ACUTE CORONARY SYNDROME: PATTERNS AND CORRELATES OF HOUSEHOLD HEALTH SPENDING

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DEDICATION

The work embodied in this dissertation is dedicated to my dad and mom, sister Rekha, niece Deborah and in particular my daughter, Naomi. Their unconditional support made this work possible.

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"Silent gratitude isn't much use to anyone." ~G.B. Stern

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DECLARATION

I hereby declare that the work embodied in this dissertation titled, 'Acute Coronary Syndrome: Patterns and Correlates of Household Health Spending' is the result of original research and has not been submitted for any degree in any other university or institution

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Date: 31 October 2008

CERTIFICATE

I hereby certify that the work embodied in this dissertation titled, 'Acute Coronary Syndrome: Patterns and Correlates of Household Health Spending' is a bonafide record of original research work undertaken by Dr. Meena Daivadanam in partial fulfillment of the requirement for the award of the 'Master of Public Health' degree, under my guidance and supervision.

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TABLE OF CONTENTS

GLOSSARY OF ABBREVIATIONS

CAD	**Coronary Artery Disease**
ACS	**Acute Coronary Syndrome**
CABG	**Coronary Artery Bypass Grafting**
CHS	**Catastrophic Health Spending**
CVD	**Cardiovascular Disease**
DHE	**Direct Health Expenditure**
HH	**Household**
IHE	**Indirect Health Expenditure**
IL	**Income Loss**
INR	**Indian Rupees**
MI	**Myocardial Infarction**
NCD	**Non-communicable Disease**
PTCA	**Per-cutaneous Trans-luminal Coronary Angiography**
Q	**Question (as numbered in Annex 1)**
SES	**Socio-economic Status**
THE	**Total Health Expenditure**
THE	**Total Household Expenditure**

ABSTRACT

Background: In India, 85 percent of health payments are financed through out-of-pocket payments. In the case of acute events related to chronic diseases, the health expenditures are sudden and substantial and treatment needs to be continued for life. In this study, total health expenditure related to the treatment of Acute Coronary Syndrome in Trivandrum district was estimated for a nine month period. The study focused on the coping strategies employed by households to manage the expenses involved.

Methods: A cross-sectional survey was carried out on randomly selected patients from six hospitals. Both direct and indirect expenditures related to the acute event, hospitalisation episodes, follow-up visits and loss of income were collected from 210 households over a three month period. The study also included two case studies

Results: In terms of catastrophic health spending, the lowest socio-economic strata, with a prevalence of 98.6 percent were the most affected. Higher socio-economic status, being male, availing only public facilities and having health security was found to significantly lower the proportionate health spending. Being non-poor and having health security were the only predictors found to be protective against catastrophic payments.

Conclusion: Catastrophic health spending was prevalent across all socio-economic strata. Borrowing, the predominant coping strategy (74.8%) employed by households was not limited to any particular sub-group. A functioning public health care system and a viable health financing mechanism are important to reduce both catastrophic payments and the level of coping that households are forced to employ to overcome the financial consequences of availing treatment.

1. INTRODUCTION

India has earned the dubious honor of being one of the top three countries of the world along with China and the Russian Federation in terms of highest number of deaths attributable to coronary artery disease (CAD).[1] What is more ironic is that even as India is making huge strides in the economic front, the very generation that we all hope will push this momentum forward is falling sick and dying at an alarming rate thanks to the high stress,[2,3] high fat,[3,4] low activity lifestyle[3] – a byproduct of this very development and of course, globalization. It is a vicious cycle that we have trapped ourselves in.

With the younger families being increasingly affected by this illness as well as other chronic diseases, breadwinners are forced to quit jobs, families are forced to take refuge in debt and children are left with no choice but to leave schools in order to support their families, effectively crippling even the next generation. What does this really imply in terms of the future loss for our nation? This increasing societal burden due to CAD among the productive age groups[5] implies a looming economic disaster that cannot be ignored. The downward shift in age[6] is adversely affecting the breadwinners and architectural frontrunners of not just today but also tomorrow and that cannot augur well for the welfare of individual households or nations or even the world at large.

The fight for basic survival is not conducive with productivity. Ultimately individuals and families have to feel secure before they can be productive. When insurance coverage is limited, public provisioning of health care is inadequate and majority of the health care expenses are out-of-pocket (85%),[7] borne by the patients and their families, it is not the 'willingness to pay' that often plays the crucial role, rather the 'ability to pay'. Households expend all their energy trying to stay afloat between each successive crisis which is often health-related and family members are mute spectators watching helplessly

as they sink deeper and deeper into the quagmire of debt, from which they have no hope of ever escaping.

This is the reality faced by many thousands of families in our country each and every day, a fact I hope will be conveyed explicitly through this study and how chronic diseases, in particular Acute Coronary Syndrome – both the disease and its treatment plays a crucial role in the upkeep of this infinite distress.

2. LITERATURE REVIEW

2.1 Coronary artery disease and acute coronary syndrome

Coronary artery disease is a chronic condition caused by narrowing or blockage of the main vessels supplying the heart known as coronaries through the process of atherosclerosis. Disruption of an atheromatous plaque in the form of fissuring or rupture is the central process that leads to local thrombin generation and fibrin deposition. This in turn promotes platelet aggregation and adhesion leading to the formation of intracoronary thrombus which can then detach and embolise downstream, causing acute myocardial ischemia and infarction (MI).[8] The term acute coronary syndrome refers to all acute myocardial ischemic states ranging from ST segment and non-ST segment elevation MI to unstable angina.[8]

Chapter 1 – Literature review will mainly talk about non-communicable diseases (NCD) with particular reference to CAD and cardiovascular diseases (CVD) – a broad term that encompasses all atherosclerotic diseases of the heart and blood vessels including CAD and ACS, and also others like cerebro-vascular disease (stroke), hypertension and peripheral vascular diseases (PVD). The study per se (chapter 3 onwards) will focus on ACS as the acute event around which sudden and substantial health spending revolves.

2.2 The disease burden

Non-communicable diseases contribute to almost half the adult disease burden in South Asia. The epidemic raging in south Asia, especially India is characterized by the adult urban Indian phenotype[9] – a combination of high levels of glucose intolerance, lower levels of high density lipoprotein (HDL) cholesterol, higher levels of triglycerides and abdominal obesity. Even newer risk factors like C-reactive protein, plasminogen activator

inhibitor, homocysteine and lipoprotein [a] were found to exhibit consistently higher levels among Asian Indians.[10,11] This puts them at an increased risk for atherosclerosis,[9,12] more severe and extensive angiographic involvement[13] and also the highest mortality rates for CAD as compared to other ethnic groups. Impaired fetal nutrition[10] resulting in low birth weight (Barker's hypothesis) has been implicated in the causation of metabolic syndrome, diabetes, hypertension and eventually to earlier onset[6] of cardiovascular diseases in this population subset (46.7 percent deaths among less than 70 years in this population compared to 22.8 percent in 'established market economies'[14]). Due to the early onset of disease, South Asia contributes 2.8 times the DALYs (Disability Adjusted Life Years) to the global burden of CVD as compared to the developed countries.[4] The combination of urbanization[9,15] and globalization that we see today, what we erroneously refer to as modernization has its own traps – the ever increasing use of tobacco products in its varied forms[4], the inactive[3] 'couch' culture, the fad foods high in empty calories and low in dietary fiber and micronutrients,[14] and this, when combined with extreme poverty[9] and inadequate health systems[9] creates an explosive situation with far reaching repercussions.

The prevalence of CAD in India is around three to four percent in rural and eight to ten percent in urban areas (2003) with an estimated 1.17 million deaths (1990) and 9.2 million productive years of life lost (2000)[10]. In 2006, the estimated losses because of coronary artery disease, stroke, and diabetes (2005 statistics) amounted to almost $1 billion in India with the accumulated losses in GDP (Gross Domestic Product) between 2006 and 2015 as much as $17 billion, representing a loss of around 0·1 percent of India's projected GDP for this period.[16]

The southern most state of Kerala, thanks to its advanced stage of epidemiologic and demographic transition has the largest proportion of elderly[17] and the highest prevalence

of NCDs[10], with CAD topping the list (rural – 7.5%, urban – 12%).[10] An estimated 140 people die of MI daily and a twenty-fold increase in acute MI admissions was recorded in a single medical college hospital from 1966 to 1988.[10] Such soaring numbers are substantiated by the high 'risk profile' of the state in terms of high prevalence of all known risk factors: current smoking (men-39.7%), physical inactivity (men-22.9%, women-21.9%), obesity (men-16.9%, women-32.7%),[18] hypertension (men-34.7%, women-40.6%), deranged Total Cholesterol : HDL ratio (men-57.2%, women-48.8%) and elevated fasting blood glucose levels (men-14.2%, women-17.2%)[19].

2.3 Socio-demographic factors and CAD

The role of the 'Wealth – Health gradient'[20] where lower socio-economic strata and less educated groups[21] are 'high risk' in terms of incidence,[12,21,22] utilization of treatment modalities,[23] treatment outcomes[24] and mortality[20,22] have been consistently reported with respect to CAD. Individuals in lower SES groups[5,14] and less educated groups[25] tend to lead less healthy life-styles[5], frequently having a higher incidence of co-morbidities[26] and other risk factors and therefore more likely to sustain adverse events over time. Hence, even in the risk–benefit trade-off,[21] the less-affluent tend to lose out, as the propensity for physicians to select lower-risk patients for post-MI coronary angiography is well known. Income inequalities force poorer households with young children to shoulder a higher burden, giving them no reprieve from poor health outcomes even in the future.[27] Income-related differentials in both mortality – modulated by the traditional risk factors themselves[28] – and rates of use of specific services after acute MI have been seen even in countries like United States, United Kingdom and Canada, where extreme care and caution has been exercised to ensure equity in access to care.[23] When health systems that are highly regulated and constantly monitored continue to face these problems, what

happens in countries like ours where public health system is grossly neglected and the private health care market is totally unregulated?

The interplay between gender and age is another socio-demographic angle that has been widely reported. Neither ethical nor scientific grounds justify the use of age as a determining factor in treatment decisions, yet this practice prevails. The concept of 'agism' has been well identified and demonstrated in cardiology and other specialties.[29] The consequences of under treating the elderly, unfortunately has gendered connotations. Less intensive treatment – both invasive and non-invasive (less likely to receive thrombolysis, aspirin, betâ blockers and revascularization)[29] and higher mortality (at discharge[29], 30 days[30] and two years[29]) have been reported for women post-MI, and much of this disparity is attributable to less intensive management of older people.[30] Age accounts for most of these differences, but not all. Women tend to be older at presentation with greater co-morbidities, therefore liable for dual discrimination, on the grounds of both age and sex.[29]

2.4 Management of CAD and its implications

Adapting appropriate prevention strategies through a combination of the individual 'high risk' approach and the population-wide strategy can avert 80 percent of all myocardial infarctions through modulation of atherosclerosis and the disease patho-physiology. Four classes of drugs – statins, anti-platelet agents, beta-blockers and ACE (angiotensin converting enzyme) inhibitors / ARBs (angiotensin II receptor blockers) – and three lifestyle components – smoking cessation, diet and physical activity – have produced dramatic reductions in CAD risk[31]

Significant changes in the three life-style components alone greatly reduces the risk of adverse events, much more so than medication – around 50 percent for smoking cessation and diet and around 25 percent for physical activity. Such concerted efforts combined

with individual 'high risk' measures like cardiac testing in non-symptomatic diabetic patients[32] were found to have a direct and positive impact on other diseases in the spectrum like diabetes and also certain cancers in terms of both prevention and screening.[33] The population-wide strategy which utilizes these same measures to shift the risk factor profile of an entire population in a favorable direction was found to be highly cost-effective[34] both from a societal and individual perspective as evidenced by the success of various programs like New Zealand's Healthy Eating – Healthy Action (HEHA) strategy partnering the food and beverage industry to tackle obesity and other risk factors, Brazil's *Agita Sao Paulo* program promoting physical activity and United Kingdom's 5 A DAY program aimed at increasing fruit and vegetable intake.[35]

