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Catastrophic health expenditure and its determinants among households in Rural Puducherry

Surendran Venkataraman[1], Surekha A[2], Suguna A[2]

Affiliation: : 1 Post Graduate Student, 2 Assistant Professor, Department of Community Medicine, Mahatma Gandhi Medical College & Research Institute (MGMC&RI), Sri Balaji Vidyapeeth, Puducherry.

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***Author for correspondence**: Dr Surekha A, Department of Community Medicine, Second Floor College Block, Mahatma Gandhi Medical College and Research Institute (MGMC&RI), Sri Balaji Vidyapeeth, Pillayarkuppam, Puducherry- 607402. E-mail: surecommed87@gmail.com

ABSTRACT

Background: Health care expenditures exacerbate poverty, with additional 25 million households or more than 100 million individuals globally pushed into poverty every year because of such expenditures. The Government expenditure on healthcare in India is only 1.04% of GDP which is and less than 30% of total health spending. **Aim:** To assess the proportion of catastrophic health expenditure and the factors influencing among households in rural Puducherry. **Materials and Methods:** A community based cross-sectional analytical study was conducted in selected villages within 5 kms of a Medical College Hospital in Puducherry from September 2016 to June 2017. Socio-demographic details and health expenditure of the households were obtained using epicollect5 software from 817 households with 3459 individuals. Data were exported to Microsoft excel and analysed using STATA(v14). Multivariate analysis using binary logistic regression analysis was done to identify the independent effect of various factors on catastrophic health expenditure. **Results:** The mean per-capita expenditure on health care among the households was INR 226.5. About 27% of the households incurred catastrophic health expenditure. Multivariate analysis revealed that households with lower socio-economic status [11.21 (95%CI:5.07-24.82)], presence of vulnerable individuals at home [2.94 (95%CI:1.82-4.01)], alcohol-tobacco consumption [2.37 (95%CI:1.31-3.19)] and no health insurance schemes [6.89 (95%CI:4.74-10.41)] were the factors independently associated with catastrophic health expenditure. **Conclusion:** Catastrophic health expenditure was found in about one-fourth (27.2%) of the households. The household factors influencing catastrophic health expenditure were also identified. Strengthening the ability of health-care systems to provide comprehensive care is essential for reducing the burden of catastrophic health expenditure. Special focus must be given to financing the health care needs of the disadvantaged sections of the population.

Key Words: Catastrophic health expenditure, health care utilisation, rural households, Puducherry

INTRODUCTION

Ill health can have a significant economic impact on a household which can trigger a cascade of asset depletion, indebtedness and cut down on basic necessities.[1] The extensive use of technology in diagnostics and treatment of diseases coupled together with the rising therapeutic knowledge and expectations of the population has led to an increase in the cost of health care, especially in low and middle-income countries (LMICs).[2] Globally, approximately 44 million households or more than 150 million individuals face catastrophic health expenditure (CHE), and about 25 million households or more than 100 million individuals are pushed into poverty by the need to pay for services every year.[3] In most LMICs, a large proportion of the money spent on healthcare comes from the out-of-pocket (OOP) expenditure of patients or their families.[4] In the South Asian region, this proportion has been estimated to reach up to 60%–70% of total expenditure due to poor public spending on health. Households in such countries experience financial hardship and are often pushed below the poverty line as a result of their spending on healthcare.[5]

Healthcare access in India is affected with 70:70 paradox; 70 per cent of healthcare expenses are incurred by people from their pockets, of which 70 percent is spent on medicines alone, leading to impoverishment and indebtedness.[6] For decades, economic planners of India regarded health expenditure as financially non-productive social spending and public financing levels were low and total spending on healthcare was about 4.1% of GDP.[7] Global evidence on health spending shows that unless a country spends at least 5–6% of its GDP on health and the major part of it is from government expenditure, basic health care needs are seldom met. The Government expenditure on healthcare in India is only 1.04% of GDP which is about 4 % of total expenditure and less than 30% of total health spending.[8] Additionally, more than 90% of the workforce in India is engaged in informal economic activities. As insurance facilities are available only to workforce in formal sector, majority of such households

are not covered under any social protection scheme. In case of ill health, these households must spend from their own pockets. The high share of OOPE on health care along with inadequate provisioning of health care facilities further worsens the existing poverty.[9] There is a lack of conclusive data related to health care expenditure patterns among households in our setting. Viewing the above situation, the present study was planned to assess the proportion of catastrophic health expenditure and the factors influencing among households in rural Puducherry.

Objectives: To estimate the proportion of catastrophic health expenditure among households in rural Puducherry;To determine the factors associated with catastrophic health expenditure among households in rural Puducherry.

METHODOLOGY

A community based cross-sectional analytical study was conducted among households in four villages located within 5 km radius of a Medical College Hospital in Puducherry from November 2016 to August 2017. Puducherry is an Union territory with four districts spread across the south Indian states of Tamil Nadu, Kerala and Andhra Pradesh. The district of Puducherry is on the shores of Bay of Bengal, surrounded by state of Tamil Nadu on all the other three sides. The population of district of Puducherry is approximately ten lakhs, with almost 65% residing in the urban areas. All households in the four villages were included for the study.

House to house visits were made in all the four villages by trained field staffs. After establishing rapport with the village heads and individuals, the purpose and procedure of the study was explained. The data were collected from the available individuals (>18 years) in each household. If houses were locked or individual eligible for study was not present during the investigators initial visit, two revisits were made. The identities of the household and individual were kept anonymous from the stage of data collection. Institutional Human Ethics Committee approval was obtained before the study.

A semi-structured interview schedule was used to collect information from the study participants. The questionnaire was converted into electronic format using epicollect5 software and the mobile application was used to collect data. The study tool included details on socio-demographic factors and household health expenditure patterns. Information on religion, type of family, total family income, number of individuals in the family, alcohol-tobacco consumption of the households, presence of vulnerable individuals and health insurance schemes were collected as part of socio-demographic details. The total household out of pocket health expenditures in the previous year was obtained.

The following definitions were used to measure the OOP health expenditure of the families: Household health expenditure was defined as the annual direct OOP health spending by households on medical goods and services and maintenance of good health.[3,5] Catastrophic health expenditure was defined as the household's annual health expenditure when exceeds 10 per cent of the total annual household income.[3,5] Vulnerable individuals includes either presence of children less than 5 years or elderly aged 60 years and above. The households were classified into different socio-economic classes based on modified BG Prasad's classification for year 2018.[10]

Data Entry and Analysis: The electronically captured data was exported into excel and analysed using STATA (v 14). Continuous variables were summarized as mean and standard deviation while categorical variables were summarized as frequency and percentages. Bivariate analysis using chi-square test was done to determine the factors associated with catastrophic health expenditure. Multivariate analysis using binary logistic regression analysis was done to identify the independent effect of various factors on catastrophic health expenditure. The strength of the association was expressed as Odds Ratio (OR) for bivariate analysis and Adjusted Odds Ratio (AOR) for multivariate analysis. Statistical significance was set at p value of less than or equal to 0.05. The Inequality in health expenditure among the wealth quintiles was graphically represented as a Lorenz curve (concentration curve).

RESULTS

Table:1 Socio-demographic characteristics of the households (N=817)

Characteristics	Summary statistics
Age, mean (±SD)	45.8 (±9.3)
Gender of the respondents, n(%)	
Male	333 (40.7%)
Female	484 (59.5%)
Family Type, n(%)	
Nuclear	516 (63.2%)
Joint	266 (32.6%)
Extended	35 (4.3%)
House type, n(%)	
Pucca	436 (53.4%)
Semi-Pucca	223 (27.3%)
Kutcha	158 (19.3%)
Family size, median (IQR)	4 (3-5)
Religion, n(%)	
Hindu	795 (97.3%)
Christian	17(2.1%)
Muslim	5(0.6%)
Socio-economic status, n(%)	
Upper	118(14.4%)
Upper middle	158(19.3%)
Middle	224(27.4%)
Lower middle	198(24.2%)
Lower	119(14.6%)

Table 2: Determinants of Catastrophic health expenditure among the households (N=817)

Characteristics	Total households	Number with Catastrophic Expenditure, n (%)	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Family Type				
Nuclear	516	125 (24.2%)	1	1
Joint	266	82 (30.8%)	1.35 (1.08-1.92)*	1.44 (0.99-2.1)
Extended	35	15 (42.9%)	2.44 (1.19-4.68)*	2.09 (0.98-4.48)
House type				
Pucca	436	105 (24.1%)	1	1
Semi-Pucca	223	66 (29.6%)	0.88 (0.57-1.37)	1.06 (0.67-1.68)
Kutcha	158	51 (32.3%)	0.67 (0.45-0.99)	1.03 (0.67-1.58)
Socio-economic status				
Upper	118	9 (7.6%)	1	1
Upper middle	158	26 (16.4%)	2.38 (1.12-5.34)*	2.38 (1.07-5.32) †
Middle	224	63 (28.1%)	4.7 (2.3-9.9)*	4.75 (2.24-10.07) †
Lower middle	198	66 (33%)	6.2 (3-13.1)*	6.06 (2.83-12.96) †
Lower	119	58 (49.2%)	11.7 (5.4-25.3)*	11.21 (5.07-24.82) †
Family size				
≤ 4	502	97 (18.9%)	1	1
> 4	315	125 (39.7%)	2.75 (2-3.77)*	1.17 (0.81-1.69)
Vulnerable Individuals				
Present	193	98 (50.8%)	4.16 (2.95-5.87)*	2.94 (1.82-4.01) †
Absent	624	124 (19.9%)	1	1
Alcohol-tobacco consumption				
Yes	206	94 (45.6%)	3.17 (2.26-4.43)*	2.37 (1.31-3.19) †
No	611	128 (20.9%)	1	1
Health Insurance				
Yes	136	87 (64%)	7.2 (4.83-10.69)*	6.89 (4.74-10.41) †
No	681	135 (19.8%)	1	1

