

IMPACT OF THE EXPENDITURE FOR THE TREATMENT OF NON-COMMUNICABLE DISEASES IN DEVELOPING COUNTRIES

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ABSTRACT: The burden from non-communicable diseases is growing. At the same time, there is an increased focus on ensuring that people are protected against financial risks due to accessing care. To understand household financial burden due to NCDs was undertaken, revealing that households with NCDs spend a substantial share of their income on care for these diseases. Spending was even higher for hospitalization related expenditure. Some households faced catastrophic health expenditure and impoverishment as a result of spending. While it is clear that the burden of non-communicable diseases is growing and is already a major problem even in the poorest countries, the questions of whether people have access to the services they need to prevent or control these diseases, and the extent to which they suffer financial catastrophe or impoverishment in obtaining the services they need is less well researched. This paper focuses on the universal coverage question: the impact of non-communicable diseases (NCDs) on the household finances of people who suffer from them.

Key Words: Cardiovascular diseases, Type 2 Diabetes Mellitus, Cancer, Weight management, Abstinence, Public health approaches.

I. INTRODUCTION

Health plays a vital role in the process of human capital formation. Quality of life, productivity and ability to earn income depend on good health. The health sector in India is at the crossroads. This is partly due to an interesting relationship between development and health, which is known as the Preston Curve. In 1975, Samuel Preston showed that if the health of nations as measured by life expectancy is plotted against the wealth of nations as measured by GDP per capita, then up to a point, there is a sharp increase in life expectancy for even the modest increase in GDP per capita. After this point, large increases in public health expenditure are required for modest increase in life expectancy (Deaton 2013). In his book "The Great Escape", Nobel Prize winning Economist Angus Deaton explains that even after the bend in the Preston Curve, there is a sustained correlation between health outcomes with growth - only that now it is a logarithmic relationship for the same degree of increase one requires a fourfold increase of the GDP per capita (Deaton 2013). He also points out that it is a two way relationship that not only in economic growth related to better health, this bend in the curve also represents the point of epidemiological transit when non-communicable diseases start becoming the main cause of death, increasingly dwarfing persistent contributions from the declining deaths due to maternal and common childhood diseases. In the 2010 version of the Preston Curve, India today is at or near the bend on the curve. At the bend in the curve, the past problems of reproductive and children health and of communicable diseases persist, but new problems have got added on.

The biggest challenge for India is the dual fight of containing a 'developing' country's health concerns while a flare-up of 'developed' world disorders are at its doorstep. On one hand, India is combating basic health concerns such as malnutrition, low immunization rates, hygiene, sanitation and infectious diseases. On the other hand, environmental pollution and lifestyle choices such as alcohol consumption, smoking and high fat diet are set to increase the incidence rate of cardiovascular diseases, diabetes, chronic obstructive pulmonary diseases and cancer to almost epidemic levels. Communicable diseases like tuberculosis, malaria, kala-azar, dengue fever, chikungunya and other vector borne diseases and water borne diseases like cholera, diarrhoeal diseases, leptospirosis etc, continue to be a major health problem in India. In fact, diarrhoeal diseases, respiratory infections, tuberculosis and malaria cause about one quarter of all deaths in the country. In addition, there is always a threat of new emerging and re-emerging infectious diseases like Ebola virus, Avian influenza, H1N1 Influenza virus etc. Thus due to industrialization and the persisting inequality in health status between and within States or Union Territories due to varying economic and social causes, the developing countries like India currently face a "Triple burden of diseases" - Unfinished agenda of Communicable Diseases, Emerging NCDs related to lifestyle and Emerging Infectious Diseases (National Health Profile 2017).

An overview of the prevalence of non-communicable disease in India and in Kerala

Health is a crucial factor in transforming human beings into human resources and human capital. Quality of life, productivity and ability to earn income depend on good health. Along with health care, commonly described as an economic good, health is also a good, albeit one with special characteristics. Health can be regarded as a fundamental commodity : one of the true objects of people's wants and for which more tangible goods and services - such as health care - are simply a means to create it. Explained in the work of Becker (1965) and Grossman (1972), but its origin can be traced to 18th century economists such as Jeremy Bentham (1780) who wrote "the relief of pain" as a "basic pleasure". In Michael Grossman's model of the demand for health, developed in the 1970s, investment in health is treated as a form of investment in human capital. The health sector in India is at the crossroads. This is partly due to an interesting relationship between development and health, which is known as the Preston Curve. In 1975, Samuel Preston showed that if the health of nations as measured by life expectancy is plotted against the wealth of nations as measured by GDP per capita, then up to a point, there is a sharp increase in life expectancy for even the modest increase in GDP per capita. Then the curve suddenly flattens out and after this point, large increases in public health expenditure are required for modest increase in life expectancy (Deaton 2013).

NCDs account for over 60% of global deaths and 47% of the Global Burden of Diseases (WHO 2014). In India, non-communicable diseases (NCDs) accounted for 40% of all hospital stays and 35% of all outpatient visits in 2004 . Also, chronic diseases are estimated to account for 53% of all deaths and 44% of disability-adjusted life-years (DALYs) lost in 2005. As of 2005, India experienced the "highest loss in potentially productive years of life" worldwide. Based on the available evidence from National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS), out of 15468520 patients who attended NCD clinics, 8.52% people are diagnosed with diabetes, 10.91% are diagnosed with hypertension (blood pressure), 0.67% are diagnosed with cardiovascular diseases and 0.18% are diagnosed with common cancers. (National Health Profile, 2017) Number of patients diagnosed with different types of non-communicable diseases in India and Kerala, 2017

