ASSESSMENT OF CATASTROPHIC HEALTH EXPENDITURE AMONG HOUSEHOLDS IN KOGI STATE, NORTH CENTRAL NIGERIA

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Abstract

Background: *Catastrophic health expenditure is a metric for assessing the effectiveness of financial risk protection in healthcare. It occurs when households are forced to make out-of-pocket payments for healthcare services that strain their financial resources. One significant challenge is the persistence of out-of-pocket expenses for healthcare, even in the presence of healthcare financing schemes. This study aims to investigate the prevalence of catastrophic health expenditure and identify the factors contributing to it among households in Kogi state.*

Methods: *This research employed a cross-sectional study design conducted among households in Kogi state. A total of 406 questionnaires were distributed to respondents, with 403 successfully completed and returned, resulting in an impressive response rate of 99.3%. Data collection involved the use of self-administered structured questionnaires. Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 23, along with a Logistic Regression Model. The results are presented through appropriate tables, and statistical significance was determined at a level of $P < 0.05$.*

Results: *The study revealed that approximately 18.4% of households in Kogi state experienced catastrophic health expenditures. Notably, a majority of those affected (65%) resided in rural areas. There was a significant correlation between the gender of the household head and their ability to cover healthcare costs ($\chi 2 = 2.55$, $df = 1$, $p < 0.01$). The Logistic Regression model demonstrated a significant link between the lack of access to the National Health Insurance Scheme (NHIS) and the economic well-being of the family. Specifically, the lack of access to NHIS was associated with a 0.645 times greater likelihood of impacting the family's economic status, and this association was statistically significant ($\beta = 0.439$, Odds Ratio [OR] = 0.645, Confidence Interval [CI] = 0.454 − 0.916, $p < 0.05$).*

Conclusion: *The study findings indicate that several household and individual characteristics are associated with catastrophic health expenditure in Kogi state. Factors such as age, education level of the household head, health insurance status, geographic location, type of healthcare facilities visited, and the nature of illnesses experienced contribute to this burden. Policymakers should consider offering fee and premium waivers to household heads above 60 years of age and their family members. Furthermore, redistributing the financial burden towards wealthier families capable of paying higher premiums and fees can enhance the fairness and progressivity of healthcare financing in Kogi state.*

Keywords*: Assessment, Catastrophic, Health, Expenditure, Household, Kogi state.*

Background

Catastrophic health expenditure is a measure of financial risk protection. It is often incurred by households who have to pay out of pocket for health care services that are not affordable. According to World Health Organization (WHO), catastrophic health expenditure occurs when the medical cost equals or exceeds 40% of a household's non-Poverty. Poor health is an expected consequence of CHE and vice versa. CHE occurs in the form of out-of-pocket spending on healthcare. It is improvised by households who must pay from their pocket for health care services that are not inexpensive. It occurs when out-of-pocket healthcare payments affect household living expenses.

Catastrophic health expenditures are also used to measure the performance of prevailing health insurance schemes. The understanding is that a significant fraction of individuals experiencing catastrophic health payments are associated with insufficient coverage concerning health insurance contracts. Globally, about 150 million people or almost a 44million households each year incur catastrophic health expenditures. Also, 25 million households out of this number are pushed into extreme poverty from paying for healthcare.

There is a skew of reliance on out-of-pocket (OOP) health payments to the health financing system in Nigeria. Several reforms such as the National Health Act 2014 and the paradigm shift to greater universalism in healthcare coverage have put the role of user fees and direct payments for services to question due to its negative impact on the poor Population, especially in the low and middle-income countries. The World Bank considers out-of-pocket payments as a crucial determinant of the socio-economic potential of household communities worldwide that experience catastrophic health payments but people in low and middle-income countries like Nigeria are affected mostly. The WHO (2018) estimates that 150 million people incur catastrophic health expenditures while over 100 million are pushed into poverty due to out-of-pocket payments.

Medical expenses are essential indicators for assessing the level of financial protections in subsidizing health insurance a country provides for its Population; hence, the rates of catastrophic health expenditure are imperative. Moreover, CHE indicators offer guidance for developing appropriate health policies and intervention programs to decrease financial inequity and achieve fairness in economic contribution to the health system. Medical care costs become financially catastrophic when it endangers the family's ability to maintain its usual standard of living. Ideally, this change in welfare would be assessed with longitudinal data by examining how health shocks disrupt consumption paths (Gertler and Gruber, 2002). OOP health payments more than a threshold budget share have been used as a proxy for severe disruptions to household living standards in the absence of longitudinal data

Enormous out of pocket payments for health care is a problem because people struck by disease or injury may risk a financial catastrophe or even impoverishment (Wagstaff, 2009). In a study

of 185 countries, Xu et al. (2010) find it may be an important problem in countries where the OOP expenditure on health is more than 20% of total health expenditure. This applies to many low- and middle-income countries.