Every coin has a flip side and for chronic diseases, it is the cost and availability of medicines, investigations and interventions. Medicines though theoretically provided free or at low cost in the public sector, is no help as availability is often poor[36,37] forcing a majority of the patients to purchase medicines from the private sector or even forego treatment if they can ill afford it. Absence of reliable supply of affordable medicines causes avoidable mortality and morbidity. For patients who require multiple medications, monthly treatment costs may be equivalent to several days' wages and therefore, unaffordable.[37] Cost greatly affects compliance when the ideal drug therapy is unaffordable for most,[11] health insurance is virtually non-existent and expenses are borne out-of-pocket.[36,37] Less expensive alternatives don't necessarily translate to financial gains either. While the superiority of revascularization treatment by either Coronary Artery Bypass Grafting (CABG) or Per-cutaneous Trans-luminal Coronary Angioplasty (PTCA) has been established, PTCA's initial financial advantage is lost due to the greater incidence of additional procedures.[38]

Countries should ideally have treatment guidelines based on both drug efficacy and analysis of the incremental costs and benefits[39] for each additional treatment so as to provide affordable options for its citizens. A combination of aspirin and anti-hypertensive medication can achieve most of the benefits of prevention at significantly lower costs[39] but it is seldom used. In many developing countries including India, there are neither guidelines nor uniformity in the management of CAD. The type of treatment received by a patient is often influenced by extraneous factors such as the need to enhance volume based revenues to the increasing financial incentives offered by device manufacturers.[40] The determining factor in this interaction between provider and patient is not actual need but profit motive and the depth of an individual's pocket holds more value in this equation. Consequently, those with shallow pockets either do not reach the system or end up receiving sub-standard care.[41]

2.5 Catastrophic health spending

Acute events such as myocardial infarction that manifest from chronic diseases are 'disastrously expensive' for a major chunk of society, a phenomenon often termed as 'catastrophic health spending'.[35] A chain of 'every day' illnesses[42] or the daily grind of managing chronic diseases can both lead to catastrophic health expenditures, forcing individuals to ignore the disease till the inevitable acute event. The brunt of the direct health and financial consequences as well as the indirect consequences like loss of opportunities or income is borne by the individuals and their households.[43]

Catastrophic health payments are not synonymous with high health-care costs[26]. From a household point of view, the cost of accessing health care whether high or low becomes immaterial if they do not bear the full cost of the service, i.e. the cost of the service is covered by subsidy, third-party insurance or pre-payment mechanisms. Both inequalities in disposable income and availability of services were found to be highly correlated with

catastrophic health expenditure in low and middle income countries.[44] Greater supply could mean higher levels of use and more financial catastrophe in countries where supply constraints limit the use of services. So, increasing the availability of services should be accompanied by ways of protecting households from the financial consequences of accessing them. Protecting people from catastrophic payments is widely accepted as a function of health systems[7] and a desirable objective of health policy.[26] Thailand's success with the Universal Coverage[45] shows that poor households can be protected from catastrophic health expenditures by reducing a health system's reliance on out-of-pocket payments and providing more financial risk pooling.[26] The way health systems are financed, impact the well being of households, particularly poorer households and this has influenced the way both health systems and health care financing mechanisms particularly insurance has evolved however, well designed government regulations and interventions have been found critical to avoid trade-offs with equity which are costly to offset.[46]

Public spending on health care in India, one of the lowest in the world, amounts to less than 100 INR (around 3 US $) per capita per year (only 0.9 percent of GDP compared to an average of 2.8 percent for developing countries) and more than 80 percent of government budgets are earmarked for salaries, leaving very little funds for drugs and other consumables[47]. According to the National Sample Survey Organization (NSSO) data, 55th Round, households spend about five to six percent of their total consumption expenditure on health, which is 11 percent of all non-food expenditure. In a year, direct out-of-pocket payments could push 2.2 percent of all healthcare users and one-fourth of all hospitalized patients, into poverty[47]. Though small these percentages, translate into substantial numbers considering our huge population. They also exclude those who do not seek care or reach the health care system for various reasons.

With respect to Kerala, the per capita government health expenditure as a proportion of the State Domestic Product (SDP), which was one among the highest for any Indian state, decreased by 35 percent between 1990 and 2002 making it, one of the states with the highest reduction in public contribution and the highest increase in private funding for health care.[48] The effect of this imbalance – a result of the lax regulations in establishing private health care institutions and the dramatic rise in disposable incomes among the population[49] – is evident everywhere in the state from the crumbling public health care system to the mercurial rise of health care costs, making a mockery of the so-called Kerala model – Good Health at Low Cost.

2.6 Rationale for the study

While various expenditure estimations have been done for CAD, most of them have been done from the health system point of view, in terms of 'costs of production' of care and services. In the United Kingdom, it has been estimated that 70 percent of the cost of treating CAD go towards drug therapy and only 25 percent towards hospital treatment in addition to substantial 'informal care cost' and 'productivity cost'[50] while in the United States, treatment costs were found to be greater when additional risk factors like obesity were involved (33 percent and 70 percent greater annual inpatient costs in obese and very obese patients respectively).[51] This macro-level approach - where everything is viewed as cost to the state machinery - may hide micro-level consequences to the population, hence the rationale for my study. The following questions were addressed in this study (Fig: 2.1)

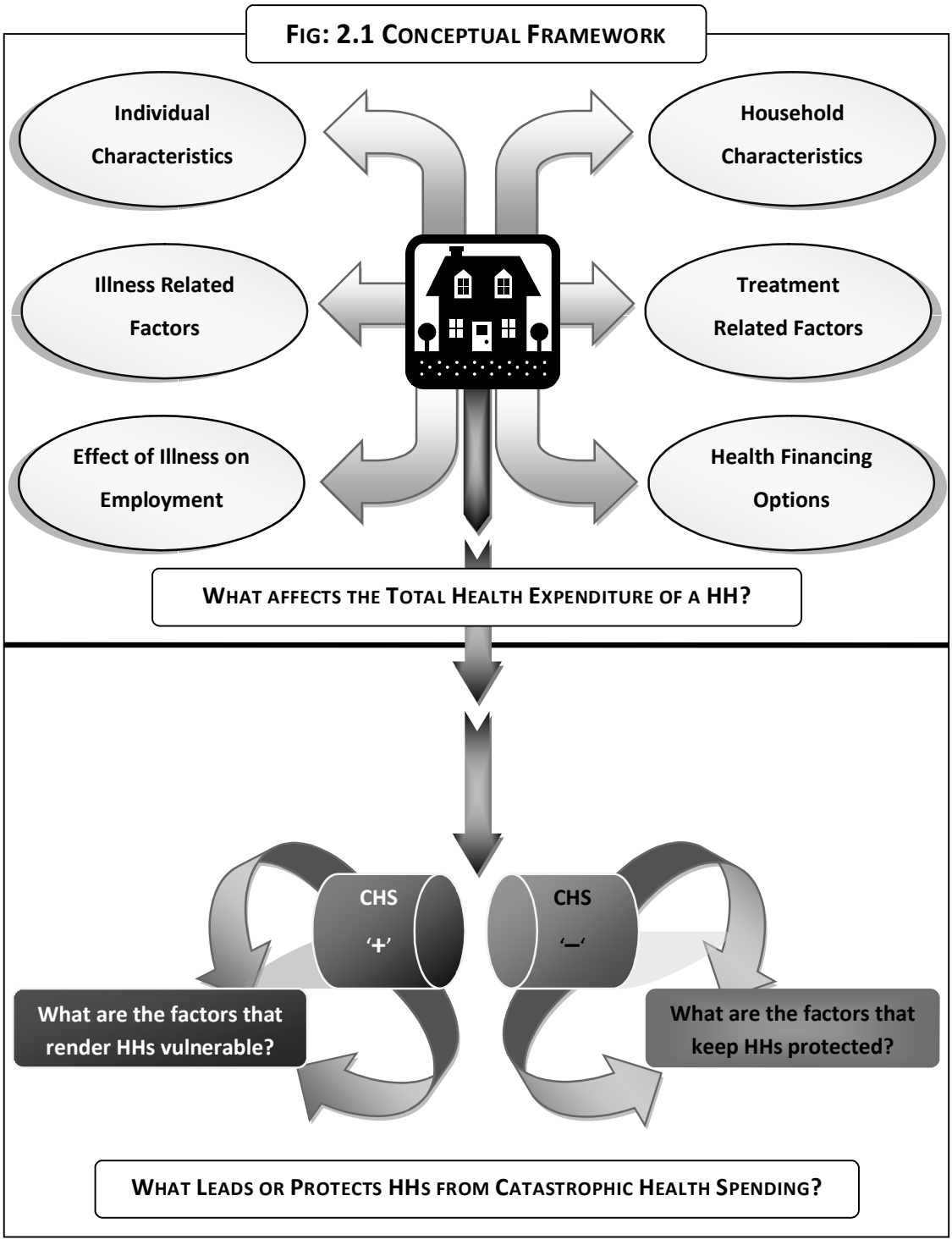
1. What are the various costs (direct and indirect) to the patient and his/her household related to the treatment and management of Acute Coronary Syndrome?
2. What mechanisms do households employ to manage the direct expenses?

3. What is the association between the estimated costs and 1) socio-demographic characteristics 2) illness and treatment related factors and 3) availability of financing options?
4. What proportion of the HHs in the study experience 'catastrophic health spending'?
5. What are the factors that protect or render HHs vulnerable to 'catastrophic health spending'

2.7 Study objectives

The study objectives included the following:

1. To estimate the household-level expenses, both direct and indirect for the treatment of Acute Coronary Syndrome
2. To study the options exercised by households to manage their direct expenses
3. To find out the association, if any, between the estimated expenditure and socio-demographic characteristics (both individual and household), illness and treatment related factors, and availability of financing options.



Source: Author, 2008

3. METHODOLOGY

3.1 Ethical clearance

Ethical clearance was obtained from the Technical Advisory Committee (TAC) and the Institutional Ethics Committee (IEC) of SCTIMST. Permissions were also obtained from the six hospitals selected to participate in the study.

3.2 Study setting

Participants were selected from six hospitals in Trivandrum district through a hospital based Acute Coronary Syndrome registry running in Kerala state. The hospitals were selected in a manner that ensured the inclusion of all socio-economic strata – two public hospitals, two large private hospitals with cardiac catheterization facilities and two medium private hospitals with a cardiologist but no cardiac catheterization facilities. All patients residing in Trivandrum district who fulfilled the terms of the inclusion and exclusion criteria were included in the sampling frame.

3.3 Study design

The study was predominantly a cross-sectional survey but also included two case studies to explain the gaps that could not be captured through the survey.

3.3.1 Sample size

Sample size calculation was done using the following formula:

Sample size, $n = 2(Z_{1-\alpha/2} + Z_{1-\beta})\ \sigma^2 / \Delta^2$, where:

$\sigma \rightarrow$ Standard deviation of expenditure = INR 60,000

$\Delta \rightarrow \left| x_1bar - x_2bar \right|$ (expected difference in means) = INR 50,000

α error = 0.05 $\rightarrow Z_{1-\alpha/2} = 1.96$

Power of the test, $(1 - \beta) = 90\% \rightarrow Z_{1-\beta} = 1.28$

The above assumptions were based on one year in-patient and out-patient expenditure (in Indian Rupees - INR) of 30 patients in three income categories admitted with Acute Coronary Syndrome under department of Cardiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology.