Country / state	Number of patients who attended NCD clinics	Number of patients diagnosed with diabetes	Number of patients diagnosed with hypertension	Number of patients diagnosed with cardiovascular diseases	Number of patients diagnosed with common cancers
India	15468520	1318310	1688271	104789	29158
Kerala	1721381	31677	43350	1631	1030

According to table, out of 1721381 patients who attended NCD clinics in Kerala, 1.83% are diagnosed with diabetes, 2.51% are diagnosed with hypertension (blood pressure), 0.09% are diagnosed with cardiovascular diseases and 0.05% are diagnosed with common cancers. About 2.4% of the total diabetes patients in India, 2.56% of the total hypertension patients, 1.55% of the total cardiovascular disease inflicted people and 3.53% of the total cancer patients in India belong to Kerala. The probability of dying during the most productive years (ages 30-70) from one of the four main NCDs is estimated to be as high as 26 per cent. In Sweden, the corresponding figure is 10, in UK is 12 and in Thailand it is 17. About 62% of male deaths due to the main NCDs would occur before the age of 70 in India, as compared to only 24% in Sweden, 29% in UK and 45% in Thailand. Similarly 52% of female deaths due to NCDs occur before the age of 70 as against only 15% in Sweden. The four leading chronic diseases in India and Kerala, as measured by their prevalence, are cardiovascular diseases (CVDs), diabetes mellitus, chronic obstructive pulmonary disease (COPD) and cancer. All four of these diseases are projected to continue to increase in prevalence in the near future. The cumulative loss of national income for India due to non-communicable disease mortality for 2006–2015 is estimated as US\$237 billion. By 2030, this productivity loss is expected to double to 17.9 million years lost.

Non-communicable diseases (NCDs) mainly include:

- Cardiovascular diseases
- Diabetes Mellitus
- Cancer
- Chronic Lung diseases
- Accidents and Injuries
- Mental health issues

Cardiovascular diseases

Ischemic heart disease (IHD) is the leading cause of death in economically developed countries and is rapidly assuming serious dimensions in developing countries. According to the WHO, an estimated 17 million people died from cardiovascular disease (CVD) in 2005 comprising 30% of all global deaths and of these nearly 80% of deaths took place in low and middle income countries like India. According to the World Heart Federation, 35% of all CVD deaths in India occur in those aged 35–64 years. Coronary heart disease (CHD) is the commonest CVD accounting for 90–95% of all cases and deaths. Further, as can be seen from Table there has been a considerable increase in the number of cases of IHD as well as the deaths due to it. Also, the observed increase is both in urban as well as rural areas.

Burden of Ischemic Heart Disease in India

Year	1998			2004		
	Urban	Rural	Total	Urban	Rural	Total
Number of cases of IHD	9,210,381	9,390,559	18,600,940	11,674,208	10,693,632	22,367,840
Number of deaths due to IHD	207,548	256,014	463,562	255,782	298,412	554,194
Number of YLLs	1,991,451	2,470,149	4,461,600	2,329,851	2,622,299	4,952,150
Number of DALYs	7,388,453	6,930,974	14,319,427	8,643,450	7,357,358	16,000,808

In India, stroke incidence registries using population-based surveillance have reported that age adjusted annual incidence of stroke varies from 100–150/100,000 population. The increase in CHD and stroke in India is largely an urban phenomenon. In 2005, estimates indicated that 58 million people died, and in them chronic diseases accounted for nearly 35 million deaths (60%). Cardiovascular diseases, predominantly heart disease and stroke, were the cause of death in 17.5 million individuals. After heart disease, stroke is the second leading single cause of death, with 5.8 million fatal cases per year, 40% of which are in people younger than 70 years (10). Approximately 12% of all strokes occur in the population less than 40 years of age. There has been an increase in the number of stroke cases in India during the last one and a half decades by 17.5%. Mortality due to strokes has increased by 7.8% from 1998 to 2004.

Diabetes Mellitus

India is currently experiencing an epidemic of Type 2 diabetes mellitus (T2DM) and has the largest number of diabetic patients. It is often referred to as the diabetes capital of the world. International Diabetes Federation (IDF) 2009 report reveals that the total number of diabetic subjects in India is 50.8 million. In a study conducted as a part of the National non-communicable diseases (NCD) risk factor surveillance, in different geographical locations (North, South, East, West/Central) in India, where major risk factors were studied using modified WHO STEPS approach and diabetes was diagnosed based on self-reported diabetes diagnosed by a physician, found that the overall prevalence of self-reported diabetes was highest in Trivandrum in Kerala (9.2%), followed by Chennai in Tamilnadu (6.4%) and Delhi (6.0%). This was followed by Ballabgarh in North India (2.7%), Dibrugargh in East India (2.4%) and the lowest was observed in Nagpur in West/Central India (1.5%). The Prevalence of Diabetes in India Study (PODIS) was carried out in 2004, in 108 centres (49 urban and 59 rural) in different parts of India to look at the urban-rural differences in type 2 diabetes and glucose intolerance.

Cancer

Nearly 56% of the estimated deaths from cancer occur in the developing world. The estimates of burden of disease due to cancer are based on data of population based cancer registries of ICMR for the year 2004. The pooled data of six population based cancer registries – Bangalore, Barshi, Bhopal, Chennai, Delhi and Mumbai was used in estimating indices of burden of disease. The six population based cancer registries cover a population of 34 million that is, 18.4 million males and 15.6 million females. The number of cases of cancer in 2004 was approximately 8.2 lakh. The number of cancer cases among males being around 3.9 lakh, and among females was 4.3 lakh. Tobacco related cancers constituted 40.43 % of all cancers in males. Among females, high incidence rates were reported for breast cancer (20.01 / 100,000), cervix (14.42 /100,000), ovary (5.6 / 100,000) which together accounted for 59 % of all cancers in women. In India, the most prevalent forms of cancer among men are tobacco- related cancers including lung, oral, larynx, esophagus, and pharynx. Amongst Indian women, in addition to tobacco-related cancers, cervix, breast, and ovarian cancers are also prevalent. India currently has the highest prevalence of oral cancer cases in the world as a result of the popularity of chewing tobacco in its rural regions.