However, with the large OOP payments for health in low- and middle-income countries found also today, there is a risk that this expenditure may be catastrophic and even lead to poverty. If they decide to seek health care, they will likely face paying substantial sums of OOP. If these sums are above a certain threshold, e.g., income or capacity to pay, the expenditure is considered catastrophic. The household members may alternatively decide not to seek health care. Health facilities may be non-accessible because the associated OOP payments are deemed too high. Then the household members pay another price – a possible deterioration of health compared to if health care had been accessed. But also, in this second alternative, there is a potential financial loss. If the health problems are severe enough for labour days, the associated income will be lost. Of course, this effect also pertains to those seeking health care (Alam and Mahal, 2014).

Research Questions

1. What is the proportion of respondents with catastrophic health expenditure?
2. What factors are responsible for catastrophic health expenditure among Kogi state households?
3. What are the effects of catastrophic health expenditure among Kogi state households?

Aim and Objectives

The aim of this study is to examine the existence and factors responsible for catastrophic health expenditure among households in Kogi state. The specific objectives are to determine the proportion of respondents' catastrophic health expenditure in Kogi state, determine the pattern of catastrophic health expenditure among the respondents, identify factors responsible for catastrophic health expenditure among Kogi state household, and assess the effect of catastrophic health expenditure among Kogi state household.

Hypothesis

1. The employment status of participants is not a factor in Catastrophic Health Expenditure
2. Out-Of-Pocket spending is not a factor in Catastrophic Health Expenditure in Kogi state
3. Location of participants does not contribute to Catastrophic Health Expenditure among households in Kogi state

Statement of the Problem

Kogi's Health Insurance Agency (KGSHIA) is a social insurance scheme that provides an efficient and suitable mechanism of pooling financial resources for strategic purchasing of health care services to confer optimal financial risk protection to all residents of Kogi State.

However, the district schemes again receive support from the central government through National Health Insurance Fund (National Health Act 2014). Regardless of the contribution from different levels, the NHIS provides a universal benefit package to all subscribers, thus warranting horizontal equity to the use of healthcare services (NHIS, 2014). The NHIS has a large and increasing number of deprived groups in its membership base. NHIS operates with the principle of cross-subsidization in its design, ensuring that the rich subsidize the poor by paying more. The contributions of healthier individuals are used to cross-subsidize the sick. Adults of high economic status pay to cross-subsidize children and impoverished individuals. It is supposed to improve the right to obtain health care and bring about universal health coverage and equity by ensuring avoidable unfairness. Redeemable differences do not exist between the poor, the vulnerable and the rich irrespective of where they are. Existing literature on Nigeria's health insurance highlights the policy's gains while addressing the accompanying challenges. Key among the challenges are out-of-pocket payments clients make for healthcare services despite the scheme's existence. Considering the prefinanced nature of the system and the patronage of disadvantaged groups, it is expedient to examine the extent to which such payments are made, how they impact the marginalized and how the NHIS influences such costs.

However, out-of-pocket payments are a significant determinant of catastrophic health expenditure that could exacerbate the poverty level, primarily when healthcare expenditure affects the demand for non-medical goods and services, implications for the Household's living standard. Bredenkamp C. et al. (2012).

Justification for the Study

The NHIS developed a policy that seeks to establish health equity and universal health coverage to ease the challenges faced by the poor in assessing health service delivery, which could have unintended consequences, leading to the poor losing out on using the scheme. This study will highlight specifically the factors responsible for catastrophic health expenditure among Kogi households and the extent to which NHIS enrolment has influenced out-of-pocket health care expenditure, which leads to catastrophic health expenditure. Also, findings from this study would help policy developers put in appropriate measures to ensure the use of NHIS in the State. The study will further add to the available literature on this topic and serve as a

reference source for other students and researchers who wish to explore this topic or other similar ones further.

Research Methodology

Study Settings

This study was carried out among residents in Kogi state; it examined the factors responsible for catastrophic health expenditure among her households.

