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The Implications of Healthcare Utilization Forcatastrophic Health Expenditure in Cameroon

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Abstract: *This paper had as main research objective toexamine the implications of healthcare utilisation for catastrophic health expenditure in Cameroon. Specifically, it (1) evaluated the incidence and intensity of catastrophic health payments in Cameroon; (2) examined whether users of particular healthcare facility are more prone to catastrophic health spending than others; and (3) assessed other factors, excepting the choice of healthcare utilization, that have important bearings on catastrophic health expenditure in Cameroon. Employing data from the most recent Cameroon Household Consumption Survey (CHCS IV), the paper estimated the catastrophic head count, overshoot, and mean positive overshoot to qualify the incidence and intensity of catastrophic health expenditure in Cameroon. The paper further employed the logistic regression analyses to assess the effects of healthcare utilisation on catastrophic health expenditure in Cameroon. Our results revealed that as the threshold increases from 5% to 40%, the incidence of catastrophic health payments falls from 78.94% to 25.42%. Importantly, we observed that in Cameroon, those spending more than 40% of their budget on healthcare, on average spent 42.94%, compared to 6.15% for those spending more than 5% of their budget on healthcare. Our regression results showed that individuals who use private health services have 13.88% more chances of being catastrophic in their health expenses compared to their counterparts who utilize public health services. Evidence also revealed that the use of traditional health services and drug vendors, compared to public health services, decreases the likelihood of catastrophic health expenditure in Cameroon. Policy measures which have implications on the costs of healthcare in the private sector are vital, and efforts to modernize and promote the use of traditional medicine are crucial in curbing catastrophic health expenditure in Cameroon.*

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I. Introduction

Cameroon,bent on becoming an emerging economy by 2035, will have to prioritize access to quality healthcare at affordable costs for all segments of the population if it is to make solid progress towardsshared growth. The country faces challenges in addressing human resource development, healthcare infrastructure as well as inequity in access to health services. The growth of private healthcare sector has been largely seen as a benefit, however it adds to ever-increasing social dichotomy. The increasing cost of healthcare that is paid by 'out of pocket' payments is making healthcare unaffordable for a growing number of people. Consequently the number of people who cannot seek medical care because of lack of money is on an increase. Health care finance in low-income countries is still characterized by the dominance of out-of-pocket payments and the relative lack of prepayment mechanisms, such as tax and health insurance. Households without full health insurance coverage face a risk of incurring large medical care expenditures should they fall ill. This uninsured risk reduces welfare. Further, should a household member fall ill, the out-of-pocket purchase of medical care would disrupt the material living standards of the household. If the healthcare expenses are large relative to the resources available to the household, this disruption to living standards may be considered catastrophic. One conception of fairness in health finance is that households should be protected against such catastrophic medical expenses (WHO, 2000).

A popular approach on the disruptive effect of health expenditures on material living standards has been to define medical spending as "catastrophic" if it exceeds some fraction of household income or total expenditure in a given period, usually one year (Wagstaff and van Doorslaer 2003; Xu et al. 2003). The idea is that spending a large fraction of the household budget on healthcare must be at the expense of the consumption of other goods and services. This opportunity cost may be incurred in the short term if health care is financed by cutting back on current consumption or in the long term if it is financed through savings, the sale of assets, or credit. In addition to medical spending, illness shocks have catastrophic economic consequences through lost earnings. Gertler and Gruber (2002) find that in Indonesia earnings losses are more important than medical

spending in disrupting household living standards following a health shock. Country specific evidence on the incidence and intensity ofcatastrophic health spending and informed knowledge on its determinants, though vital for policy guidance, is still rare. Cameroon health sector is characterised by private, public, traditional healthcare providers as well as drug vendors just to mention a few. It is policy relevant to understand how the choice of healthcare utilisationaffectscatastrophic health expenditure in Cameroon.

Cameroon in her current public policy document(the Growth and Employment Strategy Paper - GESP) has highlighted the need to implement sector strategies for a successful implementation of this reference document. These strategies make it possible to identify the main areas where the interventions of public institutions should be oriented. In the area of health, the existence of an adapted sector strategy is clearly shown when the plurality of actions to be carried out by the various stakeholders involved requires coherence and synergy. The 2001-2015 Health Sector Strategy enabled to get significant results in terms of improved coverage of some interventions. In spite of the progress made, there are still a number of challenges to be met in order to achieve universal access to quality health care. On 12 December 2012, the General Assembly of the United Nations adopted Resolution A/67/L.36 for universal health coverage. This resolution *calls upon Member States to adopt a multi-sector approach and address the determinants of health per sector, integrating health into all policies, as appropriate, while taking into account its social, environmental and economic determinants in order to reduce inequalities in this area and to promote sustainable development*. Consequently, the 2016-2027 Health Sector Strategy (HSS) falls within a twofold perspective: on the one hand, contributing to accelerate the development of human capital for health care facilities and, on the other hand, aligning with the Sustainable Development Goals by accelerating the implementation of universal health coverage. However, these well intended objectives can be seriously impaired by the costs of healthcare in the country.

Health expenditure per capita for Cameroon stood at 64 US dollars in 2016. Though Cameroon health expenditure per capita fluctuated substantially in recent years, it tended to increase through 2002 - 2016 period ending at 64 US dollars in 2016.At the macro-level, health expenditure, public (% of total health expenditure) in Cameroon was reported at 366 % in 2014, according to the World Bank collection of development indicators. At the micro-level, out of pocket expenditure as a share of current health expenditure has been consistently high in Cameroon since the early 2000s.In 2006 it was stood at 77.1%, slowing down to 71.7% in 2010 and to 69.7% in 2016.In 2017, out of pocket expenditure as a share of current health expenditure for Cameroon stood at 71 % (World Bank, 2008).These high rates of out of pocket expenditure as a share of current health expenditure can only help to expose individuals and households to the likelihood of catastrophic health spending in Cameroon. It is imperative for policy makers and healthcare providers to understand the prevalence of catastrophic health expenditure and appreciate the factors that underlie its prevalence. In this perspective, this paper has as main research objective toexamine the implications of healthcare utilisation forcatastrophic health expenditure(CHE) in Cameroon. Specifically, the paper: (1) Evaluatesthe incidence and Intensity of catastrophic health payments in Cameroon; (2) Examines whether users of some particular healthcare facility are more prone to catastrophic health spending than others; and (3) Assesses other factors, excepting the choice of healthcare utilization, that have important bearings on catastrophic health expenditure in Cameroon.

II. Literature Review

Buigut et al (2015) showed that in in Kenya, where 60 to 80% of the urban residents live in informal settlements (frequently referred to as slums), out-of-pocket (OOP) payments account for more than a third of national health expenditures. They examined the incidence and determinants of catastrophic health expenditure among urban slum communities in Kenya. Since little is known on the extent to which these OOP payments are associated with personal or household financial catastrophe in the slums. The results indicated that the proportion of households facing CHE varies widely between 1.52% and 28.38% depending on the method and the threshold used. A core set of variables were found to be key determinants of CHE. The number of working adults in a household and membership in a social safety net appear to reduce the risk of catastrophic expenditure. Conversely, seeking care in a public or private hospital were found to increase the risk of CHE.

