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Catastrophic Healthcare Expenditures and Household Poverty in Kenya: The Case of Cancer, Hypertension, and Diabetes

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Abstract
It is estimated that non-communicable diseases account for 27% of all deaths suffered by Kenyans, equivalent to almost 100,000 people per year. Kenya is experiencing an upsurge in the prevalence of non-communicable diseases (NCDs), with current estimates showing that NCDs account for a third of the disease burden. This promoted the basis of the study to examine the effects of catastrophic healthcare expenditures due to cancer, hypertension, and diabetes on household poverty in Kenya. The study used the latest Kenya Household Health Expenditure and Utilization Survey (KHHEUS) 2018 dataset. Data analysis was undertaken by employing STATA Software. A significance level of p of <0.05 was used. The results indicated catastrophic health expenditure, education level, working status, household size, and locality are significant determinants of household poverty. The presence of chronic illnesses such as hypertension, cancer, and diabetes increases the probability of being poor as a result of high out-of-pocket expenditures. It was noted that the households with catastrophic health expenditure of 40 percent and above are classified to be poor. The study recommended that the reliance on out-of-pocket expenses to finance medical services needs to be reduced because it leads to catastrophic health expenditures even as the country gears towards universal healthcare coverage. County governments are encouraged to be innovative in trying to come up with social health insurance schemes to lessen the burden of financing NCDs.
Keywords: Catastrophic healthcare expenditures, out of pocket expenditures, cancer, hypertension, diabetes, household poverty, Kenya
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1.1 Background of the study

It is estimated that non-communicable diseases account for 27% of all deaths suffered by Kenyans, equivalent to almost 100,000 people per year (WHO, 2016). Kenya is experiencing an upsurge in the prevalence of non-communicable diseases (NCDs), with current estimates showing that NCDs account for a third of the disease burden. Cardiovascular diseases, including hypertension, heart attacks, diabetes, and cancer, account for most NCD-related deaths in Kenya, followed by chronic lung diseases and stroke. The majority of NCDs result from four behavioral risk factors: tobacco use, physical inactivity, unhealthy diets, and harmful use of alcohol (Mwangi et al. 2021).

The rise of non-communicable diseases (NCD) in Kenya and throughout the world poses a threat to human health and a drain to the economy (WHO 2017). NCDs such as cancers, diabetes, and others account for 27% of the total deaths and over 50 percent of total hospital admissions in Kenya (KEMRI, 2021). Harikrishnan et al. (2018) found that NCDs accounted for 73.4% of deaths globally and 111,000 deaths in Kenya, with 62% being Kenyans under the age of 70 years. The economic impact of NCDs in Kenya is more impoverishing than communicable diseases and is more pronounced among the poor (Mwangi et.al. 2021). The most severe NCDs affecting the majority of Kenyans include cancer, diabetes, and hypertension; and they plunge many households into poverty (WHO, 2018).

In situations where poor households cannot afford to seek care due to lack of finances, most of them suffer from aggravated ill-health for prolonged periods (Barasa, Maina & Ravishankar, 2017). With the increasing burden of diseases, households need protection from financial risks arising from the need for accessing care (WHO 2011). This is especially worse in countries like Kenya, where non-communicable diseases (NCDs) like cancer, hypertension, diabetes, asthma, cardiovascular diseases, and chronic respiratory infections account for 27% of mortalities besides adverse financial devastations to households (WHO, 2018).

Catastrophic healthcare expenditures refer to a situation where a household is forced to reduce its basic expenses for some time to meet piling medical expenses for the affected household member(s). According to WHO, any expenditures equal to or greater than 40 percent of the capacity to pay are regarded as catastrophic, but countries are flexible to vary this depending on their national health policies and ensure that the vulnerable are protected. Such guaranteed protections are only through sound healthcare policy that understands the demographics and characteristics of its citizens, thereby ensuring that such policies do not end up pushing its citizens into incurring catastrophic payments while seeking medication (Xu et al., 2005).

