CATASTROPHIC HEALTH CARE EXPENDITURE AND IMPOVERISHMENT IN KERALA: AN ANALYSIS BASED ON NSSO 55TH ROUND, 1999-2000

CATASTROPHIC HEALTH CARE EXPENDITURE AND IMPOVERISHMENT IN KERALA: AN ANALYSIS BASED ON NSSO 55TH ROUND, 1999-2000

Dissertation submitted in partial fulfillment of the requirements for the degree of ***Master of Philosophy in Applied Economics*** *of the* ***Jawaharlal Nehru University***

Asish Thomas George
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CENTRE FOR DEVELOPMENT STUDIES
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I hereby affirm that the work for the dissertation, ***Catastrophic Health Care Expenditure and Impoverishment in Kerala: An Analysis Based on NSSO 55th Round, 1999-2000,*** *being submitted as part of the requirements of the M.Phil Programme in Applied Economics of the Jawaharlal Nehru University, was carried out entirely by myself and has not formed part of any other Programme and not submitted to any other Institution/University for the award of any Degree or Programme of Study.*

June 30, 2005

Asish Thomas George

Certified that this study is a bona fide work of Asish Thomas George, carried out under our supervision at the Centre for Development Studies

D Narayana
Fellow

Udaya Shankar Mishra
Associate Fellow

K. Narayanan Nair
Director
Centre For Development Studies

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ABSTRACT OF THE DISSERTATION

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Kerala, when compared to other states of India exhibits the highest levels of access and utilization of health care services in the country. These have definitely contributed to the stellar achievement of the state in terms of health indicators. But of late, studies have indicated that during the 90's expenditures on health care were increasing dramatically in the state, prompting some to call this phenomenon of unabated increase in health expenditure as 'medinflation'.

If one is concerned about the overall well being of individuals, and if good health is a pre-requisite for the same then it is pertinent to examine whether individuals can afford such high levels of expenditure on health as well as the consequences it may lead to when one is asked to meet unaffordable health care costs. An evaluation of this phenomenon is attempted here with the help of Wagstaff and Doorslaer (2001). The focuses here are to (1) Define catastrophic out-of-pocket payments on health care and subsequently look into the incidence and intensity of catastrophic payments in rural and urban Kerala. Further, the thesis also tries to see whether it is the poor who are having such 'catastrophic' payments. (2) The second objective is look into the incidence and intensity of impoverishment in rural and urban Kerala due to out of pocket expenditures on health care. The incidence and intensity of catastrophic health care payments and the impoverishment associated with it are captured by means of the headcount and gap measures respectively. The data source used for analysis is the National Sample Survey Organization (NSSO) 55th Round.

The analysis of catastrophic payments on health care finds that health care expenditure constitutes a major share of individual's total expenditure in Kerala. Around 14% and 11% of individuals in rural and urban Kerala respectively incurred expenditures on health care in excess of 15% of their income. Moreover it is evidenced that these catastrophic expenses were concentrated mostly among the poor. And with regard to impoverishment due to health care expenses it is observed that 3.8% and 4.5% of the individuals in rural and urban Kerala respectively fell below the poverty due to expenditure incurred on health care.

To sum up, the study reaffirms that health care costs in the state is fast becoming unaffordable to a large section of the population and that in case of Kerala the popular quote of 'Good health at low cost' is nothing but a trip to the past.

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Chapter I

Introduction

1.1 Introduction

In this post liberalisation period the role of state as a financier of social overheads, in a social democracy like India, has reduced substantially. This is most visible in the case of the health care system in India. If one takes the expenditure on health in India which is approximately 6 percent of GDP, the health care spending (excluding water supply) by the government is only 1 percent of GDP[1] while the remaining 4.6 percent is spent privately i.e. by individuals or households (Gill and Kavadi, 1999). The 15 year (1985-2000) time trends of public spending on health shows that the public spending on health from a high of 1.1 percent of GDP in 1985-86, declined to a low of 0.78 percent in 1996-97 .It rebounds to 0.9 percent in 1998-1999 and remains at almost the same level for 1999-2000 (World Bank 2001). Compounding the inadequacy of government spending in health is the financial constraints faced by the individual states for additional resource mobilization and capital investment in health care, the misallocation of the funds for public health programmes from the Centre to States without giving due consideration to health needs of the states, decline in central assistance to the states health care sector in the form of grants, hitting the poor states the hardest, and the misallocation of (the insufficient) government health resources more to urban areas than to the rural areas, where almost 73 % of the population resides (Garg, 1998). This inadequacy of public health care system coupled with the restricted coverage of any health insurance programme mostly to the organized sector[2] has made India a country where out of pocket health care expenditure accounts for 75 % of the total expenditure.

In a scenario where the role of the state in developing countries is shifting from one of a welfare state to protecting minimum income to prevent abject poverty, the low levels of public spending on health care translates into individuals being left with the responsibility of their own risks and living standards (Dror 2003). Moreover, in low-

[1] The average for low and middle-income countries is 2.8% and the global average is 5.5% (World Bank, 2001).

[2] Organized sector employs about 10% of the workforce but whether all of them are enrolled in health insurance schemes is still a contestable issue.

income countries like India there exist highly pronounced income disparities between the rich and poor segments of the population[3] and majority of the poor work in the informal sector, where workers are exposed to cyclical and unpredictable income fluctuations. Thus, in the absence of adequate coverage of the public health care system and the absence of social protection the poor are made vulnerable than ever before to increasing cost of health care. It is also to be remembered that the poor, employed in manual labor in the informal sector, can ill afford to be sick since good health is absolutely essential for them to earn a source of livelihood.

1.2 How high is the out of pocket spending on health care in India?

A considerable amount of evidence from National Sample Survey Organization (NSSO) points to a substantial increase in health care costs during the 1990's compared with the prior decade[4]. Between 1986-87 and 1995-96, in the rural areas, private outpatient costs went up by 142 per cent, as against a rise of 77 per cent in the public sector. In the urban areas, outpatient costs went up by 150 per cent and 124 per cent respectively in the private and public sectors during the period considered. The urban-rural price differential for outpatient care changed from 1.04 in 1986-87 to 1.10 in 1995-96. The trends in the costs of in-patient care between 1986 and 1996 showed that average costs spiralled by 436 per cent in the rural and by 320 per cent in the urban areas in nominal terms. . One of the main reasons for such an escalation in the cost of inpatient as well as outpatient care is the increasing price of drugs during this period (Sen, G. *et al* 2002). Hence, 1990's experienced an irrefutable rising cost of health care in both public and private health care sectors in India.

The huge escalation in health care costs and the resultant burden of paying for ill health in India is inversely related to the economic status of the households. Consequently the poor has been the most affected in their utilisation of health care (Visaria and Gumber, 1994; Gumber, 1997). In a recent study on health expenditure pattern, it is found that the share of health expenditure in annual income ranged between 3 percent among the richest 20 percent of the households as against 12 percent among

[3] Income data of 19 high and 20 low-income countries show that in case of high-income countries the highest income quintile is 4.8 times higher than the lowest quintile whereas in case of low-income countries the gap doubles, or the highest income quintile is 9.8 times higher than the lowest quintile (Dror 2003).

[4] Costs on health care include medical fees, the costs of drugs, diagnostic facilities, and institutional care as well as the costs of travelling to the health facility.

the poorest 20 percent of the households (Gumber 2002). Average expenditure on medical care seems to rise with monthly household per capita consumer expenditure or per capita income of household (NSSO, 1992; Visaria and Gumber 1994; Rajarathnam, *et al.* 1996; Visaria, *et al.* 1996; Satya Sekar 1997; NSSO 1998). This phenomenon is common to both rural and urban India (See Table 1.1). Also, according to Gumber's study the medical care expenditure as a proportion of total expenditure /earnings is much higher for the poor households compared to the rich households (Visaria and Gumber, 1994; Visaria, *et al.* 1996). The high burden of health care expenditure has resulted in a situation where expenditure on health in India is conditioned by the individuals' economic background rather than the nature of the ailment with which they are afflicted (Dilip and Duggal, 2002).

TABLE 1.1: Average household expenditure on health care (in Rupees) per year among different income groups, NSSO 52nd round, 1995-96.

Deciles	**Acute Illness**		**Chronic Illness**	
	Rural	*Urban*	*Rural*	*Urban*
1	1029.76	1885.51	599.74	540.60
2	1750.87	1464.91	1201.08	724.75
3	1588.29	1756.05	1097.13	787.55
4	1821.98	1568.62	1427.10	1306.54
5	2019.87	1866.80	1603.55	1390.20
6	2651.84	2223.67	1859.72	1446.02
7	2418.47	2060.86	2446.21	1717.44
8	3148.59	2404.49	3049.70	2283.97
9	3697.49	3047.14	4124.98	3234.44
10	3382.64	4026.15	12139.37	8699.41

Source: Gupta (2003)

A study using NSSO 52nd round data (Dilip and Duggal, 2002) finds that in India as a whole a quarter of the number of households sell assets or borrow to meet the inpatient health care expenditure. This involves sale of animals/ sale of ornaments/ sale of physical assets/ borrowings. The percentage of households falling into debt trap because of incidence of hospitalization was 30 percent if treatment was sought from private health care sector and 20 percent if treatment was from the public health care sector. Class differentials showed that the proportion of total number of households with an ailing person falling into debt among the richest and poorest ranged between 17 percent and 26 percent respectively if treatment was sought from the public sector, and between 23 percent and 41 percent respectively if treatment was sought from the private sector.

The study by World Bank (2001) showed large variations in the extent of borrowing and sale of assets by Below Poverty Line (BPL) households towards meeting health care expenses across the states of India. The study showed high levels of borrowing for inpatient care in both public and private sectors. Hospitalization in public sector too was costly, even with minimal or non-existent fees, on account of expenditure on diagnostic services, drugs and because of the bribes demanded. Based on the observation that the differences between states in the level of borrowing are larger than the differences between public and private sector hospitalizations within a state, the study 'demonstrated that the failure to provide financial protection to the poor for the costs of hospitalization is significant across the country, even with the presence of public sector hospitals that provide nominally free care.'(World Bank 2001:157)

In terms of the poverty impact of increasing medical care cost, the World Bank (2001) study finds that direct out-of-pocket medical cost pushed 2.2 percent of Indian households into poverty in one year. Further, at least 24 percent of all people hospitalized in India in a single year fell below the poverty line because they were hospitalized. In fact, the real effects of high out-of-pocket expenditure on health could be much greater. For instance, the reported extent of hospitalization may often be conditioned on the increasing hospitalization cost in the sense that poor might be considering hospitalization option only in dire circumstances. In other words, increasing cost of hospitalization itself limits the extent of access to treatment of ailments. Moreover such an analysis does not take into consideration issues of financing hospital expenses through debt and its effects on welfare of households, since in the absence of illness and medical expenses the extent of such medical cost related debt would be entirely avoidable. The study showed that if financing of hospital expenses by means of debt were taken into account 35 percent of all people hospitalized in India in a single year fell below the poverty line. If indirect medical expenses, such as transport costs were to be included an additional 3.3% of hospitalized Indians fell below the poverty line.

Apart from the cost of treatment inducing poverty among many, the already poor often avoid treatment in the first instance. Hence, non-treatment of illness too is largely due to financial inability on the part of the poor households. In India it is observed that the poor use health services less and the quality of medical care available to the poor are vastly inferior to what the well off receives. It is assessed that the poorest quintile of

Indians is 2.6 times more likely than the richest to forgo medical treatment during illness (See Table 1.2). The most common reason cited for this phenomenon lies in the perception of the ill and the felt severity of the said illness to warrant a medical treatment. Apart from this the second most frequent reason cited to forgo treatment is financial (World Bank 2001). It could be their low income coupled with the unaffordable health care costs that act as a deterrent to utilization of health care.

TABLE 1.2: Percentage of Indians reporting an illness within last 15 days who did not seek care, and reasons for inaction, by poverty quintile, 1995-96.

	Poorest Quintile	Second Quintile	Third Quintile	Fourth Quintile	Richest Quintile	Total	Poor/Rich Ratio
Did not seek care when ill	24.3	20.9	18.1	17.8	9.2	16.7	2.6
Among those not seeking care:							
Illness not considered serious	42.4	52.2	54.7	57.3	59.8	52.7	0.7
Financial Reasons	32.9	23.0	21.0	21.9	15.2	24.0	2.2
Medical facility not available in area	11.1	10.0	7.2	5.1	3.3	7.8	3.4
Other reasons	13.6	14.4	16.6	15.2	21.7	15.6	0.6

Source: World Bank (2001)

Thus, the review of studies points to two major findings. The first one is that during the nineties there has been a substantial increase in the cost of health care. This increase was visible both for public and private provision of health care. The second and the more important aspect is that, in absence of any social protection, the poor have been hit hard by the increase in health care costs. This has manifested itself in the high proportion of people falling into poverty on account of health care expenses, people increasingly resorting to debt to finance expenditures on health and in many cases the non-treatment of illness on account of high health care costs.

1.3 The big picture on health care: Utilisation and expenditure measures.

If out-pocket expenditure constitute the major share of expenditure on health care and if the cost of health care has increased dramatically then questions arise as to the affordability of health care especially among the poor households. In such a circumstance, a higher level of utilization of health care could well be at the cost of

putting households in economic distress. And hence, one wonders as to whether greater utilization of health care alone is sufficient to commend on the merits of a health system.

For a holistic assessment of a health system, two components are equally important: health care utilization and payments for health care services. In case of either the "Beveridgean"[5] or the "Bismarkian"[6] systems of public financing of access to health care, or, where the state plays a dominant role in financing health care, utilization figures might be sufficient to evaluate the merits of a health system. However, in health systems of the transition and developing countries, where the role of the state in financing health care is not very substantial, utilization figures might not by themselves be sufficient to asses the merits of a health system. In situations where out of pocket payments on health care are predominant, utilization would itself be conditioned by the affordability of health care.

In general, the concern for utilization levels of health care emanates from the fact that health is subject to potentially large 'shocks' which are unforeseen and the assumption that health care is the appropriate way to restore health status following such a 'shock' (Wagstaff and Doorslaer 2001). The concerns over payments or expenditures on health care "appears to derive in part from the fact that health care utilization is a response to an unforeseen and unsolicited 'shock', but also in part from the fact that health care utilization can be sufficiently costly to represent a threat to a household's ability to purchase other goods and services that may, like health care, make a difference to its members' ability to survive and *flourish* as a human being" (Wagstaff and Doorslaer 2001:3).

Thus if the ultimate objective is to enable individuals to '*flourish*'[7] as human beings and if 'good heath' is necessary for an individual to 'flourish' as a human being, and if health care is a prerequisite for achieving 'good health', then there exists a strong ethical justification for being concerned about the distribution of health care over other commodities (Culyer and Wagstaff 1993). Also, if health care spending is a burden then it might lead individuals to compromise on consumption of other essential items like food, clothing, and fuel resulting in a difference in individual's / household's ability to

[5] In the Beveridgean system entitlement or social insurance (including but not limited to health insurance) is based on citizenship or residence status and is funded by taxes.
[6] In the Bismarkian system entitlements is based on employment status and payments of contribution.
[7] The concept of 'flourishing' is derived from the moral philosophical literature and is used by Culyer and Wagstaff (1993), Wagstaff and Doorslaer (2000) as the rationale for equity considerations in health care.

flourish as human beings. Hence "irrespective of whether a particular treatment enables a person to regain his or her former health status following a health 'shock', if the expenditures associated with it compromise the household's ability to feed itself, this in itself is a matter of concern." (Wagstaff and Doorslaer 2001:4). Thus, the focus here is on the welfare loss of the individual owing to out- of -pocket health care expenditures rather than the effects of out-of -pocket expenditures on the extent of utilization of health care services.

1.4 Utilisation and out-of-pocket expenditure: Where does Kerala stand?

A comparative assessment of per capita expenditure on medical care by rural and urban residence across the Indian states using NSSO 55th Round report (see Table 1.3) shows that the monthly per capita expenditure on in-patient care for rural Kerala (Rs.21.56) is the highest followed by Punjab (Rs.15.50) against the lowest in the state of Bihar (Rs.2.00). The urban scene is no different where Kerala leads with the highest spending per-capita (Rs.27.37) followed by Haryana (Rs.23.27) and Bihar (Rs.2.46) being at the bottom. And the national average for the urban areas is almost twice that of rural areas i.e. Rs.12.33. In case of expenditure on health other than in- patient care for rural areas, Punjab had the highest per-capita monthly expenditure at Rs 40.38 followed by Kerala at Rs 39.27.The least expenditure was reported in Assam at Rs 7.23 per month per capita. In case of urban areas, non-institutional expenditure amounted to the highest in case of Kerala (Rs41.08) followed by Punjab (Rs 40.11). The least expenditure was incurred in the case of Bihar (Rs.17.84). Thus Kerala is the most expensive in terms of both inpatient and non-inpatient health care services in the country. 'Good health at low cost' (Halstead 1985) has become a trip to the past in Kerala.

TABLE 1.3: Monthly per capita value of consumption (in Rupees) on medical (institutional and non-institutional) expenditure for rural and urban areas for the 15 major states of India, 1999-2000.

	Rural India		Urban India	
State	Institutional *(Inpatient care)*	Medical non institutional *(Non-inpatient)*	Institutional *(Inpatient care)*	Medical non institutional *(Non-inpatient)*
AP	7.63	22.08	6.43	25.36
Assam	2.99	7.23	10.54	34.7
Bihar	2	14.57	2.46	17.84
Gujarat	10.35	17.62	12.29	28.19
Haryana	12.96	35.85	23.27	40.05
Karnataka	6.68	17.62	16.36	27.1
Kerala	**21.56**	**39.27**	**27.37**	**41.08**
MP	5.33	18.79	8.86	29.7
Maharashtra	11.04	26.54	19.72	35.27
Orissa	3.77	18.07	6.84	23.99
Punjab	15.5	40.38	13.88	40.11
Rajastan	5.57	21.56	8	29.05
Tamil Nadu	7.8	22.18	13.9	29.36
UP	5.73	32.96	7.2	35.31
WB	3.72	16.63	10.26	32.12
All India	6.66	22.92	12.33	30.95

Source: NSSO (2001), Consumption of Some Important Commodities in India, 1999-2000 (55th round), NSSO Report No 461.

Another distinct dimension of the health system in Kerala relates to its wide coverage of the medical institutions. In India, Kerala and Goa are the only states reporting one hospital bed for less than 400 persons while the all India average is one bed per 1400 people. While almost all Indian states show an urban bias in the number of hospital beds[8] Kerala is the only State, along with Jammu and Kashmir, whose unique geographical features make it an exception, reporting over 60% of the total hospital beds in rural areas. Almost two-thirds of these hospital beds are in the private sector in Kerala. For India as a whole, even with its predominant urban bias in the presence of hospital beds (and hence more chance of hospital beds being concentrated in the private sector), the share of private sector in the total available hospital beds is only half of what it is in Kerala (Narayana 2004).

Apart from its high expenditure on health care, high hospital bed density and the predominance of the (unregulated) private sector; Kerala reports the highest levels of incidence of reported illness along with very low levels of mortality. In case of rural Kerala the incidence of reported illness rates is twice the national average and in case of urban Kerala it is 50% higher than the all India average (See Table 1.4). Also, rural

[8] The share of urban areas in the total number of hospital beds at the all India level is 78.26%.

Kerala has higher levels of reported illness (about forty per cent higher) compared with its urban population, which is another exception among the Indian states. Moreover, rural Kerala records higher levels of both chronic and acute morbidity across all age groups compared with that of urban Kerala (Narayana 2004). It has been further pointed out that individuals belonging to the lower socio-economics status recorded the highest levels of reported illness in Kerala (Kannan *et al* 1991).

TABLE 1.4: Number (per 1000) of persons reporting ailment (PAP) and number reporting commencement of any ailment (PPC) during last 15 days.

State	Rural		Urban	
	PAP	*PPC*	*PAP*	*PPC*
Andhra Pradesh	64	35	61	31
Assam	80	52	86	57
Bihar	36	18	41	22
Gujarat	46	27	36	21
Haryana	61	34	63	24
Karnataka	45	24	40	22
Kerala	**118**	**60**	**88**	**43**
Madhya Pradesh	41	26	38	22
Maharashtra	52	29	48	26
Orissa	62	43	62	47
Punjab	76	33	85	37
Rajasthan	28	15	33	19
Tamil Nadu	52	31	58	37
Uttar Pradesh	61	33	72	41
West Bengal	65	38	65	42
India	55	31	54	30

Source: National Sample Survey Organisation, Morbidity and Treatment of Ailments, NSS Fifty-Second Round, July 1995-June 1996, Report No. 441(52/25.0/1). Taken from Narayana (2004).

Thus, Kerala presents an exception on many fronts like low levels of mortality, highest levels of reported illness, the highest levels of expenditure on health as well as contrasting rural-urban pattern of health care utilization. These unique features of the state along with its wider recognition of an egalitarian tradition predispose it for an inquiry into the well-known certification of the state having 'good health at low cost'. In other words, given the highest levels of per capita expenditures on health and its high levels of utilization of health care facilities, Kerala presents a typical case for examining the question as to whether the state could afford its high levels of utilization of health care services? The question posed essentially is; Good health, but at what cost?

1.5 High health care costs in Kerala: The evidence

Kunhikannan and Aravindan (1996) present descriptive account of the high levels of expenditure on health care in Kerala. Based on a survey of 31 households for the years

1991 to 1994 they find that the increase in the per-capita total expenditure on medical care was twice that of the increase in general consumption expenditure. They also noted that the non-drug items like doctor's fees, laboratory investigations etc have shown a far greater rate of increase. In a subsequent attempt Kunhikannan & Aravindan (2000) based on a survey of around 5000 individuals in the state found that medical expenditure per morbid person per episode increased from Rs16.56 to Rs 165.22 during the period 1987-1996, an increase of 898% (see Table 1.5). The per-capita medical expenditure for the same period rose from Rs 88.92 to Rs 548.86 in nominal terms (see Table 1.6); an increase of 517%.