Sharifa et al.(2017) investigated catastrophic health expenditure in Malaysia, which occurs when medical cost is equal or exceeding 40% of a household's health budget. For them, CHE occurs in the form of out of pocket spending on healthcare. The study showed that poverty, type of illness, lack of health insurance all contribute to CHE. They suggested that the governments should implement prepayment mechanisms in the form of social health insurance to pool risk across the population. They indicated that unlike private health insurance, enrolment in social health insurance is compulsory and contributions are based on a person's income and not his health status.Akinkugbe(2011) found that in Lesotho about 21 per cent of households become impoverished after health payments are made. In Botswana on the other hand, about 80 per cent of households are impoverished after making payments. Since it could not be established due to data limitations, whether the impoverishment was permanent or transitory, these results should be interpreted with caution. However, it is certain that high OOP payment constitutes a risk factor for poorer households. To ascertain the importance of

user's share to health payments which is crucial in terms of fairness in financing, he compared the proportion of households facing CHE to the proportion of OOP health spending share in total expenditure for both countries. In Botswana, the proportion of households facing CHE at the 20 per cent and 40 per cent threshold are 11 percent and 7 per cent respectively, while the share of OOP health payment for the year under survey period was about 0.93 percent. These results should be interpreted with caution since OOP payments in Botswana are spread over a twelve month period. It would have been interesting however for OOP expenditures to have been collected on a monthly basis for a year to observe how the proportion of those facing CHE would compare to the OOP share in total monthly expenditure in Botswana. For Lesotho the proportions of those facing CHE expenditure and the share of OOP health expenditure share in total monthly expenditure at the 20 per cent and 40 per cent threshold are 3.22 and 1.25 per cent, while the share of OOP in total monthly expenditure is 1.34 per cent.

Many health systems in Africa are funded primarily through out-of-pocket payments. Out-of-pocket payments prevent people from seeking care, can result to catastrophic health spending and lead to impoverishment. Chuma et al (2012),estimated the burden of out-of-pocket payments in Kenya; the incidence and intensity of catastrophic health care expenditure and the effect of health spending on national poverty estimates. Data were drawn from a nationally representative health expenditure and utilization survey (n = 8414) conducted in 2007. Standard data analytical techniques were applied to estimate the incidence and intensity of catastrophic health expenditure. Various thresholds were applied to demonstrate the sensitivity of catastrophic measures. The results indicated that Kenyan households spend over a tenth of their budget on health care payments. The burden of out-of-pocket payments is highest among the poor. The poorest households spent a third of their resources on health care payments each year compared to only 8% spent by the richest households. About 1.48 million Kenyans are pushed below the national poverty line due to health care payments.

Onoka et al.(2011) examined the levels of catastrophic health expenditure experienced by households with different socioeconomic status in Southeast Nigeria, considering both uniform thresholds (40%, 20% and 10%) and two alternative scenarios in which the threshold for catastrophe is allowed to differ by socioeconomic group. This has made it possible to develop a more realistic portrayal of how health care costs can affect households recognising that poorer households can be driven into poverty at a lower threshold. 15• % of households studied experienced catastrophe when the threshold level was set at 40% of non-food expenditure. At a 40% threshold, the highest proportion (23%) was amongst the poorest households (Q1) and the difference with other groups was significant. For the richest quintile (Q5) less than 8% of households experienced catastrophic costs. At this level the poorest were three times more likely to experience catastrophic health payments than the richest quintile. At levels of 20% and 10% non-food expenditure, the overall level of catastrophe was 28% and 40% respectively. At these levels the richest households had the lowest proportion of catastrophe while the second quintile (Q2) had the highest.

There is limited evidence about levels of socio-economic and other differences in catastrophic health spending in Nigeria and in many sub-Saharan African countries. Onwujekwe et al (2012) estimated the level of catastrophic healthcare expenditures for different healthcare services and facilities and their distribution across socioeconomic status (SES) groups. The study took place in four Local Government Areas in southeast Nigeria. Data were collected using interviewer administered questionnaires administered to 4873 households. Catastrophic health expenditures (CHE) were measured using a threshold of 40% of monthly non-food expenditure. Both total monthly health expenditure and disaggregated expenditure by source and type of care were examined. Their results revealed that higher health expenditures were incurred by urban residents and the better-off SES groups. Overall, 27% of households incurred CHE, higher for poorer socioeconomic groups and for rural residents. The worse-off households (the poorest SES and rural dwellers) experienced the highest burden of health expenditure.

Healthcare in many developing countries, including those in sub-Saharan Africa, is predominantly funded through out-of-pocket spending by households. Providing financial protection from exorbitant out-of-pocket expenses is an important tool for a country's health system to ensure equitable access to care. A household without such protection may be forced to pay huge medical bills to treat an ailing family member, exposing it to financial catastrophe and impoverishment. Kimani et al. (2015) estimated the incidence and intensity of catastrophic healthcare expenditure and impoverishment in Kenya in 2003 and 2007. The study was based on data sets obtained from two nationally representative household health expenditure and utilization surveys conducted in 2003 and 2007 (n = 8,414). The surveys provided detailed information on households' use of healthcare, the related out-of-pocket spending on health, household consumption expenditures, and health insurance. Descriptive analysis was used to investigate the incidence and intensity of catastrophic health expenditures and impoverishment. Their study applied several thresholds reported in other studies to demonstrate the sensitivity of measures of catastrophic expenditures.

Health expenditure for tuberculosis (TB) care often pushes households into catastrophe and poverty. Zhou et al (2016) investigate the New Cooperative Medical Scheme (NCMS) that aims to protect households from catastrophic health expenditure (CHE) and impoverishment in rural China. They assessed the effect of NCMS on relieving CHE and impoverishment from TB care in rural China. Three hundred andforty-seven TB cases were included in the analysis. The incidence and intensity of CHE and poverty were analyzed, and the protective effect of NCMS was assessed by comparing the CHE and impoverishment before and after reimbursement. For out-of-pocket (OOP) payment for TB care, 16.1 % of non-poor fell below poverty line. They found that NCMS reduces the incidence of CHE and impoverishment by 11.5 % and 7.3 %, respectively. They found that after reimbursement, 46.7 % of the households still experience CHE and 35.4 % are below the poverty line. Their results revealed that NCMS relieves the mean gap, mean positive gap, poverty gap and normalized positive gap by 44.5 %, 51.0 %, US$115.8 and 31.6 % respectively.

The catastrophic health expenditure and impoverishment indices offer guidance for developing appropriate health policies and intervention programs to decrease financial inequity. Kien et al (2016) assessed socioeconomic inequalities in catastrophic health expenditure and impoverishment in relation to self-reported non-communicable diseases (NCD) in urban Hanoi, Vietnam. A cross-sectional survey was conducted from February to March 2013 in Hanoi, the capital city of Vietnam. Their study estimated catastrophic health expenditure and impoverishment using information from 492 slum households and 528 non-slum households. Theycalculated concentration indexes to assess socioeconomic inequalities in catastrophic health expenditure and impoverishment. Factors associated with catastrophic health expenditure and impoverishments were modelled using logistic regression analysis. The study showed that poor households in both slum and non-slum areas were at higher risk of experiencing catastrophic health expenditure, while only the poor households in slum areas were at higher risk of impoverishment because of healthcare spending. They found that households with at least one member reporting an NCD were significantly more likely to face catastrophic health expenditure compared to households without NCDs. In addition, households in slum areas, with people age 60 years and above, and belonging to the poorest socioeconomic group were significantly associated with increased catastrophic health expenditure, while only households that lived in slum areas, and belonging to the poor or poorest socioeconomic groups were significantly associated with increased impoverishment because of healthcare spending.

There are many disabling medical conditions which can result in catastrophic health expenditure. Multiple Sclerosis is one of the most costly medical conditions through the world which encounter families to the catastrophic health expenditures. Juyani et al (2016)assessed the extent to whichmultiple sclerosis patients face catastrophic costs. The study was carried out in Ahvaz, Iran. The study population included households that at least one of their members suffers from Multiple sclerosis. ALogit regression model was employed. Their findings revealed that 3.37% of families were encountered with catastrophic costs. Variables such as brand of drug, housing, income and health insurance were found to be significantly correlated with catastrophic expenditure.

Kavosi et al.(2012) assessed change in household catastrophic health care expenditures (CHE) and inequality in facing such expenditures in south-west Tehran. A cluster-sampled survey was conducted using the World Health Survey questionnaire. Their study estimated the proportion of households facing CHE using the 'household's capacity to pay'. They further identified the determinants of the household CHE using regression analysis and used the concentration index to measure socio-economic inequality and decompose it into its determinants factors. Findings showed that the proportion of household facing CHE had no significant change in the period under consideration (12.6% in 2003 vs 11.8% in 2008). The key determinants of CHE for both years were health care utilization and health care insurance status. Socio-economic status was the main contributor to inequality in CHE, while unequal utilization of dentistry and outpatient services had reduced the inequality in CHE between socio-economic groups. No significant change in the CHE proportion was observed despite policy interventions aimed at reducing such expenditures. Health costs in Cameroon vary across health facility (public versus private) significantly and informed knowledge on the effects of health care utilization on CHE is still rare. This paper provides evidence in this direction.

Saito (2014) studied the incidence of catastrophic health expenditure in Nepal using a sample of 284 households. His results showed that 13.8% of them reported catastrophic health expenditure. After adjusting for confounders, this expenditure was found to be associated with injuries; particularly those resulting from road traffic accidents. Choi et al.(2015)explored the burden of out-of-pocket health expenditures among the Korean chronic patients. Roughly 3.5% of the participants experienced CHE. Their results also revealed that households with a member who suffered from cerebrovascular disease, diabetes, or chronic kidney disease were at a significantly higher risk of experiencing CHE.

Kavosi (2009) studied the incidence and the determinants of CHE in Iran. His results showed that the proportion of households facing catastrophic healthcare reduced from 12.6% in 2003 to 11.8% in 2008, but this change was not statistically significant. The key determinants of catastrophic healthcare expenditures for both

years were healthcare utilization (especially inpatient and dentistry services), economic status, and disabled or elderly family member influenced exposure to catastrophic healthcare expenditure in 2008.

Diana et al. (2015) used descriptive analysis to investigate the incidence and intensity of catastrophic health expenditures and impoverishment. They employed the methods of both Wagstaff and Van Doorslaer (2003) and Xu (2005). They found that among households that used healthcare services in 2003, 10.3 percent experienced catastrophic health expenditures and 3.5 percent were impoverished by having to pay for healthcare services at the point of consumption. Also, they reported that in 2007, 11.1 percent of households experienced catastrophic health spending, with 4 percent impoverished. Importantly, their study underlined that the poorest households experienced the highest incidence of catastrophic health expenditures in 2003 and 2007 (20%).

Bolaji et al. (2017) used secondary data from the Harmonized Nigeria Living Standard Survey (HNLSS) of 2009/10 to assess factors associated with catastrophic health expenditure in Nigeria. Household and individual characteristics associated with catastrophic health expenditure were determined using bivariate analysis and multivariate logistic regression. Buigut et al. (2015) used a unique dataset on informal settlement residents in Kenya and various approaches that relate households OOP payments for healthcare to total expenditures adjusted for subsistence, or income. Their results indicated that the proportion of households facing CHE varies widely between 1.52% and 28.38% depending on the method and the threshold used. The number of working adults in a household and membership in a social safety net were found to reduce the risk of catastrophic expenditure. They also observed that seeking care in a public or private hospital increases the risk of CHE.

Xu et al. (2003) used data from household surveys in 59 countries to investigate the variables associated with catastrophic health expenditure. Their findings revealed that catastrophic spending rates were highest in some countries in transition, and in certain Latin American countries. Three key preconditions for catastrophic payments were identified: the availability of health services requiring payment, low capacity to pay, and the lack of prepayment or health insurance. They recommended that people, particularly in poor households, can be protected from catastrophic health expenditures by reducing a health system's reliance on out-of-pocket payments and providing more financial risk protection.

According to the World Health Report (2000), one of the fundamental functions of a health system is to put in place a health financing system that protects the population against the financial risks associated with ill health. Such risks can be quantified in terms of catastrophic health expenditure and impoverishment from medical expenses. Recall that catastrophic health expenditure is defined as out-of-pocket spending for health care that exceeds a certain proportion of a household's income with the consequence that households suffer the burden of disease (Ekman 2007). A household is said to have been impoverished by medical expenses when health-care expenditure has caused it to drop below the poverty line (Xu, 2005).

High levels of out-of-pocket payments for health care expose households to financial risks associated with major illness (WHO, 2005). Expecting households to make some financial contribution for their health care is reasonable even in wealthy countries with sophisticated public and private health insurance, and particularly for frequently occurring conditions that are inexpensive to remedy. However, an over-reliance on out-of-pocket payments for health care may endanger households' customary standards of living and disrupt household welfare (Berki, 1986; Gertler and Gruber 2002; Xu *et al*, 2003; O'Donnell *et al.* 2005; Van Doorslaer*et al.* 2007; Wagstaff 2007), particularly for serious, less-frequently occurring conditions for which the costs of treatment can quickly mount. Households, especially in developing countries, may not be able to insure their basic needs (WHO, 2005) and uninsured health care events can therefore increase the risk of loss of income from reduced labour supply or lower productivity. This can cause long-term consequences pushing households into a 'trans-generational cycle' of poverty (Baeza and Packard 2005).

Accordingly to Van Doorslaer et al, (2007), catastrophic payments are more common in low-income countries where health care is mainly financed by direct payments and less common in high-income countries with established prepayment methods. In many low- and middle-income countries, a large proportion of health expenditure is paid out of pocket by households. Estimates from household surveys show that, worldwide each year, around 100 million individuals are impoverished and another 150 million face severe financial difficulties due to direct health expenditure and that more than 90% of people affected live in low-income countries (Xu et al., 2007).

Amaya-Lara (2016) calculated catastrophic healthcare spending in Colombia using the methodology proposed by the World Health Organization in 2005. Households were classified as having catastrophic health spending when their out-of-pocket health payments were over 20 % of their payment capacity. All other households were classified as not having catastrophic health spending. A probit model was estimated aimed at determining what factors influence the probability of catastrophic healthcare spending.

Many studies have shown that OOP expenditures lead to catastrophic spending and are major causes of impoverishment: Wagstaff and van Doorslaer, 2003; Xu et al., 2003, 2006, and 2007; O'Donnell et al., 2005; Lamiraud et al., 2005; Cavagnero et al., 2006; Gakidou et al., 2006; Saksena et al., 2006; Su et al., 2006; Ekman, 2007; Limwattananon et al., 2007; Mendola et al., 2007; van Doorslaer et al., 2007; Wagstaff, 2007; WHO 2011; and Chuma and Maina, 2012.