Kenya continues to report new cases of NCDs and mortalities. Table 1 below is a summary of the mortalities and new cases of cancer, diabetes, and hypertension in the period 2016-2020

Table 1: Mortality and New cases of Cancer, Diabetes, and Hypertension in Kenya (2016-2020)

Year	Cancer		Diabetes		Hypertension	
	Mortality (Yearly)	New cases (Yearly)	Mortality (Yearly)	New cases (Yearly)	Mortality (Yearly)	New cases (Yearly)
2016	17489	34001	8953	19515	5636	13639
2017	21837	35624	9201	21624	6019	15101
2018	32,987	37247	9429	23733	6402	16563
2019	26474	38870	9940	25842	6785	18025
2020	27 092	40493	11048	27951	7168	19487
Average	**24697**	**37247**	**9714**	**23733**	**6402**	**16563**

Source: (Ministry of Health, 2021)

The trend shows that mortality and new cases reported yearly of cancer, diabetes, and hypertension have increased over the years. These increases in the new cases will continue to burden many Kenyans and straining their financial resources. The accompanying hefty financial obligations will many households into impoverishment and poverty due to the high medication fees associated with seeking care in Kenya. Such approximations in mortalities and new cases may be based on the fact that Kenya continues to have heightened urbanization plagued by sedentary lifestyles, increased consumption of unbalanced and unhealthy diets, high levels of alcohol consumption, increased stress levels (Rijal et al. (2018).

The statistics indicate that the country's annual cancer cases are about 37247 with an annual mortality of about 24697 people. This makes cancer one of the most threatening diseases that is straining Kenyans to meet its cost and financially crippling many households who end selling their assets and properties. On the other hand, the annual mortality from diabetes is estimated to be around 9714, with a new average of 23733 annually. A study conducted by WHO (2018) showed that diabetes accounted for 1% of NCD mortalities in Kenya. It is estimated by the ministry of health that 6402 people died of hypertension with new cases reaching 16563 yearly. In 2020, Kenya was ranked 96th globally with the highest number of deaths of hypertension. These NCDs will continue to devastate many families, taking away productive hours for those sick and those caring for patients and in the long run, may contribute negatively towards Kenya's growth.

The government of Kenya (GoK) incorporated NCDs in the Kenya Health Policy 2014-2030 and came up with focused sector-specific interventions like increased screening, escalated awareness and education about NCDs, and rehabilitation to reduce the suffering associates with NCDs (Ministry of Health 2015). Nevertheless, the NCDs in Kenya continue to adversely affect the social and economic welfare of many Kenyans while at the same time impinging on the efforts by the GoK to increase economic growth, reduce poverty and attain sustainable development goals (SDGs). This means that many households in Kenya will continue to spend more and more from their pockets to fund healthcare needs from these NCDs.

The rise of household healthcare makes people less productive in terms of investments and uses what they have to cover medical costs. According to the WHO health report (2010) over 100 million people are pushed into poverty by NCD-related expenditures. Based on this background, the study sought to examine the effect of catastrophic healthcare expenditures due to cancer, hypertension, and diabetes on household poverty in Kenya.

2.1 Literature Review

The study was based on the cyclical theory of poverty. Cyclical poverty is defined as the state of impoverishment that is pervasive; however, the term of its event exists for a short while (Watts, 2017). This sort of poverty happens when people or households suddenly cannot afford their necessities because of unanticipated conditions like natural calamities and outbreaks of diseases. Relating to the reasons for cyclical poverty in the conventional and nontraditional social orders, the fundamental triggers of cyclical poverty in the customary social orders are natural occurrences. The theory notes that among the developed societies, cyclical poverty results basically from changes in the business patterns with massive joblessness in the events of business depressions or prolonged recession periods. The theory shows that a transient state of poverty, in contrast to continuous poverty, is when individuals enter into and out of poverty (Sen, 2008). It is in this light that there is a need for pragmatic policy from the government and health authorities to manage the dangerous effects of persistent poverty and to monitor the situation amongst common activators of this nature of poverty.

Makau-Barasa et al. (2020) conducted an in-depth systematic review of the cancer policies in Kenya. The survey showed that the main barriers to patients seeking cancer testing and treatments included high costs involved, low awareness on cancer by the population and clinicians, poor health-seeking behavior, long-distance in seeking care, inadequate and lack decentralized facilities to diagnose and treat cancer, poor communication by the healthcare providers, insufficient cancer policies and their implementation. They identified the high cost of treating cancer, insufficient budgetary allocations by the central government to healthcare and cancer services, inadequate cancer infrastructure, and lack of trained personnel as key impediments to fighting against cancer in Kenya. The researchers recommended increased financial allocations towards cancer services, escalated multi-

stakeholder engagement, and more investment in research to inform policy actions, increased decentralization of services, and increased investment in cancer surveillance and data. Their study focused on cancer alone and would have included other NCDs.

Subramanian et al. (2018) quantified the patient payments of screening, diagnosis, and treatment services across the public and private sector in Kenya intending to assess the ability to pay by Kenyans. The researchers collected data on payments for cardiovascular diseases, diabetes, breast and cervical cancer, and respiratory diseases. The payment data was collected from two facilities namely Kenyatta National Hospital and Kibera South Health Center representing public and private health facilities respectively. Their analysis showed that costs of screening ranged between $4 and $36 with even higher costs of diagnosis (breast and cervical cancers). To treat hypertension for a year, a Kenyan needed to have between $26 and $234, and between $418 and $987 to get treatment in public and private health facilities. They found that stroke and dialysis treatments were the most expensive with breast cancer treatments and especially for those in stage III costing patients $1500 and $7500 in public and private facilities, respectively. However, the study majorly concentrated on payments and thus did not major in the catastrophic health expenditure.

Another study conducted by Mwai and Muriithi (2016) showed that although all types of diseases negatively affect household welfare, NCDS had more severe impacts on impoverishment. The household impoverish by NCDS was about 5.4% greater compared to all illnesses regardless of the type. However, the researchers did not mention the specific NCDS that they focused on and hence this study endeavored to be more specific.

3.1 Methods

3.1.1 General Model

The theoretical model for this research was the derivation of utility maximization which can help inform health care utilization. The theoretical model used in the current research was the utility maximization model (Kimani, 2014; Wagstaff, 2005; Wagstaff & Doorslaer, 2003; Xu et al, 2003). Consumers maximize utility which is a function of consumption (C) and healthcare (H). Because future health-state and survival chances are affected by the usage of healthcare, the lifetime utility function on health expenses is expressed as:

U = U (C, H)……...……...….. 3.1

Health in essence is dependent on resources to meet health expenses (Grossman, 1972). Investing health is a function of healthcare features and personal factors (behavioral habits) that can affect the quality of medical care services provided.

H = f (H0, M)……..…….3.2

Costs of medical services are dependent on several variables like nature and quality state of the services. Thus, the budget model is:

PMM + PCC = Y……..3.3

For this case, PC is the price figure of other nonmedical products and PM is the net price of health care (Catastrophic Healthcare Expenditures). Y denoted the exogenous income variable. Maximizing (3.1) based on health production function (3.2) and budget constraint (3.3) and solving it employing Lagrangian function produces a hybrid health demand function illustrated as:

H = H (M, Y, PM, PC, H0) ….....3.4

Generally, the whole portfolio of price expenditure for health and consumption of items are entered into the demand function as to demand theory. Every one of the contentions in 3.4 is characterized before as; H is health state post seeking for medical services, Y denoted the exogenous income, H_0 denoted the initial health state and P_M and P_C are the costs of medical services and expenditure of non-medical products, in that order. Referring to Mwabu (2007), model 3.4 can be deciphered as a type of demand function for health services where we amplify utility factor basing on the available budget. The demand function is adapted on exogenous income Y, with different covariates in the model being regarded as exogenous (where the demand curve shifts because of changes in the factors).

Consequently, expecting a balanced correspondence among visitations and H, it is conceivable to denote the outcome factor with the number of visits to the healthcare facility (as opposed to by the state of health of an individual); from now on symbolized by V. No explanatory loss is involved by this presumption P_M that H is ideal for a given degree of M. Y and the various covariates were identified by X, and PM was identified by Catastrophic Healthcare Expenditures (Cata). In this way condition 3.4 can be modeled as:

V = V(X, Cata)……..3.5

In this study household poverty (HP) is the outcome variable while Cata is the predictor variable. The study model obtained was:

HP = V(X, Cata)……3.6

Where X includes the household head level of education, working status, household size, gender of the

household head, and locality (area of residence). The dependent factor (HP) is the household poverty is a binary variable taking value 0 if the household is poor and 1 if otherwise. The logit model is presented as;

Household Poverty (HP) = $ln\left[\frac{p}{1-p}\right] = a + \sum_{i=1}^{m} \beta iXi + \mu$ ……..……3.7

Where;

HP= The dependent factor (HP) is the household poverty is a binary outcome having two outcomes of 0 if the household is poor and 1 if otherwise

P=Probability

β = Beta coefficients

X_i=Predictor variables

μ= error term

3.1.2 Specific Model

The study employed Xu's Approach (Xu, 2005) to determine the effects of catastrophic healthcare expenditures on household poverty (HP). To compare the effect of catastrophic healthcare expenditures on household poverty levels in Kenya, the study estimated the logit models for households heads with hypertension, cancer, and diabetes. The model becomes

$$\mathrm{HP} = \ln\left[\frac{\mathrm{p}}{1-\mathrm{p}}\right] = a + \beta_1 Cata_1 + \beta_2 LOE_2 + \beta_3 \mathrm{WS}_3 + \beta_4 HS_4 + \beta_5 SEX_5 + \beta_{76} LOC_6 + \mu \ldots\ldots.3.8$$

Where:

HP=Household Poverty; ln=natural logarithm; P=Probability; Cata= Catastrophic health expenditure; LOE= Level of Education; WS= Working status; HS=Household size; SEX= Gender; LOC= Locality; a = Constant; $\beta_1 \ldots \beta_7$= Coefficients; μ = Error term

3.3 Data Source

The study used a secondary dataset of Kenya Household Health Expenditure and Utilization Survey (KHHEUS) 2018. The KHHEUS 2018 was carried out between April and May 2018 through a two-stage sampling approach. The 2018 survey collected data on household composition and characteristics, utilization of outpatient and other health-related services using a 4 week recall period, in-patient admission in the last 12 months, routine health expenses for all household members in the last 4 weeks, housing conditions, and possessions, and household expenditures and consumption. The sample size was 37500 households.

The composition of the household and its characteristics entails factors such as head of household, religion, age, education status, marital status, health status, household poverty line, area of residence, household size, gender of the household, and working status. Notably, KHHEUS seeks to explore health-seeking behavior, how Kenyans use healthcare services and how they spend on health. Kenya has conducted this survey 4 times; 2003, 2007, 2013, and 2018. Therefore, data from KHHEUS was considered reliable to be utilized to examine how catastrophic healthcare expenditures lead to household poverty in Kenya with much consideration on the expenditure on the case of cancer, hypertension, and diabetes. Data analysis was undertaken by employing STATA Software. A significance level of p of <0.05 was used.

3.4 Determination of Catastrophic Healthcare Expenditure

A household is regarded as poor when its total household expenditure is smaller than its subsistence spending (Xu, 2005). Household subsistence spending is the minimum requirement to maintain basic life in a society. Food expenditure may be lower than subsistence spending for some households, implying that their food expenditure is under the estimated poverty line.

Poor if household expenditure (exp_h) < subsistence spending (se_h)

$Poor_h$ =1 if exp_h< se_h

Where *exp* is household expenditure; h presented as subscript is household

Household capacity to pay is then defined as household non-subsistence spending. Food expenditure may be lower than subsistence spending for some households, implying that the household's food expenditure is under the estimated poverty line. This could be as a result of the fact that reported food expenditure in the survey does not consider other non-cash means of food consumption. In that case, the non-food expenditure is used as non-subsistence spending.

$ctp_h = exp_h - se_h$ if $se_h <= food_h$

$ctp_h = exp_h - food_h$ if $se_h > food_h$

where ctp is household capacity to pay

Thus, catastrophic health expenditure occurs when a household's total OOP health expenditures are equal to or exceed 40 percent of the household's capacity to pay or non-subsistence spending (non-food consumption). A non-poor household is impoverished by health expenditures when it becomes poor after paying for health

services. Thus, the burden of the health expenditures is the OOP expenditures as a percentage of a household's capacity to pay. This burden to the health expenditures is also known as catastrophic health expenditure. Thus, catastrophic health expenditure is calculated as;

$Cata_h$=OOPh/ctph

Where Cata is catastrophic health expenditure; and OOP is out of the pocket expenditure.

But, the household capacity to pay equals the nonfood expenditure or non-subsistence spending. Thus, catastrophic health expenditure is equal to out-of-pocket (OOP) expenditure divided by nonfood expenditure (non-subsistence spending)

$Cata_h$=OOP/nonfood expenditure (non-subsistence spending).

Catastrophic health expenditure is constructed as a dummy variable with value 1 indicating a household with catastrophic expenditure and 0 without catastrophic expenditure. Thus, one suffers from catastrophic health expenditure when OOP_h/ctp_h>= 40, that is

$Cata_h$= 1 if OOP_h/ctp_h>=40%.

On the other way, one does not suffer from the catastrophic health expenditure if OOP_h/ctp_h<40, that is

$Cata_h$=0 if OOP_h/ctp_h<40%.

In the study, negative values of the poverty control line (pcl) implies that food expenditure is lower than subsistence spending, showing their food expenditure is under the estimated poverty line. Thus, negative values of pcl imply that the household is poor while positive values imply the household is not poor. Thus, 0 will imply the household is below the poverty line, 1 otherwise.

3.5 Measurement of Variables

Table 2 presents the measurement of variables that have been used in the implementation of the empirical model described above

Table 2: Measurement of Variables

Variable	Measurements of the variables
Household Poverty	0 if a household is below the poverty line; 1 otherwise
Catastrophic health expenditure	1 if a household experienced catastrophic health expenditure; 0 otherwise.
Area of residence	1 if an individual resides in an urban area; 0 otherwise.
Household size	The total number of members of the household.
Gender	Gender shows whether the household head is male or female with 1 showing a male; 0 otherwise
Working status	1 show whether the household head is working; 0 otherwise.
Education level	1 depicts whether the household head is educated up to secondary school level and above; 0 otherwise.

4.1 Empirical Results and Discussion

The empirical results included discussions of the descriptive statistics and logit regression models.

4.1.1 Descriptive Statistics

This section highlights the descriptive results for the study population. The particular descriptive results include household poverty, catastrophic health expenditure, level of education, working status, household size, gender, and locality. Table 3 presents the descriptive statistics.

Table 3: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Household Poverty	31,653	0.4173	0.4931	0	1
Catastrophic health expenditure	26,813	0.2027	0.4020	0	1
Education level	33,156	0.4430	0.4967	0	1
Working status	37,498	0.3759	0.4844	0	1
Household size	37,479	4.5578	2.4892	1	25
Gender	37,498	0.4943	0.5000	0	1
Locality	37,498	0.6154	0.4865	0	1

The coding of the variables was; household poverty: 0 if a household is below the poverty line; 1 otherwise, catastrophic health expenditure: 1 if a household experienced catastrophic health expenditure; 0 otherwise, education level: 1 if one has a secondary level of education and above; 0 otherwise: Working status: 1 if one is working; 0 otherwise, Gender: 1 if one is a male; 0 otherwise, Locality: 1 if some reside in an urban area; 0 otherwise.

Based on the descriptive statistics presented in Table 3, on average 41.73 percent of households were living below the poverty line as of 2018. Those households experiencing catastrophic health expenditure were 20.27%.

Moreover, on average, 44.3% of the households were found to have a secondary education level and above. The study further showed the average household size was 5 members. On average, 49.43% of the household's members were males. The study showed the 61.54% of the respondents reside in urban areas.

4.1.2 Logit Regression Model for Hypertension

Logit regression model for hypertension is presented in Table 4

Table 4: Logit regression for Hypertension

Poverty	Coef.	Std. Err.	z	P>z
Catastrophic health expenditure				
Experiences catastrophic health expenditure	0.2562	0.0451	5.6800	0.0000*
Level of education				
Secondary school level of education and above	-0.3168	0.0391	-8.1000	0.0000*
Working status				
Working	-0.1635	0.0408	-4.0100	0.0000*
Household size	0.0227	0.0075	3.0200	0.0030*
Gender				
Male	-0.0318	0.0377	-0.8400	0.3990
Locality				
Urban	-2.15338	0.038361	-56.13	0.0000*
_cons	0.8981884	0.053482	16.79	0.0000*