TABLE 1.5: Medical expenditure (Rs.) per morbid person per episode (1987 &1996).

Item of Expenditure	1987	1996	% Increase
Drug	8.24	83.48	913
Fee	2.90	29.87	930
Other	5.41	51.87	859
Total	16.56	165.22	898

Source: Kunhikannan and Aravindan (2000)

TABLE 1.6: Medical expenditure (Rs.) per capita per year (1987 & 1996).

Item of Expenditure	1987	1996	% Increase
Drug	44.20	282.36	539
Fee	15.60	99.06	535
Other	29.12	167.44	475
Total	88.92	548.86	517

Source: Kunhikannan and Aravindan (2000)

The study takes a compound rate of 10 per cent annual increase in the consumer price index as an approximation of the general rise in cost of living (136% for nine years). Since the increase in the per-capita medical expenditure is about four times the increase in the cost of living, they coined the term "***mediflation***' to describe this unabated increase in medical expenditures. This 'mediflation' was registered in all forms of treatment (see Table 1.7).

TABLE 1.7: Medical expenditure (Rs.) per morbid person per episode by system (1987 &1996) in Kerala.

System	1987	1996	% Increase
Modern Medicine (Allopathy)	20.72	197.19	852
Ayurveda	10.80	98.97	816
Homoeopathy	7.47	66.44	789
Other	NA	45.57	-

Source: Kunhikannan and Aravindan (2000)

The analysis of annual per-capita medical expenditure as a share of per capita income across socio-economic strata revealed the impact of mediflation to be more severe among the poorer economic strata (see Tables 1.8 and 1.9).

TABLE 1.8: Annual per capita medical expenditure by socio-economic status (SES) for 1987 & 1996.

SES	1987	1996	% Increase
I	54.99	477.26	768
II	42.11	467.26	1010
III	126.33	538.27	326
IV	160.80	569.49	254
All	88.92	548.86	517

Source: Kunhikannan and Aravindan (2000)

TABLE 1.9: Annual per capita medical expenditure as percent of per capita income by socio-economic class (1987 &1996).

Status	1987	1996	% Increase
I	7.18	39.63	452
II	2.93	16.11	450
III	3.38	5.08	50
IV	2.18	2.44	12
All	3.57	6.79	90

Source: Kunhikannan and Aravindan (2000)

The World Bank (2001) study found that 30 per cent of people below the poverty line in Kerala compared to 40 per cent at the national level financed public sector hospitalization through borrowing. However, this increases to 45 per-cent with private sector hospitalization and is equal to the national average for the same.

Narayana (2004) based on a survey of 472 households spread over 21 Panchayats (local self government unit) in the northern district of Kasaragod in Kerala during June 2002 to March 2003, addresses the issues relating to high health care costs and their means of financing. Also the study exposes the extent of inability to access health care owing to high expenditures. The survey showed that a small percentage, around one percent, had sold land to meet health care expenditure and an equal percentage had withdrawn savings to pay for care. The bulk of those who had to find some source of finance turned to pawning household items, borrowing from friends, family, banks etc, or sale of food stocks. Considering all the sources of finance together, it is observed that about 55 percent of the households had resorted to soliciting aid of one kind or other in meeting health expenses. This extent of borrowing is in tune with the magnitude of increase in health expenditure among the under-privileged (Tables 1.10 and 1.11). It is also noted that, a selected number of households avoided any form of treatment being

unable to raise the required resources. Such households accounted for about one fourth of the surveyed households (24 per cent). The propensity of not seeking care is relatively less among the well off compared to the poor (Table 1.12). The study further finds that the correlation between soliciting aid and not seeking care is statistically significant implying that those not seeking care are also those soliciting aid to seek care. Thus the study concludes that financial distress is a determining force behind lack of access to health care in the surveyed region.

TABLE 1.10: Distribution of Households (%) by health expenditure quintiles and housing type.

Quintile Total Health Expenditure	**Distribution of Households by Housing Type (Roof Material)**				
	Tile	*Concrete*	*Grass/ Thatch*	*Other*	*Total*
1	18.90	25.68	16.67	25.00	94
2	21.95	10.81	20.37	25.00	95
3	**19.82**	**18.92**	**27.78**	**6.25**	**95**
4	19.51	24.32	16.67	18.75	94
5	19.82	20.27	18.52	25.00	94
Total	100	100	100	100	472
Share of the Group	69.49	15.68	11.14	3.39	100

Source: Narayana (2004)

TABLE 1.11: Distribution of households (%) soliciting aid to meet health care expenditure by quintile of health expenditure and economic status.

Quintile Total Health Expenditure	**Distribution of Households by Housing Type (Roof Material)**				
	Tile	*Concrete*	*Grass/ Thatch*	*Other*	*Total*
1	25.81	10.53	22.22	0	21.28
2	45.83	25.00	54.55	0	43.16
3	55.38	64.29	66.67	100.00	58.95
4	70.31	44.44	100.00	66.67	68.09
5	84.62	73.33	90.00	75.00	82.98
Total	56.40	43.24	66.67	37.50	54.87

Source: Narayana (2004)

TABLE 1.12: Distribution of households (%) reporting a child or adult could not be treated by quintile of health expenditure and economic status.

Quintile Total Health Expenditure	**Distribution of Households by Housing Type (Roof Material)**				
	Tile	*Concrete*	*Grass/ Thatch*	*Other*	*Total*
1	19.35	15.79	33.33	0	19.15
2	27.78	0	45.45	0	26.32
3	**21.54**	**7.14**	**26.67**	**0**	**20.00**
4	28.13	22.22	44.44	66.67	29.79
5	20.00	13.33	50.00	25.00	22.34
Total	23.48	13.51	38.89	18.75	23.52

Source: Narayana (2004)

Kunhikannan and Aravindan (2000) study is based on a sample that is representative of the state. However problem with the study is that it lacks a framework and hence a definition on what constitutes excess payments on health care. It is one thing to say that health expenses, though in nominal terms, has increased by a certain

percentage for a certain socio-economic class but another to first delineate the framework of analysis and the definition of excessive payments and then seek to analyse its effects on the welfare of the individuals. The World Bank (2001) study too has a sample that is representative of the whole state, but it is an incomplete study in the sense it focuses attention on only one extreme outcome of excessive health expenditures, that of individual falling below the poverty line. Of course the effect of high expenditures on health is not limited to individual falling below the poverty line, even without a substantial number of people not falling to poverty it could very well be the case that on the whole health payments are sufficiently costly and unaffordable to households and significant enough to alter their health care seeking behaviour. Narayana (2004) tries to rectify the problem of focusing only on the impoverishment arising out of health care payments as he takes into consideration the issues of debt and that of non-treatment of illness across all sections of the population. But the absence of framework and definition of excessive payments exists and more importantly since the sample is restricted to a region in Kasaragod in Kerala the findings might not be representative of the entire state.

1.6 Objectives of the study

This study is a modest attempt in examining financial distress arising out of the high levels of out-of-pocket expenditure in Kerala. It not only presents an individual level analysis of the phenomenon but also seeks to provide a reasonable assessment of the financial distress that is valid for the State as a whole. It seeks to examine whether individual's can afford to have such high levels of expenditure on health in the State. In a nutshell, the present research attempts to clarify whether Kerala's high levels of utilization of health care are sustainable with the unabated rise in health care expenditures. Thus the study tries to:

1) Define unaffordable out of pocket payments on health care and quantify the notion of excessive payments on heath care by means of an appropriate framework of analysis.

2) Look into the question as to who bears the burden of high health care expenditures in the state.

1.7 Methodology and Data Source

Wagstaff and Doorslaer (2001) provides a suitable framework for analyzing the extent to which disproportionate health expenditures could impair an individual's ability to purchase other essential goods so as to have a '*flourishing*' life. An approach that Wagstaff and Doorslaer elucidate for analyzing this phenomenon is that of 'Minimum Standards'. The focus of minimum standards approach is to see that the focal variable does not exceed or fall short of a threshold. The threshold is then defined in two ways. One approach sets the threshold in terms of proportionality of income. The rationale for this arises with the view that households should not spend more than some pre-specified fraction of their income on health care, as it might compromise their ability to purchase other essential goods and services. Spending in excess of this threshold is termed 'catastrophic'. The other approach under Minimum Standards sets the threshold or minimum in terms of absolute level of income, the poverty line. The rationale for this approach rests on the concerns of spending on health care pushing households into poverty and deeper into it if they are already poor. Thus, the focus of the second approach is the impoverishment issues arising due to out-of-pocket expenditure on health care. In both cases the focus is on measuring the incidence and intensity of the catastrophic and impoverishing nature of high levels of health care spending. This assessment of the incidence and intensity of health care spending is borrowed largely from the poverty literature, which resembles the concept of headcount and poverty gap measures. It is to be noted at the outset that the issues that arise in poverty measurement by use of headcount and gap measures[9] also crops up in the current analysis. What is attempted here is a cross-sectional analysis of the catastrophic and impoverishment issues within the limitations of the tools used for analysis

The data source for the analysis is the NSSO unit level data and the round selected is the NSS 55th round 1999-2000.At this point it would be worthwhile mentioning the justification for the use of NSS 55th round data. Both NSS 52nd and 55th rounds provide data on the variables necessary for analysis, namely the monthly per-capita expenditure on institutional (in-patient), non-institutional (all expenditures on health care other than inpatient care) categories and the total monthly per-capita consumption expenditure. But NSS 55th round is a more recent data set and a full-fledged

[9] See Subramanian, S. (2002)

consumption round like the NSS 55th round shows greater accuracy of the variables. In case of the 52nd round the consumption expenditure survey is ancillary .To quote the 52nd round instruction booklet "...The difficulty in achieving this objective (estimating the overall level of living of the household) is that level of living in itself is a multi-dimensional phenomenon and even if reduced to uni-dimensional concept of monthly household consumer expenditure measured in rupees, is difficult to elicit easily from the surveyed household. Getting this information accurately requires a full-fledged household consumer expenditure survey in itself. It is not operationally feasible to tag such an inquiry on to the present social consumption inquiry"(Instruction manual 52nd Round: 80). 52nd round consumption expenditure is hence a "middle course' between a full-fledged survey and a one shot question of asking the consumer expenditure during the last thirty days. Thus for the purpose of obtaining more accurate estimates, especially for the variable of monthly per capita consumption expenditure, the NSS 55th round was used.

1.8 Chapter Scheme

The thesis is organized as follows.

Chapter I presents the issue of high expenditure incurred on health care in Kerala. Section 1.2 deals with evidence of high out of pocket payment in India in the nineties and its effect on the poor. Section 1.3 looks into the need for concentrating on both health utilization measures and expenditure measures in the context of India. Section 1.4 takes the case of Kerala and tries to explain the need for a detailed analysis of the financial distress aspects in the state given its unique health care system characteristics. Section 1.5 reviewed the existing studies regarding the high health care costs in Kerala. In light of the existing studies on high health expenditures and the financial distress aspects of Kerala. Section 1.6 states the objectives of the present study and Section 1.7 presents the methodology and data source for the analysis. Section 1.8, the present section outlines the chapter scheme.

Chapter II looks into the issue of Catastrophic Payments on health care. Section 2.1 is the introduction. Section 2.2 defines catastrophic payments on health and explains the methodology of analysis. Section 2.3 presents the results of analysis for rural and urban Kerala and Section 2.4 serves as the conclusion for the chapter.

Chapter III analyses the impoverishment issues associated with high expenses on health care. Section 3.1 serves as the introduction. Section 3.2 defines impoverishment and the methodology adopted for analysis. Section 3.3 presents the results for rural and urban Kerala. Section 3.4, though a slight digression from the main issue, tries to bring out the links between poverty impacts, size of health payments and health care payment structures. Section 3.5 looks into the pattern of health expenditure of those below poverty line and those who were pushed below the poverty line due to expenses on health care. Section 3.6 tries to explore the links between catastrophic payments on health and the impoverishment aspects. Section 3.7 presents a short note on the theme of potential for health insurance in Kerala. Section 3.8 concludes the chapter.

Chapter IV is the concluding chapter. Section 4.1 presents a summary of the findings. Section 4.2 presents some suggestions on the nature of possible policy interventions to overcome the problem of unaffordable health care expenditures and the impoverishment caused by it. Section 4.3 concluded the thesis by looking into the limitations of the present study and directions for further research.

Chapter 2

Catastrophic Payments on Health Care

2.1 Introduction

Wagstaff and Doorslaer (2001) have suggested a framework to evaluate whether the spending on health care is well within certain manageable levels. They define such excess payments over the predetermined levels as '*catastrophic*' health care costs, which is obtained by taking the ratio of per-capita monthly payments on health care to the per-capita total monthly consumption expenditure of individuals. If this ratio exceeds some, often arbitrarily defined, percentage of pre-payment income, labeled as the threshold, the health care expenses are said to be catastrophic.

Just as the incidence of poverty is measured using the poverty headcount, the incidence of catastrophic health care costs could be measured by taking the *catastrophic payment headcount*. Catastrophic payment headcount is the average of the number of individuals in the whole sample whose expenses on health care as a proportion of their income exceeds the threshold levels of expenditure. Similar to the poverty measurement, where the extent of poverty is measured by means of the poverty gap measures, the severity of catastrophic health care payments or the extent by which individuals exceed the threshold could be measured by a *catastrophic-payment gap (excess)* measure. It is defined as the average of the excess 'catastrophic' payments on health care for the entire sample considered. Following which, a weighted catastrophic headcount and gap (excess) measures is computed for understanding whether it is the poor or the well off who tend to exceed the threshold.

It is well known that the head count and the poverty gap measures have their own limitation in measurement of poverty[10]. Hence the incidence and intensity of catastrophic costs of health care measured here suffers from similar limitation. Of course, there remains every scope for refining these measures on lines of a more sophisticated and conceptually accurate measures of poverty. However, here we attempt a strict application of the framework adopted by Wagstaff and Doorslaer (2001) to the Kerala case as detailed below.

[10] See Subramanian, S. (2002)

2.2 Measuring Incidence and Intensity of Catastrophic Payments.

2.2.1 Catastrophic Payment Headcount and Catastrophic Payment Gap

Following Wagstaff and Doorslaer (2001) the ratio of total monthly per-capita consumption expenditure on health care (institutional and non-institutional) to the monthly per-capita consumption expenditure maybe denoted as T/x, where T denotes the monthly per capita expenditure on health care and x denotes the total monthly per capita consumption expenditure. Then a threshold z_{cat} is defined and catastrophic expenses would be the number (or fraction) of individuals whose health care costs as a proportion of income exceed the threshold.

First of all, in order to measure the incidence of catastrophic expenses on health care, analogous to the poverty literature and the poverty headcount, a measure *Catastrophic Payment Headcount*, H_{cat}, is constructed .Let O_i be the catastrophic overshoot equal to $\frac{T_i}{X_i} - z_{cat}$ if $\frac{T_i}{X_i} > z_{cat}$ and zero otherwise, and let $E_i = 1$ if $O_i > 0$. Then the *Catastrophic Payment Headcount*, H_{cat}, is defined as

$$H_{cat} = \frac{1}{N}\sum_{i=1}^{N} E_i = \mu_E \tag{1}$$

where N is the sample size and μ_E is the mean of E_i.

One problem with the above Catastrophic Payment Headcount is that it does not indicate the extent or the amount by which individuals actually exceed the threshold. The intensity or the severity of payments, similar to the poverty gap measure used in poverty literature may be captured by a measure *Catastrophic Payment Gap (or excess)*, G_{cat}. This takes into account the height by which payments (as a proportion of income) exceed the threshold z_{cat}. The average *Catastrophic Payment Gap (or excess)*, G_{cat} may then be defined as

$$G_{cat} = \frac{1}{N}\sum_{i=1}^{N} O_i = \mu_O \tag{2}$$

where μ_o is the mean of O_i .The *Mean Positive Gap* of catastrophic payments, MPG_{cat}, is thus defined as

$$MPG_{cat} = \sum_{i=1}^{N} O_i \Big/ \sum_{i=1}^{N} E_i = \mu_O / \mu_E \tag{3}$$

and it follows from Eq. (3) that

$$\mu_O = \mu_E \cdot MPG_{cat} \tag{4}$$

In other words, the overall average *Catastrophic Payment Gap* equals the *Catastrophic Payment Headcount* times the *Mean Positive Gap.*

2.2.2 Weighted catastrophic payment measures.

The measures discussed above have the limitation in not being able to indicate whether it is the poor or the rich that exceeds the threshold. This presumably matters since the individuals in the lowest decile whose spending (as a share of its income) exceeds the threshold, compared with the one in the top decile, would incur greater difficulty in meeting these high levels of expenditure on health care. Also, there is every possibility for the poor to compromise on essential expenditures if health expenditures rise disproportionately to their income. Towards understanding this particular aspect the concentration index[11] for the catastrophic payment headcount E_i, defined as C_E is proposed. A positive value of C_E will indicate a higher proportion of the better off to be exceeding the payment threshold, whilst a negative value will indicate the reverse with a majority of the worse-off exceeding the threshold.

Wagstaff and Doorslaer (2001) propose a weighted headcount so as to see whether it is the mostly poor people who exceed the threshold compared with the well off. This measure is constructed by weighting the variable indicating whether the person has exceeded the threshold, E_i by the individual's rank in the income distribution. Let r_i denote person $i's$ absolute rank. This is equal to 1 for person 1, 2 for person 2, and N for person N. Then the weight w_i is defined as

$$w_i = 2\frac{N+1-r_i}{N} \tag{5}$$

Hence the weight w_i equals 2 for the most disadvantaged person, declines by $2/N$ for each person step in ascending order of the income distribution, and reaches $2/N$ for

[11] See appendix for a short note on Concentration Index.

the least disadvantaged person. The *Weighted Catastrophic Payment Headcount*, W_{cat}^{E} is thus defined as

$$W_{cat}^{E} = \frac{1}{N}\sum_{i=1}^{N} w_i E_i \tag{6}$$

This weighted headcount can be shown equal to

$$W_{cat}^{E} = \mu_E \cdot (1 - C_E) \tag{7}$$

This is derived as follows:

Substituting equation (5) into equation (6) and expanding,

$$W_{cat}^{E} = \frac{1}{N}\sum_{i=1}^{N} 2\left[\frac{N+1-r_i}{N}\right]E_i$$

$$= \frac{2}{N}\sum_{i=1}^{N}\left[\frac{N+1}{N} - R_i\right]E_i$$

$$= \frac{2}{N}\sum_{i=1}^{N} E_i - \frac{2}{N}\sum_{i=1}^{N} R_i E_i \quad \text{for large values of } N. \tag{8}$$

In equation (8) R_i is the individual's relative rank, which ranges from 0 to 1.

The equation can be further simplified as follows:

The first term in equation (8) is $2\mu_{cat}^{E}$. The second term in the equation can be rewritten, based on the expression for concentration index given in Kakwani, Wagstaff and Van Doorslaer (1997), which is $C_{cat}^{E} = \frac{2}{N\mu_{cat}^{E}}\sum_{i=1}^{N} R_i E_i - 1$. Then the second term in the equation is equal to $\left(C_{cat}^{E} + 1\right)\mu_{cat}^{E}$. Substituting the expressions for the first and second terms of equation (8) gives the equation (7)) or,

$$W_{cat}^{E} = \mu_E \cdot (1 - C_E).$$

Thus "we can modify the catastrophic payments headcount by weighting the dummy status indicator, E_i by the person's rank in the income distribution, assigning greater weights to poorer people. The weighting scheme chosen results in an attractive and simple summary measure described as the product of the catastrophic payment headcount and the complement of the concentration index. If more of those who exceed

the threshold happen to be poor, the concentration index C_E will be negative, and this will result in W_{cat}^E exceeding μ_E. Thus the catastrophic payment problem becomes worse compared with it being stated as the fraction of the population exceeding the threshold, since it is a simple count of those exceeding the threshold irrespective of them being rich or poor. In contrast, if the *better-off* individuals tend to exceed the threshold, C_E will be positive, and μ_E will overstate the problem of the catastrophic payments as measured by W_{cat}^E" (Wagstaff and Doorslaer 2001:23).

A similar weighting scheme could be applied for Catastrophic Payment Gap measure, which is represented as W_{cat}^G and can be shown equal to

$$W_{cat}^G = \mu_O(1 - C_O) \quad (9)$$

where C_O is the concentration index of the excess payment for the overshoot variable O_i and μ_O is the mean of O_i.

As in the case above if the catastrophic payment excess is concentrated more among the poor it will result in a negative value for the concentration index C_O and this would inflate the weighted payment gap measure W_{cat}^G above μ_O."The 'excess payment problem' is worse than it appears simply by looking at the mean catastrophic payment excess, since this overlooks the fact that the large catastrophic payments are concentrated among the worse off. By contrast, if it is the *better-off* individuals who have the largest excesses, C_O will be positive, and μ_O will overstate the severity of the catastrophic payment problem as measured by W_{cat}^G" (Wagstaff and Doorslaer 2001:23).

2.3 Results.

A limitation of the data used for the purpose needs to be mentioned before presenting the results. The analysis uses data collected at the household level but carries out the analysis of individuals where the income and payments on health care is assumed to be equally distributed across all the members of the household. As already mentioned the NSS 55th Round data has been used for the analysis.

The summary statistics of the variables of monthly per capita consumption expenditure, monthly per capita expenditure on health and the ratio of health expenses to total expenses used for the analysis of catastrophic payments are presented in Table 2.1.

TABLE 2.1: Summary Statistics for the variables of monthly per capita health expenditure, total monthly per capita consumption expenditure and the share of health expenditure in total expenditures.

Variables	**Mean**	**Standard Error**	**95% Confidence Interval**	
			Lower Limit	*Upper Limit*
Total Monthly Per Capita Consumption Expenditure				
Rural Kerala	765.5661 Rs.	11.09205	743.8204	787.3118
Urban Kerala	932.4802 Rs.	17.6964	897.7868	967.1736
Kerala State	809.3728 Rs.	9.537954	790.6739	828.0718
Monthly Per Capita Consumption Expenditure on Health Care				
Rural Kerala	60.82581 Rs.	2.387054	56.14509	65.50653
Urban Kerala	68.4517 Rs.	4.879092	58.8831	78.02029
Kerala State	62.82723 Rs.	2.17893	58.55549	67.09897
Health Expenditure as a Share of Total Monthly Per Capita Consumption Expenditures				
Rural Kerala	7.42%	0.2070382	7.016373	7.828161
Urban Kerala	6.51%	0.2575601	6.004828	7.01471
Kerala State	7.18%	0.1672	6.854989	7.510573

Source: NSSO 55th Round, 1999-2000.

For measuring the catastrophic health care payments, the threshold levels of health care expenditure (z_{cat}) were set at 2.5%, 5.0%, 10% and 15% of pre-payment income. Though these are arbitrarily chosen figures, these values have additional significance owing to the evidence that the per-capita expenditure per year on health was 3.9 % in 1991 and 5.7% in 1994 (Aravindan and Kunhikannan 1996). See Table 2.2 presented below for details.

TABLE 2.2: Per Capita Expenditure per Year for Kerala for the year 1991 and 1994.

Item	**1991**		**1994**		**Per Cent Change**
	Rupees	***(Per Cent)***	***Rupees***	***(Per Cent)***	
Food	2400.45	*(62.7)*	3943.688	*(62.2)*	64.31
Fuel	165.73	*(4.3)*	258.70	*(4.1)*	56.10
Cloth and Footwear	362.70	*(9.5)*	636.35	*(10.0)*	75.40
Travel	166.53	*(4.4)*	336.57	*(5.3)*	102.00
Medical Expense	150.65	***(3.9)***	363.56	***(5.7)***	141.30
Others	581.64	*(15.2)*	803.99	*(12.7)*	38.23

Source: Kunhikannan and Aravindan (1996)

The results of the analysis of catastrophic health care payment for rural and urban Kerala are presented in the next page in Table 2.3.

TABLE 2.3: Incidence (Headcount) and intensity (Payment Gap) of catastrophic out-of-pocket health care payments in rural and urban Kerala for the year 1999-2000.

Rural Kerala				
Threshold Level ⇒	*2.5%*	*5.0%*	*10%*	*15%*
Headcount Measures				
H_{cat}	66.81%	47.20%	26.64%	14.04%
C_E	-0.11989	-0.11648	-0.10819	-0.03557
W_{cat}^E	74.82%	52.70%	29.52%	14.54%
Gap Measures				
G_{cat}	5.52%	4.12%	2.32%	1.33%
MPG_{cat}	8.26%	8.73%	8.72%	9.47%
C_O	-0.04377	-0.01866	0.048848	0.145118
W_{cat}^G	5.76%	4.20%	2.21%	1.14%
Urban Kerala				
Threshold Level ⇒	*2.5%*	*5.0%*	*10%*	*15%*
Headcount Measures				
H_{cat}	60.21%	41.52%	20.90%	11.25%
C_E	-0.16869	-0.16085	-0.06808	0.067595
W_{cat}^E	70.37%	48.19%	22.32%	10.49%
Gap Measures				
G_{cat}	4.72%	3.46%	1.99%	1.22%
MPG_{cat}	7.84%	8.34%	9.52%	10.84%
C_O	-0.01202	0.043201	0.167449	0.276073
W_{cat}^G	4.76%	3.31%	1.66%	0.88%

Source: NSSO 55th Round, 1999-2000.

Note:

H_{cat} -Catastrophic Payment Headcount

C_E -Concentration index of Catastrophic Payment Headcount.

W_{cat}^{E} -Weighted Catastrophic Payment Headcount.

G_{cat} -Catastrophic Payment Gap.

MPG_{cat} -Mean Positive Gap of Catastrophic Payments.

C_O -Concentration index of Catastrophic Payment Gap (or excess)

W_{cat}^{G} -Weighted Catastrophic Payment Gap (or excess).

2.3.1 Catastrophic Payment Headcount

2.3.1.1 Rural Kerala

Taking first the *Catastrophic Payment Headcount*, H_{cat} for rural Kerala we find that a high percentage of the individuals exceed the threshold levels of health care expenditure (See Table 2.3). For a given 5% threshold level, in rural Kerala, 47.20 % of the individuals have payments on health care exceeding this threshold and at 10 % threshold level it is still as high as 26.64%, which declines to 14.04% at the 15 % threshold level. This demonstrates that though the percentage of individuals having payments on health care (as a proportion of income) in excess of the threshold levels (which depicts the share of payments on health care in the individual's total monthly consumption) decreases with increasing threshold levels, still a considerable percentage of the individuals in rural Kerala are seen to exceed the set thresholds. The thresholds of 10% and 15% are indicative of very high levels of health care expenditure and what is of concern is that a substantial number of people are exceeding these thresholds too. If these individuals belong to the lower end of the income distribution then out-of-pocket expenditure on health in rural Kerala is definitely resulting in acute financial distress in the poor households.

The Catastrophic Headcount Measures do not indicate whether the poor or the well off tend to exceed the threshold. As seen in Section 2.2.2, this limitation is overcome with the use of a weighted headcount (i.e. the head count times the complement of the concentration index) measure.

In rural Kerala, the *concentration index*[12] *for the catastrophic payment headcount*, C_E, declines with increasing thresholds levels. But it can also be observed that, though declining with increasing threshold levels, the values of concentration index still remains negative as we increase the threshold levels of health care expenditure (see Table 2.3). Negative values of the concentration index imply that disproportionate number of individuals with lower income exceed the threshold levels of expenditure. Another interesting feature is the near stagnancy in the values of the concentration index, C_E, at the 2.5% and 5.0% threshold levels. It implies that even with increase in the allowance for health care expenditure (or higher threshold levels) from 2.5% to 5.0% of the individual's pre-payment income, the share of the poor among those who exceed these threshold levels remains the same or does not decline. These higher percentage of poor in the catastrophic payment measures tend to intensify the *Weighted Catastrophic Payment Headcount*, W_{cat}^{E}, to 74.82% from 66.81% (non-weighted) at the threshold level of 2.5% and to 14.54% from 14.04% at 15% threshold level in case of rural Kerala. The weighted headcount at 15% threshold level is greater than the non-weighted one due to the concentration index being negative (showing that the poor still tend to exceed this high threshold) but the divergence between the values is less (than in the case of lower thresholds) because of the lesser number of poor among those who exceed this high threshold. This is evidenced from the lower magnitudes in the values of the concentration index as the threshold level increases.

2.3.1.2 Urban Kerala

In urban Kerala the incidence of catastrophic expenses, as measured by the *Catastrophic Payment Headcount*, H_{cat}, is substantial in amount at all threshold levels (see Table 2.3). In urban Kerala, 60.21% and 11.25% of individuals are seen to have expenditures on health care in excess of 2.5% and 15% of their monthly pre-payment income respectively. Though substantial in itself, the severity of the catastrophic health care payment problem would be worsened if it were the poor who tend to have such high payments on health. Hence we consider the concentration indices and weighted headcount measures of catastrophic payments in urban Kerala.

[12] See Appendix for a short note on the Concentration Index.

As seen from Table 2.3, the value of the concentration index C_E is negative at threshold levels of 2.5%, 5.0% and 10% but turns positive at the 15% threshold level. This shows that though at lower levels it is the poor who tend to exceed the thresholds, at the 15% level of threshold it is the well off whose health expenditure tends to overshoot the threshold. This is concluded from the positive values of the concentration index C_E for urban Kerala at 15% threshold level. These factors tend to increase the *Weighted Catastrophic Payment Headcount*, W_{cat}^E to 70.37% from 60.21% (non-weighed *Catastrophic Payment Headcount*, H_{cat}) at the 2.5% threshold level and at the threshold level of 15% make W_{cat}^E, 10.49%, which is less than the non-weighted H_{cat}, of 11.25%. Moreover at threshold levels of 2.5% and 5.0% the values of the concentration index C_E remains unchanged, showing that the share of poor in the catastrophic payment headcount remains the same even when allowance is made for higher health expenditure levels (2.5% to 5%).

2.3.1.3. Rural and Urban Kerala: a comparison

A comparison of rural with urban Kerala shows very high levels of incidence of catastrophic payments in both the regions. Hence it could be inferred that in Kerala expenditures on health care occupy an alarmingly high proportion of individuals' monthly consumption expenditures, irrespective of residence.

In both rural and urban Kerala the percentage of individuals incurring catastrophic health expenses is substantial, but between them it can be seen that the incidence of catastrophic payments is higher in rural Kerala .At 2.5% and 15% threshold levels it is 66.81% and 14.04% respectively in rural Kerala whereas in urban Kerala at these thresholds it is 60.21% and 11.25% respectively. If we convert these percentage figures into absolute numbers so as to obtain the total number of individuals incurring such catastrophic payments, we find that the catastrophic payment problem in rural Kerala is actually a lot worse, especially in comparison with urban Kerala, since the population size of rural Kerala is almost three times that of urban Kerala.

Despite the high incidence of catastrophic costs in both rural and urban Kerala and the observation of relatively higher incidence of catastrophic payments in rural Kerala, the values of the concentration index for rural and urban Kerala present some

interesting findings. The value of C_E, the concentration index for the catastrophic payment headcount, for urban Kerala at the 2.5% and 5% threshold level is –0.17 and –0.16 respectively. For rural Kerala it is –0.12 and –0.12 respectively. This implies that though the overall incidence of catastrophic payments (in percentage terms) is less in urban Kerala compared with that of rural Kerala at lower threshold levels, its share of poor in the overall headcount is substantially higher (at the 2.5% and 5% threshold levels).

As the threshold level is increased to 15% we find that the concentration index turns positive for urban Kerala, due to the well-off constituting the majority of those who are having health payments in excess of the threshold. In case of rural Kerala even at 15% threshold level the value of the concentration index is very close to zero but still negative implying that the poor constitute a substantial portion of those having expenses on health in excess of the threshold.

In case of both rural and urban Kerala, though at different levels, there is a near constancy in the values of the Concentration Index, C_E at the 2.5% and 5% threshold levels. This could mean that on an average the poor tend to have at least 5% of their pre-payment income spent on health care. It is worth noting at this point that Kunhikannan and Aravindan (1996) found that on average, people in Kerala spend 5.7% of their income on health care in 1994 (See Table 2.2).

2.3.2 Catastrophic Payment Gap (or excess) or CPG measures.

2.3.2.1 Rural Kerala

The *Catastrophic Payment Gap (or excess)*, G_{cat}, measures the height by which payments (as a proportion of income) exceed the threshold z_{cat} or in other words it seeks to measure the intensity of financial distress .In rural Kerala, the CPG at the threshold of 2.5% is 5.52%. The same reduces marginally to 4.12% when the threshold level is doubled to 5.0%. The levels by which the payments overshoot the threshold are seen to decrease as the threshold level goes up (See Table 2.3).

The *Mean Positive Gap* of catastrophic payments MPG_{cat} shows a value of 8.26% at the 2.5% threshold level. At the 10% threshold level MPG_{cat} shows a value of 8.72%, which is slightly less than 8.73%, the value at the 5% threshold level .At the 15%

threshold level it increases to 9.47%. It is to be noted that the Mean Positive Gap measures the average excess payments on health care (as a proportion of income), or the overshoot, for each individual whose health expenditure exceeds the threshold levels (which is nothing but the catastrophic payment headcount measure). This is important since average Catastrophic Payment Gap is the average of excess payments over the entire sample. The increasing values of Mean Positive Gap shows that the decline in *Catastrophic Payment Gap (or excess)*, G_{cat}, at higher thresholds is due to decline in the number of people having catastrophic expenses at higher threshold levels. In other words the increasing Mean Positive Gap values at higher threshold levels imply that the intensity of catastrophic payments is shared by a lesser number of individuals at higher threshold levels.

What remains to be seen is whether it is the poor who make most of these excess payments. In Section 2.3.2 a Weighted Headcount was made use of to make the headcount measures sensitive to the income distribution of the sample. Similarly, for the gap measures, a *Weighted Catastrophic Payment Gap (excess)* W_{cat}^{G} is used to see whether the intensity or the severity of the catastrophic payments, as measured by *Catastrophic Payment Gap (or excess)*, G_{cat}, is concentrated among the poor or not. This matters since high payments on health care affects the poor the most, severely compromising their ability to purchase other essential items for a living, important among them being food and clothing. Hence irrespective of the effectiveness of health care, expenses on health care would occur at increasing levels of impoverishment to such households.

For rural Kerala the *Weighted Catastrophic Payment Gap (excess)*, W_{cat}^{G} measures and the Concentration index of Catastrophic Payment Gap (excess), C_O show that at lower thresholds mostly the poor tend to have excess payments. At the thresholds level of 2.5% the Concentration index of Catastrophic Payment Gap, C_O shows a value of -0.04, this implies that the excess payments at the 2.5% threshold level are slightly skewed towards the poor. The values of the concentration index at the 10% threshold turns positive implying that it's mostly the well off who tend to have payments in excess of 10% or less of the poor are seen to have payments in excess of 10% of their pre-payment income. The rich or the non-poor exceeding the threshold tends to become more

pronounced at the threshold level of 15% with the concentration index showing a value of 0.145. Whether this is due to some source of support in health care for the poor (which is unlikely), or due to non-treatment of illness by the poor is still a question for further research. These values for the concentration index tend to give the *Weighted Catastrophic Payment Gap (excess),* W_{cat}^{G} measure the value of 5.76% at the 2.5% threshold level over the value of 5.52% for *Catastrophic Payment Gap (or excess),* G_{cat} and the value of 1.13% at 15% threshold level over the value of 1.33% for the average *Catastrophic Payment Gap (or excess),* G_{cat} measure. (See Table 2.3 for details)

2.3.2.2 Urban Kerala

The *Catastrophic Payment Gap (or excess),* G_{cat}, measures for urban Kerala declines with increasing allowances for health expenditure in the individual's monthly consumption basket (or at higher levels of thresholds set). While health care payments as a proportion of income exceed 2.5% of income by 4.72% of individuals in urban Kerala, it exceeds 15% of income by 1.22%. The MPG_{cat} measure in case of urban Kerala increases as the threshold levels are increased or when the allowances for health expenditure in the total expenditure of the individual are increased. Since, as mentioned earlier, MPG_{cat} measures the excess of expenditure on health care over individuals who actually exceed the thresholds, it can be inferred that the decrease in the catastrophic payment gap at higher thresholds is due to the decline in the number of people having high expenditures on health.

In order to see whether it is the poor or well off who tend to constitute those having excess payments on health care we take Weighted Catastrophic Payment Gap (excess), W_{cat}^{G} measures and the *Concentration Index of Catastrophic Payment Gap (excess),* C_O measures. The value of the concentration index C_O tends to show a positive value for almost all the thresholds except at the threshold level of 2.5% where it shows a negative value of -0.01. This suggests that at high levels of health care payments of around 10% and 15% of pre-payment income it is mostly the well off who tend have such high levels of expenditure. As remarked earlier further research is needed to understand whether the lower proportion of the poor at higher levels of expenditure on

health care is due to their seeking care at public facilities or due to non-treatment of illness by the poor due to high financial burden associated with health care.

2.3.2.3 Rural and urban Kerala: a comparison

Finally when comparing across rural and urban Kerala we find almost similar values of *Catastrophic Payment Gap (or excess)*, G_{cat} which could imply that the intensity of catastrophic payments are on the average same across both regions. A closer look suggests that G_{cat} in urban Kerala is less than that of rural Kerala at all levels of thresholds, showing that the severity of catastrophic payments on health care is more pronounced in rural Kerala.

The Mean Positive Gap measure at the 2.5% threshold shows a value of 8.26% in rural Kerala and 7.84% in urban Kerala. The *Mean Positive Gap* of catastrophic payments, MPG_{cat} by definition is the average Catastrophic Payment Gap divided by Catastrophic Payment Headcount. Hence the lower MPG_{cat} in urban Kerala at 2.5% threshold is due to lower G_{cat}. But towards the 10% threshold level it can be observed that the MPG_{cat} value in urban Kerala becomes higher than that in rural Kerala. Given the fact that G_{cat} measure is lower in rural Kerala, MPG_{cat} can be higher in urban Kerala only if the catastrophic payment headcount is declining rapidly in urban Kerala. At the 15% threshold level MPG_{cat} values in urban Kerala climbs to 10.84% whereas in rural Kerala it is only 9.47%. This is possible only due to the dramatic decline in incidence or headcount measures in urban Kerala. Thus, what these values indicate is that the severity of catastrophic payments is definitely worse in rural Kerala .In urban Kerala, at higher thresholds catastrophic payments is concentrated among lesser people than in rural Kerala.

Although the *Catastrophic Payment Gap (or excess)*, G_{cat} shows similar values for rural and urban Kerala, a closer look as to who belongs to the group that constitutes those having these catastrophic excess payments shows that at lower thresholds it is the poor who tend to have excess payments and at higher thresholds large excess of payments is concentrated among the rich in both rural and urban Kerala. The predominance of poor among those who have excess payments on health seems to be more pronounced in rural Kerala. In urban Kerala excess payments on health at lower

thresholds is concentrated among the poor, at higher threshold levels it is highly concentrated among the well off. This is indicated by the drastic increase in C_O to 0.28 at 15% threshold level and the corresponding lower values of Weighted Payment Gap, W^G_{cat}, at 0.88% when compared with the non-weighted Payment Gap, G_{cat}, at 1.22% (For details see Table 2.3).

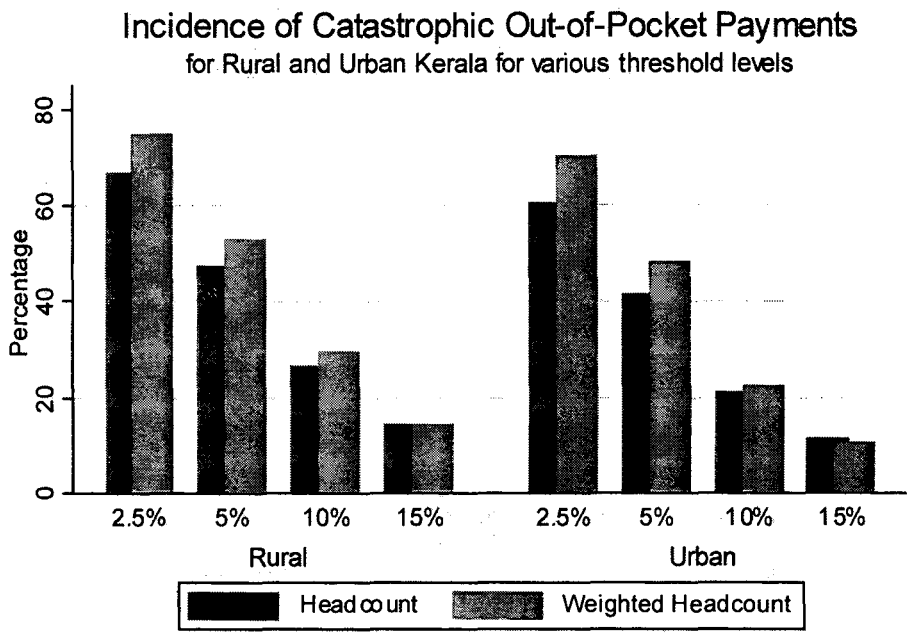
2.4 Conclusion.

In this chapter we were concerned with the question of affordability of health care payments in Kerala. The question of affordability was addressed by looking at the incidence and intensity of 'Catastrophic Payments' on health care across rural and urban Kerala.

The headcount measures showed that around 14% and 11% of individuals in rural and urban Kerala respectively incurred expenditures on health care in excess of 15% of their income. Thus, in both rural and urban Kerala health care expenditures is seen to occupy a substantial proportion of one's total expenditure (See Figure 2.1). The average catastrophic payment gap (or excess) measures showed that for payments on health care exceeded 2.5% of ones income by around 5.52% in rural Kerala and 4.72% in urban Kerala. On average payments of health care were even seen to exceed 15% of monthly income by around one percent of the individuals in both rural and urban Kerala (See Figure 2.2). The incidence and severity of catastrophic payments are more pronounced in rural Kerala compared to urban Kerala (Figures 2.1 & 2.2).

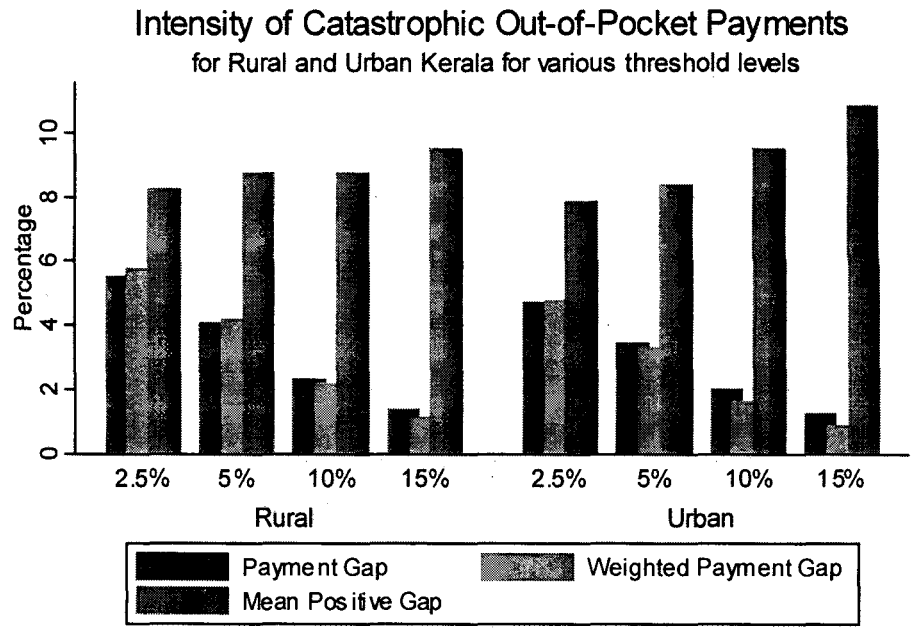
Moreover, in rural Kerala the poor constitute a large proportion of people who have catastrophic payments whereas in urban Kerala the highest expenditures on health are made by the better off (See Figures 2.3, 2.4, 2.1 and 2.2). Whether this is due to the poor getting good quality public health facilities in urban areas or by resorting to more non-treatment of illness due to high health care costs is a question that is still open for further research. It was also seen that at higher threshold levels, those who exceed them seems to exceed them by a greater amount.

FIGURE 2.1: Catastrophic Payment Headcount for rural and urban Kerala for 1999-2000.



Source: NSSO 55th Round,1999-2000.

FIGURE 2.2: Catastrophic Payment Gap (excess) for rural and urban Kerala for the year 1999-2000.



Source: NSSO 55th Round ,1999-2000.

FIGURE 2.3: Concentration index for incidence of catastrophic expenses for rural and urban Kerala for the year 1999-2000.

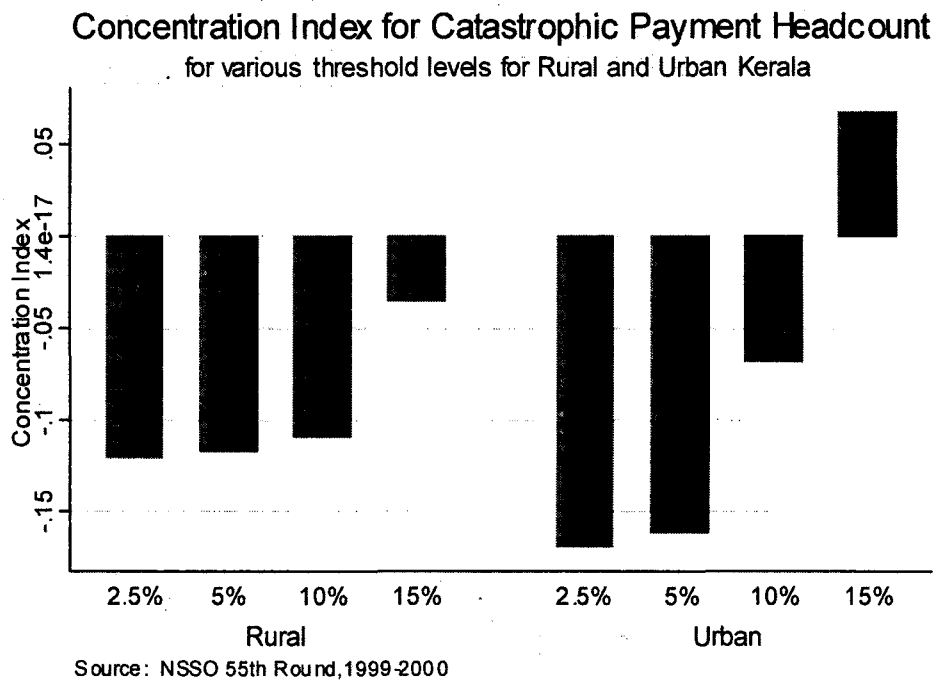
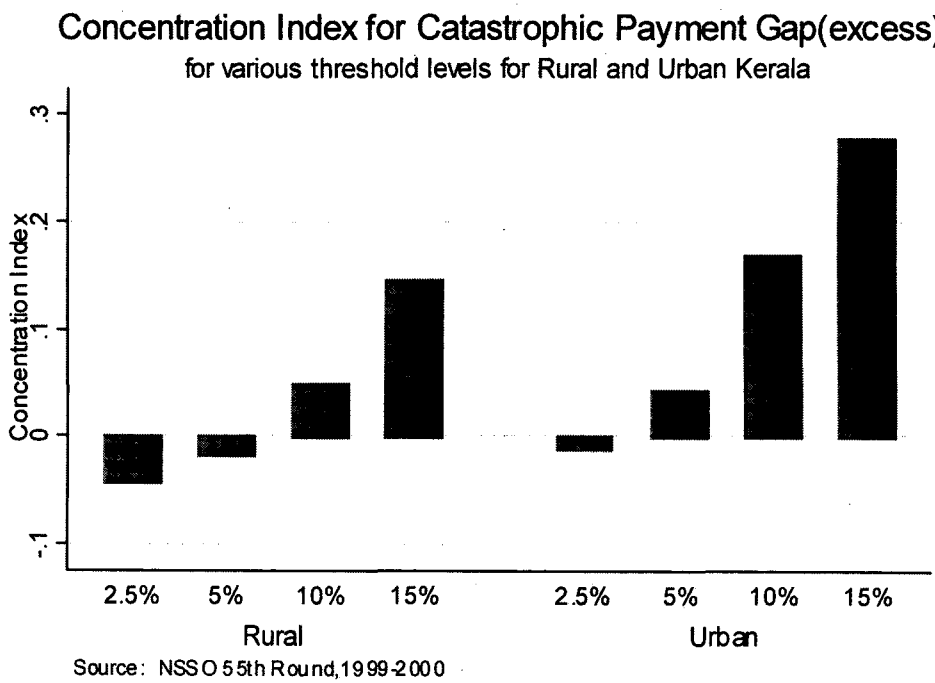


FIGURE 2.4: Concentration index for catastrophic payment excess for rural and urban Kerala for the year 1999-2000.



It needs to be reiterated that the issue of non-treatment of illness due to high financial costs in not captured by the analysis and as a consequence the analysis might understate the extend of financial distress aspects due to high health care costs among the poor. Even without taking this aspect into account it is seen that Kerala reports high levels of expenditure on health care and is seen to be moving towards an increasingly unaffordable health care to large segments of the population. One extreme consequence of high levels of expenditure incurred on health care is that individuals are being pushed below the poverty line. This leads to a situation where on account of health care costs the individuals are unable to meet even the basic subsistence requirements. In other words the individual's income, due to the high expense incurred on health care, is so drastically reduced that they are unable to meet the expenditures on essential items of food. These aspects are analysed in the next chapter.

APPENDIX

A2.1. A short note on Concentration Index[13]

An index that is increasingly being used in health research for the analysis of inequalities in health (in our present case the inequalities in out-of pocket expenditure on health) is the concentration index. In such an index people are not ranked by their health but by their socio-economic status, beginning with the most disadvantaged. Thus by plotting the cumulative proportions of the population (beginning with the most disadvantaged and ending with the least disadvantaged) against the cumulative proportions of health (in our case the out-of-pocket expenditures on health) we get the concentration curve[14] for health (health payments in our study context) .If the concentration curve coincides with the diagonal health (health expenditures) are equally distributed across socio-economic groups or individuals ranked by income. The further the concentration curves lies away from the diagonal, the greater the degree of inequality in health (health expenditure).

The health (health payments) concentration index is defined as twice the area between the concentration curve and the diagonal .The concentration index is defined as positive when the concentration curve lies below the diagonal and negative when it lies above the diagonal. Thus the lowest value that the concentration index can take is –1 and this signifies that all the population's health (health expenditure) is concentrated in the hands of the most disadvantaged person. The maximum value the index can take in +1 and it denotes the case where all the population's health (health expenditure) is concentrated in the hands of the least advantaged person.

The concentration index avoids the defects of the range measures .The concentration index unlike the range measures reflects the experiences of the entire population and it is sensitive to the distribution of the entire population across socio-economic groups. Unlike the Lorenz rations since the individuals are ranked by their socioeconomic status the concentration index also ensures that the socioeconomic dimensions to inequalities in health (health payments) are taken into account.

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[13] This short note is based on Wagstaff et al (1991).

[14] Mahalanobis (1960) suggested that generalized Lorenz curves be called concentration curves. He used it as convenient graphical device to describe consumption pattern for different commodities based on data from the *National Sample Survey of India.* Kakwani (1980) made further contributions.

Chapter 3

Unaffordable Health Care Payments and Poverty

3.1 Introduction

Apart from the affordability of health care and its consequent impact on welfare, the rising health care cost needs to be examined from its impoverishment impact. Impoverishment essentially implies falling below poverty line as a consequence of health expenditure irrespective of the pre-expenditure poverty status. Unlike the analysis of catastrophic payments on health care, examining impoverishment focuses on individuals falling below poverty line on account of health expenditure. In other words, there is a difference between a person close to the poverty line spending 5% of his income on health care and a person at the upper end of the income distribution spending 15% of his income. The former will be pushed below the poverty line while the latter would remain very much above the poverty line. Hence the 'impoverishment' measures the poverty impact of out-of-pocket spending on health care in increasing poverty head count in general and the exacerbation of impoverishment among those who are already poor.

To measure the incidence of poverty, first we consider the pre-payment poverty headcount, which is the simple percentage of people below the poverty line. Then we measure the post payment poverty headcount, which is the number of people falling below the poverty line due to expenditure on health care. Here we take the post payment income, or the income left with the individuals after expenses on health care is deducted from it, and estimate the number of people below the poverty line based on this post payment income. In this case, since income is reduced, more people would definitely fall below the poverty line given the fixed norm of income poverty. The extent of impoverishment (or the poverty impact), the focus here, is the difference between the post-payment poverty headcount and the pre-payment poverty headcount.

Similarly to measure the intensity of poverty due to health care payments, first the pre-payment poverty gap is computed, which is the average amount by which the individual in the sample falls below the poverty line. Then the post-payment poverty gap measure is calculated and the poverty impact or the severity of poverty due to expenditure on health care is tabulated as the difference between the pre-payment and post-payment poverty gap measures.

The following section, Section 3.2, elaborates the methodology of analysing poverty impact of health care consumption in detail. Section 3.3 discuses the results. Section 3.4 dwells upon the issues of progressivity of payments and poverty impact. Section 3.5 dissects the pattern of health expenditure of those who are already poor and those pushed below the poverty line. Section 3.6 explores the links between catastrophic payments on health care and impoverishment aspects. Section 3.7 presents a perspective on the theme of health insurance potential and Section 3.8 concludes the chapter.

3.2 Measurement of impoverishment arising out of expenditures on health care

To assess the impoverishment effects of health care costs Wagstaff and Doorslaer (2001) suggests the following method. First the pre-payment poverty line is taken denoted by z_{pov}^{pre}. Let x_i denote individual i's pre-payment income. Then define $P_i^{pre} = 1$ if $x_i < z_{pov}^{pre}$. The *pre-payment poverty headcount* is defined as:

$$H_{pov}^{pre} = \frac{1}{N}\sum_{i=1}^{N} P_i^{pre} = \mu_{P^{pre}} \tag{10}$$

where N is the sample size.

The pre-payment poverty gap, denoted by g_i^{pre}, can be measured as $z_{pov}^{pre} - x_i$ if $x_i < z_{pov}^{pre}$ and zero otherwise. The average *pre-payment poverty gap* is then defined as:

$$G_{pov}^{pre} = \frac{1}{N}\sum_{i=1}^{N} g_i^{pre} = \mu_{g^{pre}} \tag{11}$$

The *Normalized Pre-Payment Poverty Gap* is defined as

$$NG_{pov}^{pre} = \frac{G_{pov}^{pre}}{z_{pov}^{pre}} \tag{12}$$

and the *Mean Positive Gap* as,

$$MPG_{pov}^{pre} = \sum_{i=1}^{N} g_i^{pre} \Big/ \sum_{i=1}^{N} P_i^{pre} = \mu_{g^{pre}} / \mu_{P^{pre}} \tag{13}$$

Hence from equation (13) it can be seen that

$$\mu_{g^{pre}} = \mu_{p^{pre}} \cdot MPG_{pov}^{pre} \tag{14}$$

In other words, the average pre-payment poverty gap equals the fraction with a positive gap times the mean positive gap.

In our analysis we treat the pre-payment poverty line and the post-payment poverty line as the same, though the post-payment poverty line could be different from the pre-payment one if in the post-payment poverty line the expenditures incurred on health care is deducted.[15]The post-payment poverty measures are obtained by taking the post-payment income and by computing the *post-payment headcount* and the *post-payment poverty gap* measures in the same manner as the pre-payment head count and the poverty gap measures.

The poverty-impact of out of pocket payments is then defined as the difference between the relevant pre-payment and post-payment measures. Therefore the incidence of poverty due to out of out-of-pocket expenditure on health care, PI^H, can be defined as

$$PI^H = H_{pov}^{post} - H_{pov}^{pre} \tag{15}$$

where H_{pov}^{pre} is pre-payment poverty headcount and H_{pov}^{post} is the post-payment poverty headcount.

Similarly the intensity of impoverishment effects or the severity or the extent of poverty induced by out-of pocket expenditure on health care, PI^G, can be defined as

$$PI^G = G_{pov}^{post} - G_{pov}^{pre} \tag{16}$$

where G_{pov}^{pre} is the pre-payment poverty gap and G_{pov}^{post} is the post-payment poverty gap.

[15] For details see Wagstaff and Doorslaer, 2001.

3.3 Results

3.3.1 Rural Kerala

The designated poverty line for this analysis is taken to be Rs 374.79(m.p.c.e)[16] for Rural Kerala for the year 1999-2000. The increase in incidence of poverty, PI^H, due to out of pocket expenditure in Rural Kerala is 3.82 % (*For details see Table 3.1*) .In other words, about 4% of the people fall below the poverty line due to expenses incurred on health care in rural Kerala. The increase in the intensity or the severity of poverty as measured by PI^G, shows that due to expenditures on health the extent of poverty, as measured by the poverty gap measures, increased by an amount of 3.08 Rupees. While it is commonly believed that in-patient care costs result in high health expenditure, the findings for rural Kerala shows a surprising result with the expenditures other than inpatient care being responsible for more than half of the impoverishment. If the total increase in poverty headcount due to health care expenses is 3.82% the increase in poverty headcount due to non in-patient care (which comprises mainly of outpatient care services) is 2.34%. This finding is an eye opener against the preliminary observations made with regard to in-patient and non in-patient expenditures based on NSSO reports. The NSSO reports puts rural Kerala as having the highest expenditures and expenses on health care way above than that of the rural areas in the other States of India in terms of in-patient expenditure and not in terms of non in-patient expenditure. In fact, our analysis reveals lesser poverty impact of in-patient expenditure in rural Kerala as compared with the same due to non in-patient health care expenditure.

[16] Source: Press Information Bureau, Govt. of India & Lok Sabha Unstarred Question No. 2548, dated 31.07.2002.

TABLE 3.1: Poverty Impact of out-of –pocket payments in rural Kerala for the year 1999-2000.

	Total	**Institutional**	**Non-Institutional (Non-Inpatient)**
Food Poverty lines			
Z_{pov}^{pre}	374.79 (m.p.c.e)	374.79 (m.p.c.e)	374.79(m.p.c.e)
Z_{pov}^{post}	374.79 (m.p.c.e)	374.79 (m.p.c.e)	374.79(m.p.c.e)
Poverty Headcount			
H_{pov}^{pre}	9.37%	9.37%	9.37%
H_{pov}^{post}	13.19%	10.27%	11.71%
$PI^{H} = H_{pov}^{post} - H_{pov}^{pre}$	3.82%	0.9%	2.34%
Poverty Gaps			
G_{pov}^{pre}	5.461908	5.461908	5.461908
G_{pov}^{post}	8.544606	6.139064	7.478159
$PI^{G} = G_{pov}^{post} - G_{pov}^{pre}$	3.082698	0.677156	2.016251

Source: NSSO 55th Round, 1999-2000.

Note:

Z_{pov}^{pre} - Pre payment Poverty line.

Z_{pov}^{post} -Post payment Poverty line.

H_{pov}^{pre} -Pre payment Poverty headcount.

H_{pov}^{post} -Post payment Poverty headcount.

$PI^{H} = H_{pov}^{post} - H_{pov}^{pre}$ -Poverty Impact from headcount measures (Incidence of Poverty).

G_{pov}^{pre} -Pre payment Poverty Gap

G_{pov}^{post} -Post payment Poverty Gap

$PI^{G} = G_{pov}^{post} - G_{pov}^{pre}$ -Poverty impact from gap measures (Intensity of Poverty).

3.3.2 Urban Kerala

The poverty line for urban Kerala for the year 1999-2000 is taken as Rs. 477.06[17], monthly per-capita consumption expenditure. In case of urban Kerala the increase in the incidence of poverty arising due to out-of -pocket expenditure on health is 4.48%. In urban Kerala too, the major source of impoverishment associated with health care payments is expenditure on non-institutional care or the outpatient care services. It is seen that 2.72% of individuals fall below the poverty line due to expenditure on non-inpatient care as against 1.36% for inpatient care services. The PI^G, measure shows that the poverty gap in urban Kerala increases by an amount of Rs.5 due to out-of-pocket expenditure incurred on health care. *(For details see Table 3.2).*

TABLE 3.2: Poverty Impact of out-of –pocket payments in urban Kerala for the year 1999-2000.

	Total	**Institutional (Inpatient)**	**Non-Institutional (Non-Inpatient)**
Food Poverty lines			
Z_{pov}^{pre}	477.06 (m.p.c.e)	477.06 (m.p.c.e)	477.06 (m.p.c.e)
Z_{pov}^{post}	477.06 (m.p.c.e)	477.06 (m.p.c.e)	477.06 (m.p.c.e)
Poverty Headcount			
H_{pov}^{pre}	19.84%	19.84%	19.84%
H_{pov}^{post}	24.32%	21.20%	22.56%
$PI^H = H_{pov}^{post} - H_{pov}^{pre}$	4.48%	1.36%	2.72%
Poverty Gaps			
G_{pov}^{pre}	18.65518	18.65518	18.65518
G_{pov}^{post}	23.66191	20.06229	21.83733
$PI^G = G_{pov}^{post} - G_{pov}^{pre}$	5.00673	1.40711	3.18215

Source: NSSO 55th Round, 1999-2000.

[17] Source: Press Information Bureau, Govt. of India & Lok Sabha Unstarred Question No. 2548, dated 31.07.2002.

Note:

Z_{pov}^{pre} - Pre payment Poverty line.

Z_{pov}^{post} -Post payment Poverty line.

H_{pov}^{pre} -Pre payment Poverty headcount.

H_{pov}^{post} -Post payment Poverty headcount.

$PI^{H} = H_{pov}^{post} - H_{pov}^{pre}$ -Poverty Impact from headcount measures (Incidence of Poverty).

G_{pov}^{pre} -Pre payment Poverty Gap

G_{pov}^{post} -Post payment Poverty Gap

$PI^{G} = G_{pov}^{post} - G_{pov}^{pre}$ -Poverty impact from gap measures (Intensity of Poverty).

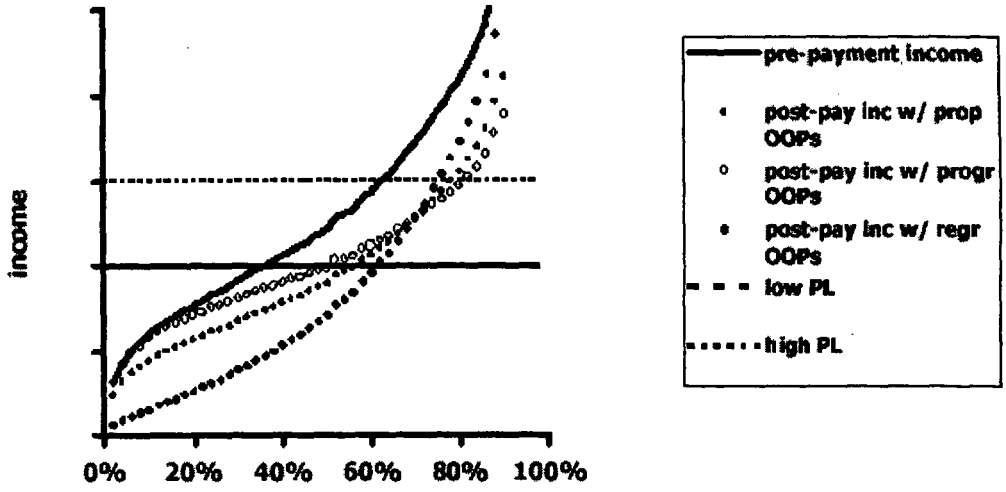
3.3.3 Rural and Urban Kerala: A Comparison

The first striking difference between rural and urban Kerala is that the poverty level in urban Kerala is more than twice that in rural Kerala. The rural and urban incidence of poverty in the state is 9.37 % and 19.84 % respectively. Despite this stark difference in poverty levels, percentage of individuals falling below poverty line as a result of health expenditure remains almost the same in both rural and urban region. The increase in percentage head count of poverty due to expenses on health care is 3.8% for rural Kerala as against 4.5% for urban Kerala. It was further observed that out of the total health care expenditures by the individuals, it was the expenses on non-institutional care or outpatient care that contributed most to the increase in poverty headcount and poverty gap measures in both rural and urban Kerala.

3.4 Poverty impact and redistributive effects.

In this section, some conceptual issues regarding the health payment structures and their influence on poverty impact of out of pocket payments are discussed based on Wagstaff and Doorslaer (2001).

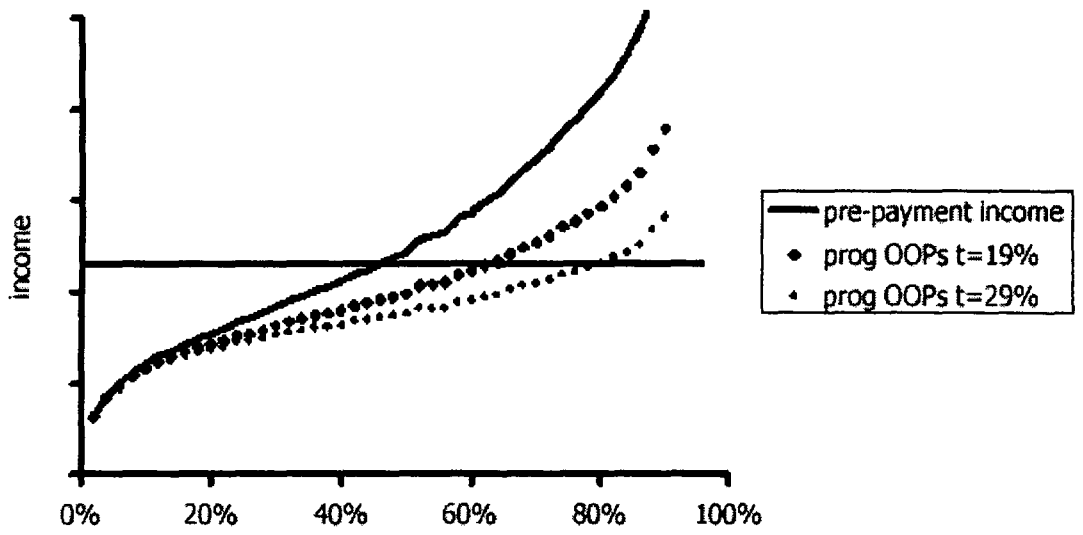
FIGURE 3.1. Poverty impact and the break-even level of income at which post-payment income is independent on degree of progressivity.



Source: Wagstaff and Doorslaer (2001).

We take three post payment income distributions corresponding to three different health payment structures each having the same share of health payments to pre-payment income (which is represented by *t*); one progressive on pre-payment income, one proportional on pre payment income and another one regressive on post-payment income. Here the pre payment and post payment poverty lines are taken to be the same, hence incidence of poverty due to out-of pocket expenses after payments on health care will definitely be higher than the one prior to payments on health care. Even then the poverty impact of out-of-pocket payments will be different under different payment structures. As can be seen in Figure 3.1, there exists a 'break even point' level of income at which the three payment structures gives rise to the same post-payment income level. If the poverty line is below this break-even level of income, the poverty impact of out of pocket payments will be the smallest under the progressive structure. Whereas if the poverty line is above this break even level of income poverty impact is the greatest under the progressive structure and the least under the regressive structure. Thus if the poverty line is not too high or above the break even point the poverty impact of out of pocket payments will be the smallest under a progressive payment structure on health care payments.

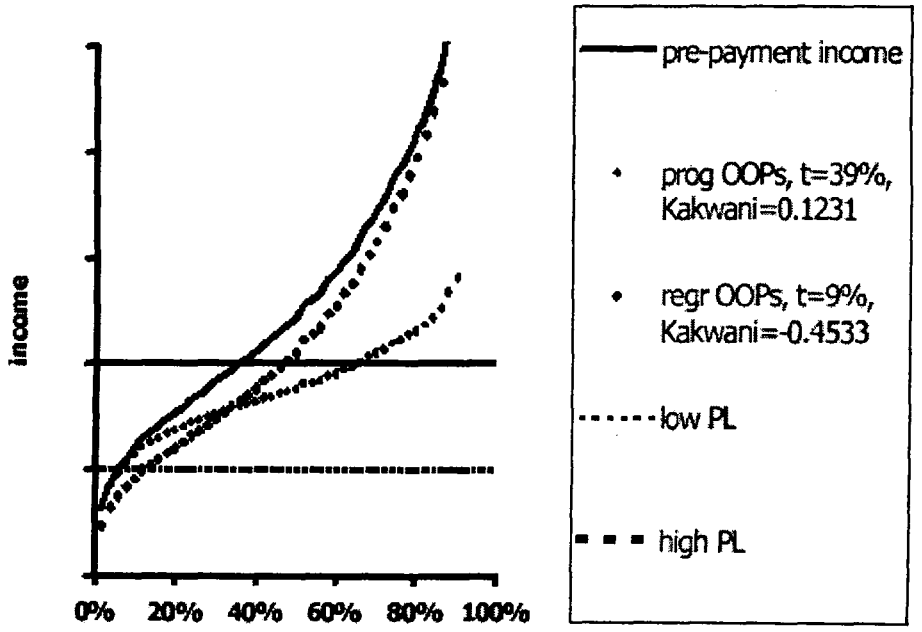
FIGURE 3.2: Poverty impact and the share of (progressive) payments



Source: Wagstaff and Doorslaer (2001).

Poverty impact in addition to the degree of progressivity on health care payments also depends on the share of health payments as a proportion of ones income. This is shown in Figure 3.2 where for a given value of Kakwani's progressivity index, poverty impact is higher for greater values of *t*, or if health payments command a greater share of ones income.

FIGURE 3.3: Poverty impact, progressivity and level of payments



Source: Wagstaff and Doorslaer (2001).

Now, the poverty impact of health payments is analyzed by bringing together the nature of payment structures and the share of health expenses as a proportion of ones income. This is illustrated in Figure 3.3. Two alternative payment structures, a progressive payment structure and a regressive payment structure are defined. In the progressive payment structure health care payments constitute a high proportion of pre-payment income, while on the regressive payment structures health care payments on average constitute only a small share of pre-payment income. The break even level of income, as shown in the figure, based on the share of payments on health (t) and the progressivity index taken in this example, occurs at a low-income rank level of around 30%. Below the break even level of income, pre payment income is higher under the progressive structure (even though the share of health payments is higher the structure of payments is progressive) whereas above the break even level of income the pre payment income is highest under the regressive structure (the share of payments is small and the payment structure is regressive). If the poverty line is below the break-even level, the poverty impact is greater under the regressive payment structure, but if the poverty line is above the break-even level, the poverty impact is greater under the progressive structure. "Thus, if a progressive structure absorbs a large proportion of pre-payment income, it may well give rise to a larger poverty impact than a regressive structure absorbing a small proportion of pre-payment income" (Wagstaff and Doorslaer 2001:28).

3.5 Health expenditures below poverty line and health expenditure as a cause of impoverishment: A graphical exposition

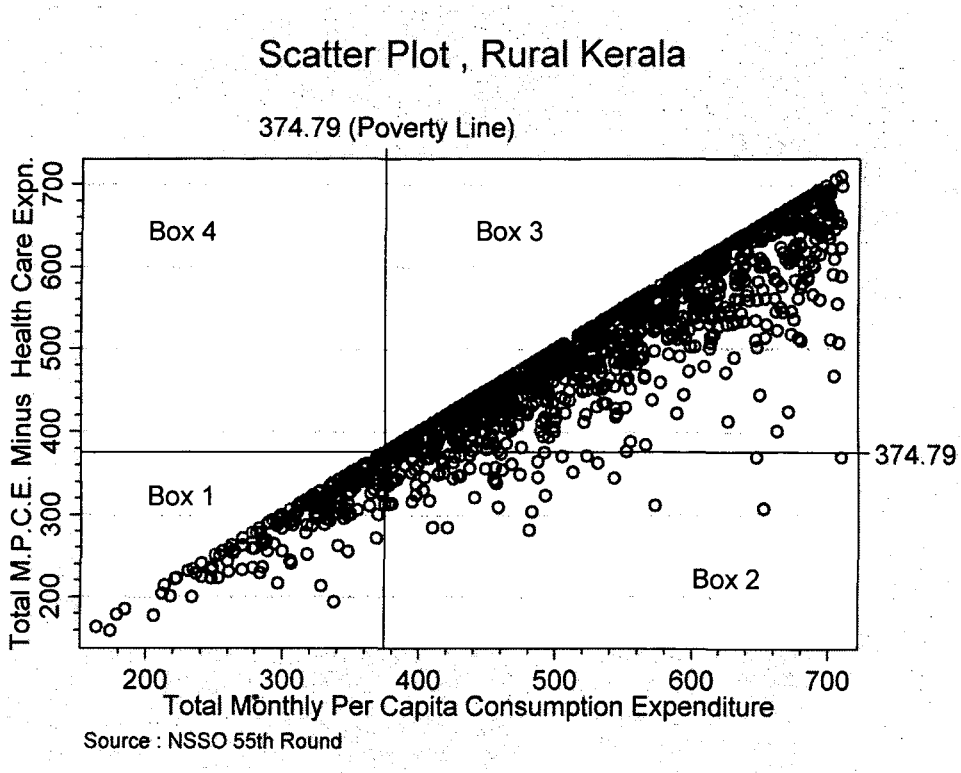
Consider the scatter plot given in Figure 3.4 and Figure 3.6. The x-axis represents the monthly per capita consumption expenditure (m.p.c.e) and the y-axis the monthly per capita consumption expenditure after payments on health are deducted from it or it is the m.p.c.e in the post health care expenditure scenario. Hence a 45-degree line (hypothetical) on this graph would represent those cases where the m.p.c.e before and after health care payments are the same, or in other words the 45-degree line would depict those cases where the individual has not incurred any expenses on health care.

Further the graph can be divided into four boxes .The lower left box depicts those cases where the individual has m.p.c.e (income) below the poverty line levels before (and naturally after) health care payments. It also depicts the cases where the individual has not spent any amount on health care payments but is below the poverty line. The lower

right box depicts those cases of individuals who, though initially above the poverty line, fell below the poverty line due to health care expenses. The upper right box represent those situations where the individuals with and without health care payments are above the poverty line. This box represents individuals who had not incurred any expenditure on health. It also represents the cases of those who had spent on health care but who have not fallen below the poverty line as a result of it. This box is plotted for the m.p.c.e range of Rs. 374.79 to Rs.710 for rural Kerala and Rs.477.06 to Rs.1144 for urban Kerala) which depicts the range of m.p.c.e. (or income) over which incidents of people falling below poverty line due to unaffordable health care payments was witnessed. The upper left box shows situations where before health payments one is below poverty line, but after health care payments above the poverty line. Since such a possibility is implausible there are no observations recorded for that box. Now we consider each box separately for rural and urban Kerala.

3.5.1 Rural Kerala

FIGURE 3.4: Scatter plot showing those below poverty line (Box 1), those pushed below poverty line due to health care expenses (Box 2), those above poverty line (Box 3) for rural Kerala for the year 1999-2000.



3.5.1.1 Below Poverty Line (Box 1)

The Box 1 or the left lower part of the graph of the scatter plot given in Figure 3.4 depicts the individuals who are below the poverty line in the pre and post health care payment scenario. Box 1 region of the scatter plot intimates that in rural Kerala close to the poverty line individuals are incurring substantial expenditure on health care, with some individuals spending up to Rs.142 per person per month on health care, pushing them way into poverty. The average expenditure on health care for those below poverty line is Rs. 21.36 (See Table 3.3). The health expenditure pattern among this group becomes more evident when we look at the box plot of health expenditures (See Figure 3.5).

From the box plot in Figure 3.5 we find that the median value of monthly per capita health care expenditure of those below the poverty line for rural Kerala is at around Rs. 15 per person per month. If we consider the spread of the middle 50% of the health care expenditure distribution, or the Inter Quartile Range (IQR), we find that for rural Kerala it is approximately Rs. 27 per person per month. Again, looking at the outliers we find that the severest outliers or the highest expenditures by people below the poverty line in rural Kerala is at around Rs.142 per person per month.

Thus what we witness among those below poverty line is that at extreme levels of poverty, at the bottom end of the income distribution, the expenditures on health care is seen to be meager. At income levels just below the poverty line people do spend on health care, sometimes substantially, pushing them further into poverty.

3.5.1.2 Fallen below the poverty line (Box 2)

Now we consider the case of individuals being pushed below the poverty line due to expenses on health care. In Rural Kerala the percentage of those who had fallen below the poverty line due to payments on health care constitute about 29% of those who are below the poverty line in the post health care payment scenario (after expenses on health care are taken into account). The remaining 71% are those who were already below the poverty line and who are pushed further into poverty if they have incurred expenses on health care.

In Figure 3.4, the scatter plot of those pushed below the poverty line due to expenses on health care, the lower right box or Box2, depicts the case of those

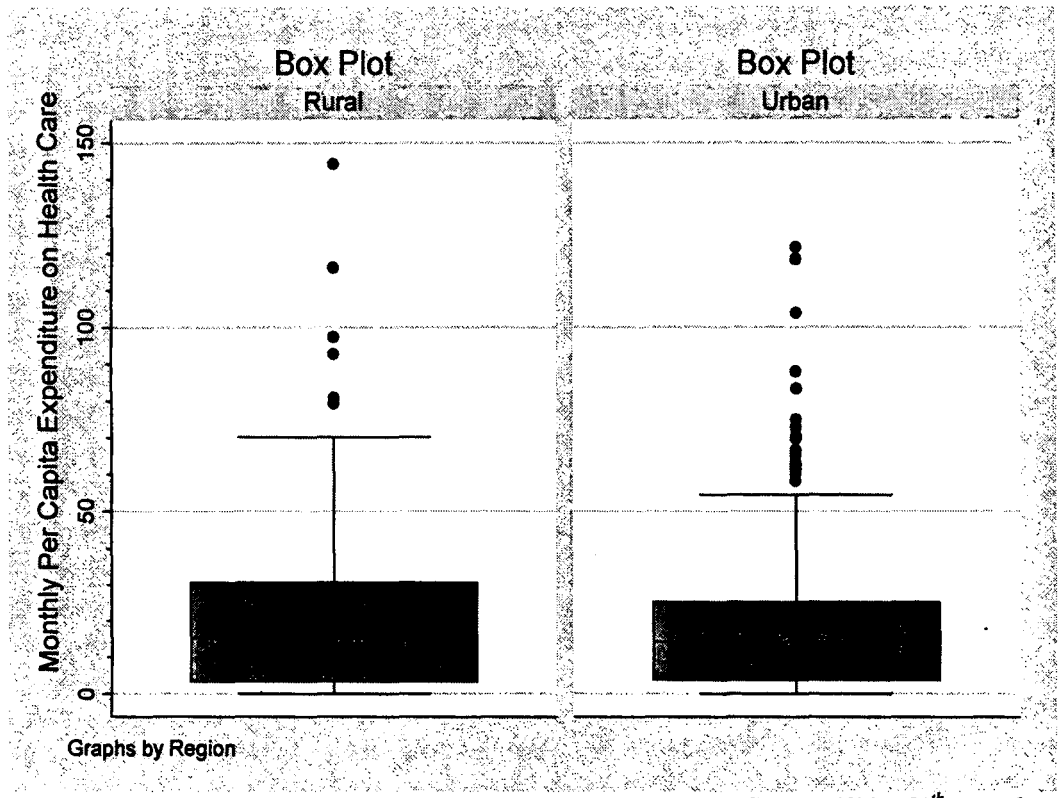
individuals pushed below the poverty line due to unaffordable health care expenses. It shows that most of those who are pushed below the poverty line are those just above the poverty line or those up to m.p.c.e of Rs. 500.The scatter plot further brings into focus cases, though less in number, of high levels of expenditure on health care pushing individuals below the poverty line. In rural Kerala, expenses on health care in the order of Rs.346 and Rs.342 per person per month by individuals with monthly per capita expenditure (m.p.c.e) levels of Rs.653 and Rs.710 respectively resulted in these individuals being pushed below the poverty line. In rural Kerala the average expenditure on health care by these individuals who were pushed below the poverty line (Box 2) is Rs. 85.48 per person per month. This is almost four times the average expenditure on health care incurred by those below the poverty line (See Table 3.3).

3.5.1.3 Above Poverty Line (Box 3)

Box 3 or the upper right region in the scatter plot shown in Figure 3.4, depicts those individuals who are above the poverty line and have not incurred any health care expenses and those who were not pushed below the poverty line due to any expenses incurred on health care. This is plotted for the m.p.c.e range of Rs.374.79 to Rs.710.This m.p.c.e range, as mentioned earlier denotes the m.p.c.e range over which incidents of individuals falling below poverty line due to health care expenses was witnessed.

In rural Kerala most of the individuals belonging to this group did not incur or incurred very little amount on health care expenses. This is deduced from the heavy thickness of the 45-degree line in the graph (See Figure 3.4). The scatter plot also shows a considerable number of cases of expenditure on health care pulling the individuals close to the poverty line, especially among those who are just above the poverty line. From the scatter plot cases of expenditures on health care increasing as the income level increases can also be seen. This is shown by the instances of greater deviation of the scatters from the diagonal at higher incomes. The average health care expenditure for this group is Rs. 32.70.It is to be recollected that the average expenditure on health care by those pushed below the poverty line (Rs. 85.48) is more than two and a half times that of those above the poverty line. (See Table 3.3) Furthermore those pushed below poverty line due to unaffordable health care expenses constitute 7.73% of the total individuals in the Rs.374.79 to Rs.710 m.p.c.e. range.

FIGURE 3.5: Health care expenditure of individuals below poverty line in rural and urban Kerala for the year 1999-2000.



Source: NSSO 55th Round, 1999-2000

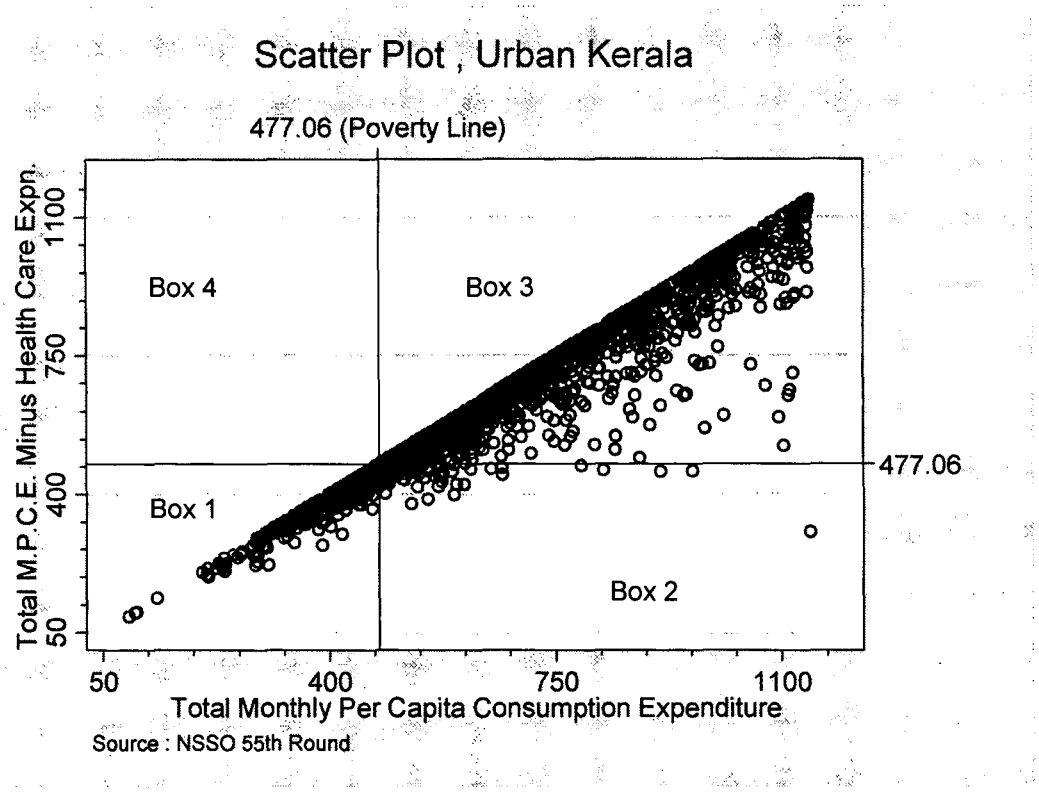
TABLE 3.3:Summary statistics of those below poverty line, those pushed below the poverty due to health care expenses and those above the poverty line for rural and urban Kerala for the year 1999-2000.

	Mean (Rs.)	Standard Error	95% confidence interval	
			Lower Limit	*Upper Limit*
Rural Kerala				
Below Poverty Line (Box 1)				
Per Capita Monthly Health Care Expenditure	21.36	2.075	17.263	25.452
Total Monthly Per Capita Consumption Expenditure	316.51	4.053	308.51	324.50
Fallen Below Poverty Line (Box 2)				
Per Capita Monthly Health Care Expenditure	85.48	7.968	69.617	101.344
Total Monthly Per Capita Consumption Expenditure	431.92	7.619	416.753	447.088
Above Poverty Line *(for m.p.c.e. range of Rs.374.79 to Rs.710)* **(Box 3)**				
Per Capita Monthly Health Care Expenditure	32.70	1.376	29.998	35.399
Total Monthly Per Capita Consumption Expenditure	545.34	3.350	538.763	551.913
Urban Kerala				
Below Poverty Line (Box 1)				
Per Capita Monthly Health Care Expenditure	19.09	1.605	15.930	22.252
Total Monthly Per Capita Consumption Expenditure	383.03	4.576	374.016	392.035
Fallen Below Poverty Line (Box 2)				
Per Capita Monthly Health Care Expenditure	94.30	13.602	67.170	121.425
Total Monthly Per Capita Consumption Expenditure	544.14	13.672	516.867	571.403
Above Poverty Line *(for m.p.c.e. range of Rs.477.06 to Rs.1144)* **(Box 3)**				
Per Capita Monthly Health Care Expenditure	46.97	2.510	42.044	51.897
Total Monthly Per Capita Consumption Expenditure	774.38	7.083	760.478	788.279

Source: NSSO 55th Round.

3.5.2 Urban Kerala

FIGURE 3.6: Scatter plot showing those below poverty line (Box 1), those pushed below poverty line due to health care expenses (Box 2), those above poverty line (Box 3) for urban Kerala for the year 1999-2000.



3.5.2.1 Below poverty line (Box 1)

The lower left box or Box 1 of the scatter plot (Figure 3.6) depicts the case of those individuals below poverty line (even before incurring any health care expenditure and of course even after having expenditures on health care) in urban Kerala. The average spending is Rs. 19.09 per person per month for this group (See Table 3.3). The low value of Standard Error at 1.605 suggests that most of the individuals belonging to this group spend more or less this average amount of Rs.19.09 per person per month on health care. From the box plot of those in Urban Kerala for those below poverty line as shown in Figure 3.5 we find that the median expenditure on health care was Rs.15. The IQR range, showing the variation in the middle 50% of the health care expense distribution, is found to be Rs.20 and the highest expenses incurred by those below poverty line is Rs.120 per person per month.

3.5.2.2 Fallen Below Poverty Line (Box 2)

Those who fell below the poverty line as a result of health care expenditures in urban Kerala is depicted by Box 2 or the lower right region in Figure 3.6.The average expenditure on health care for this group is Rs.94.30 per person per month (See Table 3.3). From the scatter plot it can be observed that most of these who were pushed below the poverty line are those who were close to or just above the poverty line. Extreme cases of individuals with m.p.c.e levels of Rs.1144 spending Rs.838 per person per month on health care and being pushed way below the poverty line can also be seen. If we consider all the individuals who are below the poverty line in urban Kerala in the post health payment scenario we find that the share of those who fell below the poverty line due to health care expenses is 18% of those below poverty line. The rest 82% are those who were already below the poverty line even before incurring any expenditure on health care.

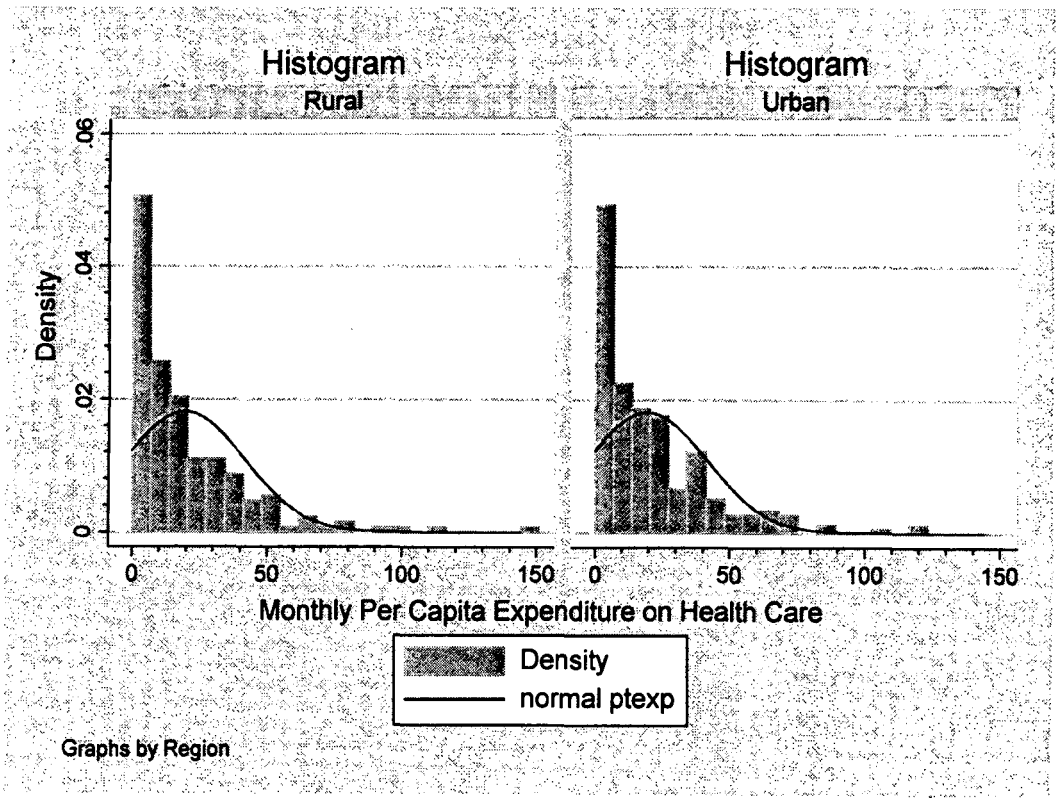
3.5.2.3 Above Poverty Line (Box 3)

Box 3 or the upper right regions of the scatter plot in Figure 3.6 depicts those individuals above the poverty line in the pre and post health care payment scenario. The scatter is plotted for the m.p.c.e range of Rs. 447.06 to Rs. 1144 (the range of m.p.c.e along which individuals were pushed below the poverty due to health care expenses in urban Kerala). The thick band along the 45-degree line shows that most of the individuals in this box or group spent only meager amounts on health care. But cases where due to health care expense individual's income came close to that of poverty line can also be seen. This high level of expenditure on health care is visible even at higher incomes or m.p.c.e levels in this group. The average spending on health care for this group is Rs. 46.97 per person per month. It is to be recollected that those who were pushed below the poverty line due to unaffordable health care expenses constitute 8% of the total individuals in the Rs.447.06 to Rs.1144 m.p.c.e. range.

To sum up, both in rural and urban Kerala a majority of those pushed below the poverty line are those just above the poverty line. Almost all cases of impoverishment in urban Kerala are among those on the fringes of poverty line being pushed just below the poverty line. Whereas in rural Kerala several instances of individuals with high income levels and income levels close to poverty line incurring substantial expenditure on health care and being pushed way below the poverty line can also be seen. In both these regions

those pushed below the poverty line were seen to spend twice or thrice the amounts on health care when compared to those who have not fallen below the poverty line due to health care payments. Even among those who did not fall below the poverty line, it is observed that for some individuals as m.p.c.e level (or income) increases expenditure on health also increases, sometimes to the extend of bringing them close to the poverty line. Coming to those below the poverty line, it can be seen that in both rural and urban Kerala some close to the poverty line were seen to spend substantial amounts on health care more so in the case of rural Kerala, resulting in these households being pushed further into poverty. Towards the lower end of the income distribution of those below the poverty line it is seen that in absolute amounts consumption on health care is very meager or almost absent. Finally this brings the question of, whether, for people below the poverty line, especially for those in the bottom half of this income distribution, the scatter plots point to under consumption or non-consumption of health care? This can be validated or answered only by further research. But as the histograms in Figure 3.7 show there seems to be a very strong case for under consumption of health care by those below the poverty line .If so it has serious implications for policy, especially on the role of public health care service provision.

FIGURE 3.7:Distribution of health care expenses of individuals below poverty line for rural and urban Kerala for the year 1999-2000.



Source: NSSO 55th Round, 1999-2000

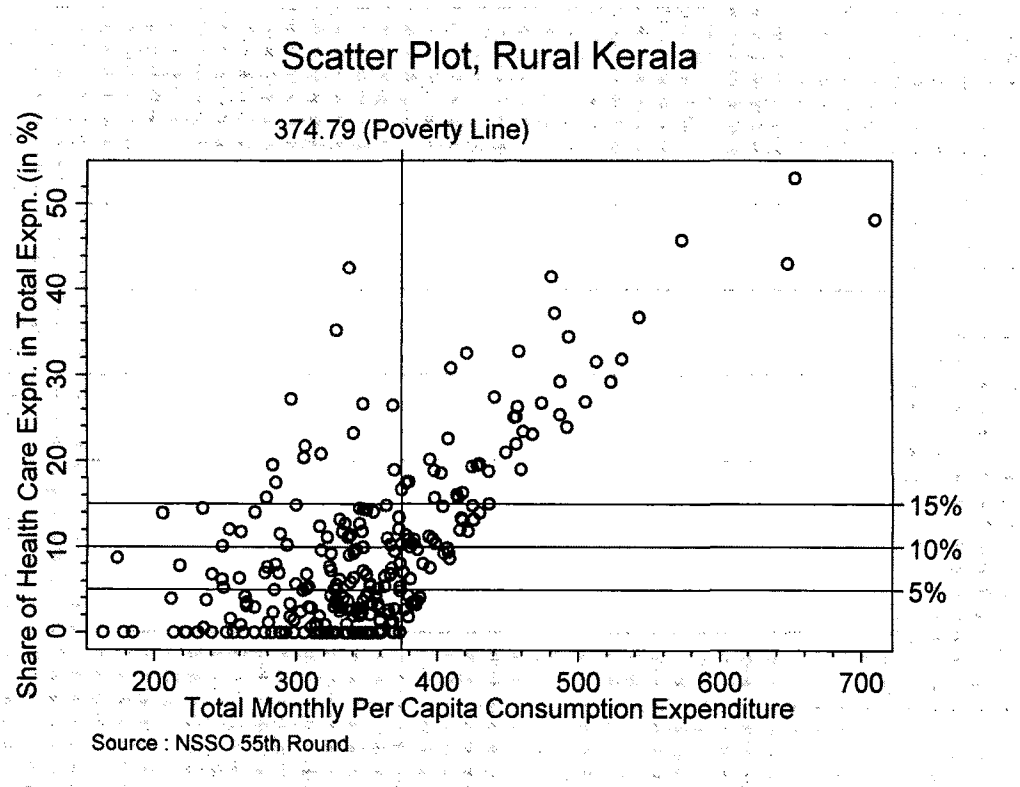
3.6 Exploring the links between catastrophic health care payments and impoverishment issues: Decomposing the catastrophic payments on health

3.6.1 Decomposing the catastrophic payments on health: A preliminary enquiry

As a beginning towards analysing the proposed link between catastrophic payments and impoverishment, the share of health expenditure in total income of those below poverty line and who have fallen below poverty line due to health care expenses is presented by means of the scatter plots in Figure 3.8 and Figure 3.9. The threshold levels of 5% and 10% and 15%, which was used in estimating catastrophic payments on health care, are superimposed on this graph.

In case of rural Kerala, most of those below poverty line, who had expenditures on health care, spent around 8% of their income on the same. Individuals between the Rs. 200 to Rs. 300 m.p.c.e range were seen to spend around 15 % of their income on health care. Moreover some individuals placed near the poverty line were seen to have health expenditure in the order of 42 % of their income.

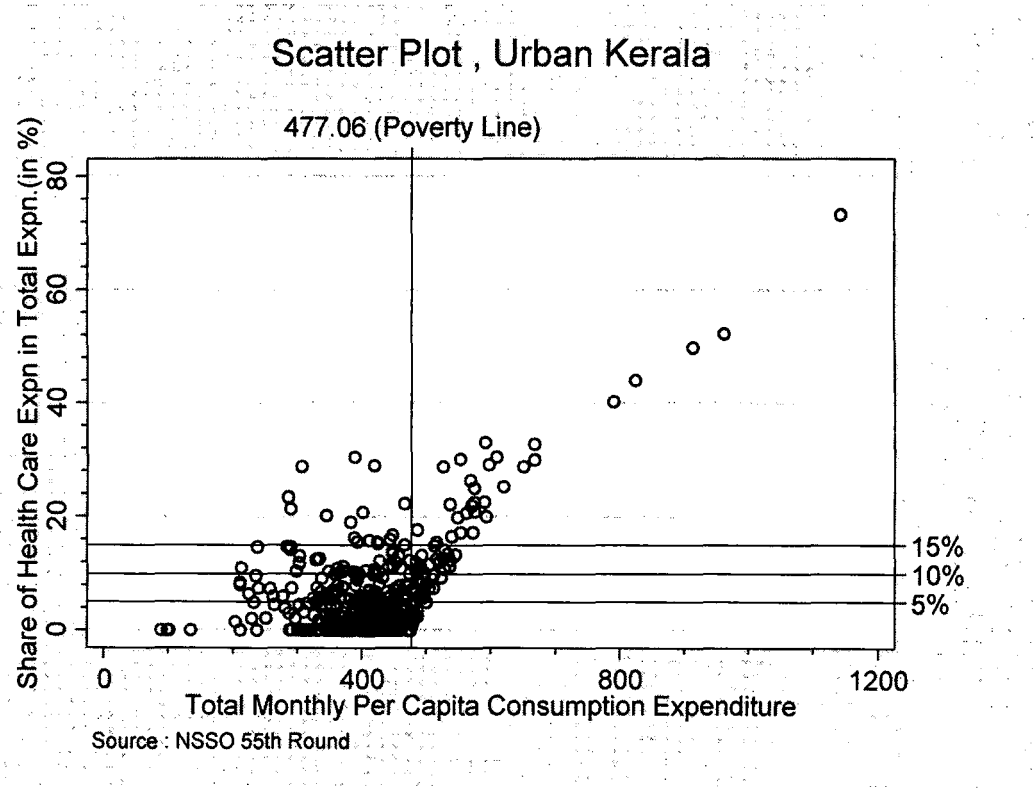
FIGURE 3.8: Total consumption expenditure and health care expenditure as a share of total expenditure of those below poverty line and those who have fallen below poverty line due to health care expense for rural Kerala for the year 1999-2000.



In Urban Kerala too, most of the people below poverty line who had expenditures on health care spent around 8% of their income on health care. Some individuals just below the poverty line spending around 30% of their income on health care could also be seen, pushing them way below the poverty line.

Focusing on those falling below poverty line due to health expenses, it is observed that in both rural and urban Kerala, these individuals spent around 10% to 38% of their income on health care. Rural Kerala presents instances of individuals just above poverty line (around the m.p.c.e level of Rs. 400) spending about 24 per cent of their income on health. In exceptional cases individuals in Rural Kerala were even found to be spending 50% of their income on health care. These were people way above the poverty line, in the m.p.c.e range of Rs.640 to Rs.700 prior to spending on health care. In urban Kerala it could be observed that a few individuals, in the m.p.c.e range of Rs.600 to Rs.1000 spending around 44% of their income on health care. An extreme case where an individual with an m.p.c.e of around Rs.1200, was seen to spend almost 74% of the individual's income on health care pushing the person way below the poverty line.

FIGURE 3.9: Total consumption expenditure and health care expenditure as a share of total expenditure of those below poverty line and those who have fallen below poverty line due to health care expense for urban Kerala for the year 1999-2000.



Thus in both rural and urban Kerala, health care spending were seen to range from 8 per cent to 74 per cent of income for the group of individuals below the poverty line and those pushed below poverty line as a consequence of health care spending. Hence in the subsequent section, an attempt is made to decompose the consequence of catastrophic payment measures in terms of those already in poverty and those pushed into poverty due to health care spending.

3.6.2 Decomposition of Catastrophic Costs: The methodology

3.6.2.1Catastrophic Payment Headcount Measures

To undertake the analysis, as seen in Chapter 2, we first take the ratio of total monthly per-capita consumption expenditure on health care (institutional and non-institutional) to the monthly per-capita consumption expenditure. This ratio can be denoted as T/X, where T denotes the monthly per capita expenditure on health care and X denotes the total monthly per capita consumption expenditure. Then a threshold z_{cat} is defined.

Now let us construct a measure *Catastrophic Payment Headcount of those above poverty line*, H_{cat}^{APLpre}. Let O_i be the catastrophic overshoot equal to $\frac{T_i}{X_i} - z_{cat}$ if $\frac{T_i}{X_i} > z_{cat}$ and zero otherwise, and let $E_i^{APL} = 1$ if $O_i > 0$ and if $X \geq z_{pov}^{pre}$ where z_{pov}^{pre} is the pre-payment poverty line and X as mentioned earlier is the total monthly per capita consumption expenditure. Then the *Catastrophic Payment Headcount of those above poverty line* H_{cat}^{APLpre}, is defined as,

$$H_{cat}^{APL} = \frac{1}{N}\sum_{i=1}^{N} E_i^{APL} = \mu_{E^{APL}} \tag{17}$$

where N is the sample size.

Now the measure of number of individuals below the poverty line having catastrophic health care expenditures, or the *Catastrophic Payment Headcount among those below the poverty line* H_{cat}^{BPL} can be measured as;

$$H_{cat}^{BPL} = H_{cat} - H_{cat}^{APL} \tag{18}$$

where H_{cat} is the *Catastrophic Payment Headcount* and H_{cat}^{APL} is the *Catastrophic Payment Headcount of those above poverty line.*

Let us now construct a headcount measure titled as the *Catastrophic Payment Headcount of individuals above poverty line after incurring catastrophic payments on health care,* $H_{cat}^{APLpost}$. This measure identifies those who had incurred catastrophic payments on health but have not fallen below the poverty line due to such catastrophic health care costs. Here also let us define O_i as the catastrophic overshoot equal to $\frac{T_i}{X_i} - z_{cat}$ if $\frac{T_i}{X_i} > z_{cat}$ and zero otherwise .Let $E_i^{APLpost} = 1$ if $O_i > 0$ and if $X^{post} \geq z_{pov}^{post}$ where X^{post} is the monthly per capita income of the individuals after incurring expenses on health care (total monthly per capita consumption expenditure minus the monthly per capita expenses on health care) and z_{pov}^{post} is the post payment poverty line. In the present analysis the pre payment and post payment poverty lines are considered to be the same. $H_{cat}^{APLpost}$ is then defined as;

$$H_{cat}^{APLpost} = \frac{1}{N}\sum_{i=1}^{N} E_i^{APLpost} = \mu_{E^{APLpost}} \tag{19}$$

where N is the sample size.

The above defined measure becomes useful when we try to measure the number of individuals who incurred catastrophic costs and as a result fell below the poverty line. To account for it we define a measure called the *Catastrophic Payment Headcount of those who fell below the poverty line* due to expenditures on health care, $H_{cat}^{BPLpost}$. It is measured as;

$$H_{cat}^{BPLpost} = H_{cat}^{APL} - H_{cat}^{APLpost} \tag{20}$$

where H_{cat}^{APL} is the catastrophic payments on health care of those above poverty line before payments on health care and $H_{cat}^{APLpost}$ is the catastrophic payment headcount of those above poverty line even after incurring catastrophic payments on health care .

3.6.2.2 Catastrophic Payment Gap (or excess) measures

The *Catastrophic Payment Gap,* G_{cat} measure describes the intensity or the severity of catastrophic payments. It evaluates the percentage by which payments on health care as a proportion of income (or total expenditures) exceed the given threshold levels of health expenditures.

The *Catastrophic Payment Gap,* G_{cat} while computed for those above poverty line is called the *Catastrophic Payment Gap (or excess) of those above poverty line,* G_{cat}^{APL}. This measures the height by which health care payments as a proportion of income exceed the threshold z_{cat} among those who are above the poverty line. The average *Catastrophic Payment Gap (or excess) of those above poverty line,* G_{cat}^{APL} is then defined as;

$$G_{cat}^{APL} = \frac{1}{N}\sum_{i=1}^{N} O_i^{APL} = \mu_{O^{APL}} \qquad (21)$$

where O_i^{APL} is the overshoot or $\frac{T_i}{X_i} - z_{cat}$ if $X_i \geq z_{pov}^{pre}$. T_i denotes the monthly per capita expenditure on health care, X_i denotes the total monthly per capita consumption expenditure and z_{pov}^{pre} the pre-payment poverty line.

The average *Catastrophic Payment Gap (or excess) of those below poverty line,* G_{cat}^{BPL} is then defined as;

$$G_{cat}^{BPL} = G_{cat} - G_{cat}^{APL} \qquad (22)$$

where G_{cat} is the Catastrophic Payment Gap and G_{cat}^{APL} is the Catastrophic Payment Gap of those above poverty line.

As in the case of the headcount measures seen earlier, we now construct a measure titled *Catastrophic Payment Gap (or excess) of those above poverty line after incurring catastrophic expenses on health care,* $G_{cat}^{APLpost}$. It computes the height by which payments as a fraction of income exceeds the set threshold levels for those who have not fallen below the poverty line even after incurring catastrophic health care costs.

Hence the average *Catastrophic Payment Gap (or excess) of those above poverty line after incurring catastrophic expenses on health care,* $G_{cat}^{APLpost}$ is defined as;

$$G_{cat}^{APLpost} = \frac{1}{N}\sum_{i=1}^{N} O_i^{APLpost} = \mu_{O^{APLpost}} \tag{23}$$

where $O_i^{APLpost}$ is the overshoot or $\frac{T_i}{X_i} - z_{cat}$ if $X_i^{post} \geq z_{pov}^{post}$. T_i denotes the monthly per capita expenditure on health care, X_i^{post} denotes the total monthly per capita consumption expenditure of individuals after expenditures on health were deducted from it and z_{pov}^{post} the post-payment poverty line. In the present analysis both the pre-payment and post-payment poverty lines are considered to be the same.

Then we can construct a measure to capture the payment excess of those who fell below the poverty line due to health care expenses. This Catastrophic *Payment Gap (excess) of those who fell below the poverty line* due to expenditures on health care, $G_{cat}^{BPLpost}$ is defined as:

$$G_{cat}^{BPLpost} = G_{cat}^{APL} - G_{cat}^{APLpost} \tag{24}$$

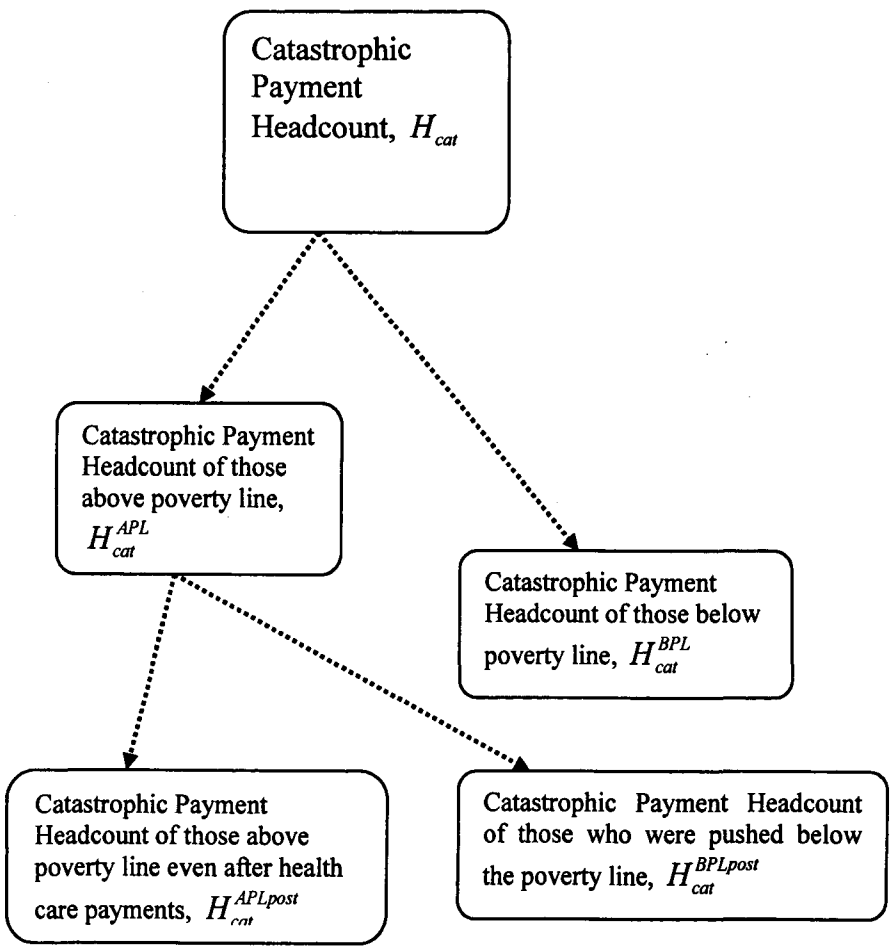
where G_{cat}^{APL} is the *Catastrophic Payment Gap of those above poverty line* and $G_{cat}^{APLpost}$ is the *Catastrophic Payment Gap (or excess) of those above poverty line even after incurring catastrophic expenses on health care.*

The logic of the methodology elucidated above could be explained in a few line as thus: Those below the or above the poverty line could have catastrophic payments on health care, incurring payments on health care in excess of 2.5%, 5%, 10% and 15% of one's income. For some individuals above poverty line, such catastrophic payments result in a scenario where the income of such individuals is reduced sufficiently so as to push them below the poverty line. Of course, all those who incur catastrophic payments need not end up in impoverishment but some do end up below the poverty on account of such health care expenses. The above methodology, hence, tried to measure the poverty impact arising out of catastrophic health care payments.

This decomposition methodology is illustrated by means of the flow chart in Figure 3.10.Here the *Catastrophic Payment Headcount,* H_{cat} is taken as an example.

The same logic applies to the decomposition of Catastrophic Payment Gap G_{cat} measures too. The H_{cat} measure can be divided into those below and above poverty line and having catastrophic payments. Taking the case of those above poverty line incurring catastrophic payments, due to payments on health care there results a change in the income distribution of those above poverty line. In other words due to expenses on health care (or post-payment) individual's income gets reduced. Sometimes the income reduction is so large that the individual is pushed below the poverty line. This incidence of impoverishment due to catastrophic costs is measured by $H_{cat}^{BPLpost}$. Those individuals who had catastrophic health care payments but still above the poverty line is measured by $H_{cat}^{APLpost}$.

FIGURE 3.10: Flow Chart showing the decomposition of Catastrophic Payment Headcount into those above and below poverty line, in the pre-payment stage, and into those who have been pushed below the poverty line due to catastrophic expenses on health care.



* Each of these variables is computed in percentage terms for rural and urban Kerala as a whole.

3.6.3 Decomposing catastrophic health care cost: the results

3.6.3.1 Rural Kerala

The results for rural Kerala are presented in Table 3.4. At the 2.5% threshold level, *Catastrophic Payment Headcount of those above poverty line,* H_{cat}^{APL} gives a value of 60.43%. This implies that in rural Kerala the percentage of individuals having expenses on health care in excess of 2.5% of their monthly income and who are above the poverty line amounts to 60.43%. At the same 2.5% threshold level, it may be recollected that the value of *Catastrophic Payment Headcount,* H_{cat} was 66.81%. The difference between H_{cat} and H_{cat}^{APL} of 6.38% denotes the percentage of individuals who were below the poverty line and who had expenditures on health care in excess of 2.5% of their monthly income. In general, across threshold levels, the *Catastrophic Payment Headcount for those below the poverty line* H_{cat}^{BPL} measure captures this difference. H_{cat}^{BPL} at the 2.5% threshold level amounts to a value of 6.38%. This value can be interpreted in the following way too. From Section 3.3.1, the percentage of individuals below the poverty line in rural Kerala was seen to be 9.37%. The H_{cat}^{BPL} value of 6.38% at 2.5% threshold levels implies that out of the total 9.37% of individuals below poverty line 6.38% had expenses on health care in excess of 2.5% of their pre payment income. As a result of these health payments the individuals' income have indeed diminished and are pushed deeper into poverty.

As we increase the threshold levels we find that the values of H_{cat}^{APL} declines. For instance, at the 15% threshold level, it becomes 13.10%. Moreover at higher threshold levels the divergence between H_{cat} and H_{cat}^{APL} measures decreases considerably implying that only a very small number of individuals below the poverty line are spending in excess of say 10% or 15% of their income on health care. This is reflected in the declining values of H_{cat}^{BPL} from 4.67% at 5% threshold level to 0.94% at the 15% threshold level.

The *Catastrophic Payment Headcount of individuals above poverty line even after incurring catastrophic payments on health care,* $H_{cat}^{APLpost}$, which measures those above poverty line even after the loss in income due to health care payment is taken into account, declines with increasing threshold levels. This is essentially due to the decline

in overall catastrophic payments, H_{cat}, at higher threshold levels. However, the difference between the *Catastrophic Payment Headcount of those above poverty line* H_{cat}^{APL}, and $H_{cat}^{APLpost}$ is of relevance as it indicates the head count of people falling below poverty as a result of catastrophic expense on health care. This difference being the *Catastrophic Payment Headcount of those who fell below the poverty line* due to expenditures on health care is termed as $H_{cat}^{BPLpost}$ measure.

TABLE 3.4: Decomposition of Catastrophic Payments, with the impoverishment at each levels of threshold, for rural Kerala for the year 1999-2000.

Rural Kerala				
Threshold Level ⇒	*2.5%*	*5.0%*	*10%*	*15%*
Headcount Measures				
H_{cat}	66.81%	47.20%	26.64%	14.04%
H_{cat}^{APL}	60.43%	42.53%	24.19%	13.10%
H_{cat}^{BPL}	6.38%	4.67%	2.45%	0.94%
$H_{cat}^{APLpost}$	56.65%	39.17%	21.16%	10.87%
$H_{cat}^{BPLpost}$	3.78%	3.36%	3.03%	2.23%
Gap Measures				
G_{cat}	5.52%	4.12%	2.32%	1.33%
G_{cat}^{APL}	5.06%	3.80%	2.17%	1.27%
G_{cat}^{BPL}	0.46%	0.32%	0.15%	0.06%
$G_{cat}^{APLpost}$	4.45%	3.28%	1.81%	1.02%
$G_{cat}^{BPLpost}$	0.61%	0.52%	0.36%	0.25%

Source: NSSO 55th Round, 1999-2000.

Note:

H_{cat} -Catastrophic Payment Headcount

H_{cat}^{APL} - Catastrophic Payment Headcount of those above poverty line

$H_{cat}^{BPL} = H_{cat} - H_{cat}^{APL}$ - Catastrophic Payment Headcount of those below poverty line

$H_{cat}^{APLpost}$ - Catastrophic payment headcount of those above poverty line even after incurring catastrophic payments on health care.

$H_{cat}^{BPLpost} = H_{cat}^{APL} - H_{cat}^{APLpost}$ - Catastrophic Payment Headcount of those below poverty line after incurring catastrophic payments on health care.

G_{cat} -Average Catastrophic Payment Headcount

G_{cat}^{APL} -Average Catastrophic Payment Gap (or excess) of those above poverty line

$G_{cat}^{BPL} = G_{cat} - G_{cat}^{APL}$ - The average Catastrophic Payment Gap (or excess) of those below poverty line.

$G_{cat}^{APLpost}$ - Average Catastrophic Payment Gap (or excess) of those above poverty line after incurring catastrophic expenses on health care

$G_{cat}^{BPLpost} = G_{cat}^{APL} - G_{cat}^{APLpost}$ - Average Catastrophic Payment Gap (excess) of those who fell below the poverty line due to expenditures on health care

With a 2.5% threshold level $H_{cat}^{BPLpost}$ shows a value of 3.78%. It implies that in rural Kerala 3.78% of the individuals were pushed below the poverty line on account of health care expense in excess of 2.5% of their income. As seen earlier in Section 3.3.1, from the PI^H measure for rural Kerala, the number of individuals falling below poverty line in rural Kerala due to expenses on health care was 3.82%. The divergence in value between $H_{cat}^{BPLpost}$ and PI^H measure for rural Kerala is primarily due to PI^H measure including those who fell below the poverty line even while incurring less than 2.5% of their income on health care. In rural Kerala the $H_{cat}^{BPLpost}$ measure is seen to hover around 3% even at 10% threshold implying that a substantial umber of those who fell below the poverty line due to health care expenses had spent around 10% of their income on health care. At the 15% threshold level the $H_{cat}^{BPLpost}$ measure declines to 2.23%.

Now we consider the Gap measures. The average *Catastrophic Payment Gap (or excess) of those above poverty line,* G_{cat}^{APL} measures the catastrophic payment gap for those above the poverty line, exceeding the threshold levels of health care expenditure.

The G_{cat}^{APL} measure at the 2.5% threshold level shows a value of 5.06%. This means that in rural Kerala health payments as a proportion of income exceeds 2.5% of the income by 5.06% for those above the poverty line. The value for *Catastrophic Payment Gap (or excess),* G_{cat} at 2.5% threshold was 5.52%. The difference between the two represents the *average Catastrophic Payment Gap (or excess) of those below*

poverty line, G_{cat}^{BPL}. At the 2.5% threshold level G_{cat}^{BPL} shows a value of 0.46%, meaning that expense in excess of 2.5% of income by those below the poverty line amounts to 0.46% out of a total G_{cat} value of 5.52%.

With increasing thresholds all measures of Catastrophic Payment Gap of G_{cat}, G_{cat}^{APL} and G_{cat}^{BPL} declines. Moreover at higher thresholds the difference between G_{cat} and G_{cat}^{APL} declines substantially. It implies that most of the payment excess at higher thresholds is shared by those above poverty line. This aspect is reiterated with the declining values of G_{cat}^{BPL} to 0.06% at the 15% threshold level from 0.32 % at the 5% threshold level.

The average *Catastrophic Payment Gap (or excess) of those above poverty line after incurring catastrophic expenses on health care,* $G_{cat}^{APLpost}$ measure like the average *Catastrophic Payment Gap (or excess) of those above poverty line,* G_{cat}^{APL} measure declines with increasing threshold levels. The Catastrophic *Payment Gap (excess) of those who fell below the poverty line* due to expenditures on health care, $G_{cat}^{BPLpost}$ measure at 2.5% threshold level shows a value of 0.61%. It means that in rural Kerala those who fell below the poverty line due to expenses on health care in excess of 2.5% of their income exceeded it by 0.61%. The value of $G_{cat}^{BPLpost}$ further declines to 0.25% at the 15% threshold level.

3.6.3.2 Urban Kerala

The results for urban Kerala are presented in Table 3.5. Taking the headcount measures first, the *Catastrophic Payment Headcount of those above poverty line,* H_{cat}^{APL} measure at 2.5% threshold with a value of 47.70% indicates that 47.70% of those who spend more than 2.5% of their income belong to APL category. The *Catastrophic Payment Headcount,* H_{cat} measure for the 2.5% threshold was 60.21%. The difference between H_{cat} and H_{cat}^{APL} as evidenced by *the Catastrophic Payment Headcount for those below the poverty line,* H_{cat}^{BPL} is to the tune of 12.51%. This shows that out of the 60.21% who spent more than 2.5% of their income on health, 12.51% belonged to those below the poverty line. The H_{cat}^{BPL} value of 12.51% at 2.5% threshold level can also be

interpreted in the following manner. Out of the total percentage of individuals below poverty line in urban Kerala of 19.84%[18], 12.51% had expenditures on health care in excess of 2.5% of their pre-payment income. These individuals as a result were pushed deeper into poverty. The remaining 7.33% of individuals below poverty line had either no expenses on health care or had expenditures on health care less than or equal to 2.5% of their pre payment income. With higher threshold levels H_{cat}^{APL} values decline and the deviation between H_{cat}^{APL} and H_{cat} values decreases implying that health expenses of the order of 10% and 15% of income are mostly borne by individuals above the poverty line. This is inferred based on the decline in the values of H_{cat}^{BPL} to 1.12% with 15% threshold from 12.51% with 2.5% threshold level.

TABLE 3.5: Decomposition of Catastrophic Payments, with the impoverishment at each levels of threshold, for urban Kerala for the year 1999-2000.

Urban Kerala				
Threshold Level ⇒	*2.5%*	*5.0%*	*10%*	*15%*
Headcount Measures				
H_{cat}	60.21%	41.52%	20.90%	11.25%
H_{cat}^{APL}	47.70%	33.90%	18.06%	10.13%
H_{cat}^{BPL}	12.51%	7.62%	2.84%	1.12%
$H_{cat}^{APLpost}$	43.37%	29.84%	15.10%	8.56%
$H_{cat}^{BPLpost}$	4.33%	4.06%	2.96%	1.57%
Gap Measures				
G_{cat}	4.72%	3.46%	1.99%	1.22%
G_{cat}^{APL}	4.09%	3.08%	1.83%	1.15%
G_{cat}^{BPL}	0.63%	0.38%	0.16%	0.07%
$G_{cat}^{APLpost}$	3.51%	2.61%	1.54%	0.96%
$G_{cat}^{BPLpost}$	0.58%	0.47%	0.29%	0.09%

Source: NSSO 55th Round, 1999-2000.

[18] See Section 3.3.2

Note:

H_{cat} -Catastrophic Payment Headcount

H_{cat}^{APL} - Catastrophic Payment Headcount of those above poverty line

$H_{cat}^{BPL} = H_{cat} - H_{cat}^{APL}$ - Catastrophic Payment Headcount of those below poverty line

$H_{cat}^{APLpost}$ - Catastrophic payment headcount of those above poverty line even after incurring catastrophic payments on health care.

$H_{cat}^{BPLpost} = H_{cat}^{APL} - H_{cat}^{APLpost}$ - Catastrophic Payment Headcount of those below poverty line after incurring catastrophic payments on health care.

G_{cat} -Average Catastrophic Payment Headcount

G_{cat}^{APL} -Average Catastrophic Payment Gap (or excess) of those above poverty line

$G_{cat}^{BPL} = G_{cat} - G_{cat}^{APL}$ - The average Catastrophic Payment Gap (or excess) of those below poverty line.

$G_{cat}^{APLpost}$ - Average Catastrophic Payment Gap (or excess) of those above poverty line after incurring catastrophic expenses on health care

$G_{cat}^{BPLpost} = G_{cat}^{APL} - G_{cat}^{APLpost}$ - Average Catastrophic Payment Gap (excess) of those who fell below the poverty line due to expenditures on health care

The *Catastrophic Payment Headcount of individuals above poverty line even after incurring catastrophic payments on health care,* $H_{cat}^{APLpost}$ like the *Catastrophic Payment Headcount of those above poverty line* H_{cat}^{APL}, measure declines with increasing threshold levels. The *Catastrophic Payment Headcount of those who fell below the poverty line* due to expenditures on health care, $H_{cat}^{BPLpost}$ measure at the 2.5% threshold level shows a value of 4.33% implying that in urban Kerala 4.33% of the individuals had catastrophic expenses in excess of 2.5% of their pre-payment income and as result they were pushed below the poverty line. As seen in Section 3.3.2, in urban Kerala the PI^H measure, or the number of people who fell below the poverty line due to health care expenses was 4.48%. The difference between the PI^H measure and the $H_{cat}^{BPLpost}$ measure is 0.15%. This difference represents the proportion of individuals in urban Kerala being pushed below the poverty line even while incurring less than 2.5% of their income on health care. The $H_{cat}^{BPLpost}$ measure up to the 5.0% threshold level shows a value of around 4% implying that a large number of those who were pushed below the poverty line due to health care expenses spent more than 5% (but less than 10% of their income) on health care. $H_{cat}^{BPLpost}$ declines to 1.57% at the 15% threshold level.

The average *Catastrophic Payment Gap (or excess) of those above poverty line,* G_{cat}^{APL} at 2.5% threshold is 4.09% and the values for *Catastrophic Payment Gap (or excess),* G_{cat} was 4.72%. This implies that in urban Kerala out of the total excess payments of 4.72%, those above the poverty line contribute to 4.09% of it. The *average Catastrophic Payment Gap (or excess) of those below poverty line,* G_{cat}^{BPL} at 2.5% threshold shows a value of 0.63%. It means that for the whole of urban Kerala considering those below the poverty line and having catastrophic payments in excess of 2.5% of their pre payment income, the payments as a proportion of income is seen to exceed the threshold level by 0.63%. The values of G_{cat}^{APL} declines with increasing threshold but at higher thresholds the divergence between G_{cat} and G_{cat}^{APL} values are very small implying that at higher thresholds almost all the excess payments on health care is met by those above the poverty line. Hence the G_{cat}^{BPL} values show a decline to 0.06% at 15% threshold level indicating that, for urban Kerala as a whole, for those below the poverty line, payments on health care as a proportion of income exceed the 15% threshold level by 0.06%.

The average *Catastrophic Payment Gap (or excess) of those above poverty line after incurring catastrophic expenses on health care,* $G_{cat}^{APLpost}$ measure like the average *Catastrophic Payment Gap (or excess) of those above poverty line,* G_{cat}^{APL} measure declines with increasing threshold levels. The Catastrophic *Payment Gap (excess) of those who fell below the poverty line due to expenditures on health care,* $G_{cat}^{BPLpost}$ measure at 2.5% threshold level shows a value of 0.58%. It means that in urban Kerala those who fell below the poverty line due to expenses on health care in excess of 2.5% of their income exceeded the 2.5% threshold by 0.58%. The value of $G_{cat}^{BPLpost}$ declines to 0.09% at the 15% threshold level.

3.6.3.3 Rural and urban Kerala: A Comparison.

Making a comparison between urban and rural Kerala, first and foremost it can be observed that the incidence of catastrophic payments indicated by H_{cat} is equally high in both the regions but a shade higher in rural Kerala.

The decomposition of the H_{cat} for urban Kerala reveals that there is a heavy concentration of individuals below poverty line incurring such catastrophic expenditure at 2.5 % threshold level. Here, out of a total catastrophic payment head count of 60.21%, individuals below poverty line shared 13 % of the incidence of catastrophic costs. In rural Kerala the same is only 6.38%. At the 5% threshold level, the incidence of health care payments in excess of 5% of pre payment income by those below the poverty line account for 7.62% in urban Kerala as against 4.67% in rural Kerala. These observations very well substantiate the reasons behind *Concentration index of Catastrophic Payment Headcount* C_E having a lower negative value in case of urban Kerala at the 2.5% and 5% threshold levels. For urban Kerala the values for C_E at the 2.5% and 5% threshold levels were –0.169 and –0.161 respectively whereas for rural Kerala it was –0.12 and –0.116 at the 2.5% and 5% threshold levels. When speaking about expenditures on health care of the order of 2.5% and 5% of pre payment income for those below the poverty line, it has to be borne in mind that in absolute Rupee terms these percentage terms translates into a very low amount.

In case of both rural and urban Kerala at higher threshold levels of 10% and 15% of prepayment income the share of those below poverty line making catastrophic payments drops down substantially, more so in the case of rural Kerala. At this point it is worth mentioning the fact that at 10% and 15% threshold levels the concentration index was negative in case of rural Kerala. At 15% threshold level in rural Kerala C_E showed a value of –0.04 whereas for urban Kerala the value of C_E was 0.07. This when coupled with the observation that instances of individuals below poverty line having catastrophic costs of the order of 15% of pre payment income is higher in urban Kerala, points to the fact that in rural Kerala, when compared with urban Kerala, thought the percentage number of people below poverty line incurring such catastrophic payments is less, perhaps more individuals on the fringe of the poverty line are incurring catastrophic payments in rural Kerala. This is corroborated by the graphical exposition made earlier and from the higher percentage values for $H_{cat}^{BPLpost}$, or the *Catastrophic Payment Headcount of those who fell below the poverty line* due to expenditures on health care, in rural Kerala at the 15% threshold level. For rural Kerala at 15% threshold level

$H_{cat}^{BPLpost}$ shows a value of 2.23% whereas the same for urban Kerala is 1.16% at the 15% threshold level.

Comparing $H_{cat}^{BPLpost}$ across rural and urban Kerala first we find that at lower thresholds of 2.5% and 5%, the percentage of individuals falling below the poverty line is higher in urban Kerala but at higher thresholds of 15% those falling below the poverty line due to health care expenses is higher in rural Kerala.

This lower value of $H_{cat}^{BPLpost}$ in urban Kerala at 15% threshold is due to the rapid decline of $H_{cat}^{BPLpost}$ with increasing threshold levels. In rural Kerala even though at 2.5% threshold the value of $H_{cat}^{BPLpost}$ is lower than that in urban Kerala the decline in its value, with increasing threshold levels, was by a much smaller amount than that in urban Kerala. Therefore at a 15% threshold level $H_{cat}^{BPLpost}$ shows a value of 2.23% in rural Kerala while the same for urban Kerala is 1.57%.

The above observation implies is that in urban Kerala, those who fell below the poverty line due to health care expenditure had expenses between 5% and 10% of their pre-payment income. On the other hand, in case of rural Kerala, though the percentage of individuals falling below the poverty line is less, they spend more than 10% of their income on health care. This high catastrophic cost phenomenon in rural Kerala could be more acute on conversion of these percentage figures to absolute numbers. Since the population of rural Kerala is more than twice that of urban Kerala, the actual number of individuals falling below the poverty line is higher in rural Kerala than in urban Kerala.

All measures of Catastrophic Payment Gap of G_{cat}, G_{cat}^{APL} and G_{cat}^{BPL} show higher percentage values in case of rural Kerala .In rural Kerala a major part of these excess payments are made by those above poverty line. In urban Kerala too, though the intensity of catastrophic payments is less than that in rural Kerala, most of these excess payments are among those above poverty line. From the G_{cat}^{BPL} measure it can be observed that at threshold levels of 2.5% and 10%, those below poverty line in urban Kerala have higher excess payments than rural Kerala, while at the 10% and 15% threshold levels the G_{cat}^{BPL} values become almost identical for both rural and urban Kerala. It implies that excess payments on health care in excess of 10% and 15% of income by those below

poverty line are almost of the same magnitude in percentage terms for both rural and urban Kerala.

The Catastrophic *Payment Gap (excess) of those who fell below the poverty line* due to expenditures on health care, $G_{cat}^{BPLpost}$ measure shows that most of the increase in catastrophic payment gap by those falling below the poverty line occurs at the 2.5% and 5% threshold levels of expenditure.

3.7 A short note on the 'health insurance potential' in rural and urban Kerala.

As a final note, a few reflections on the question of the health insurance potential in both rural and urban Kerala are presented. At the outset, it has to be mentioned that this short note proposes to comment on this question within the tools and framework of this study. It is not an analysis into the question of health insurance potential.

If one takes the *Catastrophic Payment Headcount of those above poverty line*, H_{cat}^{APL}, it could serve as a pointer towards assessing the potential for health insurance. Here the issue is addressed in terms of health care spending pattern of the individuals. The H_{cat}^{APL} measure shows the number of individuals who are above the poverty line and incurring expenses on health care in excess of 2.5%, 5% and 10% of their pre payment income. The assumption here relates to those below poverty line having no surplus left for meeting any kind of premium or other payments associated with any health care insurance package. As a caveat it should be mentioned that this is true for many in the fringe of the poverty line too. At present we are not addressing this issue.

The *Catastrophic Payment Headcount*, H_{cat} values are higher in rural Kerala, but if one considers the H_{cat}^{APL} too the differences between rural and urban Kerala becomes more stark especially at lower threshold levels. At the 2.5% threshold level H_{cat} shows a value of 66.81% whereas H_{cat}^{APL} is 60.83%. In urban Kerala at the 2.5% threshold level H_{cat} shows a value of 60.21% whereas H_{cat}^{APL} gives a value of 47.70%. The difference captured by the H_{cat}^{BPL} is substantial in urban Kerala implying that a substantial number of people below the poverty line comprise of those who have catastrophic payments. At higher threshold levels too the H_{cat}^{APL} values are higher in rural Kerala. In rural Kerala for

those above poverty line a substantial 13.10% of the individuals are seen to have payments on health care in excess of 15% of pre-payment income. In urban Kerala 10.13% of the individuals above poverty line have expenditure on health care in excess of 15% of pre payment income. These measures represent a rough approximation of the insurance potential. Further it is observed that the G_{cat}^{APL} measure or the *Catastrophic Payment Gap (or excess) of those above poverty line* constitutes most of the *Catastrophic Payment Gap,* G_{cat} measure. It indicates that that the severity of excess payments on health care is mostly borne by those above poverty line. Hence if the severity excess payments on health care are shared predominantly by those above poverty line, it can be deduced that the figures of H_{cat}^{APL} serve as a very good approximation of the candidates in both rural and urban Kerala that could potentially be insured for health care.

Thus we find that across thresholds and especially at lower thresholds for health care payments rural Kerala and not urban Kerala shows a higher potential for health insurance. While at higher thresholds both rural and urban Kerala shows a substantial population that can reduce their burden of health expenditure through health insurance.

As said earlier this is at best a very rudimentary exercise. Whether they will actually insure themselves or not depends on the perception or behaviour of the individuals towards risk, the nature of illness or morbidity patterns and the amount of surplus income with the individuals/households among others.

3.8 Conclusion

This chapter analyzed one acute result of having unaffordable payments on health care that of individual's income being pushed below the poverty line. The surprising result that irrespective of the initial levels of poverty almost the same percentage of individual's in both rural and urban Kerala were seen to fall below the poverty line on account of expenses on health care (See Figure 3.11 and Figure 3.12). In rural Kerala, an area with very low poverty of 9%, almost another 4% were seen to fall below the poverty line due to unaffordable health care expenses .In urban Kerala too, a region having poverty incidence more than twice that of rural Kerala, an additional 4.5% of individuals were pushed below the poverty line due to health care expenditures. Moreover it is the high levels of expenditure on non-institutional or outpatient care (of which expenditure

on drugs constitute a major component) and not inpatient care that was the major source of impoverishment.

FIGURE 3.11: Poverty Impact (Headcount) of Out-of -Pocket Expenditures for rural and urban Kerala for the year 1999-2000

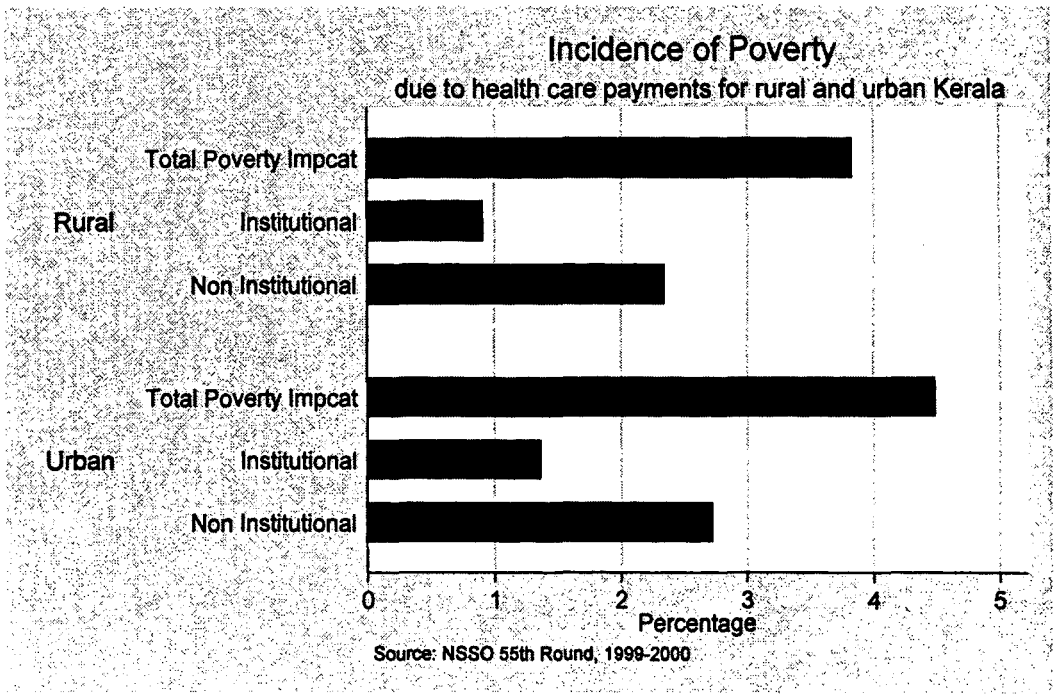
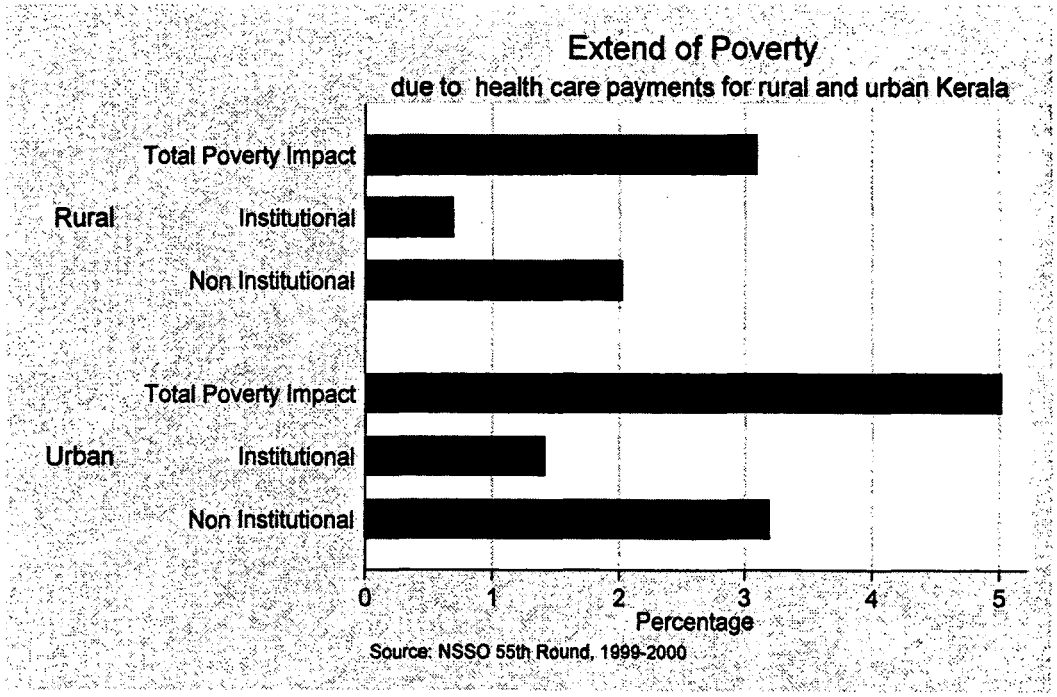


FIGURE 3.12: Poverty Impact (Gap measures) of Out-of -Pocket Expenditures for rural and urban Kerala for the year 1999-2000.



Further looking into the question of the income composition of those pushed below the poverty line, it was observed that most of them were initially just above the poverty line. In both rural and urban Kerala cases of individuals spending very high amounts on health care thereby being pushed below the poverty line could also be seen.

The decomposition exercise of catastrophic payment measures, to account for the poverty impact of health expenditure revealed that in both rural and urban Kerala at lower threshold levels of health expenditure there is a higher concentration of those who are below the poverty line. In other words those below the poverty line were seen to spend between 2.5% and 10% of their income on health care. This phenomenon is relatively more pronounced in urban Kerala. At higher threshold levels of health expenditure, of say 15%, the incidence of such high level of health expenses by those below poverty line is very low in both rural and urban Kerala, but relatively rural Kerala was seen to have a higher incidence of individuals below poverty line spending more than 15% of their income on health care.

For those individuals pushed below the poverty line it was seen that most of them spent more than 5% of their income on health expenditure with a substantial percentage of individuals spending in excess of 15% of their income on health care.

Looking at the severity or intensity of catastrophic payments and impoverishment aspects, the decomposition analysis showed that most of the excess payments on health care at higher threshold levels were borne mostly by those above poverty line.

To conclude, in Kerala we find that unaffordable health care expenses does result in impoverishment of individuals. The very fact that this happens in Kerala which in the 1980's was lauded for its 'good health at low cost', calls for a major introspection on how one could guarantee good health for the population at large without resulting in financial distress and impoverishment to the households.

Chapter 4
Conclusion

4.1 A summary of the study

The objective of the study was to look into the question of affordability of health care in Kerala in the light of the dramatic increase in health care costs in the state. Hence two aspects were looked into: the incidence and extend of 'catastrophic' payments on health care and extend of impoverishment in Kerala due to unaffordable health care payments. A brief summary of the results obtained is presented below.

When looking at the incidence of catastrophic costs, or the catastrophic payment headcount measures, one finds that at a very general level there exists a great deal of similarity between rural and urban Kerala. But at the same time there also exist stark differences when one goes into the details. The similarities arise from the fact that in both rural and urban Kerala a very high percentage of the individuals spend a substantial part of their income on health care. More than 41% of individuals in both rural and urban Kerala spend in excess of 5% of their monthly pre-payment income on health care. 10% of individuals in both areas were seen to have expenses on health care in excess of 15% of their pre-payment income. But once we look into the income distribution of those having such catastrophic payments on health care, the difference starts to appear. At lower thresholds, in both rural and urban Kerala, we find that the catastrophic payments on health care are concentrated more among the poor. In case of rural Kerala it is mostly the poor who seem to constitute the group with very high levels of expenses on health, as is evidenced by the higher percentage of individuals exceeding the 10% and 15% threshold levels. Whereas in the case of Urban Kerala it is generally the well off who seem to have very high levels of expenditure on health care.

Considering the catastrophic payment gap (or excess) measures we find that rural and urban Kerala follow a similar pattern. The intensity or extend of catastrophic payments, as shown by the catastrophic payment gap (or excess) measures, were seen to decline as we increase the threshold levels of health care expenditure. Moreover at higher thresholds the severity of catastrophic payments is shared among smaller proportion of individuals in both rural and urban Kerala. Further looking into the question as to who constitutes those incurring such high payments on health care (in excess of the threshold

levels), it was seen that payment excess at low threshold levels were concentrated more among the poor .At very high threshold levels, in both rural and urban Kerala, the severity (or extend) of excess payments on health care was more concentrated among the well off.

One extreme consequence of incurring very high levels of expenditure on health is impoverishment or individuals falling below the poverty line. The existence of catastrophic payment does not necessarily imply impoverishment. Impoverishment can occur when individuals are already poor, or in the fringes of poverty line, and as such any expense incurred on health care push them below the poverty line. Impoverishment can also arise, as an acute situation, when payments on health care occupy a very high proportion of one's income and results in a situation where one is left with no income after expense on health care to meet even the basic food requirements for subsistence.

In the pre-payment stage or before taking into consideration the expenses incurred on health care, it is seen that the incidence of poverty in urban Kerala, at around 20%, is twice that of rural Kerala, at 10%. What we find is that, due to unaffordable out-of-pocket payments on health care around 4% in rural Kerala and almost a similar percentage of individuals in urban Kerala, at 4.5%, fall below the poverty line. In both rural and urban Kerala outpatient care could be seen as the major component of impoverishment. Comparing across the two areas we find that the role of in-patient care in causing impoverishment is more pronounced in urban Kerala.

Those below poverty line, generally, were seen to spend a lesser proportion of their (modest) income on health care than the households that are well off. Considering the case of those pushed below the poverty line due to health care payments it was observed that such individuals spent on health care two and a half times more than those who belonged to similar income (or m.p.c.e.) category situated above the poverty line. The analysis further showed in general it was those above the poverty line who had payments on health care far exceeding 10% and 15% of the pre-payment income.

Thus the question that arises for Kerala in the end is: Good health, but at what cost? Our analysis points to the fact though there is a substantial coverage of health care services in Kerala, the utilisation of these services comes at a substantial commitment of one's income. In some cases, in both rural and urban Kerala, payments on health care had led to impoverishment of the households. Hence on the whole Kerala is moving

towards a high cost health care structure that is unaffordable to large segments of the population, especially to the poorer sections. The suggestions for policy for the health care system in Kerala in light of the analysis done is attempted in the following section.

4.2 Suggestions for policy

In a scenario of catastrophic payments on health care and where health care expense results in impoverishment of the households the question that arises is that of policy response. The broad contours of a policy prescription to the problem of unaffordable health care payments would be that of active reorganization of the role of the government in health sector and the need to stress more on social or community health insurance mechanism, namely that of Micro-insurance units (MIU's)[19].

In a health care sector such as that of Kerala where 91% of health care provision is in hands of private sector (Panikar 1999) one cannot talk of a meaningful health intervention bypassing the private sector. The present study showed that the major source of impoverishment due to health care payments occurs via the outpatient care expenses. Considering the above two aspects, the solution to unaffordable health care expenses in the state does not lie in public sector provision of the entire ambulatory care[20]services, but in focusing strategically with respect to ambulatory care provision. Hence what is needed in case of ambulatory care provision is a private-public mix provision of services. Since impoverishment arises mainly through outpatient care the government needs to focus more on outpatient care services, especially in primary health care centers and expanding and strengthening ambulatory care provision in areas where private sector is lacking. At the same time where there exists a vibrant private sector it would be more efficient for the government to think of contracting and buying ambulatory care services from the private sector rather than replicating the entire structure in such areas.

Another way in which the government can seek to increase the coverage of ambulatory care for the poor is through the use of 'demand side' mechanisms that give the poorest publicly subsidized discounts at either public or certified private providers. This would help redirect the poor from the low quality providers towards higher quality

[19] While microfinance could be defined as the range of financial services available to the poor and sustainable in the medium term, micro-insurance is one of such institutions under microfinance others being micro savings and micro credit schemes.

[20] The term ambulatory care provision refers to the individuals and organization that deliver health care services on an out patient basis (Berman 2000).

providers by reducing the costs of higher-quality private providers. Moreover, as mentioned earlier, in areas where private sector provision of ambulatory care services is predominant the government could move away from provision altogether and refocus its resources where little or no health care options exist. The challenge in such a scenario is for the public sector to develop greater administrative capabilities to form partnerships with the private sector (World Bank, 2001).

Moreover as remarked in World Bank (2001) what is of utmost importance is for the government to improve the 'health system oversight'. Since health is a clear 'public good' and benefits everyone, proper supervision of the health care system by the government would benefit the society at large. According to World Bank (2001) this calls for increasing the measurability[21] of health care providers and to increasingly collect information regarding the prices, quality of care and clinical outcome and distributing these information to the public at large. It also addresses the question of who is benefiting and who is being excluded in the health care system. As World Bank (2001) reports the costs of strengthening oversight are small in financial terms. What it requires more is a reorientation of what governments do.

The role of MIU's in reducing catastrophic expenses was investigated in case of the SEWA health insurance scheme by Ranson (2002). The study showed that among those who submitted claims for insurance, after reimbursement, the claimants post reimbursed expenditures was 1.4% as against 8% of the patient's annual income without insurance claims. The study also showed that the scheme prevented 3.4% of claimants who were reimbursed from falling below the poverty line or that the scheme was able to reduce impoverishment due to hospital expenses by 52%. Even so, the success of MIU's lie in identifying the specific context and situations where it can be implemented (Ekman 2004) and in understanding health needs of the people (Dror 2003). The success of MIU's also necessitates the use public financing to create the mechanisms sustaining local insurers (Dror 2003).

In short, what is needed for the health sector, as Sen[22] pointed out, is a broad based composite package. What is advocated here is a more pro-active role by the

[21] Measurability in the health sector, as in other sectors, is the precision with which inputs; outputs and outcomes of particular goods and services can be measured.

[22] See the interview with Amartya Sen by the Hindu newspaper published in the same on Sunday, January 9, 2005, page 14.

government in health care. It would definitely call for more allocation to health care sector while at the same time it all calls for more strategic prioritization of the resource allocation based on the health needs and the health system characteristics in the particular region.

4.3 Limitations of the study

In this concluding section some of the limitations of the study needs to be mentioned. Other than the limitations of the tools adopted for the analysis, which was mentioned earlier, the stress here would be on the concept of financial distress and the incompleteness of the present study in considering the phenomenon in its entirety.

One major deficiency, especially when dealing with catastrophic costs is that, the analysis does not take into account the issue of non-treatment of illness due to high costs of health care. This matters since, for if this phenomenon is widespread, then the lower occurrence, if any, of high health care expenses or catastrophic payments on health care among the poor could be very well due to the poor not taking recourse to medical care in event of an illness, on account of the huge hospital expenses that needs to be incurred by way of treatment.

This brings the related issue of financing health care costs by means of debt. In the framework adopted the debt issues were not considered. Moreover in the consumption expenditure survey taken up for the analysis, since expenditure patterns determine income levels of the household, the issue of using debt to finance current medical expenditure cannot be captured[23]. If indebtedness due to health care expenditure is substantial it could lead to acute financial distress for the households at a later stage, especially at the time of repayment of debt.

This analysis also has the deficiency of 'averaging out' the pattern of expenditure on health. It does matter if an individual had to spend Rs 1200 in one month or Rs100 in twelve months on health care. In fact many of the issues of financing of health expenses by debt and the non-treatment arise from such high lump sum, unexpected payments on health care.

[23] Unless the questionnaire specifically inquires about the share of debt in total health care expenses as is done in the 52nd round, but other than that, as mentioned earlier the consumption expenditure survey in 52nd round has its own problems relating to the ad hoc nature of the survey.

Thus in one sense, what our analysis gives is only a very broad picture and in many ways it could understate the extent of financial distress due to unaffordable health care payments in the state. A comprehensive study taking into account these nuanced details could very well provide a more accurate picture of the extend of financial distress arising out of high levels of out-of-pocket payments on health care and its various dimensions in the state.

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