*** -p <0.05, by chi-square test; †- p<0.05, by binary logistic regression**

Figure 1: Proportion of Households with Catastrophic health expenditure (N=817)

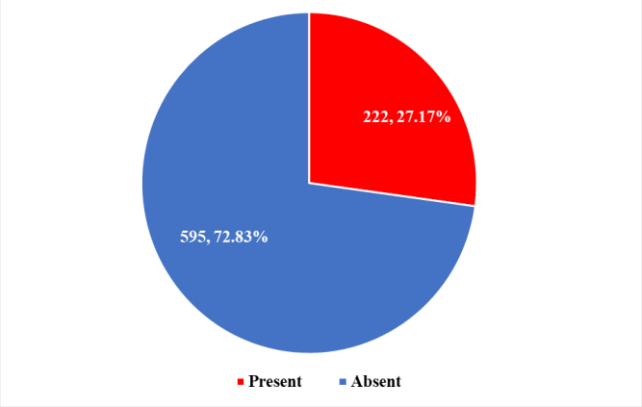
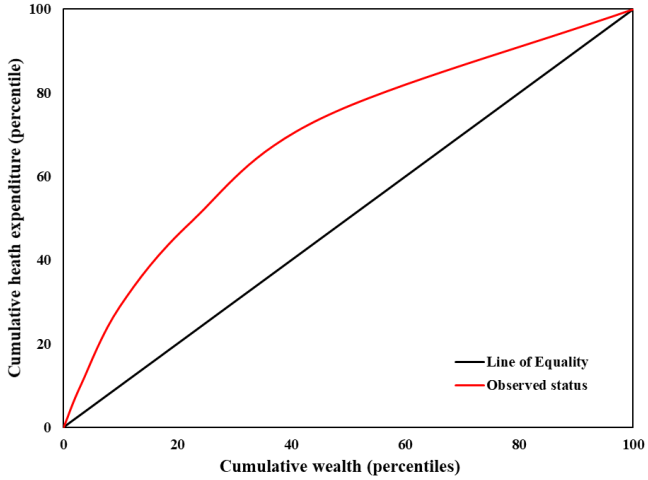


Figure 2: Inequality in health expenditure among the wealth quintiles- a concentration curve (N=817)



Information on socio-demographic details and various household expenditures were obtained from 817 households consisting of 3459 individuals. The mean age of respondents in the households was 45.8 (±9.3) and majority were females (59.5%). Most of the households in the surveyed area were pucca in type (71.9%) with nuclear families (63.2%) belonging to Hindu religion (97.3%). Majority of the households belonged to the middle class (27%) and only 16.7% had health insurance schemes available. (Table 1) The mean per-capita expenditure on health care among the households was INR 226.5. About 27% of the households incurred Catastrophic health expenditure. (Figure 1).

Bivariate analysis revealed that households with extended family [2.44 (95%CI:1.19-4.68)], low socio-economic status [11.7 (95%CI:5.4-25.3)], family size of >4 [2.75 (95%CI:2-3.7)], presence of vulnerable individuals at home [4.16 (95%CI:2.95-5.87)], alcohol-tobacco

consumption [3.17 (95%CI:2.26-4.43)] and no health insurance schemes [7.2 (95%CI:4.83-10.69)] were significantly associated with catastrophic health expenditure on comparison with other sub groups. However, in multivariate analysis lower socio-economic status [11.21 (95%CI:5.07-24.82)], presence of vulnerable individuals at home [2.94 (95%CI:1.82-4.01)], alcohol-tobacco consumption [2.37 (95%CI:1.31-3.19)] and no health insurance schemes [6.89 (95%CI:4.74-10.41)] were the factors independently associated with catastrophic health expenditure. (Table 2)

Inequality in health expenditure was analysed using concentration curve. Households in the bottom 20% of the wealth quintiles contributed to about 40% of the total health expenditure. Hence, there was inequality in health expenditure with more financial risks to the poor. (Figure 2)

DISCUSSION

The average per capita expenditure on health care among households in the current study (INR 226.5) was more than two-fold on comparison with the Consumer Expenditure Survey (CES) report 2009-10 value of INR 96 for Puducherry.[11] The change in reference period, growth in population since the year 2009, and the rising cost of health care could be the possible reasons for the increase in the per capita expenditure on health in the current study.

About 27% of the households incurred Catastrophic health expenditure. The proportion was high when compared to a study by Karthiyayini *et al* where the Catastrophic health expenditure was present only in 18.6% of households.[12] However, TV Sekher reported similar proportions of catastrophic health expenditure (26.5%) among rural households in six states.[13] Similarly, Anamika Pandey et al reported that the proportion of catastrophic health expenditure from national surveys increased 1.47-fold between the 1993–1994 expenditure survey (12.4%) and the 2011–2012 expenditure survey (18.2%) and 2.24-fold between the 1995–1996 utilization survey (11.1%) and the 2014 utilization survey (24.9%).[14]

The households with lower socio-economic status, presence of vulnerable individuals at home, alcohol-tobacco consumption and no health insurance were significant predictors of catastrophic health expenditure. Few studies reported that increased health expenditure was more common among the poor,[11,15] while others report it being more common among the rich.[13,16] Better-off households can respond more often to medical needs but are less likely to face permanent impoverishment. Whereas, without adequate resources, poor households simply choose to forgo health care to avoid catastrophic health expenditure in the short run, which could have severe long-term consequences for health and earnings. The adverse impact of ill health in poorer households is grossly underestimated because it is not included in identifying catastrophic health expenditure.[17] Older people are less likely to work if they are unhealthy, which could increase the economic burden on their families and society.[18] Evidence from low- and middle-income countries indicates that households with older people, especially those with chronic noncommunicable diseases or disabilities, experience higher rates of catastrophic health expenditure.[19] Even in some of the wealthiest countries in Europe, older people diagnosed with chronic diseases face catastrophic health expenditure.[20] In coming decades, an ageing population combined with the absence of active measures to reduce catastrophic health expenditure will result in more older people falling into poverty and poor health.[11] Li *et al* in their study on factors affecting catastrophic health expenditure and impoverishment from medical expenses in China found out that age, sex, education, household size, employment status of the head of household and location were the determinants for the risk of catastrophic health expenditure.[21] Pal28 in his study on catastrophic health expenditure in India found that the incidence of catastrophic payments goes down with increased income and improved education. He also identified economic and social status of households as key determinants of incidence of catastrophic health expenditure.[22] World Health Organisation in their strategy for Health Financing in Asian Pacific Region has identified inadequate access to the healthcare facility as a determinant for catastrophic health expenditure. The Report identifies the distance of health facility as a key determinant for access with distance being a greater barrier for women than for men.[23] Karthiyayini *et al* found that the health insurance coverage of households was high (43%) and it had reduction in financial burdening or hardship.[12]

Strengthening the ability of health-care systems to provide comprehensive care by increasing investment and human resources is essential for reducing the burden of catastrophic health expenditure. Special focus must be given to financing the health care needs of the disadvantaged sections of the population, as health expenses can push these households into greater risk of poverty through mobilizing funds to cater their healthcare needs. Healthcare financing system should focus on achieving vertical equity (households of unequal ability should be treated unequally), horizontal equity (households of the same ability should be treated equally) and progressivity in healthcare expenditure. However, in areas where the institutional capacity to organize mandatory nationwide risk pooling is weak, community-based health insurance schemes can be effective in protecting poor households from unpredictably high medical expenses.

The study was subjected to some limitations. Foremost, causal inference is precluded by the cross-sectional study design. As the study was conducted in limited rural field practice area, results may not be applicable for the whole district. The study tried to analyse only the absolute burden of healthcare spending and couldn't categorize the health care expenditures among the households. The household health expenditure incurred was assessed as self-reported that could be unverifiable. Apart from that, household income and expenditure patterns could also be under reported due to respondents' recall bias.

Conclusion:

In this study, catastrophic health expenditure was found in about one-fourth (27.2%) of the households. The households with lower socio-economic status, presence of vulnerable individuals at home, alcohol-tobacco consumption and no health insurance were significant predictors of catastrophic health expenditure. Higher public expenditure on health and the provision of affordable health care are required. In addition, governments should provide financial protection through viable prepayment mechanisms and risk-pooling and ensure health security. To achieve equity in health-care financing, public policy should focus on economically disadvantaged groups. Insurance coverage and the provision of good-quality, subsidized, public health facilities and regulation of the private sector will both improve access to affordable health care and protect the poor against financial catastrophe.

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