

DOI: <https://doi.org/10.33314/jnhrc.v18i4.2392>

National and Provincial Estimates of Catastrophic Health Expenditure and its Determinants in Nepal

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ABSTRACT

Background: Despite various supply-side efforts, out of pocket expenditure occupies a considerable portion of healthcare financing in Nepal. With the recent process of federalization in country, there is additional scope for contextualized planning at provincial level to prevent catastrophic health expenditure among Nepalese households. In this context, this study intends to estimate the proportion of population facing catastrophic health expenditure at national and provincial level and identify the determinants of catastrophic health expenditure.

Methods: This study involved analysis of Nepal Living Standard Survey III, which was a cross sectional study. Out of 5,988 households comprising 28,460 individuals, data from total of 7,911 individuals who reported having acute or chronic illness was extracted and analyzed in the study.

Results: In the study, 11.11% of households had faced catastrophic health expenditure. Catastrophic health expenditure was found to be 11.3% in Province 1, 9.4% in Province 2, 10.7% in Bagmati Province, 10% in Gandaki Province, 11.7% in Lumbini Province, 13.3% in Karnali Province and 13.4% in Sudurpaschim Province. Household size, literacy status of household head, consumption quintile, urban or rural residence, type of illness and type of health facility visited were identified as determinants of catastrophic health expenditure.

Conclusions: A tenth of households, most of whom lying below poverty line, residing in rural areas, suffering from chronic illness are facing catastrophic healthcare burden. The government needs to pursue its equity-oriented strategies preventing catastrophic health expenditure and impoverishment associated with it.

Keywords: Catastrophic health expenditure; out of pocket payment; Nepal

INTRODUCTION

Though Nepal made significant progress in health sector¹ but there are wide variations in health services availability, utilization and health status across different population subgroups, indicating the challenge of access and equity. In most instances, poor households have to pay for health services from their own income than rich households.²⁻⁴ The financial burden that the family incurs because of disease is measured in terms of catastrophic health expenditure (CHE). If the out-of-pocket expenditure for health care exceeds a certain proportion (generally 40% of non-food expenditure) of a household's income, the expenditure is considered as catastrophic.³ Study in 89 countries found considerable variations in incidence of CHE across countries ranging.^{4,5} CHE is concerning for policy makers as it may lead to impoverishment of a segment of population³ and deprive poor from even the essential services particularly in low

income countries.^{5,6} The study attempted to measure the level of CHE payment and its determinants.

METHODS

This study involves the analysis of data from Nepal living standard survey III (2012)⁷ conducted by Central Bureau of statistics (CBS). It was a cross-sectional survey which collected information on different aspects of household's demography, access to facilities, expenditure, education, and health across 75 districts of the country. We extracted required data and recategorized districts into seven provinces. Former 75 districts structure during the survey was converted into 77 districts splitting Nawalparasi and Rukum districts into two each during state restructuring process. Nawalparasi district was split into Nawalpur district and Parasi district falling in Gandaki Province and Lumbini Province respectively. Rukum district was divided into Rukum East and Rukum

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West falling in Lumbini Province and Karnali Province respectively. However, for the purpose of analysis the whole of Nawalparasi district was considered into Gandaki Province and Rukum district was considered into Karnali Province.

For this paper two parts of the survey data: chronic illness (in past 12 months) and the expenditure incurred; and acute illness (in past 30 days) and its expenditure were extracted. All the expenditures incurred during past one year for chronic illness and past one month for acute illness (later converted into expenditure per annum) were added together to calculate total out of pocket (OOP) expenditure. Household was the unit of analysis. The data were analyzed using the descriptive (percentage, mean and standard deviations) and inferential analysis (logistic regression). Data analysis was done using STATA version 12.

The study applied the calculation technique applied in previous studies to measure and find out whether a household falls in CHE situation.⁸ For the purpose of our study, a household's situation was considered to have encountered CHE if its OOP expenditures on health services exceeds 40% of non-food expenditure. A logistic regression was applied to analyze the factors that determine catastrophic payment.

The ethical approval was obtained from Ethical Review Board of Nepal Health Research Council.

RESULTS

Of the 7911 cases analyzed in the study, 11.11% households had faced CHE.

Province wise, higher proportion of the residents of Sudurpaschim Province (13.4%) Lumbini province (11.7%) and province 1 (11.3%) had faced CHE compared to national average (11.11%). Bagmati Province (10.7%) and province 2 (9.4%) had CHE less than national average.