The minimum sample size required to compare any two groups was calculated to be 30 each. To consider three Socio-economic (SES) categories and two age-groups, i.e. total of six categories, the required minimum sample size was 180. Since SES grouping was done only at the time of analysis, data were collected from 210 participants in order to pre-empt any deficiencies in numbers across required categories. (Table: 3.1)

Table: 3.1: Survey sample by age and socio-economic strata 2008

Age groups → / **SES groups ↓**	**< 55 years**	**≥ 55 years**	**Total**
SES 1 – low	36	34	70
SES 2 – middle	36	34	70
SES 3 – high	33	37	70
Total	105	105	210

Source: Primary survey, 2008 Trivandrum

3.3.2 Sample selection

Participants were selected by stratified random sampling based on two age categories, < 55 years and ≥ 55 years. Field level tally for age groups had to be maintained as age was found to be grossly under-reported in one of the public hospitals. That younger people tend to be treated on a priority basis was the explanation offered by the respondents as the reason for this widely prevalent practice. The state government retirement age of 55 years was used as the cut off for the age groups. It was ensured that the final number reflected the same proportion as the registry in terms both sex and hospital-wise distribution. The inclusion and exclusion criteria as it applies to this study are given below.

a. Inclusion criteria

1. Men and women 25 to 70 years of age
2. First episode after March 1, 2007 and at least 6 months before date of interview
3. All patients with classical signs and symptoms of ACS and diagnosed as follows:
4. Chest pain consistent with ACS with at least one of the following: electrocardiograph changes or enzyme elevation

b. Exclusion criteria:

1. Pregnant women
2. Co-morbidities that require regular treatment or hospitalization (other than diabetes, hypertension and its related complications) like stroke / peripheral vascular disease
3. Prior documented myocardial infarction
4. Deaths

3.4 Data collection

Data collection was carried out from 15 June to 10 September 2008 by the principal investigator at the residence of the study participants, except in a few cases based on their request. Of the total 280 patients who were randomly selected, attempt was made to contact 262 patients. Of these, 23 were found to have expired in the months prior to the survey, 14 patients could not be traced due to wrong addresses or change of addresses or were unavailable as they were working abroad or in other states or districts, 12 had to be excluded as they were found to fulfill the exclusion criteria at the time of survey and three expressed disinterest to participate in the study. The response rate was 210/239 = 87.9 percent (excluding deaths).

Care was taken to ensure the privacy and confidentiality of the participants and their households. Data collection was carried out only after obtaining informed consent.

Interviews were mostly conducted at the residence of the participants or a place chosen by the participants as spending patterns and the lack of treatment availed for even serious health conditions are often a result of lack of financial resources and not indifference or unwillingness and therefore was treated as sensitive information. An additional informed consent with particular reference to the use of a voice recording device was obtained from the two households which were selected as case studies.

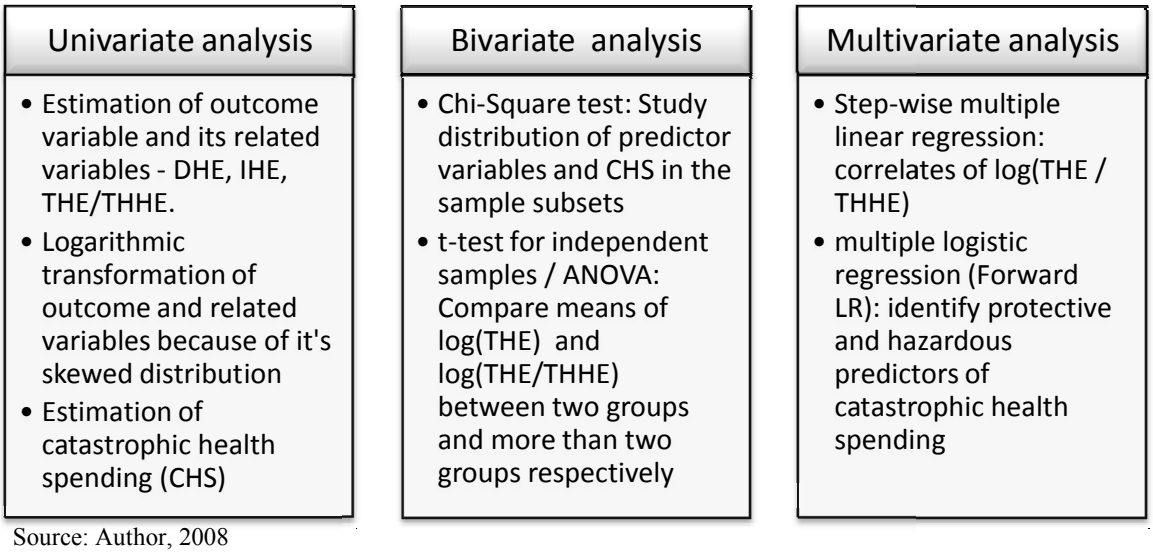
3.4.1 Data collection tools

For the cross-sectional survey, the data were collected using a locally translated and pre-tested structured interview schedule. (Annex: 1) Written informed consent was obtained prior to the interview. (Annex 2) The interview schedule was pre-tested both in the cardiology out-patient as well as in the community and took no more than 40 minutes. The two case studies were done only after completion of survey. The interaction between the investigator and the household members was recorded and in addition, field notes were maintained to record the various observations. The interview schedule (Annex: 1) was divided into nine sections. Section 3 to 7 dealt with the various expenditures that were related to the disease and its treatment and management. Since the SES stratification and catastrophic health spending estimates were based on household expenditure, section nine had a detailed exploration of the household's spending (both food and non-food expenditures) over the past one year or the past one month as the case may be.

3.5 Data entry and analysis

Data entry was done using Epi-data, version 3.1 and data analysis was done using SPSS for Windows, version 15.0. Fig: 3.1 describes the framework for the analysis that has been described in the subsequent chapters. Details regarding the outcome and predictor variables are discussed subsequently.

Fig: 3.1 Framework for analysis



Source: Author, 2008

3.5.1 Outcome and related variables

The outcome variable, total health expenditure was calculated for a reference period of nine months and converted to per capita per month figures for the purpose of analysis and ease of comparison. The reference period was identified by the acute event which was defined as first episode of acute coronary syndrome which occurred after March 2007 but at least 6 months prior to date of interview. (Refer to Fig. 4.1)

The three months before the acute event was the pre-event period and any ACS related expenditure collected for this period mainly dealt with two issues (Q26 – Q28). Firstly, if a patient has been symptomatic or unwell in the months preceding the acute event and had visited many providers, but was unable to get a proper diagnosis or treatment, then the expenses related to this becomes important. ACS symptoms were frequently confused with that of acute gastritis and it was possible that a patient who finds no respite from the prescribed treatment is forced to go back again and again for symptom relief. Alternately, patients may choose to disregard the advice once the acute symptoms subside and takes it seriously only when they recur. Both these scenarios are very common and familiar to anyone who has worked in a hospital setting. Secondly, patients who already had prior

co-morbidities like diabetes, hypertension or dyslipidemias, may already be on medication and regular follow-up for the same. Since this information was captured post-event, it was also collected pre-event to avoid any imbalance.

The post-event period starts with the acute event and information was collected for the subsequent six months only. The expenditures incurred during this period were captured under three headings; hospitalization expenses including expenses incurred for transport and bystanders (Q32 – Q34); the non-hospitalization expenses which included all expenses incurred after the acute event and in between the various hospitalization episodes including expenses incurred on medication and any special family arrangements made to take care of either the patient or other dependents in the household as a direct consequence of this illness (Q35 – Q40) and income loss to the patient, primary care giver or any other household member resulting either from their jobs being adversely affected or from the necessity of availing leave or forgoing work days (Q42 – Q51). As a general rule, if a hospitalization episode started within the reference period, it was included in the study irrespective of when the episode concluded.

The information related to current medication was collected (Q40), however, it was not analyzed as it was found to offer no additional significance to the analysis at this stage. The data obtained from Q54 regarding the amounts raised through the various financing options was incomplete and could not be included in the analysis. The outcome variable and all its related variables were calculated as follows:

a. **Total health expenditure (THE):** The sum total of all expenditures (excluding any reimbursements) related to acute coronary syndrome in the reference period was calculated as per capita per month figures.

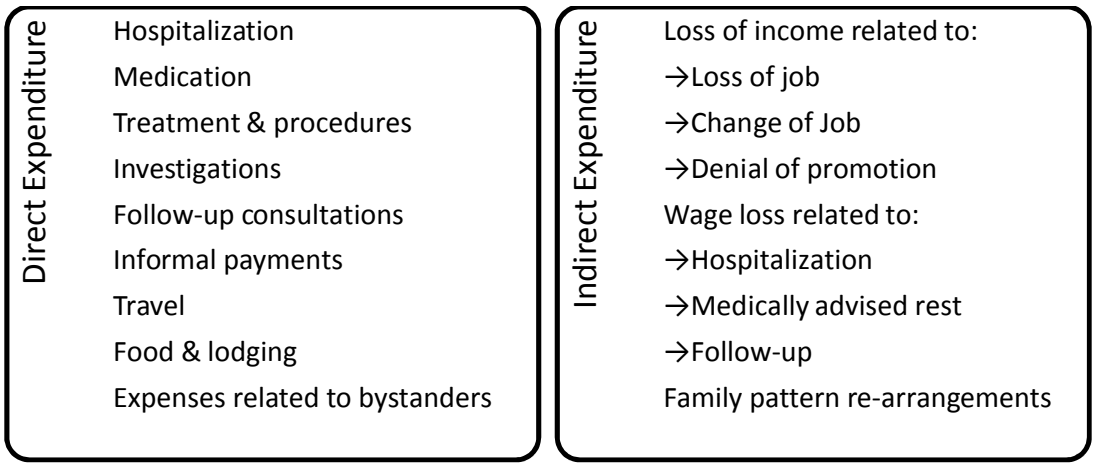
b. **Direct health expenditure (DHE):** The sum total of all direct expenses (excluding any reimbursements) related to acute coronary syndrome in the reference period calculated as per capita per month figures. (Fig: 3.2)

c. **Indirect health expenditure (IHE):** Sum total of all indirect health expenditures for the 6 months after the acute event calculated as per capita per month figures.(Fig: 3.2)

d. **Total health expenditure as a proportion of total household expenditure (THE/THHE):** Ratio of THE divided by THHE to indicate what proportion of a household's total consumption expenditure is spent for the treatment and management of acute coronary syndrome in the reference period. This variable was constructed and extensively used in the analysis as it gives a more realistic picture of the situation taking into account; a household's spending capacity in terms of its consumption expenditure. While it is important to know what the actual expenditure is in monetary terms, it is more important to know how much the same expenditure measures in terms of a household's economic capacity.

e. **Income loss as a proportion of total household expenditure (IL/THHE):** This ratio was constructed to extract information regarding the extent of income loss and the type of households who are the most affected as a result of ACS.

Fig: 3.2 Direct and indirect expenditures as used in the study

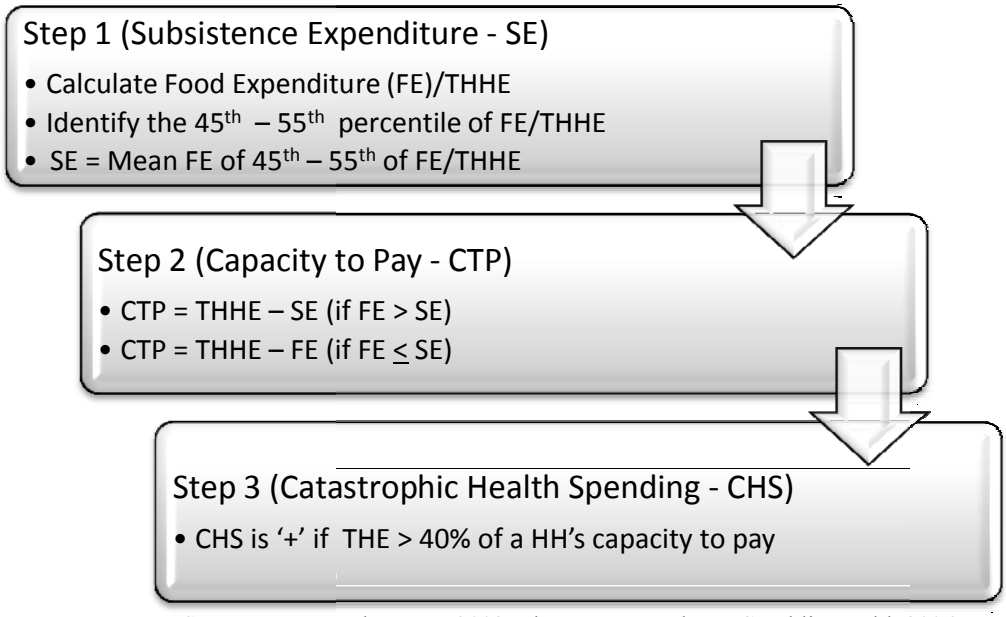


Source: Author, 2008

f. Catastrophic health spending[26,42]

The concept of 'catastrophic health spending' is not new and the debate regarding the best definition is an ongoing one. Various definitions involving varied thresholds such as 10 percent of annual household income[52] or expenditure[45], difference between pre- payment and post-payment dollar-a-day or $2-a-day poverty head count,[53,54] etc have been used. The 40 percent threshold methodology developed and defined by Xu K et al[26,44] from the of department of Health Systems Financing, Health Systems and Services of the World Health Organization[44] has been used recently to produce CHS estimates across 89 countries covering 89 percent of the world's population[44]. The same methodology has been used in this study in order to identify households that had experienced catastrophic health spending as a result of managing acute coronary syndrome (Fig: 3.3).