Total number of cases registered for the Population Based Cancer Registries (PBCRs) in Kerala, 2012-14

Population Based Cancer Registry	Males	Females	Total
Kollam	5534	5478	11012
Thiruvananthapuram	7638	8002	15640

Crude Mortality Rate (CMR), Age Adjusted Mortality Rate (AAMR) and Truncated Mortality Rate (TMR) per 1,00,000 lakh population in the PBCRs in Kerala, 2012-14

PBCRs	Males			Females		
	CMR	AAMR	TMR	CMR	AAMR	TMR
Kollam	79.8	63.9	96.9	51.3	38.8	68.2
Thiruvananthapuram	62.9	51.2	78.9	45.7	34.9	61.6

According to table, the Crude Mortality Rate (CMR) among male cancer patients is 79.8% in Kollam and 62.9% in Thiruvananthapuram. The Adjusted Mortality Rate (AAMR) is 63.9% among men in Kollam and 51.2% among men in Thiruvananthapuram. For males, the Truncated Mortality Rate (TMR) is 96.9% in Kollam and 78.9% in Thiruvananthapuram. Among females, CMR is 51.3% in Kollam but 45.7% in Thiruvananthapuram, AAMR is 38.8% in Kollam and 34.9% in Thiruvananthapuram and TMR is 68.2% in Kollam and 61.6% in Thiruvananthapuram.

Possibility of one in number of persons developing cancer in the PBCRs in Kerala, 2012-14

PBCRs	Possibility of one in number of persons developing cancer			
	0- 64 years		0- 74 years	
	Males	Females	Males	Females
Kollam	15	15	7	9
Thiruvananthapuram	14	12	7	8

In Kerala, 61 percent of women have ever undergone an examination of the cervix, 33 percent have ever undergone a breast examination, and 51 percent have ever undergone an examination of the oral cavity. Older women are more likely than younger women to have undergone each of these examinations. Table asserts that in the age group of 0- 64 years, one out of 15 men and one out of 15 women have the possibility of developing cancer and in the age group of 0-74 years, one out of 7 men and one out of 9 women have the possibility of developing cancer in Kollam. In Thiruvananthapuram, one out of 14 men and one out of 12 women aged between 0-64 years and one out of 7 men and one out of 8 men in the age group of 0-74 years have the possibility of developing cancer.

Chronic Lung Diseases

Estimates from India suggest that in 2005 chronic diseases accounted for 53% of all deaths and 44 % of DALYs lost, with chronic respiratory disease accounting for 7% deaths and 3% DALYs lost. According to the National Family Health Survey (NCDs 2014-15), the prevalence of asthma was 1,600 persons / 100,000. It is estimated that there are more than 12 million adults with COPD in India. In males, the prevalence varies from 2.12% to 9.4% in north India and from 1.4% to 4.08% in south India. Similar patterns are reported in women, with lower rates in the south. The prevalence amongst women is consistently lower than in men. Table 3 shows that the prevalence of chronic obstructive pulmonary disease (COPD) has consistently been more in males compared to females and also that over the years the prevalence has largely remained unchanged in females.

Prevalence of COPD - changes over the years (%)

Period	Males	Females
Upto 1970	4.2	2.7
1971-1990	5.7	2.6
After 1990	4.9	2.7
Average	5.0	2.7

Mental health issues

Average prevalence of severe mental disorders in India is at least 18-20/1000 population. About 1-2% children suffer from learning and behavior problems. Mental retardation is estimated at 0.5-1.0% of all children. Among elderly (above 60 years of age) prevalence rate of mental morbidity is about 80-90/ 1000 population of aged (i.e., about 4 million severely mentally ill). This is in comparison to U.K. where the rate is as high as 260-265/1000. Geriatric depression is most frequent with a prevalence rate of 60/1000. Drug abuse surveys have reported the prevalence rate

ranging from about 2-40% (Alcohol, tobacco, cannabis and opium are common) In India, at least 20 per cent of young people are likely to experience some form of mental illness such as depression, mood disturbances, substance abuse, suicidal behaviors, eating disorders and others. There is an estimated prevalence of mental morbidity including 16 mental and behavioral disorders (classified into eight groups of organic psychosis, schizophrenia, manic affective psychosis, manic depression, endogenous depression, mental retardation, epilepsy, phobia, generalized anxiety, neurotic depression, obsession and compulsion, hysteria, alcohol/drug addiction, somatisation, personality disorders and behavioral/emotional disorders) of 22.2 per 1000 population among 15 to 24 years.

Number of suicides in India, 2008-15

Year	Number of suicides
2008	125017
2009	127151
2010	134599
2011	135585
2012	135445
2013	134799
2014	131666
2015	133623

According to table, there has been a steady growth in the number of suicides in India since 2008, except in 2013 and 2014 during which there has been a small decline in the number of suicides. In 2012, the number of suicides were 135445 which declined by 0.04% to reach 134799 in 2013. It again declined by 2.37% to reach 131666 in 2014. In 2014, the number of suicides in India again rose to become 133623 According to Kerala State Mental Health Report 2017, about 14.4 percent of population aged 18 and above in the state has suffered psychic disorder once in their lifetime. Though Kerala has a better health care system, about 11.36 percent of the total population is affected by mental disorders, including schizophrenia and other depressive disorders. According to the report, the prevalence of severe mental disorders in the state is 0.44 percent. About 11 percent are affected by common mental morbidity.