Most of these studies have been conducted in Asia and Latin America with very few of them in Africa (Saksena et al., 2006; Su et al., 2006; Xu et al., 2006a; Ekman, 2007; Perkins et al., 2009; Barasa et al., 2012; and Chuma and Maina, 2012). Studies in Cameroon are still emerging, some such as Njimanted et al. (2017), do not give the true picture of catastrophic health expenditures in the country because they are plagued with problems such as unrepresentative samples and the association of OOP costs only with hospital admissions or maternity care. This paper adds to the existing literature by emphasising the role of the choice of healthcare utilisation in explaining catastrophic health expenditures in Cameroon.

III. Methodology and data used

Methodology

The incidence of catastrophic payments is defined as payments in excess of a threshold budget share. In this paper we use three thresholds; 5%, 20% and 40%.The catastrophic head count (HC) refers to the percentage of households incurring catastrophic payments and is estimated as follows (O'Donnell O, 2008):

$HC = \frac{1}{N}\sum_{i=1}^{N} E$ ……..(1)

Where N is the sample size: E is an indicator equal to 1 if OOP payments of individual i as a proportion of its incomes is greater than the threshold and zero otherwise. The HC estimates the proportion of individuals that have OOP payments above the threshold but does not measure the amount by which these payments exceed the chosen threshold. The catastrophic payment overshoot is estimated to give an indication of how much OOP paymentsexceed the threshold. The overshoot (O) is estimated as follows (O'Donnell O, 2008):

$O_i = E_i\, T_i/X_i - z$……(2)

Where Ti is the OOP payments of individual i, Xi is the individual's income and z is the threshold budget share. Following this estimation, the average over shoot is (O'Donnell O, 2008):

$O = \frac{1}{N}\sum_{i=1}^{N} O_i$……(3)

The intensity of catastrophic expenditure is measured by the payment in excess of the threshold, averaged over all individuals exceeding that threshold. This measure, referred to as the mean positive overshoot (MPO) is equal to:

$MPO = \frac{O}{HC}$……(4)

A limitation of the head count and overshoot discussed in the previous section is that they do not differentiate between poor and rich individuals. The headcount (HC) for example counts all individuals whose levels of OOP payments exceed a certain threshold equally. The overshoot (O) counts the payments in excess of the threshold equally, irrespective of whether these payments are made by poor or rich individuals (O'Donnell , 2008).

Furthermore to estimate the determinants of catastrophic health expenditure as in previous studies (Xu, 2006, Juyani et al 2016, Bolaji et al 2017), the paper employed the logistic regression model:

$Iog\left(\frac{p}{1-p}\right) = b_o + b_1X_1 + b_2X_2 + \cdots . + b_p b_P$……..(5)

where$\frac{\mathrm{P}}{1-\mathrm{P}} = \mathrm{Odds}$, which is defined as the ratio of the probability to its complement.Note that $logit\,(P) = Iog\left(\frac{p}{1-p}\right)$. This implies that as the probability goes down to zero, the odds approach zero and the logit approaches -∞. At the other extreme, as the probability approaches one, the odds approach +∞, and so does the logit. Negative logits represent probabilities below half and positive logits represent probabilities above half. The dependent variable *(p)* is the occurrence of catastrophic health expenditure dichotomized and defined as 1 when the household faces catastrophic health payments and 0 otherwise. The independent and/or explanatory variables in the logistic regression equation above included the following variables: healthcare utilisation variables (public, private, traditional healthcarefacilities and drug vendors), age, gender, marital status, levels of education, employment sector (public employment, private-formal, informal and unemployed), health status, access to health insurance and poverty status.

Data used

Data used in this paper came from the most recent Cameroon household consumption survey, CHCS IV. CHCS IV (or ECAM IV in French) was conducted in the months of October, November and December

2014. Unlike other Cameroon Household Surveys, CHCSIV is peculiar since it employed the electronic field data collection called 'Computer Assisted Personal Interviewing' (CAPI) as opposed to 'Paper and Pencil Interviewing' (PAPI).

CHCSIV sample was made up of 46,560 individuals drawn using a random sampling plan stratified at two levels. The strata were obtained by combining the 12 survey regions (all 10 regions of Cameroon with Yaoundé and Douala considered separately[1]) with the area of residence (urban, semi-urban and rural)[2]. A total of 32 survey strata were constituted of which 12 urban strata (Yaoundé, Douala, and the urban stratum of each of the 10 regions of the country), 10 semi-urban strata and 10 rural strata of which one stratum per region. At the first level, the Enumeration Areas (EA) were drawn independently in each stratum with a probability proportional to their size in terms of number of individuals in households. In total, 1,024 EAs were drawn among which 639 in urban strata, 99 in semi-urban strata and 286 in rural strata. At the second level, from each EA drawn, a sample of individuals was drawn using the systematic drawing with equal probability, from the lists of households got during the numbering. The number of households sampled per EA was 10 in Yaoundé and Douala, 12 in other urban strata, and 15 in semi-urban and rural strata. The final sample of CHCSIV was 46550 individuals for the individual data set and 10,303 households for the household data set. The difference between the sample at the beginning (12,847 households) and the sample at the end (10,303 households) comes from the non-responses during data collection and from the fact that some households were deleted from the data base because of the poor quality of their questionnaire (for instance, households with food consumption expenditure equal to zero were deleted). This study employs individual data set. Stata version 12 and this data set is used for all the empirical analyses (chapter 3, 4 and 5) of this thesis.

IV. Empirical Findings

4.1. The magnitude of catastrophic health payments in Cameroon

4.1.1. The Incidence and Intensity of Catastrophic Health Payments

Table 1: Incidence and Intensity of Catastrophic Health Payments in Cameroon, defined across various thresholds (*z*)

Catastrophic payments measures	***Threshold budget share, z***			
Out-of-pocket health spending as share of total income	5% (Z_5)	10% (Z_{10})	20%(Z_{20})	40%(Z_{40})
Head count (*HC*)	78.94%	65.01%	47.35%	25.42%
Overshoot (*O*)	90.92%	87.36%	81.85%	74.74%
Mean positive overshoot (MPO)	1.15%	1.34%	1.73%	2.94%

Source: Computed by author using STATA 14 and MS EXCEL 2010

Table 1 hosts theincidence and intensity of Catastrophic Health Payments in Cameroon, defined across various thresholds (z). The head count (HC) shows the fraction of households/individuals with health care budget shares that exceed the threshold *z*. At the threshold $Z_{5,}$ we can observe that 78.94% of individuals have health care budget shares that exceed 5% of their income. As the threshold increases from 5% to 40%, the incidence of catastrophic health payments fallsconsistently. This finding is consistent with the WHO (2008). Worthy of note, at Z_{40} the incidence of catastrophic health payments stands at 25.42%, that is, 25.42% of individuals have health care budget shares that exceed 40% of their income.

The catastrophic payment overshoot (O) measures the average degree by which payments (as a proportion of total income) exceed the threshold *z*. We can observe that as the threshold increases from 5% to 40%, the incidence of catastrophic health payments fallsrespectively and the overshoot drops from 90.92% of expenditure to only 74.74%. In line with theory (see WHO, 2008, p), the mean positive overshoot (MPO) instead increases (does not decline) as the threshold increases from 5% to 40%. Interestingly, in Cameroon, those spending more than 5% of total income on health care, on average spent 6.15% (5% + 1.15%). Those spending more than 40% of the household budget on health care, on average spent 42.94%. These results are in line with the study of the WHO (2008) on the incidence and intensity of catastrophic payments for health care in Vietnam.