Figure: 3.3 Steps in Calculation of Catastrophic Health Spending



Source: Xu K et al, Lancet 2003, Thuan NBT et al, BMC Public Health 2006

3.5.2 Predictor variables

Five categories of predictor variables have been used in this study (Table: 3.2). Since both individual and household factors can influence the expenditures in a household, these

have been considered separately. Further, factors that are related to the illness per se, its treatment and management have also been measured as they directly influence the health expenditure. The indirect expenditure is a direct reflection of the effect the illness has on employment and this was painstakingly explored. Health financing mechanisms in the form of either health security or coping mechanisms like selling assets and availing loans have also been examined as this has a direct bearing on the manner in which a household handles the direct expenditure involved. The variables that have measurement issues and the composite variables that were constructed have been discussed here. Other variables that are self-explanatory are only mentioned in the table below.

Table: 3.2 List of predictor variables

I. Individual characteristics	**IV. Illness and treatment related factors**
Age	Prior co-morbidities
Sex	Clustering of co-morbidities
Place of residence	Duration of symptoms
Marital status	Number of providers
Patient's education	Number of admissions
Patient's occupation	Type of treatment
	Type of Facility
II. Household characteristics	Hospitalisation facility
Socio-economic status	Facility for follow-up
Household size	
Dependency burden	**V. Health financing options**
Head of household	Savings
Highest education in HH	Health security
HH Occupation	Sale of assets
HH Indebtedness	Loans: financial institutions or money lenders
	Assistance: family and friends
III. Effect of illness on employment	Subsidy or bill reductions
Effect on patient's job	Under-treatment due to expense
Effect on primary caregiver 's job	
No. of paid working days lost	

Source: Author, 2008

a. Socio-economic status (SES)

Total household expenditure was taken as the proxy for socio-economic status. Though data on monthly household income was collected, it was found to have no correlation with the total expenditure in a household and hence was not used for analysis. In

developing countries, expenditures, rather than income, are commonly used as a measure of SES, since they tend to vary less than income and households tend to understate their income in general.[42] While expenditures may also include spending by borrowing, it has been assumed that a household's borrowing capacity is an indirect reflection of their socio-economic standing.

Total household expenditure (THHE) was calculated as the per capita per month expenditure of a household using the data collected through section eight of the interview schedule (Annex: 1). THHE was further divided by the 33.3rd percentile and the 66.6th percentile into low, medium and high SES.

b. Household occupation

Household occupational groups were constructed using a subjective hierarchy based on prevalent norms in the society. For the purpose of the study, 'regular' jobs are defined as 'permanent' employment with benefits like leave, pension/gratuity on retirement, health security benefits for the individual and dependent members of the family, etc and 'retired' is defined as retired from government service with similar benefits as described earlier. 'Contract' employment refers to employment that has a stipulated time period and is devoid of the described benefits. 'Self-employed' includes all small, medium or large business owners and also includes any paying enterprises or endeavors initiated or owned by the individual or the family in question such as being an insurance agent. Daily wage earners include all unskilled, semi-skilled or skilled laborers who are paid on a daily basis. Unemployed included both the category of people who are unemployed but able to work and unemployed but unable to work due to illness or other factors. Homemakers in this study setting included only housewives. This was in no way meant to belittle a housewife's contribution to her household or to say that being a house-wife was unproductive or non-contributory to family income. Since only actual monetary

transactions in the form of payment for health care or household expenses and loss of income in terms of loss of existing income was considered, it was beyond the scope of this study to attribute a monetary value to the loss incurred by a household in terms of value of the time and contribution of a home maker. HH occupation was categorized into four and it was done in such a way that any HH who had either a regular employee or a retired individual was grouped into the first category. Of the remaining households, those who had either a contract employee or a self-employed individual were grouped into the second category. Similarly the third category consisted of HHs whose earning members were exclusively daily wage earners and the last category comprised of households with no earning members.

c. Dependency burden and household size

Initially a variable called dependency burden was constructed as a ratio of number of non-earning members to the number of earning members. Households with two or less dependents per earning member were grouped to form one category and those with more than two dependents per earning member formed the second category. All households without any earning members were grouped together into a third category. This variable was however unable to capture the true effect of dependency probably because many of the households who had no earning members were in reality being externally supported by children, spouse or even siblings. The household size which included both earning and non-earning members was used as the alternative and offered a better reflection of the effect of household size on expenditure patterns.

d. Type of facility

In this study the number of hospitalizations ranged from one to five. Individuals who were admitted only in public health facilities and only in private facilities for all their hospitalization episodes were grouped to form the categories, ‘public only’ and ‘private

only' respectively. 'Others' include all those who had shown no consistent pattern with respect to choice of facility for admission and also those who were admitted in charitable and other institutions, as they comprised a very small number. Similar grouping was done according to facility used for follow-up visits and both of these were combined to form 'type of facility'

e. Type of treatment

The category 'medical treatment only' comprised of those individuals who were either only thrombolysed or only received some form of medical treatment. Individuals who underwent an angiogram but no revascularization procedure irrespective of whether they received medical treatment were grouped together into 'up to angiogram only'. All individuals who underwent a revascularization procedure in the form of either Per-cutaneous Trans-luminal Coronary Angiography (PTCA) or Coronary Artery Bypass Grafting (CABG) or both have been grouped to form the last category, 'angioplasty and above'.

f. Under-treatment due to expense

The interview schedule had two separate questions to assess whether a prescribed treatment (Q31) or the regular follow-up medication (Q39, option2) was unaffordable to the respondent. These two were combined to form the above variable which indicates whether an individual 'undertreated' her (him)self because (s)he could not afford the same.

g. Health financing

Of the various options exercised by the households to finance the treatment (Q54), the various types of loans and asset sales were combined to form three separate variables. 'Treatment debt' describes all households who resorted to loans in one form or other or sale of assets for their treatment in addition to using other means such as savings or direct

payment from insurance or employer. ‘By debt alone’, portrays only those individuals who financed their treatment solely through loans or asset sales, that is, they had no other means of paying for the treatment. ‘New debt’ depicts those who had no prior loans or asset sales (based on reported HH indebtedness - Q60), but had to resort to these measures for the treatment of ACS, that is, they are the newly indebted group. The variable ‘Health Security for ACS’ on whether the expenses incurred for the treatment of ACS were partially or fully covered by any form of health security – reimbursement or some form of social, employer provided or private health financing mechanism – was extracted from Q52 as it was found to be more relevant for the study than Q23.

Due to the small numbers involved, all variables with more than two categories were further collapsed into dichotomous variables while performing bivariate and multivariate analysis that looked at the associations and predictors of catastrophic health spending.

4. RESULTS

The survey was completed for 210 respondents and their households. The mean age of the study population was 55.6 $\pm$ 8.9 years (25, 70) and the mean household size was 4.0 $\pm$ 1.6 (1, 13). The median reported per capita monthly household income was INR 1733 (64 - 63,000) and the median per capita monthly household expenditure (THHE) was INR 3051 (263 - 95,203). All expenditure values described in the study are in Indian Rupees (INR) and relate to 2007-08.

4.1 Socio-demographic and co-morbidity profile

Table: 4.1 and 4.2 gives socio-demographic profile of the study participants and their households respectively. Two age and three socio-economic status categories had comparable numbers as it was the basis for sample selection and household expenditure based stratification respectively (Table: 3.1). Eighty three percent of the study respondents were men and only 17 percent were women since the sampling frame itself had fewer women as compared to men. Forty six percent of women were widowed as compared to only five percent of men. Fifty five percent of the study respondents resided in rural areas and 53 percent were educated only till secondary school and a significant proportion of them belonged to the lowest socio-economic strata (71% and 74% respectively). It was interesting to note that all the three reported co-morbidities were distributed as well as clustered almost uniformly in the study respondents across various socio-demographic groups with 54 percent having type 2 diabetes, 57 percent having hypertension and 68 percent having dyslipidemias. Only 13 percent had no reported co-morbidities while 26 percent had all three.

Table: 4.1 Individual characteristics of the study sample 2008

Variable	< 55 yrs n = 105	≥ 55 yrs n = 105	Total N = 210
Sex			
Male	92 (87.6)	83 (79.0)	175 (83.3)
Female	13 (12.4)	22 (21.0)	35 (16.7)
Place of residence			
Urban	52 (49.5)	43 (41.0)	95 (45.2)
Rural	53 (50.5)	62 (59.0)	115 (54.8)
Patient's education*			
≤ Secondary School	46 (43.8)	66 (62.9)	112 (53.3)
> Secondary School	59 (56.2)	39 (37.1)	98 (46.7)
Marital status*			
Currently married	100 (95.2)	84 (80.0)	184 (87.6)
Others	5 (4.8)	21 (20.0)	26 (12.4)
Prior co-morbidities [a]			
Diabetes Mellitus	53 (50.5)	61 (58.1)	114 (54.3)
Hypertension	57 (54.3)	62 (59.1)	119 (56.7)
Dyslipidemias	74 (70.5)	64 (64.8)	142 (67.6)
Clustering of co-morbidities			
No co-morbidity	16 (15.2)	11 (10.5)	27 (12.9)
Any one co-morbidity	20 (19.0)	25 (23.8)	45 (21.4)
Any two co-morbidities	43 (41.0)	41 (39.0)	84 (40.0)
All three co-morbidities	26 (24.8)	28 (26.7)	54 (25.7)

Source: Primary survey, 2008 Trivandrum

[a] Total does not add up to 210 as the co-morbidity groups are not mutually exclusive, *Chi-square p-value < 0.05 levels, **Chi-square p-value < 0.001

The lower SES were almost always found to be at a disadvantage in the distribution of socio-demographic variables. In terms of occupation, 45 and 21 percent of the households had regular or retired employees and daily wage earners respectively; however their distribution across the three SES groups was skewed with the regular employed households concentrated in the highest SES and the daily wage households in the lowest SES. Similarly proportion of households with more than two dependents per earning member and household size more than three was higher in the low SES group. Health security coverage was available for this illness in only 35 percent of the households with the least proportion (7%) again concentrated in the low SES. Of the four daily wage households who were in the high SES, two had multi-tasking skilled laborers and two

owned rubber plantations and all four generated average revenues in excess of INR 500 daily.