Blood pressure (hypertension)

Nine percent of women aged between 15-49 in Kerala have hypertension, including 6 percent with Stage 1 hypertension, 1 percent with Stage 2 hypertension, and 0.5 percent with Stage 3 hypertension. Two-third (66%) of women have normal blood pressure including 1 percent of women with normal blood pressure who are taking medicine to lower their blood pressure. The prevalence of hypertension is slightly higher among men than among women. Twelve percent of men in Kerala have hypertension, including 8 percent with Stage 1 hypertension, 1 percent with Stage 2 hypertension, and 1 percent with Stage 3 hypertension. About half (49%) of men have normal blood pressure including 1 percent of men with normal blood pressure who are taking medicine to lower their blood pressure. For both women and men, hypertension increases with age and decreases with the level of schooling.

Selected Risk Factors for NCDs

The major risk factors for non-communicable diseases are smoking, alcohol abuse, a sedentary lifestyle, and an unhealthy diet. If these could be addressed adequately, 40–50% of non-communicable disease-related, premature deaths are preventable.

- **Tobacco use**

The prevalence of tobacco use, in smoked and smokeless forms, has been estimated in the National Sample Survey and the National Family Health Survey (NFHS). According to the NFHS (2014- 15) report, the prevalence of smoking in men and women aged 15–49 was 32.7 % and 1.4% respectively. In context of using tobacco in any form, the prevalence in males and females was 57% and 10.8% respectively. Among youth, 40 percent of men and 5 percent of women use tobacco. Nineteen percent of men report smoking cigarettes or bidis and 30 percent report consumption of pan masala, gutkha, or other tobacco products. In the Indian component of the Global Youth Tobacco Survey (2000–04), 25·1% of the students aged 13–15 years reported that they had ever used tobacco, whereas current use was reported by 17·5%.

During 2015-16, in Kerala, twenty-six percent of men age 15-49, but less than 1 percent of women age 15-49, use any type of tobacco. Men are more likely to smoke cigarettes (21%) than to use other type of tobacco. Among men, the use of any form of tobacco is higher in rural than in urban areas, primarily because men in rural areas are more likely to smoke bidis (7%) than men in urban areas (3%). Most men who smoke cigarettes or bidis smoked 1-5 cigarettes or bidis in the past 24

- **Alcoholism**

Pattern of alcohol consumption varies with geographical location. Punjab, Andhra Pradesh, Goa and north-eastern states have a much higher proportion of male alcohol consumers than the rest of the country. Women tend to drink more in the states of Arunanchal Pradesh, Assam and Sikhism. In India, the estimated numbers of alcohol users in 2005 were 62.5 million, with around 17% of them, which translates into 10.6 million, being dependant users. Usually 20–30% of hospital admissions are due to alcohol-related problems.

- **Obesity and physical activity**

Overweight is more prevalent among female, urban and high socioeconomic status (SES) groups. The prevalence of overweight and obesity had increased slightly over the past decade in India, but in some urban and high-SES groups it reached a relatively high level. A large multiple-site survey conducted in 10 industries in urban areas reported a high combined prevalence (BMI ≥ 25) of 30.9%. Another survey conducted in six major cities (Chennai, Bangalore, Hyderabad, Calcutta, Mumbai and

New Delhi) showed that the combined prevalence of overweight and obesity was 30.8% and that of central obesity (waist–hip ratio ≥ 0.90 in men and ≥ 0.85 in women) was 50.3%. On comparing National Family Health Survey (NFHS) (1998–99) with NFHS (2005–06) report, the prevalence of overweight in females increased from 5.9% to 7.4% and of obesity from 0.9% to 1.3%. The National Nutrition Monitoring Bureau (NNMB) data for adults also showed a moderate increase in the combined prevalence of overweight and obesity between 2000–2001 and 2005–2006 among men (5.7% to 7.8%) and women (8.2% to 10.9%) in the rural population

