

# Assessment of Economic Impact Among In-Patients with Non-Communicable Diseases in a Private Tertiary Care Hospital in Southern India

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## ABSTRACT

**Introduction:** Non-communicable diseases (NCDs) are currently responsible for tremendous economic impact on households.

**Aim:** This study was done to estimate the direct, indirect and total costs incurred by households of in-patients with non-communicable diseases admitted in a Private tertiary care hospital.

**Materials and Methods:** It was a cross-sectional study conducted in a private tertiary care hospital of Mangalore city in June 2012 by interviewing 30 patients and their attenders using a validated interview schedule.

**Results:** Direct cost constituted 58.6% of the total expenses during the course of stay in the hospital. Mean direct cost was more among patients with cancers ( $p=0.049$ ). Indirect cost was

associated with educational status ( $p=0.04$ ), occupational status ( $p<0.001$ ) and socio economic status (ses) ( $p<0.001$ ) of patients. Total cost was more among patients from upper middle ses households ( $p=0.012$ ). Direct and indirect cost constituted 5-10% each and total cost > 20% of the annual income of majority of households. Medical insurance scheme was not availed by 26 (86.7%) patients due to ignorance.

**Conclusion:** Economic burden imposed by a single admission among inpatients with NCDs was tremendous on their households. Hence, information on various medical insurance schemes needs to be popularized among people to improve its utilization. Health care providers need to introduce more financial schemes to minimize health care costs among poor households.

**Keywords:** Medical expenses, Non-medical expenses, Admitted cases

## INTRODUCTION

Non-Communicable Diseases (NCDs) in the current era are causing tremendous impact on health in middle, low income countries and that to among low socioeconomic groups [1]. NCDs constitutes about 35 percent of outpatient visits, 40 percent of in-patient admissions and accounts for 62% of Disability Adjusted Life Years in India [2,3].

The expenditures following hospitalization is significantly more with NCDs compared to CDs [2]. A single hospital stay for a patient with NCD results in out of pocket expense nearly double compared with patients admitted with other ailments [2]. Unfortunately social insurance schemes provided by the governments are very limited and often not utilized. This has resulted in 47.3% of out of pocket expenses towards NCD management by various households [2]. Financing has been rather done by means like borrowing and sale of assets by 40 percent households to meet these treatment costs. The end result being 35% households have fallen below poverty line [2]. Hence it becomes essential to estimate the economic burden imposed by these admissions in the current settings, an aspect which has not been much researched in developing countries [4].

## AIM

This study was therefore done to estimate the direct, indirect and total costs incurred by households of in-patients with NCDs admitted in a hospital in southern India.

## MATERIALS AND METHODS

This cross-sectional study was conducted in a private tertiary care hospital in Mangalore city in June 2012. Institutional Ethics Committee approval and permission from Medical Superintendent was obtained. All admitted patients with a definitive diagnosis of NCDs constituted the study population. Patients having co

morbidities other than NCDs were excluded from the analysis to maintain accuracy in cost estimation for NCDs only. Households wherein more than one member suffering from NCDs was also excluded as analysis of several parameters would become a complicated exercise. Patients who left hospital against medical advice or who were transferred to another hospital or who died during course of treatment and out patients were also excluded.

All consenting patients gave a written informed consent after being assured full confidentiality of information provided by them. Demographic and socioeconomic data, type of morbidity, modality of treatment and details of other co-morbidities or complications and expenses met towards direct and indirect cost were collected by interviewing each patient in the local language Kannada. The interview schedule was content and language validated by experts and pre tested before its use in this study. Each subject was interviewed on several occasions during their hospital stay to update cost data. Direct costs consisted of consultation fees, medications, laboratory investigations, lodging, miscellaneous costs and expenses for meals and travelling [5]. These costs reported were further verified from hospital electronic databases and medical records. Patients and their relatives were advised to preserve all bills and receipts related to patient's treatment, to improve the accuracy of cost estimates. Indirect costs consisted of loss of wages (sickness absenteeism) by the patient and the family during the period of stay at the hospital [5].

## STATISTICAL ANALYSIS

Socioeconomic Status (SES) was assessed using modified Kuppaswamy's scale of 2012. Data was entered and analysed using SPSS version 16.0. Student's unpaired 't'-test, Chi-square test and Analysis of Variance were used to test statistical significance. The  $p\leq 0.05$  was taken as statistically significant association.

Characteristics	Number	Percentage (%)
<b>Age group (years)</b>		
40 – 49	7	23.3
50 – 59	13	43.4
60 – 69	10	33.3
<b>Gender</b>		
Male	21	70.0
Female	9	30.0
<b>Educational status</b>		
Illiterate	6	20.0
Primary school	7	23.3
Middle school	7	23.3
High school	4	13.4
Pre university	3	10.0
Graduate	3	10.0
<b>Occupational status</b>		
Unemployed	4	13.4
Unskilled	11	36.7
Semi-skilled	8	26.7
Skilled	2	6.6
Semi professional	3	10.0
Professional	2	6.6
<b>Socio economic status (SES)</b>		
Upper middle	4	13.4
Lower middle	7	23.3
Upper lower	19	63.3
<b>Place</b>		
Urban	16	53.3
Rural	14	46.7
Total	30	100.0

[Table/Fig-1]: Socio demographic distribution of study participants.

Characteristics	Number	Percentage (%)
<b>Hospital</b>		
Private	30	100.0
<b>Type of ward</b>		
Semi-special	9	30.0
General	21	70.0
<b>Type of primary diagnosis*</b>		
Hypertension	11	36.7
Diabetes mellitus	15	50.0
Myocardial infarction	6	20.0
Cancer	8	26.7
<b>Duration of stay in hospital (days)</b>		
≤ 14	6	20.0
15 – 30	8	26.7
31 – 60	6	20.0
61 – 90	5	16.7
91 – 120	5	16.7
<b>Medical insurance</b>		
Present	4	13.4
Absent	26	86.7
Total	30	100.0

[Table/Fig-2]: Morbidity pattern and other details about inpatients with non-communicable diseases.

\*Multiple responses.

## RESULTS

A total of thirty patients with NCDs took part in this study. None of them presented with multiple hospitalization during the study period. Mean age of these patients was 56.0±7.5 years [Table/Fig-1]. Medical insurance scheme was not taken by 26 (86.7%) patients and their families due to ignorance [Table/Fig-2].

The mean duration of hospital stay of participants in this study was 44.4±35.8 days. The total cost incurred by all patients put together was Rs. 3,65,600 of which direct cost amounted to Rs. 2,14,100 (58.6%) while indirect cost amounted to Rs.1,51,500 (41.4%).

Diabetes mellitus	Duration of stay (days) (%)					Total
	≤14	15 – 30	31 – 60	61 – 90	91 – 120	
Present	2(13.3)	1(6.7)	4(26.7)	4(26.7)	4(26.7)	15
Absent	4(26.7)	7(46.7)	2(13.4)	1(6.7)	1(6.7)	15
Total	6	8	6	5	5	30

[Table/Fig-3]: Association between duration of stay with presence of diabetes mellitus among participants.  $\chi^2=9.43$ , DF=4,  $p=0.05$ .

Type of cost	Number	Percentages (%)
<b>Direct cost</b>		
≤ 5%	6	20.0
5.1 – 10%	11	36.7
10.1 – 15%	4	13.4
> 15%	9	30.0
<b>Indirect cost</b>		
≤ 5%	6	20.0
5.1 – 10%	12	40.0
10.1 – 20%	9	30.0
> 20%	3	10.0
<b>Total cost</b>		
≤ 10%	5	16.7
10.1 – 20%	12	40.0
> 20%	13	43.3
Total	30	100.0

[Table/Fig-4]: Percentage of annual income spent on direct, indirect and total cost.

Type of costs	Number	Percentages (%)
<b>Direct cost</b>		
≤ 20%	8	26.7
20.1 – 40%	11	36.7
> 40%	11	36.7
<b>Indirect cost</b>		
10.1 – 20%	4	13.4
20.1 – 30%	7	23.3
30.1 – 40%	5	16.7
40.1 – 50%	11	36.7
> 50%	3	10.0
<b>Total cost</b>		
20 – 40%	5	16.7
40.1 – 60%	6	20.0
60.1 – 80%	7	23.3
> 80%	12	40.0
Total	30	100.0

[Table/Fig-5]: Percentage of annual per capita income spent on direct, indirect and total cost.

Mean total cost of treatment was Rs.14061.5±1328.5. Of this mean direct cost of treatment was Rs. 8234.6±1231.2 and indirect cost of treatment was Rs. 5826.9±448.5. The median direct cost was Rs.3100, indirect cost was Rs.4000 and total cost was Rs.9000.

Average direct cost and total cost was more in the age group 50 to 59 years while indirect cost was more in the age group 40 to 49 years. However, these observations were not statistically significant. Although direct, indirect and total cost were more among males, it was not statistically significant.

Indirect cost was significantly more among those educated up to pre university or graduation ( $p=0.04$ ) and those participants who were skilled workers, semiprofessionals and professionals ( $p<0.001$ ). There was no association of direct and total cost with educational and occupational status of participants.

The direct cost were more in the upper middle followed by upper lower ses ( $F=1.772$ ,  $p=0.192$ ). Indirect cost were more in upper middle followed by lower middle ses ( $F=11.474$ ,  $p<0.001$ ). Total cost was more in upper middle followed by upper lower ses ( $F=5.4$ ,  $p=0.012$ ).

The mean direct cost spent on treatment for cancer (Rs.14687.5 ±1973.5) among cancer patients (n=8) was significantly more than mean direct cost of treatment (Rs. 5366.7± 585.3) for other non-communicable diseases among rest 22 patients (t=2.06, p=0.049). Period of stay was significantly more among diabetes mellitus patients compared with patients with other morbidities (p=0.05) [Table/Fig-3]. Majority of patients spent between 5 to 10% of their annual income towards direct and indirect cost and more than 20% of their annual income towards total cost [Table/Fig-4]. In this study, patients in the upper middle on an average spent 9.2%, lower middle spent 3.9% and lower ses class spent 16% of their annual family income towards direct cost for NCD management.

Proportion of their annual per capita income spent on direct, indirect and total costs by majority of patients in the present study was >20%, >40% and >80% respectively [Table/Fig-5].

## DISCUSSION

Two third of patients admitted with NCDs in this study were of the productive age group (< 60 years) which was same as the findings of a Sri Lankan study [5]. Morbidities in productive age group increase indirect cost as a consequence of lost earnings, thereby aggravating economic burden on households [5]. In the latter study, male predominance was noticed among NCD cases as also reported in this study [5]. The likely economic impact as a consequence of this is going to be severe, as males are usually the earning individuals in households.

Majority of patients in this study were from poor SES which was again similar to the observations of the latter study [5]. This again supports the fact that NCDs are becoming more common among people from poor households in developing countries.

The average duration of stay in India due to NCDs was 11.3 days in 2004 which was much lesser than the findings of this study where it was found to be 44.4 days [2]. This could be because, half of the participants in the present study had diabetes mellitus and they had significantly longer period of stay than patients with other morbidities.

The study done in Sri Lanka reported 97% and in this study it was 86.7% patients with NCDs, having no medical insurance due to ignorance [5]. Large number of families in India has been reported to rely upon borrowing from others, selling assets or claim unsecured loans with potential carrying interest to meet high hospital costs [2]. Non utilization of social protection would ultimately result in poor households to suffer disproportionately from expenses of NCD management [4].

Government insurance schemes like "Rashtriya Swasthya Bima Yojan" offer good financial coverage for poor households. Therefore awareness of these schemes needs to be disseminated using mass media sources to improve its utilization.

The direct cost involved in NCD management in the Sri Lankan study [5] was 70% and in a study done in Chandigarh [6] was 71.2 percent of the total costs which were more than our observations.

In this study, the indirect cost for NCDs was found to be 41.4% of the total costs which was more than the observations of

Chandigarh based study where it was 28.8% among outpatients with diabetes mellitus [6]. Higher indirect costs in this study could be because of prolonged duration of hospital stay both for patients and their attenders leading to greater productivity loss and sickness absenteeism.

In this study, out of pocket expenses per hospital stay were particularly high for cancer which was similar to the findings of National Sample Survey Organization [2,3]. Cancers have also been implicated as the major factor incurring health spending in households leading to poverty [2].

Majority of patients in this study spent more than 20% of their annual income towards total costs. Kasturiratne A et al., in their study observed that the total costs incurred by patients and their families for the entire hospital stay was about 25% of the income per month of an average Sri Lankan family [5].

## LIMITATION

There is possibility of non-disclosure of actual family income which might have caused some inaccuracy while estimating indirect costs. Moreover estimation of income in occupations like farming was difficult among patient or other family members. Due to strict exclusion criteria used, the sample size was small. Since the study was done among inpatients in a major referral center, the findings may not be generalizable to the entire population.

## CONCLUSION

Majority of in-patients were of poor socio economic background. Direct cost mainly constituted the economic burden imposed by a single admission. Direct and indirect cost of a single hospital stay each constituted 5-10% and total cost >20% of the annual income of majority of households. As hospital inpatients represent only a fraction of the iceberg of NCDs in the community, the actual economic impact could be much more. Hence, information on various medical insurance schemes of the government needs to be popularized among people to ease the economic burden involved in NCDs management. Risk factors associated with medical care costs in this study might help health care providers to improve patient care and introduce more financial schemes to minimize health care costs. Moreover to reduce duration of hospital stay, prevention of complications due to NCDs by screening activities for early diagnosis, treatment and life style modification is essential under primary health care services in these settings.

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