Table: 4.2 Household characteristics of the study sample 2008

Variable	Low SES n = 70	Middle SES n = 70	High SES n = 70	Total N = 210
Head of HH*				
Patient / Spouse	68 (97.1)	62 (88.6)	68 (97.1)	198 (94.3)
Others	2 (2.9)	8 (11.4)	2 (2.9)	12 (5.7)
HH occupation**				
Regular / Retired	13 (18.6)	34 (48.6)	48 (68.6)	95 (45.2)
Self-employed / Contract	19 (27.1)	20 (28.6)	16 (22.9)	55 (26.2)
Daily Wage	31 (44.3)	9 (12.9)	4 (5.7)	44 (21.0)
No employed individuals	7 (10.0)	7 (10.0)	2 (2.9)	16 (7.6)
Dependency burden*				
≤ 2 dependents / EM	35 (50.0)	38 (54.3)	48 (68.6)	121 (57.6)
> 2 dependents / EM	28 (40.0)	25 (35.7)	20 (28.6)	73 (34.8)
No Earning Member (EM)	7 (10.0)	7 (10.0)	2 (2.9)	16 (7.6)
HH size				
≤ 3 members	21 (30.0)	22 (31.4)	33 (47.1)	76 (36.2)
4 members	28 (40.0)	26 (37.1)	23 (32.9)	77 (36.7)
≥ 5 members	21 (30.0)	22 (31.4)	14 (20.0)	57 (27.1)
Health security coverage for ACS**				
Yes	5 (7.1)	20 (28.6)	35 (50.0)	60 (28.6)
No	65 (92.9)	50 (71.4)	35 (50.0)	150 (71.4)
Reported HH indebtedness*				
Yes	27 (38.6)	36 (51.4)	43 (61.4)	106 (50.5)
No	43 (61.4)	34 (48.6)	27 (38.6)	104 (49.5)

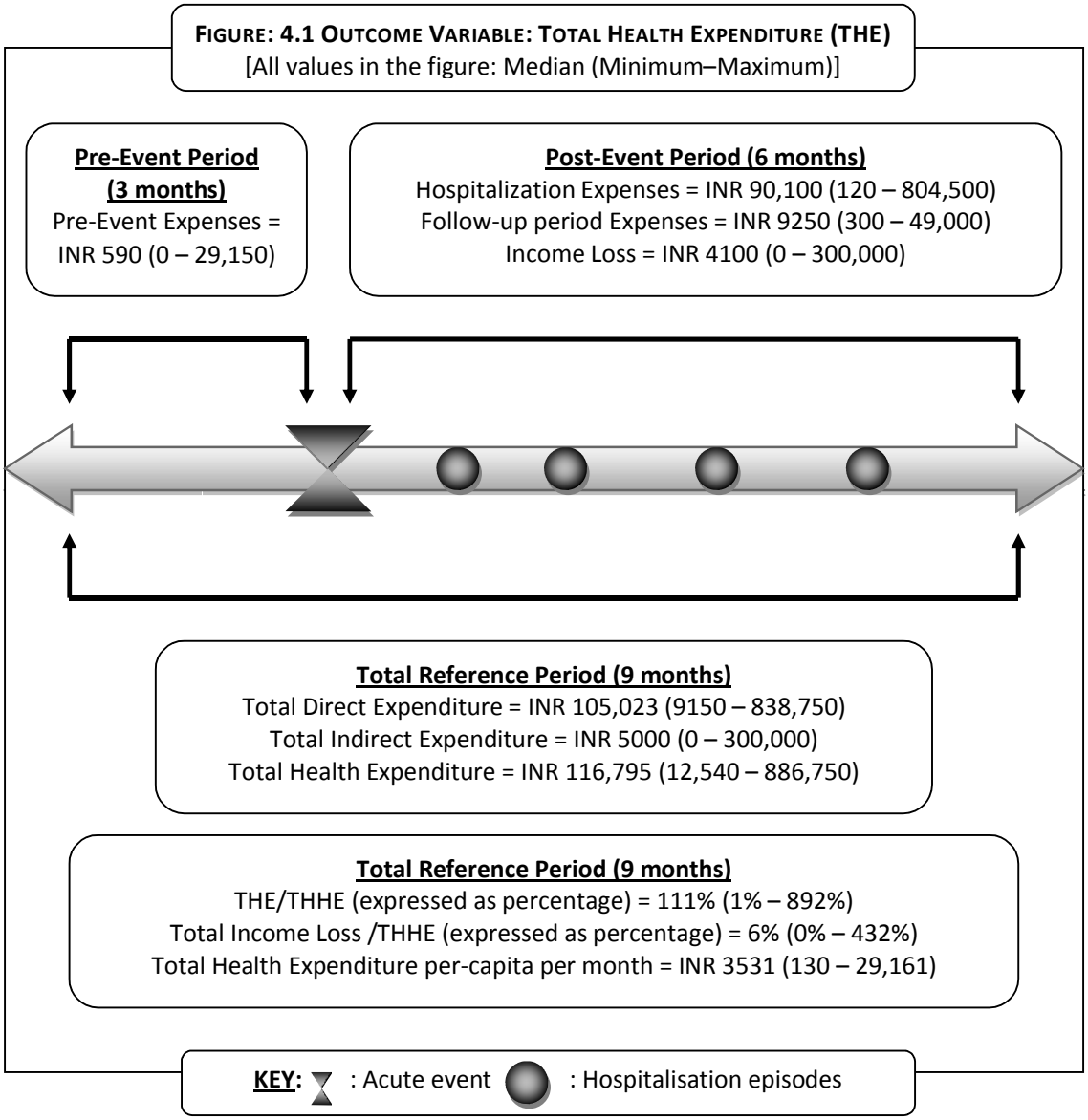
Source: Primary survey, 2008 Trivandrum

* Chi-square p-value < 0.05 levels, **Chi-square p-value < 0.001, EM – Earning member

In terms of household debt (includes asset sales), the pattern is interesting. The highest SES had the maximum proportion of indebted households (61%), suggesting that a good portion of the 'elite and globalised' life style is debt financed. This was specially evident when it came to expenditure incurred for children's education where households would be struggling to make both ends meet but children would be studying in capitation-based private professional colleges financed through educational loans or asset sales. Probably the hope that these children would bring salvation to the households once they pass out

and turn employed is the basis for this widespread practice. If that fails to happen, the repercussions on the households may be disastrous.

4.2 Outcome variable: total health expenditure (THE) and related variables



Source: Primary survey, 2008 Trivandrum

Figure: 4.1 describes the various ACS related expenditures as they are, along with the time periods involved. Subsequent to this, all expenditures mentioned in the text are in per capita per month numbers unless otherwise stated. Direct health expenditure that too

hospitalization expenses forms the bulk of the total health expenditure. The mean of total reimbursement amounts received as part of health security coverage was INR 36,788 $\pm$ 72,763 and this was subtracted from the overall figures when the total health expenditure was calculated. (Refer to section 3.5.1 for description of variable and reference periods)

4.2.1 Comparison of means: outcome variables by specific characteristics

All analyses were performed on log transformed variables, however, the values displayed are in Indian rupees for ease of understanding (Table: 4.3).

Mean percent of total health expenditure out of total household expenditure was significantly higher in rural areas (195%) compared to urban areas (110%). Similar trend was observed with respect to education with significantly higher mean percent among the lower educated (183%) as compared to higher (126%). Place of residence and patient's educational status were found to be effective proxies for socio-economic status and this probably accounts for the above trend [rural: 71% of low SES; $\leq$ secondary school: 74% of low SES]. Across the three SES groups, the results were as expected with the lowest SES spending the least in terms of total health expenditure but spending the highest in terms of proportion of their total household expenditure. The total health expenditure is the highest when the treatment involved revascularization procedures like Per-cutaneous Trans-luminal Coronary Angioplasty (PTCA) or Coronary Artery Bypass Grafting (CABG) and the least when all admissions were in public facilities only. Similarly, total health expenditure was more in households who had no health security or had to incur debt or sell assets for treatment. Conversely, the ACS related expenditure was less among those who could not afford the prescribed treatment and thus under treated themselves

.

Table: 4.3 Bivariate analysis: ANOVA / t-test for independent samples 2008

Variable	MeanTHE±SD in INR (N = 210)	Mean(THE/THHE±SD)% (N = 210)
Place of residence		
Urban	NS	110 ± 114**
Rural		195 ± 171**
Patient's education status		
Up to secondary school	NS	183 ± 173*
Above secondary school		126 ± 122*
SES groups		
Low	3193 ± 2850*	240 ± 195**
Middle	4624 ± 4271*	149 ± 113**
High	6644 ± 6368*	79 ± 88**
HH size		
≤ 3 members	6973 ± 6128**	
4 members	4179 ± 4199**	NS
≥ 5 members	2818 ± 2191**	
HH occupation		
Regular / retired	4979 ± 5481*	110 ± 112**
Self-employed / contract	5266 ± 4143*	165 ± 152**
Daily wage	2804 ± 1710*	189 ± 166**
No employed individuals [a]	7892 ± 7383*	307 ± 221**
Hospitalisation facility		
Public only	4012 ± 4494*	
Private only	5195 ± 5057*	NS
Others (including both)	5594 ± 5229*	
Effect on patient's employment		
Adversely affected	6257 ± 6078*	227 ± 191**
Not affected	4039 ± 3949*	117 ± 113**
Undertreated due to expense		
Yes	3302 ± 2568*	NS
No	5487 ± 5515*	
Health security coverage for ACS		
Yes	3750 ± 4236**	69 ± 74**
No	5249 ± 5105**	191 ± 164**
Incurred debt for treatment purposes		
Yes	5237 ± 4873**	184 ± 159**
No	3588 ± 4853**	72 ± 97**

Source: Primary survey, 2008 Trivandrum

*p-value < 0.05, **p-value < 0.00, NS – Not Significant

4.2.2 Comparison of means: related variables by specific characteristics

Comparisons were also done using the other related variables (log transformed). Since these variables were part of the main variables discussed in the earlier section, the table has not been displayed; only the important and statistically significant results will be highlighted. The higher age group was found to have higher mean direct expenditure (<55 years: INR 3453±3659, ≥ 55 years: INR 4446±4196) while the lower age group had higher mean indirect expenditure (<55 years: INR 1111±2355, ≥ 55 years: INR 631±1544). Those less than fifty five years tend to be employed and hence stood to lose more in terms of wage or income loss. Both proportionate health expenditure (THE/THHE: 189%) and proportionate income loss (IL/THHE: 45%) was highest for daily wage households even though they spend the least in absolute terms with 55 percent opting to be under-treated.

Both direct and consequently total health expenditure tend to increase significantly as number of admissions increased, type of treatment varied from medical treatment or thrombolyis to angiogram, PTCA or CABG and hospitalisation facility differed from 'public facilities only' to private and others. On the other hand, those who accessed only private facilities for both hospitalisation and follow-up were found to incur the least indirect expenditure with the mean number of paid working days lost being only 14.8 days for this category as compared to 31.0 days among those who used only public facilities. This difference is probably due to the minimal waiting time and post-procedural stay associated with private health care facilities.

4.2.3 Multivariate analysis: correlates of THE as a proportion of THHE

According to the multivariate model (Table: 4.4), the proportionate health spending for households was found to decrease significantly when household expenditure increased (or socio-economic status improved), household size increased, the afflicted person was male

and the household had some form of health security. On the other hand it was found to increase significantly when the treatment modality involved any form of revascularization procedure like PTCA or CABG, the patient' job was adversely affected, the household incurred debt or sold assets for treatment purposes and the households used either private facilities exclusively or there was no consistent pattern in the use of facilities for both admissions and follow-up.

Table: 4.4 Results of multiple linear regression: correlates of log (THE/THHE) 2008

Variable	Regression Coefficient 'b'	SE (b)	p-value
Constant	0.283	0.238	0.236
THHE [a]	-5.2×10^{-5}	0.000	< 0.001
HH Size [a]	-0.182	0.030	< 0.001
Sex			
Male	-0.270	0.134	0.045
Female [r]	Reference		
Type of facility			
Public only [r]	Reference		
Private only	0.382	0.117	0.001
Others including both	0.348	0.132	0.009
Type of treatment received			
Medical treatment only [r]	Reference		
Up to angiogram only	--	--	NS
Angioplasty and above	0.657	0.106	< 0.001
Effect on patient's employment			
Not affected [r]	Reference		
Adversely affected	0.431	0.110	< 0.001
Health security coverage for ACS			
Yes	-1.016	0.135	< 0.001
No [r]	Reference		
Incurred debt for treatment purposes			
Yes	0.520	0.130	< 0.001
No [r]	Reference		

Source: Primary survey, 2008 Trivandrum

Dependent Variable: Log (THE/THHE), [a] Predictor used in the model as a continuous variable [r] Reference category NS – Not significant**.** Other variables included in the model: Age, Place of residence, Patient's educational status and HH Occupation. [Model F-value: 43.341, p-value < 0.001, Adjusted $R^2 = 0.646$]

The proportionate health spending being higher for females, found in this study, can be indirectly inferred from some previous studies. Women tend to be older at the time of presentation with greater co-morbidities[29,30] which contributes to the increase in proportionate health spending. The mean age of the women in the study sample was 57.8±8.6 years as compared to 55.2±8.9 years for men and the older age group was significantly associated with higher direct expenditures. Moreover, 46 percent of women in the study sample were seen to access only private facilities for both hospitalisation and follow-up as compared to only 24 percent of men and accessing private facilities was also significantly associated with higher expenditures.