The ownership of health care facilities in the State falls into three main categories; Government (State and Local), Religious organizations and Private. There are 908 (834 Primary Health Facilities, 74 Secondary Health Facilities) Health Care Facilities in Kogi State. Out of the 834 PHC facilities in the State, 762 are public, while 72 are private. In Kogi East senatorial district, there are 536 public PHC facilities instead of just 26 privates. A ratio of 1 private PHC facility to 21 public PHC facilities. In Kogi west, there are 146 and 16 public and private facilities, respectively. It gives a ratio of 1 private PHC facility to 9 public PHC facilities. There are 80 and 30 Public and Private Health facilities in Kogi Central, respectively. It gives a ratio of 1 private to 3 public PHC facilities.

Study Design

This is a descriptive cross-sectional study

Study population.

The study population will be the heads of households who are residents in Kogi state.

3.3.1 Inclusion Criteria

The study population includes the head of Household in Kogi state

3.3.2 Exclusion Criteria

Household heads, who are too ill, to participate in the survey.

Determination of sample size

The minimum sample size required for this study was determined using

$n = \frac{Z^2pq}{d^2}$ (Susan Rose et al, 2015)

Where n = sample size

Z = Standard normal deviate at confidence interval of 95% = 1.96 p = CHE is when health expenditure is equal or exceeding 40% (WHO definition) q = 1 – p (1- 0.40 = 0.60) d = desired precision at 5 %

Therefore, $N = \frac{1.96 \times 1.96 \times 0.40 \times 0.60}{0.05 \times 0.05}$

n = 369

Adjusting for envisage 10% non-responses.

$n = (\frac{10}{100} \times 369) + 369$

n = 406

This study used a sample size of 406 participants.

Results

To analyze continuous quantitative variables, the study describes household background characteristics using descriptive statistical analyses based on central tendencies and dispersion measures. Frequency, percent frequency and contingency tables were used to summaries categorical variables. The association between the categorical variables and NHIS status was based on the Chi-square test of independence. The association between continuous variables and NHIS status was investigated using Principal Component Analysis. A multivariate logistic regression analysis was used to determine the relationship between covariates and NHIS coverage. To estimate the proportion of households incurring catastrophic health expenditure, frequency, percent frequency and Odds ratio was used. The level of significant was set a $P<0.05$ Additionally, multivariable logistic regression analysis was used to determine the relationship between covariates and CHE at 10% and 40% thresholds.

Table 1: Sociodemographic characteristics of respondents

Variables	Frequency N=403	Percentage (%)
Gender of household head		
Male	350	86.8
Female	53	13.2
The age group of the household head		
21 – 30	11	2.7
31 – 40	84	20.8
41 – 50	103	25.6
51 – 60	79	19.6
61 – 70	97	24.1
70 above	29	7.2
Marital status of household head		
Single	21	5.2
Married	340	84.4
Widow/Widower	42	10.4
Level of education of household head		
No formal education	17	4.2
Primary education	2	0.5
Secondary education	28	6.9
Tertiary education	356	88.3
Religion		
Christianity	302	74.9
Islam	101	25.1
Ethnicity		
Yoruba	89	22.1
Ebira	58	14.4
Igala	217	53.8
Others	39	9.7
Occupational status		
Employed	307	76.2
Unemployed	96	23.8
Geopolitical zone of residence		
Kogi West	255	63.3
Kogi East	87	21.6
Kogi Central	61	15.1
Place of residence		
Urban	225	55.8
Semi-Urban	12	3
Rural	166	41.2

Table 1 shows the socio-demographic characteristics of the respondents. Above average (53.6%) are male, while a little below average (46.4%) are female. The commonly occurring age group of respondents who participated in the study were aged 31-40 years (33.5%), followed by those aged 21-30 years (28.0%). More than eighty percent (84.4%) of the respondents were married, while very few (5.2%) are single. The majority (88.6%) had a Tertiary level of education. The predominant religion of respondents is Christianity (74.9%), and their Islam counterpart accounted for a quarter (25.1%). More than the average (53.8%) of respondents were the Igalas. Almost one-quarter were Yorubas, the Ebiras (14.4%), while (9.7%) are other tribes.

Over three-quarters of the respondents (76.2%) were employed, while about (24%) were unemployed category. Most of the respondents (63.3%) are residents in Kogi, the west senatorial district. Above average (55.8%) are residents in the urban area of the state.