The 30%, 20% and 10% of non-food expenditure as cut-off would led to prevalence of CHE of 14.56%, 20.44% and 33.22% respectively.

As shown in Table 2, CHE among female headed household was 13.1% while it was 10.4% in male headed household. CHE was also higher in household with illiterate household head (13.6% in illiterate vs 8.9% in literate). Proportion of CHE decreased with increasing household size. Similarly, the proportion of CHE was lower in higher consumption quintile. For instance, CHE was 16.6% among lowest quintile while it was 7.5% in highest quintile.

Among ecological belts, CHE was 11.6% in Mountain, 11.2% in Hilly region and 10.9% in Terai.

To find out the level of inequality regarding justifiable sharing of health care cost, a Lorenz curve was constructed based on OOP payment shared by consumption quintile of the households. The bulging out curve in the diagram below shows a noticeable gap between the curve of equality (diagonal line) and the inequality curve. The curve indicates that higher amount of OOP burden is borne by the poor segment of the population. As we move along the right side horizontally, as the cumulative percentage of income level rises a lower amount of OOP expenditure is shared by the households.

Table 1. Prevalence of CHE.

Province	N	Average Expenditure (NRs.)		Health expenditure as % of nonfood expenditure	CHE considering different cut off level of non-food expenditure			
		Health	Non- food		40%	30%	20%	10%
Province 1	1542	9004	75598.9	11.9	11.3	13.7	18.4	28.7
Province 2	1252	10480.8	103273.7	10.1	9.4	12.1	18.9	32.5
Bagmati province	1656	15146.1	104250	14.5	10.7	13.3	18.4	30.7
Gandaki province	841	11831	85282	13.9	10	13.3	18.0	30.2
Lumbini province	1416	8017.4	52100.1	15.4	11.7	16.5	23.9	38.3
Karnali province	384	7663.8	49494.8	15.5	13.3	18.8	27.6	38.5
Sudurpaschim Province	402	11339.2	66311.9	17.1	13.4	19.2	24.6	42.8
Nepal					11.1	14.6	20.4	33.2

Table 2. Socio-Demographic character of household and CHE.

Variables	Category	N	Illness			% of households with CHE
			Chronic	Acute	Any illness	
Household head sex	Male	4063	11.2	18.9	27	10.4
	Female	1455	12.4	20.8	29.4	13.1
Household head literacy	Illiterate	3748	11.5	20	27.9	13.6
	Literate	4163	11.5	18.9	27.3	8.9
Household size	1 to 2	626	18.7	12.7	27.4	18.6
	3 to 4	1769	19.5	11.4	27.8	11.2
	5 to 6	2061	20	11.6	28.2	9.8
	7 above	1062	18.4	10.6	26.3	8.9
Consumption quintile	Poorest	843	9.3	17.5	24.2	16.6
	Second	1028	10.9	19.8	27.4	14.1
	Third	992	12.2	21.2	29.5	11.9
	Fourth	1230	13.2	21.7	31.1	8.8
	Richest	1425	11.5	17.6	26.2	7.5
Belt	Mountain	360	11.8	18.3	25.6	11.6
	Hill	2518	11.7	17.6	26.2	11.2
	Terai	2640	11.2	21.6	29.6	10.9
Place residence	Urban	5493	11.6	17.4	26.3	11.2
	Rural	2418	11.4	20.3	28.2	11.1
Total	All illness	7911				11.11

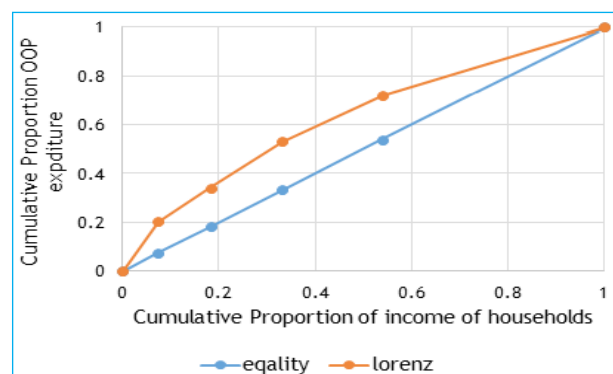


Figure 1. OOP concentration curve.

Household size was statistically significant at 1% level (OR=0.7, CI at 95%: 0.7 to 0.8). The odds value of 0.7 indicates with households with one-unit increase in household size, the risk of household facing CHE decreases by around 30%. Households with illiterate household heads had 1.3 times higher odds (95% CI=1.1 to 1.6) of having CHE. Compared to richest consumption quintile, households with poorest (OR=7.2, 95% CI: 4.9 to 10.7), second (OR=5.0, 95% CI: 3.5 to 7.3), third (OR=2.9, 95% CI: 2.0 to 4.1) and fourth (OR=1.5, 95% CI=1.1 to 2.1) quintile had higher odds of having CHE. Similarly, rural residents had higher odds (OR=1.8, 95% CI=1.4 to 2.3) of

having CHE compared to urban. Compared to households having acute illness, household having someone with chronic illness had three folds higher odds (OR=3.2, 95% CI: 2.6 to 4.1). Similarly, households visiting public health facilities (HFs) had higher odds (OR=1.3, 95% CI=1.1 to 1.6) of having CHE compared to those visiting private HFs.

Table 3. Factors associated with CHE.

Variables	Odds Ratio (S.E)	P>z	95% CI
Household head sex (b= female)	1.0 (0.1)	0.74	0.8 to 1.3
Household size	0.7 (1.0)	<0.001	0.7 to 0.8
Household head literacy (b= literate)	1.3 (0.1)	0.01	1.1 to 1.6
Caste ethnicity (Ref: brahmin chhettri)			
Janajatis	1.2 (0.2)	0.28	0.9 to 1.5
Terai madhesis	0.8 (0.1)	0.19	0.6 to 1.1
Dalits	0.8 (0.1)	0.12	0.8 to 1.1
Quintile (Ref: richest)			
Poorest	7.2 (1.5)	<0.001	4.9 to 10.7
Second	5.0 (1.0)	<0.001	3.5 to 7.3

Third (Median)	2.9 (0.5)	<0.001	2.0 to 4.1
Fourth	1.5 (0.3)	0.02	1.1 to 2.1
Place residence (Ref: urban)	1.8 (0.2)	<0.001	1.4 to 2.3
Province (Ref: Sudurpaschim Province)			
Province1	0.9 (0.2)	0.77	0.6 to 1.5
Province2	0.9 (0.2)	0.80	0.6 to 1.5
Bagmati province	0.9 (0.2)	0.87	0.6 to 1.5
Gandaki Province	0.8(0.2)	0.39	0.5 to 1.3
Province5	0.7 (0.2)	0.09	0.4 to 1.1
Karnali Province	1.2 (0.3)	0.51	0.7 to 2.0
Type illness (Ref: acute illness)	3.2 (0.4)	<0.001	2.6 to 4.1
Facility visited for service (Ref: private)	1.3 (0.1)	0.02	1.1 to 1.6
_cons	0.2 (0.1)	<0.001	0.1 to 0.4
No. observations = 3357, LR chi2(19), prob> chi2 = 0.000, loglikelihood = -1364.158, Pseudo R2 = 0.1098			

DISCUSSION

Proportion of CHE provide insight on the level of financial safety ensured by health financing system in the country. Protecting population against financial risk associated with ill health is one of the fundamental functions of health system. CHE quantifies the financial risk population in any country. Higher rates of CHE mean that larger proportion of household face financial barriers in access to health care.⁹

The CHE proportion in our study (11.1%) is slightly lower than in another study based on NLSS data which estimated that around 13% of households face CHE in Nepal.¹⁰ Considering 10% of total household expenditure or income spent on health seeking as cut off for CHE, World Health Organization estimates the CHE in Nepal could be 10.71%.¹¹ In previous studies, the estimates of CHE in Bangladesh (9%), Vietnam (10.45%) and Brazil (10.27%) were found to be closer to our estimates in Nepal.^{3, 12} However, the level of CHE in Nepal is notably higher than that of Bhutan (1.79%), Pakistan (4.47%) Sri-Lanka (5.42%), Thailand (2.22%) and Iran (2.1%).^{11, 13} These differences from one country to another could be the result of health financing system adopted within the country, population living below poverty line and cost of health care services. Incidence of CHE also tend to be higher in countries where health spending as a share of national income is larger and have heavy reliance on OOP financing of health care.¹⁴ For example, countries

like Sri-Lanka (49.76%), Iran (41.76%) Bhutan (13.71%) and Thailand (11.5%) have lower proportion of OOP and have lower CHE compared to Nepal.¹¹

The households lying at lower consumption quintiles bear higher burden of OOP expenditure which is shown by the concentration curve in this study. Similar findings were also reported in previous studies in India, China, Thailand, Vietnam and Turkey.¹⁵⁻²⁰ The findings also align with study done in Burkina Faso which reports that probability of facing catastrophic payment falls with increase in economic status of households.²¹ Poor segment of the population seem to be paying larger proportion of their income on health services. Poverty itself can lead to ill health and ill health through financial catastrophe could push the population further below the poverty line thus leading to ill health-poverty trap.²² To break this trap, country could focus on protecting poor segment of population from financial risk protection.