When it came to household size, there was an apparent contradiction, as households with more members seemed to be spending less on treatment. This however was a reflection of the inequality in disposable income. As household size increases, it is usually the number of dependents who increase and not earning members. This was true for this study sample as well. While the numbers of dependents vary from zero to ten (mean: 2.5±1.5) across various households, the numbers of earning members only range from zero to four (mean: 1.5±0.9). This means that the disposable income for a household was provided on an average by one or two earning members. Consequently, when the household size increased, the disposable income decreased and all mean expenditures tend to fall. As household size increased from three or less to five or more, the average household consumption expenditure fell from INR 7462±11,693 to 3013±1769 and the average ACS related health expenditure fell from INR 6973±6128 to 2818±2191.

4.3 Outcome variable: catastrophic health spending (CHS)

84 percent of the study households were found to have experienced catastrophic health spending as a consequence of treating and managing acute coronary syndrome. Only 16 percent of the households were spared from incurring catastrophic payments.

4.3.1 Bivariate analysis: catastrophic health spending by specific characteristics

Catastrophic health spending had graded prevalence across all socio-economic strata and all sample subgroups. (Table: 4.5) For all analyses involving CHS, variables with more than three categories were collapsed to form dichotomous variables as the numbers in the CHS'-' group was very small (n=34).

Table: 4.5 Results of bivariate analysis: catastrophic health spending (CHS) 2008

Variable (N = 210)	CHS '+' (n = 176)	CHS '-' (n = 34)
Place of residence*		
Rural (n=115)	104 (90.4%)	11 (9.6%)
Urban (n=95)	72 (75.8%)	23 (24.2%)
Patient's educational status*		
Up to secondary school (n=112)	101 (90.2%)	11 (9.8%)
Above secondary school (n=98)	75 (76.5%)	23 (23.5%)
SES groups**		
Poor (n=70)	69 (98.6%)	1 (1.4%)
Non-poor (n=140)	107 (76.4%)	33 (23.6%)
HH occupation**		
Regular employment (n=150)	118 (78.7%)	32 (21.3%)
Irregular employment (n=60)	58 (96.7%)	2(3.3%)
Effect of illness on patient's employment**		
Adversely affected (n=74)	72 (97.3%)	2 (2.7%)
Not affected (n=136)	104 (76.5%)	32 (23.5%)
Undertreated due to expense*		
Yes (n=64)	60 (93.8%)	4 (6.3%)
No (n=146)	116 (79.5%)	30 (20.5%)
Health security coverage for ACS**		
Yes (n=60)	37 (61.7%)	23 (38.3%)
No (n=150)	139 (92.7%)	11 (7.3%)
Incurred debt for treatment purposes**		
Yes (n=157)	146 (93.0%)	11 (7.0%)
No (n=53)	30 (56.6%)	23 (43.4%)

Source: Primary survey, 2008 Trivandrum
Percentages go row-wise, * Chi-square p-value < 0.05 levels, **Chi-square p-value < 0.001

CHS was even present among 77 percent of those who had studied above secondary school, 76 percent of non-poor, 76 percent of those with regular employment, 77 percent

of those whose jobs were not adversely affected, 80 percent of those who did not under-treat themselves, 62 percent of those who had health security and 57 percent of those who did not avail loans or sell assets for treatment financing. The potential impact of these numbers on society can only be devastating.

4.3.2 Multivariate analysis: predictors of catastrophic health spending

Only being non-poor and having health security were found to be protective while undergoing any revascularization procedure, patient's job being adversely affected and being newly indebted were found to be hazardous predictors for catastrophic health spending. (Table: 4.6)

Table: 4.6 Results of multiple logistic regression: correlates of CHS 2008

Variable	p-value	Adjusted Odds Ratio (OR)	95% CI for Adj. OR	
			Lower	Upper
SES groups				
Poor[r]		Reference		
Non-poor	0.015	0.069	0.008	0.591
Type of treatment received				
No intervention[r]		Reference		
Any intervention	0.044	3.237	1.031	10.157
Effect of illness on patient's employment				
Adversely affected	0.012	7.213	1.539	33.799
Not affected[r]		Reference		
Health security coverage for ACS				
Yes	0.001	0.167	0.056	0.494
No[r]		Reference		
New debt for treatment purposes only				
Yes	0.014	6.969	1.479	32.851
No[r]		Reference		

Source: Primary survey, 2008 Trivandrum

Dependent variable: catastrophic health spending (CHS), Other variables included in the model: Age group, Sex, Place of Residence, HH Size, HH Occupation, Type of Facility, Undertreated due to Expense [Model Nagelkerke R^2: 0.433, Chi-square for the model: 61.597, p-value: < 0.001]

Minimizing income inequalities or the rich-poor divide; the only way to increase the proportion of non-poor is a very slow process and requires considerable commitment and

motivation from the political establishment. Forgoing needed interventions to avoid catastrophic expenditure is not a practical solution and is the choice currently being exercised by poorer households. The only viable alternative is the provision of a health security measure. This has a dual advantage in that, households especially the most vulnerable can, not only avail treatment which otherwise they may not even seek due to financial inaccessibility, but they can also be spared from resorting to debt or asset financing thereby securing them against future risks as well.

4.4 Health financing

One of the objectives of this study was to study the options exercised by households to manage the direct expenses involved. Even though numbers were small, this section had some important findings which cannot be overlooked and hence has been considered separately. (Table: 4.7)

Table: 4.7 Forms of health financing 2008

Form of health financing [a]	HS not available n = 150 (%)	HS available n = 60 (%)	Total N = 210 (%)
Savings*	53 (35.3)	32 (53.3)	85 (40.5)
Sale of assets**	24 (16.0)	0 (0.0)	24 (11.4)
Unsecured loans**	87 (58.0)	8 (13.3)	95 (45.2)
Mortgage of assets*	46 (30.7)	9 (15.0)	55 (26.2)
Mortgage of land [b]	5 (3.3)	0 (0.0)	5 (2.4)
Assistance / gift *	61 (40.7)	14 (23.3)	75 (35.7)
Direct payment**	0 (0.0)	26 (43.3)	26 (12.4)
Subsidy / bill reduction**	42 (28.0)	4 (6.7)	46 (21.9)
Newly indebted**	66 (44.0)	9 (15.0)	75 (35.7)
By debt alone**	97 (64.7)	0 (0.0)	97 (46.2)
Treatment debt**	132 (88.0)	25 (41.7)	157 (74.8)

Source: Primary survey, 2008 Trivandrum

[a] Numbers and percentages do not add up as categories are not mutually exclusive, [b] cell numbers inadequate for chi-square test *chi-square p-value < 0.05, **chi-square p-value < 0.001 HS – Health Security in the form of reimbursement, insurance, etc, Direct payment: directly from employer / insurance / ESIS / ECHS / CGHS

The use of all forms of health financing except savings and direct payment was significantly more among those who had no health security coverage for ACS. Of these, sale and mortgage of property was resorted to, entirely by this group, implying that these measures were probably exercised when all other options fail. Subsidies and bill reductions were received by 28 percent of those who did not have any health security as opposed to seven percent who had. Forty six percent of the study participants financed their treatment exclusively through borrowings or asset sales and without exception, none of these households had any health security. With the rapid increase in ACS incidence across all socio-economic strata, the fact that 44 percent of previously debt-free households had to either avail loans or sell assets for treatment over these nine months, is indeed, a matter of concern, especially considering that 41 percent among the newly indebted group had opted to under-treat themselves.

That the availability or non-availability of health security was an important factor in influencing decision making regarding the type of coping mechanism employed by a household is evident. This was also true in the case of both 50 year old Mr. Mani[1] who lived with his wife and two children in the heart of the city as well as 66 year old Mr. Kumar[1] who lived with other inmates in an old age home.

[1] Names have been changed in keeping with the confidentiality terms provided for in the informed consent

4.5 Case studies

Mr. Mani, who was a diabetic and hypertensive prior to his illness, was diagnosed to have acute coronary syndrome at one of the major public hospitals in the city. He returned home after his angiogram as he did not have the financial means to undergo the revascularization procedure advised by the doctors, even though he was offered subsidized treatment in lieu him being a daily wage earner. However, he had to be readmitted and underwent PTCA when his symptoms recurred. He spent a total of INR 79,567 on both his admissions. His treatment was financed solely through borrowings from the local money lender and his family. His wife proudly attests to the fact that in his hey days he was one of the most able bodied men and used to work seven days a week earning an average of INR 775 daily. His illness however left him unable to continue his previous work. He can barely walk without chest pain to the agarbatti rolling factory where he currently works doing only supervision for INR 30 a day. One of his sisters washed her hands off him when he went to her for assistance fearing that she will have to share his financial burden.

"Right now, I am staying with my sister, so that I don't have to pay rent, water or electricity charges. But there is a limit to being a burden on someone, isn't it?"

"I am not sure how long I can take my medicines. I have a credit account with the local pharmacy. Because they know my condition, they give me medicines regularly, But for how long?"

"How can I sit at home? Even my daughter, who is still studying takes tuitions before she goes for her classes and my wife has also started working. So, I have to at least do my share."

Mr. Kumar, a retired government employee, was asked to make a one time payment for some additional retirement benefits which included a government health security package, XXXX[2] for pensioners like him about three or four years back. At the time, he says, he did not think too much about it and paid up as it was a small amount and he could very well manage. A widower, he had been estranged from his children for more than 5 years and had found refuge in an old age home in the city where he had been staying for the last two years. The rent at the home was a very nominal INR 2000 and including all his other needs, his monthly expenses fell well within his monthly pension of INR 3800. It was there that he suddenly became ill and collapsed and his friends rushed him to one of the private hospitals in the city. As he was retired and could avail the health security provided by his erstwhile employer, he was transferred to one of the leading public hospitals in the city where he underwent an angiogram followed by PTCA, all within the space of five days. He spent a total of INR 1,85,580 on that one admission but as he describes, he did not feel the pinch since it was directly paid by the concerned government office. His regular follow-up visits were also paid for, including medicines and consultation charges, he only had to manage his transportation expenses. Many of his friends who opted out of the scheme initially have subsequently been forced to reconsider in the face of similar circumstances. He feels overwhelmed while recounting these details; in his opinion, managing both his day to day

> "If it was not for XXXX[2], I would not have survived. There is no way; I could have found this money at such short notice. Even if I had to take a loan, how would I have repaid it on my pension?"

> "I don't have to pay even a rupee for my medicines. When the local pharmacist told me that my monthly medicines which I get free are worth around Rs. 3000, I got a shock. I don't know how I would have managed if I had to pay for it myself."

[2] Name of the health security scheme has been masked to avoid drawing inferences based on the type of financing mechanism portrayed in the case study

life and this illness simultaneously would not have been possible on his meager pension. Predictably, he has to contend with a lot of red tape bureaucracy but he brushes such concerns aside saying it is a small price to pay for the privilege of being free from financial tensions of this magnitude.

No two individuals are alike, and that is so for the two case studies as well. However, effort was made to identify two individuals who were not too different in terms of their financial backgrounds or too wide apart on the social scale and had a key factor that made a difference to their circumstances.

Households who have nil or limited options have to weigh the day to day realities of their illness and its treatment on one side and the daily grind of living and managing their families on the other. Most often they are left with no choice but to avail loans that they cannot repay, stop medicines which they can neither afford to take nor afford to stop, sell assets which were to provide for a daughter's marriage and even allow their children to discontinue school and share the family burden. All things considered, both non-seeking of care and under-treatment are extreme forms of coping employed by the most desperate of households.