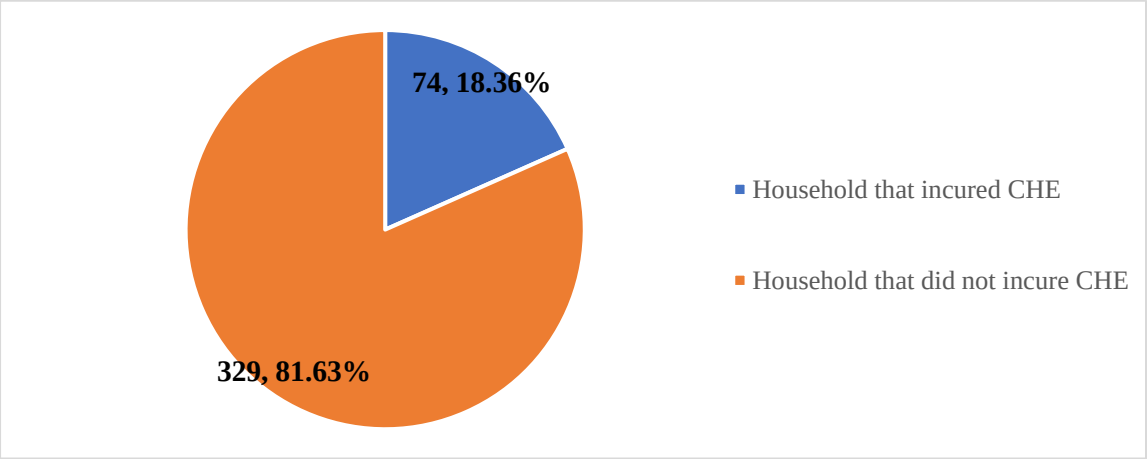

Figure 1: Proportion of Households that incurred Catastrophic Health Expenditure

The figure 1 above chart shows that a total of about 18.4% of the households incurred catastrophic health expenditure.

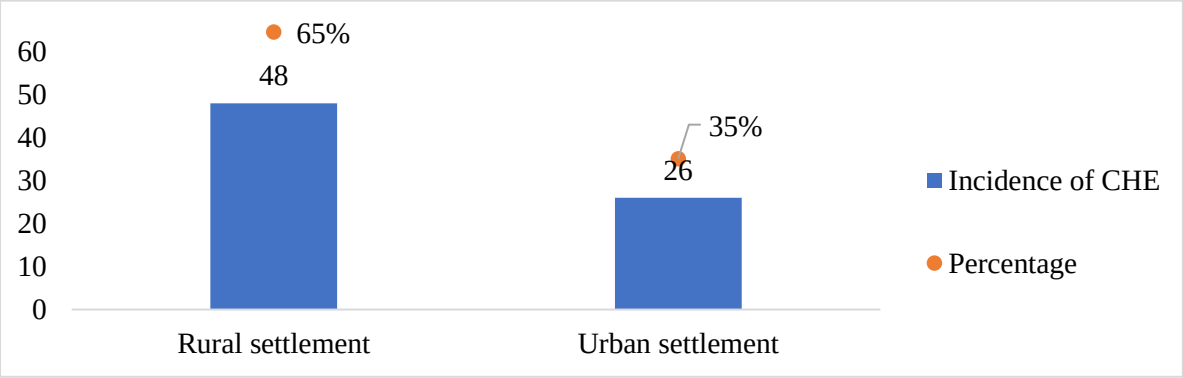

Figure 2: Incidence of Catastrophic Health Expenditure among the rural and urban settlements

From figure 2 above, the chart shows that above average (65%) of the catastrophic health expenditure occur among the rural settlements, while the urban settlement experienced 35% catastrophic health expenditure.

Table 2: Perceived factors responsible for catastrophic health expenditure among respondents