4.1.2. Stochastic Dominance of Health Expenditures as a proportion of total income (HE)

Table 2: Distribution of individuals with respect to poverty status and quintiles of HE

	Quintile of HE					
	1	2	3	4	5	Total
Non-poor	6,337	6,110	6,207	6,998	6,257	31,909

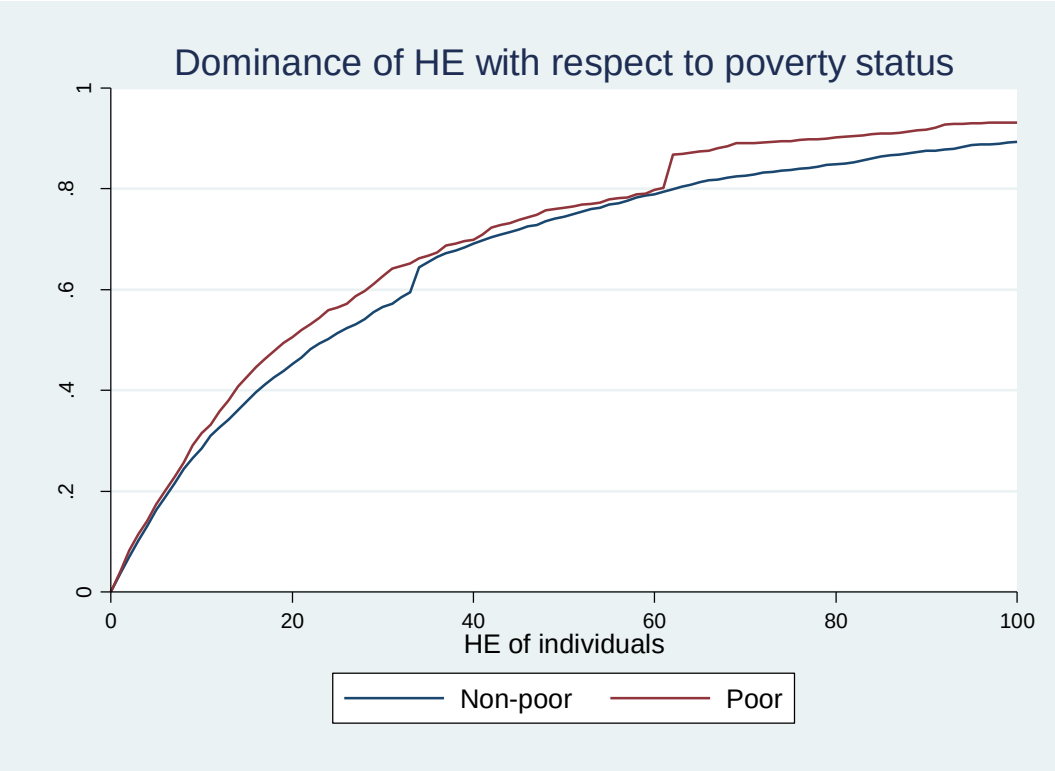
[1]Considered separately due to their very large sizes.

[2] The urban is made up of towns having 50,000 inhabitants or more; the semi-urban, towns of 10,000 inhabitants to less than 50,000 inhabitants; and the rural, towns of less than 10.000 inhabitants.

Poor	2,956	3,185	3,084	2,297	3,032	14,554
Total	9,293	9,295	9,291	9,295	9,289	46,463
	Pearson chi2(4) = 249.8767				Pr = 0.000	

Table 2 submits the distribution of individuals with respect to poverty status and quintiles of HE(health expenditures as a proportion of total income of the individual) and Figure 1 the dominance of HE with respect to poverty status. Across poverty status, analysis of HE reveals some interesting insights. Not only is there a strong and significant correlation between poverty status and HE (Tables 2), the net dominance of the nonpoor individuals compared to their poor counterparts is an interesting finding (Figures 1). Figure 1 clearly shows that despite the threshold[3] (cut-off point), the nonpoor systematically dominate the poor in terms of the total amount spent on health as a proportion of total income.

Figure 1: Dominance of HE with respect to poverty status



Source: Designed by author using STATA-DASP package
NB: HE is the health expenditures as a proportion of total income of the individual

Table 3 hosts the distribution of individuals with respect to gender and quintiles of HEand Figure 2 the dominance of HE with respect to gender. Table 3 revealthe existence of a strong and significant correlation between gender and HE. Figure 2 depict that despite the threshold (cut-off point), the female systematically dominate the male in terms of HE.

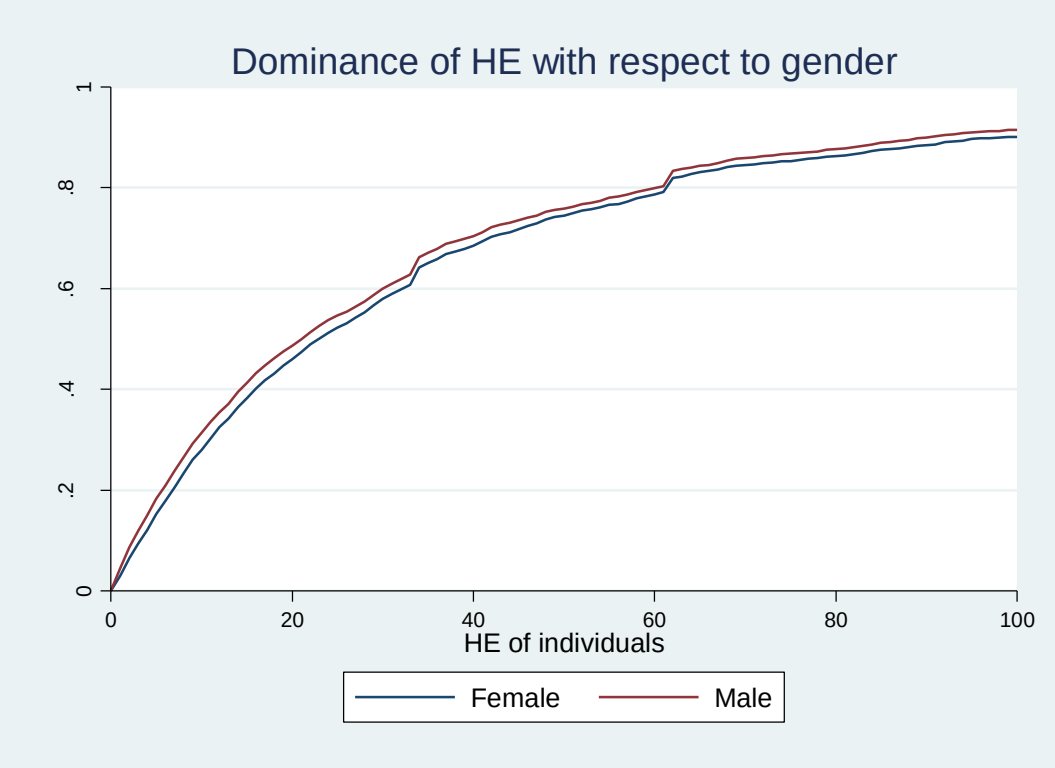
Table 3: Distribution of individuals with respect to gender and quintiles of HE

	Quintile of HE					
	1	2	3	4	5	Total
Female	4,240	4,746	4,880	4,898	4,979	23,743
Male	5,053	4,549	4,411	4,397	4,310	22,720
Total	9,293	9,295	9,291	9,295	9,289	46,463
	Pearson chi2(4) = 151.7107				Pr = 0.000	

[3] Level of cumulative distribution of individuals

The net dominance of female individuals compared to the male is theoretical founded; as evidence (Russell 2004) underline that women are more sensitive and need more health attention and care than the men. Importantly, women naturally visit the health facility more than men; their regular pre- and post-natal checks/consultations obviously cause them to spend more than their male counterparts.