5. DISCUSSION

Most studies on catastrophic health spending have looked at all illnesses in general[42,45,52,54,55]. To the best of my knowledge, there are no studies on any illness with a similar profile as Acute Coronary Syndrome.

Catastrophic health spending

Catastrophic health spending estimated for 89 countries was found to range form virtually zero percent in countries like Czech Republic, Slovakia and United Kingdom to more than 10 percent in Vietnam and Brazil[44]. India was not among the countries included in this study. The three key pre-conditions for CHS that were identified included health services that require payment, low capacity to pay and lack of prepayment or health financing mechanism.[26] Since Kerala and the whole of India as well, indubitably fulfill these criteria, high levels of catastrophic health spending should come as no surprise.

Seven out of 621 households in a study conducted in Vietnam were found to have experienced CHS and the health care expenditure for them was found to range from 41 percent to 83 percent of the household's capacity to pay. For 79 episodes among 13 individuals, the total health expenditure was estimated to be 46.6 percent of the total household expenditure.[42] This is much lower than the estimates in this study for two reasons. The Vietnam study looked at all illnesses and only 26.2 percent of all the episodes were related to non-communicable diseases.[42] The present study focused only on one defined acute manifestation of a chronic illness for which the recommended interventions are known to be expensive. Secondly, apart from curative health expenditures, the Vietnam study only considered expenditures related to rehabilitation and health insurance while the present study had estimated both direct and indirect expenses. At the national level, 43.8 percent [56] of the population in Vietnam is covered

under the public health insurance system and public expenditure on health as a percentage of total health spending is 20 percent [7] as opposed to only 13 percent in India [7]. This too contributes to the difference.

The overall positive relationship between proportion of households experiencing catastrophic health spending and the share of out of pocket payments in total health expenditure has been well established by Xu K et al[26] in their study. Hence, when there is a decrease in the volume of total health expenditure met by out-of-pocket payments, the range of catastrophic payments also decreases. In Thailand, the catastrophic payments (defined as out-of-pocket spending exceeding 10 percent of total consumption expenditure) among those using in-patient services was found to decrease from 31 percent in 2000 to 15.1 percent in 2002 and 14.6 percent in 2004 after the introduction of Universal coverage in 2001[45] through which 75 percent of the population was covered with the health care scheme [56]. Sixty seven percent of hospitalized patients from ACCORD and 34 percent from SEWA – two community health schemes in India – did not have to make any out-of-pocket payments; however, catastrophic payments (defined as exceeding 10 percent of annual household income) were still experienced by four percent and 23 percent of households respectively. Of these, surgical payments and admissions for non-communicable diseases were identified as leading to catastrophic payments.[52]

5.2 Coping strategies

Eighty five percent of health care expenses in India are paid out-of-pocket and poverty adjustments were found to be greater for India compared to other low-income countries like Sri Lanka where reliance on out-of pocket spending is low and application of user fees in the public health sector is limited.[55] The ACS related health expenditure for 71.4

percent of households were paid out of pocket in the present study, which explains the high level of catastrophic payments and coping strategies observed.

The patterns of coping strategies across urban and rural areas were similar across other studies[54] though the magnitude is higher in the present study owing to the higher expenditure involved. The issue of coping strategies is deceptive in that while it helps households 'cope' with the unexpected expenditure in the short run, they are worse off in the long run when the repayment period and the interest rates are taken into consideration. Rural areas are generally ruled by the local money lenders, colloquially referred to as 'blade' who charges daily interest rates. Poor households approach these informal bankers in times of crisis as the loans are 'sanctioned' in no time and with minimal guarantee. Often they tend to get exploited as was observed in the present study, with the unscrupulous ones taking property deeds and other such assets as guarantee and usurping the same when the repayment does not happen.

Using National Sample Survey Organization (NSSO) data 52nd round, Flores G et al has estimated catastrophic health spending based on current income, considering only health payments that have been financed from income while adjusting for coping mechanisms.[54] Flores G et al[54] argues that, when coping mechanisms are ignored as in the Xu K et al methodology,[26,42,44] poverty is underestimated by six to seven percent (calculated using the official poverty line of India). For example, indebtedness or borrowing, the main coping strategy, was found to finance almost 34 percent of out-of-pocket expenditures in rural areas and 22 percent in urban areas. Borrowing temporarily increases a household's reserve and protects the current consumption from being affected but; only up to a point. When health payments made through debt financing are taken into consideration for CHS estimates, Flores G et al points out that we are erroneously over-estimating the risk to the normal household expenditures as this payment was made using 'borrowed' and not

'own' resources. This according to the author can lead to an exaggeration in the scale of catastrophic payments. However, one has to keep in mind that the expenditure involved for treatment of ACS is often too large to be financed by most incomes. Only 10 percent of rural and 25 percent of urban households in the present study were able to finance their treatment exclusively from savings as opposed to 34 percent of rural and 48 percent of urban households in the Flores G et al study (savings $\pm$ income). In fact, 59 percent of households in the present study had no savings so to speak, to finance even a fraction of their direct expenditure. While coping may keep a family afloat in the short run; they still have to shoulder the strain of repayment in the long run, that too at exorbitant interest rates; so any adjustments for coping fails to take these facts into consideration. In these circumstances, CHS estimates are likely to be seriously under-estimated if coping-assisted health payments are excluded. In fact the very 'catastrophe' in this equation is the fact that households are forced to shoulder such long term 'burden' for the sake of their health care needs. In any case, for the present study, the total household expenditure included neither the ACS related payments nor the interest or capital repayments for amounts supplemented through coping. Only repayments being made towards existing household debt, incurred prior to the illness were included. Apart from this, the unreliable nature of income data from developing counties is well known (reasons already discussed in chapter 3). Any summary estimates based on income measures in a country like India are highly likely to give erroneous results.

Health needs in India often push families into selling assets or borrowing cash, even in the upper-income quintiles.[41] In the present study, 55.7 percent of high SES have availed debt or sold assets for treatment financing and 41 percent among them financed their treatment solely from borrowings or asset sales. While these strategies are 'obvious' in that they increase the household 'resources', other 'masked' strategies are often employed

to check the drain of 'resources'. Children discontinue their education or are transferred from paying private schools to free government schools. Families move out of expensive rental accommodation to cheaper ones or even move in with willing relatives to cut costs. While a patient's employment is always adversely affected because of illness, the primary care givers – spouse or children – often start working to support the family. In the present study all, except one primary care giver who reported any impact of the illness on their employment, actually took up jobs for the first very time in their life (6%) because the earning members were unable to support their family.

5.3 Health financing mechanism

Many studies have projected health insurance as the solution for CHS.[26,44,45,54] The analyses of primary data in the present study had also narrowed down health security as the most modifiable predictor which is protective. However, such results should be interpreted with caution. Private health insurance, often considered synonymously with health financing mechanism, has only led to serious compromises with equity and not any significant reductions in public health spending.[46] Pre-payment mechanisms have definitely been found to offer the most protection, but, it is the 'social security' type of prepayment and not private insurance that has been the most promising.[46] Countries like Slovakia and Czech Republic who finance 93 and 90 percent of their total health spending respectively through social security[41] have virtually zero percent catastrophic health spending[26]. A financially accessible health system on the other hand is probably the ultimate form of secure health financing. Absence of user fees and co-payments,[44,53,55] i.e. zero-payment at point of contact with a functioning health system has also been found to decrease catastrophic payments.

5.4 Limitations of the study

The study was a cross-sectional survey and as such all the limitations of a cross sectional design apply to this study as well. The study sample was identified from a hospital based registry. Apart from the fact that the limitations of the registry apply to the present study, cases in the community who may not seek care due to various reasons are totally excluded. The sample size of 210 restricts the number of variables that can be included in the multivariate models, thus limiting the scope of the study. Recall bias was found to be minimal as the expenditures involved were substantial. Only a few female respondents have participated in the study as the registry itself had only a small number of female patients. This disallowed any detailed analyses to look out for gender-based differences, only broad trends could be studied. One possible reason for the low enrollment of women is that women access health systems less as compared to men. They tend to seek care only when they see no other alternative, as the needs of spouse and family tend to supersede their own. Besides, women also lose out with respect to gender as well as earning potential in the subconscious risk-benefit assessment that physicians in general tend to do.

5.5 Strengths of the study

The data collection was carried out by a single investigator thus eliminating the chances of inter-observer bias. All the diagnoses were confirmed by discharge summaries and 75 percent of hospitalization expenditures were verified by hospital bills. The agreement between the reported expenses and the actual expenses based on hospital bills was found to be high. Therefore, all the reported indirect expenditures as well as the expenditures reported by the remaining 25 percent of respondents were also accepted as valid. This is the first study of its kind looking at household spending and catastrophic health expenditure associated with ACS in India. In addition, this study also looks at the various aspects of health financing as it relates to households which most studies fail to do. The

case studies, though only two, complement the quantitative results, giving a human face to the numbers.

5.6 Conclusions

Eighty four percent of the households across all socio-demographic strata have experienced catastrophic health spending as a result of treating and managing Acute Coronary Syndrome. The lowest socio-economic strata and households with highest occupation as daily wage laborers were the most affected spending 240 percent and 189 percent of their total household expenditure respectively as health payments. Borrowing, the predominant coping strategy (74.8%) employed by households was not limited to any particular socio-economic strata. Public health care institutions do not seem to afford any kind of protection against catastrophic payments, though, in absolute terms, utilizations of public facilities was found to incur the least expenses. Availability of health security is the single most significant predictor that was found to offer protection against catastrophic payments.

5.7 Policy implications

In the light of the findings of this study, at the policy level, two major concerns need to be addressed on a priority basis. Firstly, a functioning health system is a must. It should be able to help absorb some of the consequences of health shocks; however, that was not the case here. Hence, steps need to be taken to rectify the same. Our health system at present is not geared towards the management of non-communicable diseases. With deaths from chronic diseases projected to increase from 40 percent of all deaths in 1990 to 67 percent by 2020, [35] what will be the degree of rise in catastrophic payments? Ultimately, when households exhaust all their resources, health systems will be forced to pick up this burden.

Secondly, a viable health financing mechanism is necessary irrespective of socio-economic strata. It is beyond the scope of this study to identify the type of health security that would most protect households in such situations. Further research is required in this area with particular reference to Kerala and its huge private health care sector. Risk pooling mechanisms or prepayment strategies that can reduce the level of coping that households are forced to employ are essential to prevent future catastrophes of greater magnitude.

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Respondent ID: _____

ANNEX 1

INTERVIEW SCHEDULE

I. GENERAL INFORMATION (including inclusion / exclusion criteria)

S. No	Questions	Response
1	Respondent ID	
2	Hospital ID	
3	Date:	
4	Consent Obtained (Verbal or Written)	1. Yes 2. No ☐
5	Interview Language:	1. Malayalam 2. English ☐
6	Name of the Patient	
7	Address	
8	Contact no: (Residence / Off / Cell)	
9	Place of Residence	1. Rural 2. Urban ☐
10	Age: (completed years)	
11	Sex	1. Male 2. Female ☐
12	If female, are you pregnant?	1. Yes 2. No ☐
13	How many times have you been diagnosed to have heart attack?	1. Once 2. More than once ☐
14	Have you been diagnosed to have any of the following? (Please tick all that is applicable)	1. Diabetes Mellitus 2. Hypertension 3. Dyslipidemias 4. Others (specify) _____
15	Name of Main Respondent	

In the next section, I will be asking you some details regarding your household members. When I say household member, it will include anyone who has been living in your house for the past 6 months sharing in both the income as well as the expenses of the household. This will not include household help or any other members who may be part of your expenditure but does not contribute to a share in the income.