Variables	Frequency N=403	Percentage (%)
Estimated monthly income of the household head		
Less than N20,000	30	7.4
N20,000 – N50,000	74	18.4
N50,000 – N100,000	99	24.6
N100,000 – N150,000	80	19.9
More than N150,000	120	29.8
Type of health facility utilized by the household		
Private Health Facility	121	30
Government Health Facility	282	70
Access to a health facility when a member of the household is sick		
Yes	349	86.6
No	54	13.4
Able to pay the financial cost of healthcare services		
Yes	322	79.9
No	81	20.1
Persons responsible for the payment of healthcare services when sick		
Household head	331	82.1
My self	6	1.5
HMO/NHIS	66	16.4
Distance to the health facility		
Less than 1 hour	346	85.9
1 hour – 2 hours	47	11.7
More than 2 hours	10	2.5
Distance to the healthcare facility is a hindrance to accessing the quality of care		
Yes	47	11.7
No	356	88.3
Status of health insurance of the Household		
Insured	119	29.5
Not insured	284	70.5
Type of illness suffered by the Household		
Chronic illness	15	3.7
Acute illness	327	81.1
Don't know	61	15.1
Did any of the family members hospitalize in the last six months		
Yes	103	25.6
No	300	74.4
Any sick household cannot afford to pay		
Yes	59	14.6
No	344	85.4
Medical bills contribute to poor financial status		
Yes	154	38.2
No	249	61.8
Medical bill landed you in obtaining a loan from financial institutions		
Yes	74	18.4
No	329	81.6

Table 2 above revealed that more than one quarter (29.9%) of the household head earned more than one hundred and fifty thousand naira (NGN150,000) as an estimated monthly income. The majority (70.0%) of the Household in the study location utilized Government
Health Facilities whenever they were sick. In comparison, (30.0%) patronized Private Health Facilities. More of the household head (82.1%) is responsible for medical bills whenever a household member is ill. It was revealed that about (71.0%) of the respondents in the study location are not accessing the HMO/NHMIS.

Table 3: Relationship between the gender and people affected by catastrophic health

Variables	Gender of the household head			Statistics		
Would you be able to pay the financial cost of healthcare services at any government facilities?	Male	Female	Total(N)	χ^2	df	P-value
Yes	179(55.6)	143(44.4)	322(100.0)			
No	37(45.7)	44(54.3)	81(100.0)	2.55	1	0.04*
Total (N)	216(53.6)	187(46.4)	403(100.0)			
Would you be able to pay the financial cost of healthcare services at any private facilities?						
Yes	105(52.2)	96(47.8)	201(100.0)			
No	111(55.0)	91(45.0)	202(100.0)	0.3	1	0.01*
Total (N)	216(53.6)	187(46.4)	403(100.0)			
Who mostly bears the cost of health care services when you are sick?						
Household head	170(51.4)	161(48.6)	331(100.0)			
Myself	6(100.0)	0(0.0)	6(100.0)	7.17	2	0.03*
NHIS/HMO	40(60.6)	26(39.4)	66(100.0)			
Total (N)	216(53.6)	187(46.4)	403(100.0)			
Have you or any family members ever had any sickness you cannot pay the bills?						
Yes	40(67.8)	19(32.2)	59(100.0)			
No	176(51.2)	168(48.8)	344(100.0)	5.6	1	0.02*
Total (N)	216(53.6)	187(46.4)	403(100.0)			
Have medical bills contributed to a decline in your financial status?						
Yes	80(51.9)	74(48.1)	154(100.0)			
No	136(54.6)	113(45.4)	249(100.0)	0.27	1	0.6
Total (N)	216(53.6)	187(46.4)	403(100.0)			
Have you ever had the cause to sell household property/items to pay hospital bills?						
Yes	28(63.6)	16(36.4)	44(100.0)			
No	188(52.4)	171(47.6)	359(100.0)	2	1	0.16
Total (N)	216(53.6)	187(46.4)	403(100.0)			
Have you ever had a situation where other household members go hungry so you can pay hospital bills?						
Never	124(53.9)	106(46.1)	230(100.0)			
Occasionally	33(55.0)	27(45.0)	60(100.0)			
Very rarely	59(57.8)	43(42.2)	102(100.0)	56.6	9	0.00*
Many times,	0(0.0)	11(100.0)	11(100.0)			
Total (N)	216(53.6)	187(46.4)	403(100.0)			

**Statistically significant at P<0.05*

Table 3 shows the association between the gender of the household head and catastrophic health spending. Male participants were opined that they would be able to pay the financial cost of healthcare services at any of the government facilities (55.6%) compared to 47.8% of the female participants who claimed they would not be able to pay the financial cost of healthcare services at any of the government facility.

There was a significant association between the gender of the household head and the ability to pay the financial cost of health services ($\chi^2 = 2.55, df = 1, p < 0.01$). This implies that ability to afford the financial cost of healthcare services at any healthcare facility had a lot to do with gender.