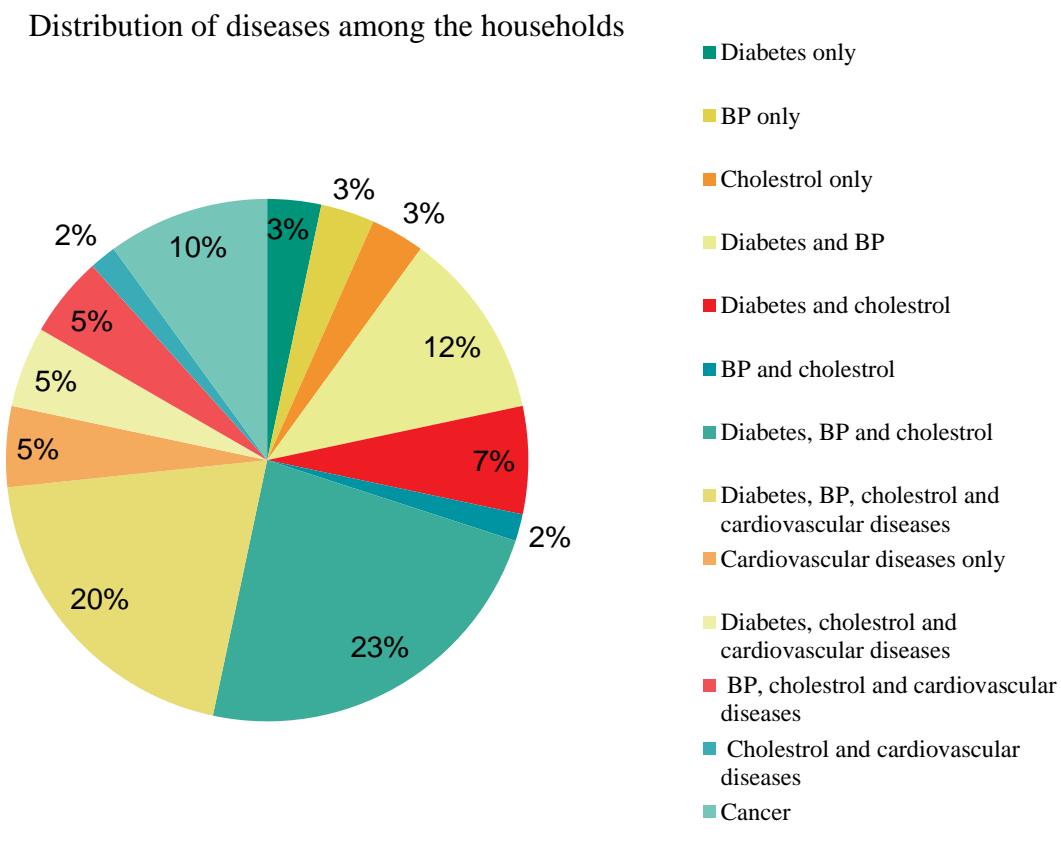
Impact of NCDs on health system

Increased prevalence of NCDs has also led to increased pressures on the health systems. In an analysis of the Indian National Sample Survey data for 1995-96 and 2004-05 rounds, Mahal et al. 2010 found nearly 2.5 billion outpatient visits in the year 2004, the share of visits linked to NCDs were 35% (increasing from 22% of all outpatient visits in 1995-96). Hospital stays for NCDs were 40% of 30.6 million hospital stays in 2004 increasing from 32% in 1995. As the prevalence of NCDs rises, there will be greater demand for NCD-related healthcare services, including diagnosis and treatment.

Economic Impact of NCDs

There has been an increase of nearly 50% in the out of pocket expenditure for NCDs i.e. from 31.6 percent in 1995–96 to 47.3 percent in 2004 with the major portion of the money used for purchasing of medicines, diagnostic tests and medical equipment's. It is estimated that in Kerala, a southern Indian state, the economic burden due to cardiovascular disease (CVD) is around 20% of the state domestic product (GDP). The Economist Intelligence Unit (EIU, 2007) estimated the economic costs of the diabetes epidemic in India, including direct medical care costs, productivity loss due to mortality, morbidity and disability associated with diabetes, at about 2.1 percent of GDP. Shobhana et al. estimated the out-of-pocket spending by a sample of about 600 diabetic in-patients in Chennai. The average out-of-pocket expenditure for hospitalization in private hospitals ranged from INR 621 in West Bengal to INR 6,034 in Gujarat. In 2010, the expenditure will amount to INR 3321.24 and INR 32,271.22 respectively. Similarly, in the two states Gumber found that public hospitals were somewhat cheaper with spending on injury- related medical care ranging from INR 324 to INR 1,740 in the two states respectively. On the basis of primary data, following information were collected through surveys and discussions.

Distribution of diseases



Proportion of income spent on the treatment of NCDs

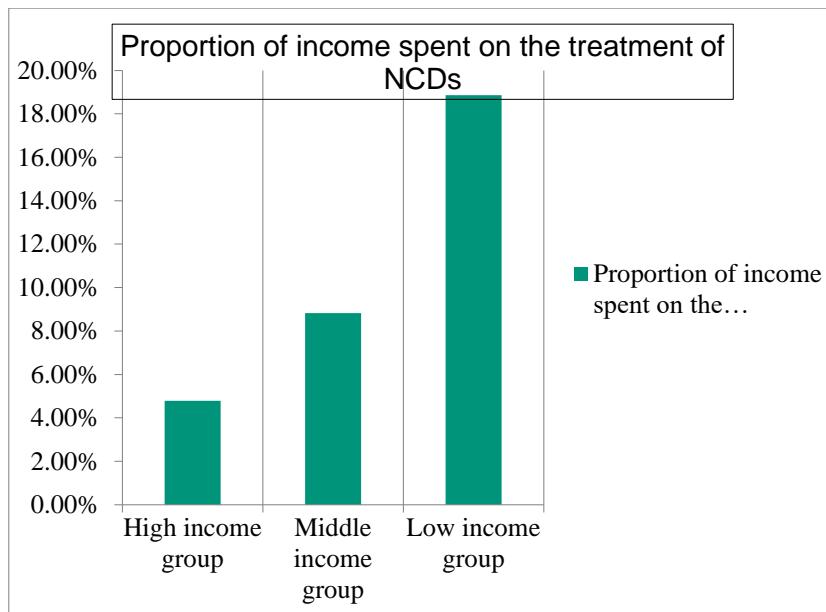


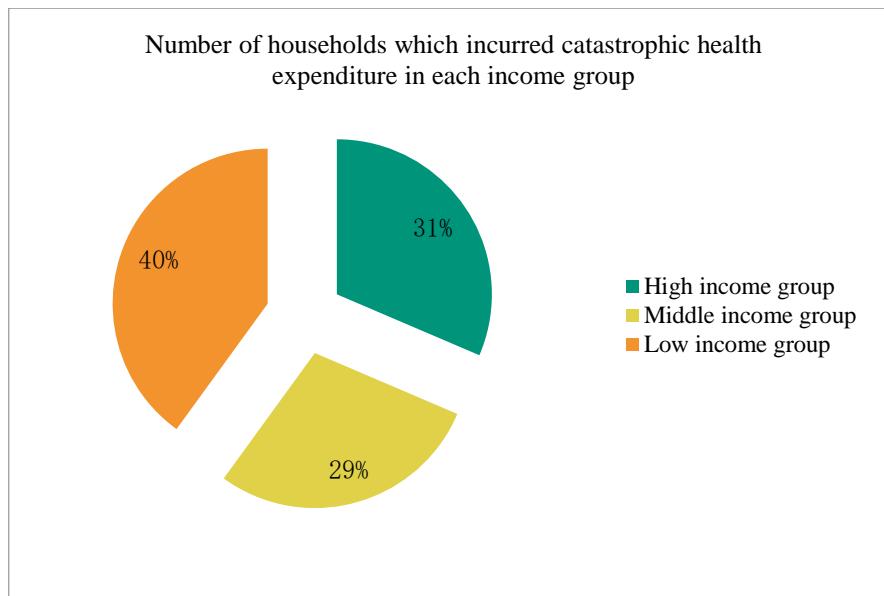
Figure shows a huge variation in the proportion of income spent on the treatment of NCDs by the three income groups - low, middle and high income groups. The high income group spends 4.78% of their total income on the treatment of NCDs, middle income group spends 8.83% of their total income on the treatment of NCDs and low income group spends 18.86% of their total income on the treatment of NCDs.

Work status of NCD inflicted people

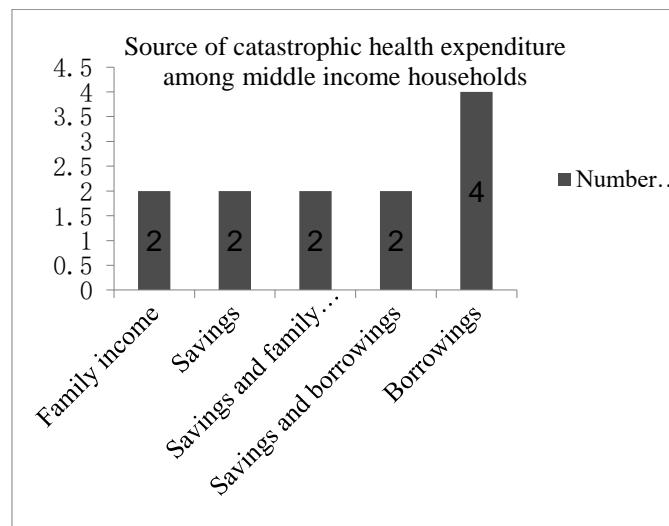
Out of the 60 households taken, 39 people inflicted by NCDs are employed and 21 people unemployed. According to figure, from the 39 employed people, 14 persons belong to the high income group, 12 to the middle income group and 13 to the low income group. From the 6 unemployed people each in the high income group and the middle income group, only 1 person remains unemployed due to the disease who had voluntarily resigned from the job due to health problems. In the case of low income group, out of the 9 unemployed persons, 5 people remain unemployed due to the disease. In this case, 2 people had lost their job whereas 3 people had voluntarily resigned from the job due to health problems.

NCDs also affect an individual's ability to perform a job. Out of the 14 employed in the high income group, only 2 people face difficulty in performing their job due to NCDs. With regards to the middle income group, 7 people out of the 12 employed people face difficulty in doing their jobs as a result of the NCDs and the related health problems. In the case of low income group, 10 people out of the 13 employed people face difficulty in doing their jobs as a result of the NCDs and the related health problems.

Catastrophic health expenditure



From the 60 households taken for the study, 31 households incur catastrophic health expenditure. Figure shows that 31% of the households which incurred catastrophic health expenditure belong to the high income group, 29% belong to the middle income group and 40% belong to the low income group.



Out of the 10 middle income households incurring catastrophic health expenditure, 2 households use family income only, 2 households use savings only, 2 households use savings and family income, 2 households use savings and borrowings and 4 households use borrowings only to meet the catastrophic health expenditure.

Sources of money for the treatment of NCDs

In the middle income group, recurring expenditure incurred on the treatment of NCDs is financed solely by family income for 14 households, by family income and savings for 1 household, by savings and borrowings for 1 household, family income and borrowings for 1 household and by savings, family income and borrowings for 1 household.

With regard to low income group, 6 households rely solely on family income, 2 households rely on family income and borrowings, 2 households on family income, borrowings and government programmes, 3 households on family income and government programmes, 1 household on savings, family income and government programmes, 7 households on savings, family income, borrowings and government programmes and 1 household on borrowings and government programmes to meet the recurring expenditure incurred on the treatment of NCDs.

Status of debt taken to meet the expenditure on the treatment of NCDs

Out of the 60 households taken, no household in the high income group has taken debt for the treatment of NCDs. It can be seen that 95% of the high income households rely on private sector and only 5% rely on public sector for the treatment of NCDs. The thought that the heavy expenditure associated with NCDs should not force them to curtail other expenditures especially of their children, was the reason for the 5% of the high income households which chose public sector hospitals.

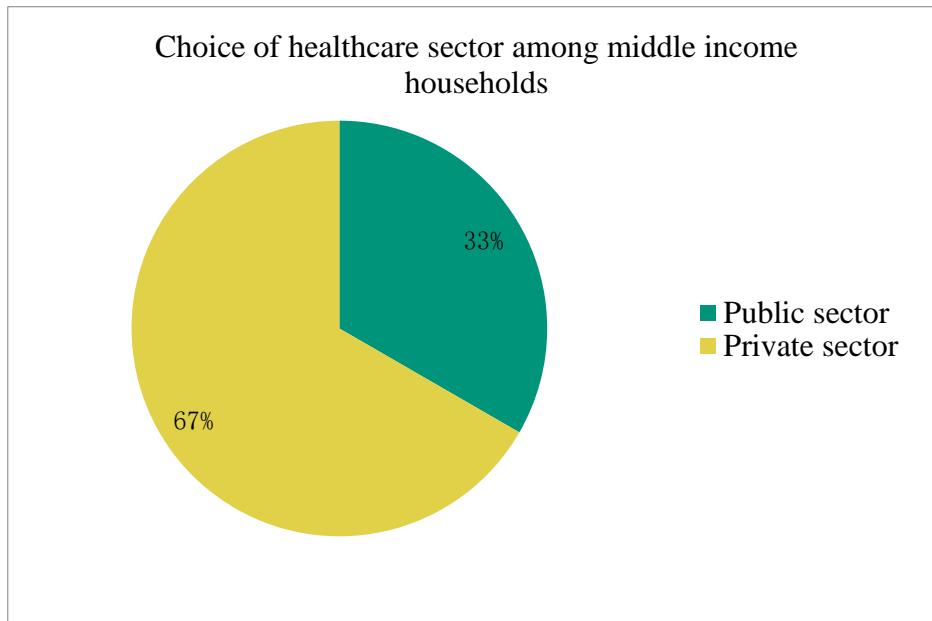


Figure shows that private sector is chosen by 67% of the middle income households and public sector by 33% of the middle income households. Quality of treatment and easy accessibility are the reasons for 67% of the middle income households to resort to private sector hospitals. The remaining 33% resort to public sector hospitals to reduce the burden of expenditure

asserts that 41% of the low income households have chosen private sector and 59% of the low income households have chosen public sector for the treatment of NCDs.

All the 9 households which chose private sector for treatment in spite of the heavy expenditure, did so because of quality treatment and easy accessibility offered by private sector hospitals. The remaining 59% find it extremely unaffordable to resort to private sector hospitals.

Education

75% of the high income households (15 households), 72.22% of the middle income households (13 households) and 86.36% of the low income households (19 households) have members pursuing education.

Level of education	Number of households		
	High income group	Middle income group	Low income group
School	5	7	16
Collegiate	4	2	1
School and collegiate	6	4	2

Table shows that out of 15 high income households with members pursuing education, 33.3% of the households (5 households) have members pursuing school education only, 26.7% of the households (4 households) have members pursuing collegiate education only and 40% of the households (6 households) have members pursuing school and collegiate education.

Out of 13 middle income households pursuing different levels of education, 53.8% of the households (7 households) have members pursuing school education only, 15.4% of the households (2 households) have members pursuing collegiate education only and 30.8% of the households (4 households) have members pursuing school and collegiate education.

Out of 19 low income households pursuing different levels of education, 84.2% of the households (16 households) have members pursuing school education only, 5.3% of the households (1 household) have members pursuing collegiate education only and 10.6% of the households (2 households) have members pursuing school and collegiate education.

Type of educational institutions

Educational institution	High income group	Middle income group	Low income group
Government	2	4	13
Aided	4	3	3
Self financing / Private	9	6	0

Table shows that only 13.3% of the high income households (2 households) rely on government institutions, 26.7% of the high income households (4 households) rely on aided institutions and 60% of the high income households (9 households) rely on self financing or private institutions for their wards' education. In the case of middle income group, 30.7% of the households (4 households) depend on government institutions, 23.1% of the households (3 households) depend on aided institutions and 46.2% of the households (6 households) depend on self financing or private institutions for their wards' education.

As far as low income group is concerned, 68.4% of the households (13 households) rely on government institutions and 31.6% of the households (6 households) rely on aided institutions. None of the households depend on self financing or private institutions for their wards' education. Figure states that 82% of the households which had reduced educational expenses to meet the expenditure on the treatment of NCDs belong to the low income group and only 18% belong to the middle income group. No households from the high income group had reduced the educational expenses.

Mental and emotional health

50% of the households which had been mentally and emotionally affected by NCDs and the associated expenditure belong to the low income group while only 25% of households each belong to high and middle income groups. What sets India truly apart in today's economy is its gigantic workforce. The country has the largest number of young workers in the world, with 12 million joining the workforce every year. But the question is, how productive can these people be if they suffer from frequent illness and poor health. India, along with most other nations, has fallen victim to a lethal modern day scourge non-communicable diseases (NCDs). According to experts, cardiovascular diseases, cancer, chronic respiratory diseases and diabetes could cost the world \$47 trillion in lost economic output from 2010 to 2030 if urgent action is not taken to prevent and treat them.

II. Current Challenges

A major share of the households was inflicted by a combination of multiple NCDs. About 23% of the households were inflicted by a combination of diabetes, BP and cholesterol and 20% of the households were inflicted by diabetes, BP, cholesterol and cardiovascular diseases.

Another major finding was that there exists a drastic difference in the proportion of income spent on the treatment of NCDs by high, middle and low income households. Households belonging to the high income group spend only 4.78% and those belonging to the middle income group spend 8.83% of their income on the treatment of NCDs. But low income households spend about 18.86% of their income on the treatment of NCDs. Regarding employability, only 30% of the NCD inflicted people in the high income households remain unemployed and out of the unemployed, only 16.67% of the people resigned from the job due to the disease. In the case of middle income group, out of 33.33% of the unemployed NCD inflicted people, only 16.67% resigned from the job due to the disease. In the case of low income group, 41% of the NCD inflicted persons remain unemployed, out of which the reason of 55.56% of the people's unemployment is infliction of the disease. About 40% (2 persons) lost their job due to the disease and 60% (3 persons) resigned voluntarily from the job due to health issues.