II. INDIVIDUAL / HOUSEHOLD CHARACTERISITCS

S.No.	Questions	Response
16	Can you identify who is the head of this household (person who takes decisions) in relation to the patient	1. Patient 2. Spouse 3. Parent 4. Sibling 5. Son / Daughter 6. Son / Daughter-in law 7. Other (specify) _____
17	No. of earning household members in the household	
18	No. of dependents (Children and non-earning adults including retired people who are dependent on the household even if they receive a pension)	
19	What is the highest attained educational level of the patient (completed)?	1. No Schooling 2. Primary School 3. Secondary School 4. High School 5. Post High School Certificate 6. Degree / Diploma 7. Professional 8. General Post-graduation 9. Professional Post-graduation 10. Others (Specify) _____

20	What is the highest qualification among the members in the household?	1. No Schooling 2. Primary School 3. Secondary School 4. High School 5. Post High School Certificate 6. Degree / Diploma 7. Professional 8. General Post-graduation 9. Professional Post-graduation 10. Others (Specify) _____
21	What is the main occupation of each earning HH member? 1. Unemployed (able to work) 2. Unemployed (unable to work) 3. Regular. Employee 4. Contract Employee 5. Daily wage earner 6. Self-employed 7. Home maker 8. Retired 9. Others (Specify)	1. Head of HH 2. Patient (if different from Head of HH) 3. Primary care giver 4. Member 1 5. Member 2 6. Member 3 7. Member 4 8. Member 5
22	What is the joint household monthly income? 1. Head of HH 2. Patient (if different from head of HH) 3. Primary care giver 4. Member 1 5. Member 2 6. Member 3 7. Member 4 8. Member 5 9. Other Sources:	→ → → → → → → → →

23	How many members in the HH have a job that gives health security in the form of either reimbursements or ESIS or employer provided health insurance?	
24	Marital status of patient	1. Unmarried 2. Currently married 3. Widow / widower 4. Divorced 5. Separated 6. Others (specify) _____

In sections III onwards, I will ask you some details about your illness and the expenses related to it. Please tell me as much as you can remember. I will give you some options which may help you to remember the various kinds of expenses you had to manage. I will also be asking you questions related to the number of days lost by various members of your household on account of your illness. Section VII deals with how you financed the treatment and section VIII and IX deals with your general household expenditure and debt.

III. ILLNESS / TREATMENT DETAILS (with respect to ACS only)

S.No.	**Questions**	**Response**
25	When were you diagnosed to have a heart attack? (month and year)	
26	How many months before you were diagnosed to have a heart attack have you been feeling unwell / experience any symptoms?	
27	Can you tell me how many providers you would have visited from the time of onset of your symptoms till your diagnosis?	

28	What were the various expenditures related to the above period (from onset of symptoms to the heart attack) in the 6 months before the acute event: 1. Any hospitalization 2. Medications / treatments 3. Investigations 4. Doctors' consultations 5. Any informal payments 6. Travel, food and lodging 7. Others (specify) _____	 → → → → → → →
29	How many times have you been admitted in the 6 months since the heart attack	
30	What type of treatments have you received in the 6 months since the heart attack? (Please tick all relevant options. In case of last two please specify the name)	1. Medical 2. Interventional _____ 3. Surgical _____
31	Once a treatment option was advised, have you done any of the following due to inability to arrange finances	1. Refused a suggested option 2. Postponed a suggested option 3. Chosen a less expensive alternative 4. Others (specify) ☐ _____

Respondent ID: _____

IV. HOSPITALISATION EXPENDITURE (For each episode)				
S.No.	**Questions**	**Episode 1**	**Episode 2**	**Episode 3**
32	Please classify the health facility in which you were hospitalized? [1-public, 2-private, 3-charitable, 4-ESIS hospital, 5-Others (specify)]			
33	Direct Expenses related to hospitalization: 1. Total hospitalization 2. Drugs from outside 3. Investigations 4. Doctors' fee 5. Any informal payments 6. Own travel 7. Food and lodging 8. Bystander's travel 9. Bystander's food/lodging 10. Others (specify) _____			
34	Expenses related to family pattern rearrangements: 1. Extra help employed 2. Care of children / others 3. Special arrangements 4. Others (specify) _____			

V. NON-HOSPITALISATION PERIOD EXPENDITURE (up to 6 months only)

S. No.	Questions	Response
35	What kind of health facility do you use regularly for seeking care / follow up?	1. Public 2. Private hospital 3. Private clinic 4. Charitable 5. ESIS Hospital 6. Others (Specify) _____
36	Direct expenses related to hospital visits: 1. Consultation fees (x no. of visits) 2. Investigations 3. Drug expense/mth (x no. of mths) 4. Any informal payments 5. Travel, food and lodging 6. Bystanders' travel, food and lodging 7. Others (specify) _____	→ → → → → → →
37	Expenses related to family pattern rearrangement: 1. Home nurse / home care 2. Employment of extra help 3. Change in life style / food / oil 4. Others (specify) _____	→ → → →
38	Do you regularly take your medication?	1. Yes 2. No
39	If no, why?	1. I am forgetful 2. Too expensive 3. No one to give me medicines 4. Others (specify) _____

40	Names of drugs (from prescriptions)					
	S. No.	Name	No./mth	Duration	Price/tab	Total
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15					
41	Total calculated expenses due to drugs					

VI. EXPENDITURE RELATED TO WORK / INCOME LOSS

S.No.	Questions	Response
42	Patient: Was your job affected because of illness	1. Not affected 2. Loss of job 3. Change of job 4. Promotion denied 5. Relocated 6. Others (specify) _____
43	Patient: If yes, loss in income (X duration)	
44	Patient: Have you resumed work after the heart attack? (If No, skip to question 47)	1. Yes 2. No

45	Patient: Total no. of days lost (without wages) 1. Hospitalizations including medical leave • Episode 1 • Episode 2 • Episode 3 2. Follow-up visits	 → → → →
46	Patient: wages lost per day	
47	Primary care giver: Was the primary care giver's job affected because of illness (Skip to question 51, if primary care giver is unemployed)	1. Not affected ☐ 2. Loss of job 3. Change of job 4. Promotion denied 5. Relocated 6. Others (specify) _____
48	Primary care giver: If yes, loss in income (X duration)	
49	Primary care giver: Total no. of days lost (without wages) 3. Hospitalization • Episode 1 • Episode 2 • Episode 3 4. Follow-up visits	 → → → →
50	Primary care giver: wages lost per day	
51	Any other HH member/s: Total loss of wages	

VII. HEALTH FINANCING

S.No.	Questions	Response
52	Was your illness covered by any kind of health security?	1. Subsidy 2. Reimbursements 3. Employer provided private health insurance 4. Self / HH provided private health insurance 5. Social insurance(ESIS) 6. Others (specify) _____
53	Can you please specify the amount received / eligible to be received?	
54	How did you finance the treatment? (Against each option, except option 1, please specify the amount raised through the process) 1. Savings 2. Sale of assets 3. Unsecured loans 4.Mortgage of assets 5. Mortgage of land 6. Assistance / gift 7. Others (specify) _____	→ → → → → →
55	Were your hospital bills written off partially or completely for any of the hospitalization episodes?	1. Yes 2. No

VIII. TOTAL HOUSEHOLD EXPENDITURE

S.No.	Questions	Response
56	Food Expenditure per month:	
	→ Provisions + Ration (PDS)	→
	→ Vegetables + Fish, meat, eggs and milk	→
	→ Baked items + Outside food	→
	→ Others (specify)_____	→
57	Food Exp (special occasions) past one year:	
	→ Festivals / Religious ceremonies	→
	→ Parties / Eating out	→
	→ Others (specify)_____	→
58	Non-Food Expenditure per month	
	→ Household consumables	→
	→ Petrol / travel	→
	→ Newspaper / Magazines	→
	→ Gas/firewood/kerosene	→
	→ Others (specify)_____	→
59	Non-Food Expenditure in last one year	
	→ Clothing + Footwear	→
	→ Expenses related to children	→
	→ Social & Religious events	→
	→ Utility bills	→
	→ HH maintenance (incl. wages, purchases)	→
	→ Agriculture / Livestock	→
	→ Tax / insurance premiums / Loan EMIs	→
	→ Health expenses related to other HH members	
	→ Miscellaneous (incl. litigation)	→
	→ Others (specify)_____	→

IX. HOUSEHOLD DEBT

S. No	Questions	Response
60	Can you please specify the total HH borrowings / amounts raised through following means (other than those mentioned earlier for treatment financing) 1. Sale of assets 2. Unsecured loans 3. Mortgage of assets 4. Mortgage of land 5. Assistance / gift 6. Others (specify) _____	 → → → → → →

Respondent ID: _____

ANNEX 2

RESEARCH SUBJECT INFORMATION SHEET

This study is being carried out as part of the course requirement for post-graduate studies (Master of Public Health) in Achutha Menon Center for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum which I am currently undertaking. This consent form may contain words that you do not understand. Please ask me if any words or information is not clearly understood by you.

Purpose of the Study

There is growing concern on the rise in Coronary Artery Disease (CAD) in our country, increasingly being seen among both younger age groups as well as poorer sections of society. We know that in the event of an acute episode, individuals and households bear the brunt of both the direct health and financial consequences associated with such illnesses. Thus, monitoring these expenses and its consequences on households become vitally important in order to understand the intolerable burden that these diseases place on our society.

A survey is being carried out to estimate the expenses that households bear with respect to the treatment and management of acute events related to coronary artery disease, referred to as Acute Coronary Syndrome (commonly referred to as heart attacks). You have been chosen through a random process of selection from among patients who have been enrolled in the ACS Registry through the hospitals where you were treated. A total of about 200 participants will be included and interviewed as part of this study.

Procedure

The survey would take approximately 30 - 45 minutes of your valuable time. You will be asked questions in private. These will pertain to details about your household members, your illness especially the hospitalizations for a period of six months following the acute event. You will be asked questions on the expenses that you incurred both for the hospitalization as well as the period that followed and also details as to how you financed your treatment. You will also be asked questions regarding your average income and general household expenses over the past one year to serve as a comparison. This collected data will be used for research purposes only. I may contact you again if the collected information was found to be incomplete.

Risks and Discomforts

Participation in this study imposes no risk to your health. However you would be asked questions which you may find personal in nature.

Benefits

There may not be any direct benefit for you from this study. The information collected from you and from other participants will help in assessing the financial burden that these diseases impose on our households.

Confidentiality

You will be interviewed in private. All information related to you will be kept confidential and at no stage will your identity be revealed. A respondent identification number will be assigned to each participant that will help in maintaining the confidentiality of the data collected. Access to this number will be restricted to those analyzing the data only.

Contact Information

If you have any research related questions or you would like to verify my credentials, you may contact me or a member of our institute's Ethics Committee at the following address:

Dr. Meena Daivadanam
MPH2007
AMCHSS, SCTIMST
Trivandrum
Cell: 9446173669

Dr. Anoop Kumar Thekkuveettil
Member Secretary
Institutional Review Board
SCTIMST, Trivandrum - 11
Off: 0471-2520256

Voluntary Participation

Your participation in this study is purely voluntary which means you can decide whether to participate in the study or not. If at any stage you wish to discontinue, you are free to do so without any adverse consequences.

Respondent ID: _____

ACUTE CORONARY SYNDROME: PATTERNS AND CORRELATES OF HOUSEHOLD HEALTH SPENDING

CONSENT FORM

I have read / been read out the information in the information sheet. The nature of the study and my involvement has been explained and all my questions have been answered satisfactorily. By signing this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises.

Respondent's Name:
Respondent's Signature / Thumb Impression
Date:

Interviewer's Name:
Interviewer's Signature:
Date:

Respondent ID: _____

ACUTE CORONARY SYNDROME: PATTERNS AND CORRELATES OF HOUSEHOLD HEALTH SPENDING

CONSENT FORM – CASE STUDY

I have read / been read out the information in the information sheet. In addition to the earlier questionnaire, I understand that you will also be asking me details as to how finances were arranged at such short notice and any difficulties that we encountered. I also understand that you wish to record our conversation and that any information collected from me will be used for study purposes only. By signing this consent form, I am giving you the permission to record our conversation and use the same for study purposes only with the understanding that my identification details will be kept confidential. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises

Respondent's Name:
Respondent's Signature / Thumb Impression
Date:

Interviewer's Name:
Interviewer's Signature:
Date: