly pay. Calculations of income loss of own property and crops was a difficult task. In addition some patients' paddies were cultivated by relative or family member and gave back the whole or proportion of income. In such it was difficult to calculate indirect house hold cost. Others used substitution person to look after their business. It should be noted that loss of productivity did not take into account the welfare losses of women not being able to perform domestic duties.

Median total household cost per patient during hospital stay period was Rs. 50 750.00. With direct cost component (74.73%) accounted for majority of the household cost and indirect cost components represents 25.27 % cost component. The mean total monthly income of a patient's family was Rs. 26,585. The important thing is that 94.1% patients was getting monthly income less than Rs.50 000 per month.

This shows that mean total household cost during hospital stay period well above twice average monthly income of the patient. This shows the gravity of the condition.

According to the Department of Census and Statistics (2013) the mean Sri Lankan household income per month is Rs. 46 207. And mean household monthly expenditure is Rs 40 887. From this expenses mean total expenses for food and drink is Rs. 15 358. In our study sample patient's household monthly cost exceeds the average income and expense level of Sri Lankan family. This gave additional financial burden to their families.

Mean duration of the hospital stay was 31 days in our study. Among the patients 50.7% had stay in the ward for 32 to 37 days. Thus, when the hospitalized period of a patient is increased more, the patients' direct and indirect expenses too are increased. Karan et al. (2014) mentioned that cardiovascular disease- CVD-affected households experienced greater financial hardship due to illness than similar control households, due to long hospital stay days.

In our study sample, to avoid this financial difficulty various strategies were used. Out of all, 19.6% patients use their own money, their salary or their savings for this. Ten percent of the patients had to mortgage or sold their properties to find the expenses during hospital stay period. Only 6% percent of the patient had insurance cover to recover their cost. It was also not a full insurance system as mentioned earlier. In our study sample 23.3% had admitted after some delay due to not being in a position to raise the required financial support.

Our study also sheds light on the potential economic burden on CVD-affected households in groups of different socio-economic status and suggests that low socio economic households are less able to protect themselves against the associated financial risk. This is reflected in their greater reliance on borrowing and sales of assets to finance health spending, and their considerably larger decline in adult workforce participation (and potential loss of earnings).

## Conclusion

Our study points out to a greater reliance on borrowing or sales of assets to finance OOP can have long-term implications for the economic future of patients and household members. We see the "tip of the iceberg" only. Increasing the risk of getting the non-communicable disease invariably leads to coronary heart disease risk also. Long-term management of these conditions needs to be upgraded to face the epidemiological and demographic transition.

We found that the burden of OOP spending could be significant on households that have a member undergo CABG, and that this burden arises primarily due to direct (OOP) cost, including spending on medicines, travelling, food, and accommodation. Our analysis also

suggests that patients may increase the risk of not working due to illness, although this effect appears to be small, These findings underline the need for policymakers to consider measures to protect households from the hospital expenses associated with CABG.

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