Figure 2: Dominance of HE with respect to Gender



Source: Designed by author using STATA-DASP package
NB: HE is the health expenditures as a proportion of total income of the individual

4.4. THE EFFECT OF HEALTHCARE UTILIZATION ON CATASTROPHIC HEALTH EXPENDITURE(CHE) IN CAMEROON

Table 4: Weighted statistics of the variables used in the logit regression

Variable	Obs	Weight	Mean	Std. Dev.	Min	Max
CHE	46,560	144478064	0.285551	0.451681	0	1
Public health facility	46,560	144478064	0.2473	0.431447	0	1
Private health facility	46,560	144478064	0.050728	0.219444	0	1
Traditional health	46,560	144478064	0.011845	0.108187	0	1
Drug Vendor	19,410	55834147	0.135393	0.342152	0	1
Age	46,560	144478064	20.80889	18.42928	0	99
Female	46,560	144478064	0.517264	0.499707	0	1
Married	46,560	144478064	0.24413	0.429575	0	1
Pre-school	46,560	144478064	0.037415	0.189778	0	1
Primary education	46,560	144478064	0.366663	0.481899	0	1
Secondary education	46,560	144478064	0.24345	0.429169	0	1
Tertiary education	46,560	144478064	0.036531	0.18761	0	1
Public sector employment	46,560	144478064	0.019888	0.139616	0	1
Private-formal employment	46,560	144478064	0.013723	0.116339	0	1
Informal sector	46,560	144478064	0.355945	0.478804	0	1

employment						
Unemployed	46,560	144478064	0.02116	0.14392	0	1
Sick	46,560	144478064	0.305615	0.460672	0	1
Insurance	46,560	144478064	0.025756	0.158409	0	1
Poor	46,560	144478064	0.461419	0.498515	0	1

Source: Compiled by author

Note: CHE is the catastrophic health expenditure, taking the value 1 for individuals who spend 40% or more of their income on health and the value 0 for individuals who spend less.

Table 4 hosts the weighted statistics of the variables used in the logit regression. With the exception of CHE and pre-school, all the other variables are discussed above (sub section 3.2.1). The mean value of 0.2855 for CHE shows that on the average 28.6% of the individuals in our sample undergo catastrophic health expenses. The mean value of 0.0374 for pre-school indicates that only 3.74% of the sampled individuals have no formal education.

Table 5: Logit regression of the effects of healthcare utilization on CHE: Coefficients

CHE	**Coef.**	**z**
Public health facility (ref.)	/	/
Private health facility	0.1300***	2.87
	(0.045)	
Traditional health facility	-0.2043**	-2.03
	(0.101)	
Drug vendor	-0.6048***	-10.35
	(0.058)	
Age	0.0062***	6.23
	(0.001)	
Female	0.0756**	2.31
	(0.033)	
Married	0.0355	0.84
	(0.042)	
Pre-school (ref.)	/	/
Primary education	0.1131***	2.76
	(0.041)	
Secondary education	0.2271***	5.18
	(0.044)	
Tertiary education	0.2710***	3.47
	(0.078)	
Unemployed (ref.)	/	/
Public sector employment	-0.5928***	-4.82
	(0.123)	
Private-formal employment	-0.6252***	-5.02
	(0.125)	
Informal sector employment	-0.5044***	-12.14
	(0.042)	
Sick	0.2007***	6.13
	(0.033)	
Insurance	-0.1357	-1.22

	(0.111)	
Poor	-0.0635	-1.59
	(0.040)	
Constant	-1.0516***	-24.4
	(0.043)	
	Number of obs =	19,410
	LR chi2(15) =	412.28
	Prob> chi2 =	0.0000
	Pseudo R2 =	0.0177
	Log likelihood =	-11453.839

Source: Computed by author
Note: values in parentheses are standard errors
Significance: * p<.10; ** p<.05; *** p<.01

Tables 5 and 6 present respectively the coefficients and odd ratios of the logit regression of the effects of healthcare utilization on catastrophic health expenditure(CHE). The Likelihood Ratio - Chi-Square statistic (LR chi2) of 412.28 and the p-value of 0.0000 clearly show that our logistic model is globally significant at 1%. Utilization of private health facility relates positively and significantly to CHE (Table 5), indicating that the use of private health services, compared to public health services, increases the likelihood of CHE in Cameroon. Specifically, an odd ratio of 1.1388 (Table 6) shows that individuals who use private health services have 13.88% more chances of being catastrophic in their health expenses compared to their counterparts who utilize public health services. This result is very feasible, given that in Cameroon private health care is more expensive that public health care; public health services in Cameroon are subsidized in part by the government, making them cheaper than private health services. This result is in tandem with the work of Bolaji et al (2017).

On the contrary, utilization of traditional health services and drug vendors relates negatively and significantly to CHE (Table 5); these provide evidence that the use of traditional health services and drug vendors, compared to public health services, decreases the likelihood of CHE in Cameroon. Importantly, their respective odd ratio of 0.8152 and 0.5462 (Table 6) indicate that individuals who resort to traditional medicine and drug vendors (road side drugs most often bought without prior medical diagnosis and prescriptions) for their health concerns have respectively 18.48% and 45.38% less chances of being catastrophic in their health expenses compared to their counterparts who resort public health services. These results are very realistic, given that the available of forest lands, shrub, and grass fields in Cameroon provide needed inputs to traditional health practitioners, making their services affordable and cheaper compared to the modern health sector. This is a call for the government to promote policy measures and initiatives with the focus of re-organizing the traditional health sector in Cameroon, given its evidenced potentials to reduce catastrophic health expenses. This result is in line with the study ofBashiru et al (2013).

Table 6: Logit regression of the effects of healthcare utilization on CHE: Odd ratios

CHE	Odds Ratio	Z
Public health facility (ref.)		
Private health facility	1.1388***	2.87
	(0.051)	
Traditional health facility	0.8152**	-2.03
	(0.082)	
Drug vendor	0.5462***	-10.35
	(0.032)	
Age	1.0062***	6.23
	(0.001)	
Female	1.0785**	2.31
	(0.035)	

Married	1.0362	0.84
	(0.044)	
Pre-school (ref.)		
Primary education	1.1197***	2.76
	(0.046)	
Secondary education	1.2549***	5.18
	(0.055)	
Tertiary education	1.3113***	3.47
	(0.103)	
Unemployed (ref.)		
Public sector employment	0.5528***	-4.82
	(0.068)	
Private-formal employment	0.5351***	-5.02
	(0.067)	
Informal sector employment	0.6039***	-12.14
	(0.025)	
Sick	1.2223***	6.13
	(0.040)	
Insurance	0.8731	-1.22
	(0.097)	
Poor	0.9384	-1.59
	(0.037)	
Constant	0.3494***	-24.4
	(0.015)	
	Number of obs =	19,410
	LR chi2(15) =	412.28
	Prob> chi2 =	0.0000
	Pseudo R2 =	0.0177
	Log likelihood =	-11453.839

Source: Computed by author
Note: values in parentheses are standard errors;
Significance: * p<.10; ** p<.05; *** p<.01

The primary, secondary and tertiary levels of education all relate positively and significantly to CHE (Table 5) compared to pre-school level (likened to no formal education). This shows that educated individuals are more likely to being catastrophic in their health expenses compared to their counterparts who have no formal education.More so, the odd ratios of 1.1197 for primary education, 1.2549 for secondary education and 1.3113 for tertiary education (Table 6) clearly underline that the likelihood of being catastrophic in health expenses increases with level of education. This is so because educated persons spend more on health care than uneducated persons. Individuals with formal education, when sick, will often desire to follow scrupulously the medical procedure (consultation, medical tests/diagnosis, doctor's prescription) before purchasing their medication compared to those with no education, who most often resort to auto-medication.