Regarding the source of money for the treatment of NCDs, majority of the high income and middle income households resort to family income followed by savings to finance the expenditure incurred on the treatment of NCDs. But majority of the low income households use borrowings, government allowances and family income to finance the expenditure incurred on the treatment of NCDs.

The high income households have not taken any debt to meet the expenditure incurred on the treatment of NCDs. About 67% of the middle income households have repaid the debt taken to finance the expenditure on NCDs. Only 17% of the low income households have repaid the debt taken to finance the expenditure incurred on the treatment of NCDs. Thus, the incidence of NCDs traps the low income households in a vicious cycle of debt which further lessen their income which has already been lessened by the expenditure on NCDs.

The high income households have not sold any assets for the treatment of NCDs. Out of the total households which had sold assets for the treatment of NCDs, 60% of the households belong to the low income group. Property and gold are the assets mainly sold by them. Another major finding is regarding the choice of health care sector. Majority of the high income households (95%) have chosen the private sector hospitals for the treatment of NCDs. But in spite of the heavy expenditure burden imposed by private sector hospitals, 67% of the middle income households and 41% of the

low income households resort to private sector hospitals for treatment because of the quality of treatment and easy accessibility.

The incidence of non-communicable diseases has forced 59.09% of the low income households to reduce their expenditure on food. But not a single household belonging to the high and middle income groups has reduced their expenditure on food. All households of high and middle income groups stay in concrete houses. But about 27.27% of the low income households stay in thatched houses. Regarding ownership, all high income households own their houses. About 77.78% of the middle income households own their houses. In the case of low income households, only 45.45% of the households own their houses. All high income households own vehicles out of which majority of the households own cars and two wheelers. About 77.77% of the middle income households own vehicles out of which majority of the households own two wheelers. Out of 36.36% of low income households owning vehicles, majority own two wheelers. Another important impact of NCDs is the impact of NCDs on mental and emotional health. About 50% of those mentally and emotionally affected by NCDs belong to the low income group, where a major share of households cite the heavy burden of expenditure incurred on the treatment of NCDs and the reduction of other non-medical expenditures as the reasons for the mental and emotional ill health. Only 25% each of those mentally and emotionally affected belong to high and middle income groups, where it arises because of their health consciousness.

Thus, NCDs do not seriously affect the employability, productivity and earning capacity of high income households. As far as high income group is concerned, it does not result in the sale of assets and debt trap. The incidence of diseases does not lead to reduction in educational and food expenditures of high income households. Even though it affects the mental and emotional health of a small percentage of households, they are not concerned with the burden of expenditure associated with the treatment of NCDs.

The incidence of NCDs has adversely affected the low income households. It has seriously affected the employability, productivity and earning capacity of low income households. It has resulted in the sale of their assets and trapping them in a vicious cycle of debt. It has led to the reduction in educational and food expenditures of low income households. The creation of dropouts is another negative implication of NCDs in households belonging to low income group. The heavy burden of expenditure associated with the treatment of NCDs has also led to mental and emotional illhealth of some of the low income households.

III. Suggestions

Promotion of micro - insurance initiatives in the short-run and driving towards a universal health entitlement benefit package which includes essential NCD care based on primary healthcare approach in the long run can help in easing the heavy burden of expenditure incurred on the treatment of NCDs. Regulation of pharmaceutical sector and promotion of research and procurement of generic medicines for treatment of NCDs should be urgently pursued, as evidence shows that 64% and 58% of total OOP spending on hypertension and diabetes, respectively, is on purchase of medicines alone. The providers of subsidized medicines like Jan Oushadhi Stores, Neethi Government Medical Stores, Kerala Government Medical Supplies Corporation, Supplyco Medical Stores etc. should ensure the timely availability of adequate quantity of essential medicines. Rashtriya Swasthya Bima Yojana (RSBY) should introduce an additional special package including hospitalization, medicinal and diagnostic expenditures for financing the treatment of NCDs of poorer households. The government programmes like RSBY, Rashtriya Arogya Nidhi (RAN) etc. should help in financing the expenditure on NCDs incurred by those households just Above Poverty Line (APL), along with the households Below Poverty Line (BPL). The health care facilities in public sector hospitals should be raised to international levels and also they should avoid delays in providing treatment so that the situation of even low income households depending on private sector hospitals for speedy and qualitative treatment can be avoided. The speedy medical reimbursement of government health care programmes should be ensured. Scholarships and sponsorships should be introduced by the government for the dependents of fatal NCDs. Also private scholarships and sponsorships should be promoted.

IV.CONCLUSION

Non communicable diseases (NCDs) already pose a substantial economic burden, and this will evolve into a staggering one over the next two decades with respect to cardiovascular disease (CVD), chronic respiratory disease, cancer, diabetes, and mental health, the macroeconomic simulations suggest a cumulative output loss of US\$ 47 trillion over the next two decades. This loss represents 75% of global gross domestic product (GDP) in 2010 (US\$ 63 trillion). NCDs have become a major public health problem in India accounting for 62% of the total burden of foregone and 53% of total deaths. The effects of NCDs are inequitable with evidence of a reversal in social gradient of risk factors and greater financial implications for the poorer households in India. Out-of-pocket expenditure associated with the acute and long-term effects of NCDs is high resulting in catastrophic health expenditure for the households. A study in India showed that about 25% of families with a member with CVD and 50% of families with cancer experience catastrophic expenditure and 10% and 25%, respectively, are driven to poverty. The odds of incurring catastrophic hospitalization expenditure were nearly 160% higher with cancer than the odds of incurring catastrophic spending when hospitalization was due to a communicable disease. In macroeconomic term, most of the estimates suggest that the NCDs in India account for an economic burden in the range of 5%–10% of GDP, which is significant and slowing down GDP thus hampering development.

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