Study revealed provincial differences in proportion of CHE ranging from 9.4% in province 2 to 13.4% in Sudurpaschim Province. Provincial differences within country could be because of differences in treatment cost in different localities, differences in non-medical costs like travelling distance/cost etc.

Households residing in urban areas had higher odds of having CHE compared to rural households. Similar results were reported in study conducted in Burkina Faso²¹ did not show any significant association based on urban rural residence. Higher CHE in urban areas could be because higher cost of services in urban areas compared to rural. For example, the mean expenditure for consultation in public HFs was Rs. 2069 in urban areas Rs.1040 and in rural areas in Nepal. Similarly, the mean expenditure for consultation in private HFs was Rs. 1077 in urban areas and Rs. 992 in rural areas in Nepal.⁷

The study also reveals that proportion of CHE is higher among household led by illiterate household heads. Similar findings were also reported in another study conducted in Kailali district of Nepal.⁹ Literacy level was also found to be associated with CHE in previous studies conducted in India and Nigeria.^{15, 23} This may be because illiterate household tend to have less employment and earning opportunities. On the other side, with the increase in household size, the proportion of CHE decreased which indicates that having higher number of household member tend to have advantage. This could be because family with higher family size often have higher number of earning members. However, higher number of family member also could mean higher health expenditure. Further, studies exploring the reason for

lower CHE among families with larger household size could be useful.

Interestingly, the households visiting public HFs that often offer health services free of cost had higher proportion of CHE compared to private. This finding does not align with previous studies in India and Thailand.^{16,18} Approximately 63% of people in Nepal visit private HFs with remaining 37% visiting the public HFs. NLSS reports that the cost incurred in utilizing service from public HFs in Nepal is Rs. 1,167 while it is Rs. 1,010 for private HFs. In the study, approximately 25% of participants were found to visit pharmacies from where participants may have directly purchased the medicines without having to pay for consultation. NLSS survey also reveals participants pay more on travelling, diagnostic and other services while utilizing service from public HFs compared to private. In the study, the cost of medicine was found higher in private HF.⁷ Higher rates of CHE while utilizing service from public HFs also could be because the service users in public HFs are more likely to visit multiple facilities in search of better quality of services or may have to visit health facility multiple times to utilize the service. Variations on results CHE estimates across countries based on type of health facility visited could be because of the differences in performance of public HFs, average travelling distance to the public and private HF and service availability that differ across the countries.

CHE of 11.1% while the OOP in country stands at 55.4% of current health expenditure²⁴ indicate that CHE could be potentially reduced by shifting from OOP to prepayment mechanism. This could be achieved through increasing prepayment through taxes or from insurance contribution as highlighted in a previous study.⁵ Country can also have a targeted financial risk protection strategy particularly protecting poor segment of population from financial catastrophe as relatively small amount of expenditure too can cause catastrophe in poor segment of population. As Nepal has transitioned to federal structure, there is additional scope for tailored interventions through provincial and local government to protect poor segment of population from financial risk. Further studies on how the different health care financing schemes impacted CHE in different segment of population could provide further insights. Qualitative study exploring why CHE is more on public HFs than private could also be useful from policy perspectives.

Despite being nationwide study with large sample size, the study suffers some limitations. The study findings are based on further analysis of NLSS, which is broadly a living standard survey, health being only a part of it.

National health insurance scheme has been launched after the survey was conducted which could have impact on cost patients incur in utilizing the services. The survey was also conducted before Nepal transitioned to federal structure and districts were later categorized into provinces which could alter the provincial estimates slightly.

CONCLUSIONS

CHE was found to be 11.1% at national level and varied from 9.4% in Province 2 to 13.4% in Sudurpaschim Province. Household size, household head literacy status, consumption quintile, place of residence, type of illness and type of health facility visited were identified as determinants of CHE. The government needs to emphasize equity-oriented strategies preventing CHE and impoverishment associated with it.

ACKNOWLEDGEMENTS

We would like to acknowledge UNICEF, and Nepal and Institute for Nepal Environment & Health system Development (INEHD) Nepal for financial and technical support.

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