Public sector employment, private-formal employment and informal sector employment relate negatively and significantly to CHE (Table 5), indicating that being employed, compared to being unemployed, decreases the likelihood of CHE in Cameroon. However, it is important to note that being employed in the public sector and formal-private sector are more potent for CHE reduction than being employed in the informal sector. An odd ratio of 0.5528 for public sector employment shows that individuals who are employed in the public sector have 44.72% less chances of being catastrophic in their health expenses compared to their

counterparts who are unemployed. The odd ratios for private-formal and informal sector employment stand at 0.5351 and 0.6039, showing that these likelihoods in these sectors are 46.49% and 39.64% respectively.

Being sick relates positively and significantly to CHE (Table 5), showing that poor health status increases the likelihood of CHE in Cameroon. Explicitly, an odd ratio of 1.2223 (Table 6) indicates that individuals who often fall sick have 22.23% more chances of being catastrophic in their health expenses compared to their counterparts who often enjoy good health. This is realistic because sickness/illness comes with costs (consultation cost, costs of diagnoses, and medication) compared to those who are not sick/ill.

Having health insurance relates negatively and significantly to CHE (Table 5), indicating that individuals with health insurance in Cameroon are less likely to being catastrophic in their health expenses, compared to those with no health insurance. Importantly, the odd ratio of 0.8731 (Table 6) indicate that individuals who enjoy health insurance have 12.69% less chances of being catastrophic in their health expenses compared to their counterparts who have no health insurance. This result is so because individuals with health insurance have their health care costs partly subsidized by the insurance policy compared to their counterparts with no health insurance who cover the totality of their health care costs. This finding is in conformity with that of …… Being poor relates negatively and significantly to CHE in Cameroon, this only indicates that poor people spend less on health care compared to rich people.

V. Concluding Remarks And Policy Implications

This paper had as main research objective to investigate the implications of healthcare utilisation for catastrophic health expenditure in Cameroon. Explicitly, it (1) examinedthe incidence and intensity of catastrophic health payments in Cameroon; (2) assessed whether users of particular healthcare facility are more prone to catastrophic health spending than others; and (3) identified other factors, excepting the choice of healthcare utilization, that have important bearings on catastrophic health expenditure in Cameroon. Our paper observed that seeking care in private health facility increases the risk of CHE. We equally observed that access to health insurance reduces the probability of CHE significantly in Cameroon.

The pattern of health care utilization in Cameroon is consistent with policies implemented in the country and in the intended direction. However the significant disparities in the use of health facilities, which favor the rich, deserves policy makers' attention and further investigation related to the quality of these services.

The identification of possible gradients like education, insurance, employment, income, gender and poverty in the utilization of healthcare is of great importance. In this paper, we have investigated and realized a potential correlation between utilization of healthcare and CHE. The promotion and modernization of traditional health care in Cameroon is vital input to reducing CHE.

The health care promotion objectives of vision 2035 may not be attainable with high OOP payments by the poor or non-poor for health care, emerging trend for governments in developing countries is the move away from OOP by the poor and near-poor to pre-payment schemes or health insurance. In Cameroon majors to promote pre-paid system in private health care sector are very crucial. This is because spending on out of pocket payments on health care has further impoverish the already poor who have limited income to divide among basic necessities of which health care is one.

We recommend the reduction of out-of-pocket payment by individuals through a fair and sustainable finance policy; and government should increase the workforce according to prioritized needs in health facilities in all the regions. In designing health systems, policy makers need to ensure that households are not only able to access health services when needed, but that they are also protected from facing financial catastrophe by reducing OOP. The results from this paperoffer some suggestions for evidence based interventions that might help reduce the prevalence of CHE particularly in Cameroon

References

[1]. Akinkugbe O, 2011. Health Financing and Catastrophic Payments for Health Care: Evidence from Household-Level Survey Data in Botswana and Lesotho.AERC Collaborative Research Project on Health, Economic Growth and Poverty Reduction in Africa, 2011.

[2]. Amaya-Lara J 2016. Catastrophic expenditure due to out-of pocket health payments and its determinants in Colombian households International Journal for Equity in Health (2016) 15:182 DOI 10.1186/s12939-016-0472-z *Journal of Health Economics* 26(1): 82–100

[3]. Baeza, C. and T. G. Packard. 2005. Beyond Survival: Protecting Households from Health Shocks in Latin America. Washington, DC: World Bank and Stanford University Press.

[4]. Bashiru I.I. Saeed, Munyakazi Louis Xicang Zhao 2007. Socio-economic Inequalities and Healthcare Utilization in Ghana

[5]. Berki SE 1986. A look at catastrophic medical expenses and the poor. Health Aff (Millwood) 1986, 5:138–145.

[6]. Bolaji Samson Aregbeshola and Samina Mohsin Khan 2017. Determinants of catastrophic health expenditure in Nigeria. Springer-Verlag Berlin Heidelberg 2017

[7]. Buigut, S., Ettarh, R., &Amendah, D. D. 2015. Catastrophic health expenditure and its determinants in Kenya slum communities. *International journal for equity in health, 14*(1), 46.http://dx.doi.org/10.1186/s12939-015-0168-9.

[8]. Choi, J.-W., Choi, J.-W., Kim, J.-H., Yoo, K.-B., & Park, E.-C.2015. Association between chronic disease and catastrophic health expenditure in Korea.*BMC health services research, 15*(1), 26. http://dx.doi.org/10.1186/s12913-014-0675-1

[9]. Chuma Jane and Thomas Maina, 2012. Catastrophic health care spending and impoverishment in Kenya. BMC Health Services Research 2012, 12:413 http://www.biomedcentral.com/1472-6963/12/413

[10]. Diana Kiman and Thomas Maina 2015.Catastrophic Health Expenditures and Impoverishment in Kenya. U.S. Agency for International Development doi:10.1093/heapol/czs001.

[11]. Ekman B 2007. Catastrophic health payments and health insurance: some counterintuitive evidence from one low-income country. *Health Policy* 2007; 83: 304-13 doi: 10.1016/j.healthpol.2007.02.004 pmid: 17379351.

[12]. Gertler, P. and Gruber, J. 2002. "Insuring Consumption against Illness."*American Economic Review* 92(1): 51–70.

[13]. Juyani Y, Dorsa Hamedi, SeyedeSedigheHosseini Jebeland Maryam Qasham, 2016.Multiple Sclerosis and Catastrophic Health Expenditure in Iran.*Global Journal of Health Science*; Vol. 8, No. 9; 2016ISSN 1916-9736 E-ISSN 1916-9744Published by Canadian Center of Science and Education194.

[14]. Kavosi Z,ArashRashidian, AbolghasemPourreza, Reza Majdzadeh,FarshadPourmalek Ahmad Reza HosseinpoorKazem Mohammad 2012. Inequality in household catastrophichealth care expenditure in a low-incomesociety of Iran.Health Policy and Planning 2012;27:613–623

[15]. Kavosi, Z., Rashidian, A., Pourmalek, F., Majdzadeh, R., Pourreza, A., Mohammad, K., & Arab, M. 2009.Measuring household exposure to catastrophic health care expenditures: A Longitudinal study in Zone 17 of Tehran.*Hakim Research Journal, 12*(2), 38-47.

[16]. Kien V, Hoang Van Minh Kim BaoGiang, Amy Dao, Le ThanhTuanandNawi Ng 2016. Socioeconomic inequalities in catastrophichealth expenditure and impoverishmentassociated with non-communicablediseases in urban Hanoi, Vietnam. *International Journal for Equity in Health* (2016) 15:169DOI 10.1186/s12939-016-0460-3

[17]. Kimani D and Thomas Maina 2015.Catastrophic Health Expenditures and Impoverishment in Kenya. Washington, DC: Futures Group, Health Policy Project. ISBN: 978-1-59560-070-7

[18]. Limwattananon S, Tangcharoensathien V, Prakongsai P. 2007. Catastrophic andpoverty impacts of health payments: results from national household surveyin Thailand. Bull World Health Organ. 2007;85:600–6.

[19]. Njimanted Godfrey Forgha, Nfor Omarine Nlinwe, Yakum Ivan Mboambogoh and Mbohjim Othniel Mobit 2017. Households' Choices of Healthcare Services in the North West Region Of Cameroon. *Journal ofthe Cameroon Academy of Sciences* Vol. 14 No. 1 (2017). DOI: https://dx.doi.org/10.4314/jcas.v14i1.4

[20]. O'Donnell O, Van Doorslaer E, Wagstaff A, Lindelow M. 2008. Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation. Washington, DC: World Bank

[21]. O'Donnell, O., E. van Doorslaer, R. P. Rannan-Eliya, A. Somanathan, C. G. Garg, P. Hanvoravongchai, M. N. Huq, A. Karan, G. M. Leung, K. Tin, and C. Vasavid. 2005. "Explainingthe Incidence of Catastrophic Payments for Health Care: Comparative Evidence from Asia." EQUITAP Working Paper #5. Erasmus University, Rotterdam, Netherlands, and Institute of Policy Studies, Colombo, Sri Lanka

[22]. Onoka C, Onwujekwe O. Hanson, K andUzochukwu, B. 2011. Measuring catastrophic health care expenditures in Nigeria Implications for financial risk protection.Consortium for Research on Equitable Health Systems (CREHS).Department for International Development (DFID) UK.

[23]. Onwujekwe O, Hanson K, Uzochukwu B 2012.Examining Inequities in Incidence of Catastrophic Health Expenditures on Different Healthcare Servicesand Health Facilities in Nigeria.PLoS ONE 7(7): e40811. doi:10.1371/journal.pone.0040811

[24]. Pradhan, M., and Prescott. N. 2002."Social Risk Management Options for Medical Care in Indonesia."*Health Economics* 11: 431–46.

[25]. Qiang Sun, Henry Lucas and ShitongHuan 2016.The effect of NCMS on catastrophic healthexpenditure and impoverishment fromtuberculosis care in China. International Journal for Equity in Health (2016) 15:172DOI 10.1186/s12939-016-0463-

[26]. Saito, E., Gilmour, S., Rahman, M. M., Gautam, G. S., Shrestha, P. K., & Shibuya, K. 2014. Catastrophic household expenditure on health in Nepal: a cross-sectional survey. *Bulletin of the World Health Organization, 92*(10), 760-767. http://dx.doi.org/10.2471/BLT.13.126615

[27]. SharifaPuteh and YasminAlmualm 2017.Catastrophic Health Expenditure among Developing Countries. *Health Systems and Policy Research* ISSN 2254-9137. iMedPub Journalshttp://journals.imedpub.com

[28]. Steven Buigut, RemareEttarh and Djesika D Amendah 2015. Catastrophic health expenditure and its determinants in Kenya slum communities *International Journal for Equity in Health* (2015) 14:46 DOI 10.1186/s12939-015-0168-9

[29]. Su TT, Kouyaté B, Flessa S. Catastrophic household expenditure for health care in a low income society: a study from Nouna district, Burkina Faso. *Bull World Health Organ*. 2006;84(1):21-7. DOI:10.2471/BLT.05.023739

[30]. Van Doorslaer E 2006. Effect of payments for health care on poverty estimates in 11 countries in Asia: an analysis of household survey data. *Lancet*, 2006, 368:1357-64.

[31]. Van Doorslaer E, O'Donnell O, Rannan-Eliya RP. 2007. Catastrophic payments for health care in Asia. Health Economics 16: 1159–84.

[32]. Wagstaff A, van Doorslaer E. 2003. Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993–1998. Health Econ 2003, 12:921–934.

[33]. WHO Afro 2011. Framework for the implementation of the Ouagadougou Declaration on Primary Health Care and Health Systems in Africa: achieving better health for Africa in the new Millennium: Report of the Regional Director. Technical Report. Retrieved February 23, 2014, from http://apps.who.int/iris/handle/10665/1645

[34]. WHO, 2014.Global health expenditure atlas. Geneva: World Health Organization; 2014. Available from: http://www.who.int/health-accounts/atlas2014.pdf [cited 2017Jan 2].

[35]. WHO. 2006. Health System Profile: Islamic Republic of Iran. Cairo: Regional Health Systems Observatory, WHO Eastern Mediterranean Regional Office.

[36]. WHO. 2010. The World Health Report 2010: Health Systems Financing: The Path to Universal Coverage. Geneva: World Health Organization.

[37]. World Bank, 2008.Analyzing Health Equity Using Household Survey Data. *A Guide to Techniques and Their Implementation.*1818 H Street, NW Washington, DC 20433

[38]. World Bank, 2008.Analyzing Health Equity Using Household Survey Data. *A Guide to Techniques and Their Implementation.*1818 H Street, NW Washington, DC 20433

[39]. World Health Organization 2005.Distribution of health payments and catastrophic expenditures methodology. Geneva, Switzerland

[40]. World Health Organization, 2000. A Conceptual Framework for Action on the Social Determinants of Health. 20 Avenue Appia, 1211 Geneva 27, Switzerland

[41]. Xu K, David B Evans, Kei Kawabata, RiadhZeramdini, Jan Klavus, Christopher J L Murray 2003. Household catastrophic health expenditure: a multicounty Analysis *Lancet* 2003; 362: 111–17

[42]. Xu K, Evans DB, Carrin G, Aguilar-Rivera AM. 2005. Designing health financing systems to reduce catastrophic health expenditure. World Health Organization, Geneva.
[43]. Xu K, Evans DB, Kadama P, Nabyonga J, Ogwal PO, Nabukhonzo P, Aguilar AM, 2006 Understanding the impact of eliminating user fees: utilization and catastrophic health expenditures in Uganda. Soc Sci Med 2006, 62:866–876.
[44]. Xu, K. Evans, DB. Carrin, G. Aguila-Rivera, AM. Musgrove, P. Evans, T. (2007), "Protecting households from catastrophic health spending." *Health Affairs (Project Hope),* 26(4): 972-983.

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