****significant at 5%**

Reference categories: (Catastrophic health expenditure (experiences no catastrophic health expenditure); Level of education (below secondary school level of education); Working status (does not work); Gender (female); Locality (rural)

Based on the results presented in Table 4, the catastrophic health expenditure is positively and significantly related to household poverty (odds ratio=0.2562, P=0.000). This implied that households with catastrophic health expenditures are 0.2562 units more likely to be poor than those who do not experience catastrophic health expenditures. This effect can be explained by the OOP expenditures incurred in seeking treatment, which causes households to experience catastrophic health expenditures and, consequently, impoverishment. The household level of education is negatively and significantly related to poverty (odds ratio=-0.3168, P=0.000). This implied that those households with a secondary school level of education and above are less likely to be poor by 0.3168 units than those with below secondary school level of education. Educational attainment is a predictor of employment and educated people are more likely to have employment opportunities.

Working status and household poverty are negatively and significantly related (odds ratio -0.1635, P=0.0000). This implied that those household members working are 0.1635 units less likely to be poor than those who are not working. Household size is positively and insignificantly related to household poverty (odds ratio=-0.0318, P=0.0030). Gender was negatively related to household poverty, with males having the slightest possibility of being poor (odds ratio=-0. 0318, P=0.3990). However, gender was insignificant in determining household poverty. The results are supported by Owens (2008), who indicated that women tend to use significantly more services and spend more health care dollars than men. The locality is negatively and significantly related to the poverty level, with urban areas being the most affected area (odds ratio=-2.15338, P=0.000). The likelihood of urban households being poor is 2.15338 less than those in rural areas.

4.3 Logit Regression Model for Cancer

The Logit regression model for cancer is presented in Table 5

Table 5: Logit Regression Model for Cancer

Poverty	Coef.	Std. Err.	z	P>z
Catastrophic health expenditure				
Experiences catastrophic health expenditure	0.2233	0.0512	4.3600	0.0000*
Level of education				
Secondary school level of education and above	-0.2346	0.0425	-5.5200	0.0120*
Working status				
Working	-0.1409	0.0440	-3.2000	-0.0010
Household size	0.0277	0.0084	3.2800	0.0010*
Gender				
Male	-0.0372	0.0418	-0.8900	0.3740
Locality				
Urban	-2.2645	0.0420	-53.8800	0.0000*
_cons	0.9873	0.0595	16.5900	0.0000*

****significant at 5%**

Reference categories: (Catastrophic health expenditure (experiences no catastrophic health expenditure); Level of education (below secondary school level of education); Working status (does not work); Gender (female); Locality (rural)

The catastrophic health expenditure is positively and significantly related to household poverty as shown in Table 5 (odds ratio=0.2233, P=0.000). This implies catastrophic health expenditure has 0.2233 units likelihood of driving household to poverty. Household-level education is negatively and significantly related to poverty (odds ratio=-.2346, P=0.0120). This indicates the probability of households with a secondary level of education and above has 0.2346 units likelihood less to fall to poverty as those with below secondary level of education. The study indicates working status is negatively and significantly related to household poverty (odds ratio=-0.1409, P=0.010). This means that those working are 0.1409 units less likely to fall into poverty than those who are not working.

Household size is positively and significantly related to household poverty (odds ratio=0.0277, P=0.0010). This implies that the probability of the household size increasing the household poverty is 0.0277 units. The higher the household size, the higher the poverty level. Gender is negatively related to household poverty with the male having the least possibility of being poor (odds ratio=-0.0372, P=0.3740). Nevertheless, gender is found to be insignificant in determining household poverty. Locality is negatively and significantly related to household poverty (odds ratio=-2.2645, P=0.0000). This implies that those households in the urban areas are 2.2645 units less likely to be poor than those in the rural areas. In urban areas, there are a lot of opportunities compared to rural areas. The results imply that a large portion of the Kenyan population resides in rural areas; however, there has been an influx of populations to the urban areas, a phenomenon attributed to seeking employment opportunities.

4.4 Logit Regression Model for Diabetes

The Logit regression model for diabetes is presented in Table 6

Table 6: Logit Regression Model for Diabetes

Poverty	Coef.	Std. Err.	z	P>z
Catastrophic health expenditure				
Experiences catastrophic health expenditure	0.2349	0.0368	6.3900	0.0000
Level of education				
Secondary school level of education and above	-0.1724	0.0302	-5.7100	0.0110
Working status				
Working	-0.0911	0.0312	-2.9200	0.0030
Household size	0.0243	0.0059	4.0900	0.0000
Gender				
Male	0.0042	0.0298	0.1400	0.8890
Locality				
Urban	-2.206068	0.0302863	-72.84	0.0000
_cons	0.9142664	0.0426311	21.45	0.0000

****significant at 5%**

Reference categories: (Catastrophic health expenditure (experiences no catastrophic health expenditure); Level of education (below secondary school level of education); Working status (does not work); Gender (female); Locality (rural)

The study showed that the catastrophic health expenditure is positively and significantly related to household poverty as depicted in Table 6 (odds ratio=0.2349, P=0.000). This indicates catastrophic health expenditure has a 0.2349 unit probability of driving households to poverty. Household-level of education and poverty household poverty is negatively and significantly related (odds ratio=-0.1724, P=0.0110). This implies the likelihood of households with a secondary level of education and above is 0.1724 units less likely to be poor than those with below secondary level of education. Working status is negatively and significantly related to household poverty (odds ratio=-0.0911, P=0.0030). This implies the likelihood of working households falling in the poverty is 0.0911 units less than those who are not working. Those from the highest class had the lowest catastrophic healthcare expenditures. Thus, the government and other health care stakeholders need to establish ways to help household heads from the lowest class. Household size is positively and significantly related to household poverty (odds ratio=0.0243, P=0.0000). This implies the probability of poverty increasing with the increase in the household is 0.0243 units. Gender is positively related to household poverty with the male having a high possibility of being poor (odds ratio=0.0042, P=0.8690). However, gender is insignificant in determining household poverty. Locality is negatively and significantly related to household poverty (odds ratio=-2.206068, P=0.0000). This implies households in the urban areas are 2.206068 units less likely to be poor than those in the rural areas.

5.0 Conclusion

The study results indicated catastrophic health expenditure, education level, working status, household size, and locality are significant determinants of household poverty. The catastrophic spending on health has led to many people falling into poverty. The out-of-pocket expenditure is a deterrent to health care utilization, impoverish households, and a significant determinant of household poverty through their effects on health care utilization and catastrophic health expenditures. The government has spurred health system reforms and innovative health financing mechanisms such as the 10/20 policy, but the catastrophic health expenditure has continued to be comprehended within families.

The presence of the chronic illness such as hypertension, cancer, and diabetes increase the probability of being poor as a result of high out of pocket expenditures. This could be explained by the fact that with chronic illness, there is more utilization of health services hence higher OOP expenditures. The high out-of-pocket spending on health drains household savings and assets. A further explanation is that those chronically ill are less productive, hence low or no income which leads to poverty.

The out-of-pocket expenditure on health is inappropriate in financing medical services because it results in catastrophic health expenditure. The poor households are the most impoverished by health expenditures because they use most of their assets to pay for health services. The burden of the health expenditures/catastrophic health expenditure is the out-of-pocket expenditures as a percentage of a household's capacity to pay. Thus, those households with catastrophic health expenditure of 40 percent and above are classified to be poor.

6.0 Recommendations and Policy Implications

The study recommends that the reliance on out-of-pocket expenses to finance medical services needs to be reduced because it leads to catastrophic health expenditures. The higher the catastrophic health expenditure, the higher the poverty level. Educational attainment is a predictor of employment and educated people are more likely to have employment opportunities. Poverty alleviation policies can help reduce heavy dependence on OOP by implementing universal health care coverage supported by the government and financed by people's tax revenue. The poverty mitigation intervention policies should reduce too much reliance on out-of-pocket payments for medical bills.

The study also recommends alternative health financing mechanisms that offer financial risk protection to the population, especially the poor who are most affected by catastrophic health expenditures. Expanding the current health coverage and moving towards universal health coverage is seen as the most effective way to shield the population from the impoverishing effects of out-of-pocket expenditures. The study recommends country-wide awareness of family planning and management. Household size was found to be positively related to household poverty. Though family planning training is available in public health institutions, many Kenyans do not trust the methods for lack of awareness. Family planning should be a voluntary exercise after creating awareness among households.

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