Declined financial status as a result of paying medical bills ($\chi^2 = 0.27, df = 1, p > 0.05$), and gender distribution of the respondent, are not statistically significant. This implies that gender does not affect the declined financial status of the study participants.

Table 4: Relationship between the type of health facility utilized and catastrophic health

Variables	Type of healthcare facility utilized by the Household			Statistics		
	Private health facility	Government health facility	Total(N)	χ^2	df	P-value
Type of settlement						
Rural	87(27.0)	235(72.9)	322(100.0)			
Urban	34(42.0)	47(58.0)	81(100.0)	6.89	1	0.007
Total (N)	121(30.0)	282(70.0)	403(100.0)			
What is the distance from your house to the health facility you use?						
Less than 1hour	110(31.8)	236(68.2)	346(100.0)			
1hour – 2 hours	11(23.4)	36(76.6)	47(100.0)	5.79	2	0.055
More than 2hours	0(0.0)	10(100.0)	10(100.0)			
Total (N)	121(30.0)	282(70.0)	403(100.0)			
What is the status of health insurance for the Household?						
Insured	50(42.0)	69(58.0)	119(100.0)			
Not insured	71(25.0)	213(75.0)	284(100.0)	11.56	1	0.001*
Total (N)	121(30.0)	282(70.0)	403(100.0)			
Long duration of hospitalization makes the family pay unreasonable medical bills, which increases the low standard of living?						
Strongly agree	71(33.2)	143(66.8)	214(100.0)			
Agree	29(19.6)	119(80.4)	148(100.0)			
Neutral	19(65.5)	10(34.5)	29(100.0)	35.02	1	0.00*
Disagree	2(100.0)	0(0.0)	2(100.0)			
Strongly disagree	0(0.0)	10(100.0)	10(100.0)			
Total (N)	121(30.0)	282(70.0)	403(100.0)			
Lack of access to NHIS/HMO hampered access to quality of care?						
Strongly agree	43(39.4)	66(60.6)	109(100.0)			
Agree	60(20.1)	169(79.9)	299(100.0)			
Neutral	18(37.5)	30(62.5)	48(100.0)	5.07	1	0.000*
Disagree	0(0.0)	12(100.0)	12(100.0)			
Strongly disagree	0(0.0)	5(100.0)	5(100.0)			
Total (N)	121(30.0)	282(70.0)	403(100.0)			
Have you ever had the cause to stop children's schools to pay hospital bills?						
Yes	8(14.0)	49(86.0)	57(100.0)			
No	113(32.7)	233(67.3)	346(100.0)	3.08	1	0.002*
Total (N)	121(30.0)	282(70.0)	403(100.0)			

**Statistically significant at P<0.05*

Table 4 shows the association between the type of facility utilized and the catastrophic health spending of the respondents. Type of settlement resided by the respondent ($\chi^2 = 6.89$, $df = 1$, $p < 0.05$), health insurance status of the respondents, whether insured or not-insured ($\chi^2 = 11.56$, $df = 1$, $p < 0.05$), paying unreasonable medical bills as a result of long duration of hospitalization ($\chi^2 = 35.02$, $df = 1$, $p < 0.05$), lack of access to NHIS/HMO hampering quality of services and contribute to high medical bills ($\chi^2 = 5.07$, $df = 1$, $p < 0.05$), having to stop children's school fees from paying the medical bill ($\chi^2 = 3.08$, $df = 1$, $p < 0.05$), are statistically significant. This implies that the type of healthcare facility utilized by the Household has a significant effect on the settlement, health insurance status, paying unreasonable medical bills as a result of a longer duration of hospitalization, access to NHIS/HMO, and conditions that warrant putting a hold on children school fees to pay the hospital bill. Distance from a healthcare facility ($\chi^2 = 5.79$, $df = 2$, $p > 0.05$), is insignificant with the type of healthcare facility utilized. This implies that distance to healthcare facilities has no relationship with catastrophic health spending.

Table 5: Relationship between the education of the household head and catastrophic health

Variables	Education of the household head					Statistics		
What is the type of health care facility utilized by the Household?	**No formal education**	**Primary education**	**Secondary education**	**Tertiary education**	**Total(N)**	χ^2	**df**	**P-value**
Private health facility	0(0.0)	2(1.7)	13(10.7)	106(87.6)	121(100.0)			
Government health facility	17(6.0)	0(0.0)	15(5.3)	250(88.7)	282(100.0)	15.52	3	0.001*
Total (N)	17(4.2)	2(0.5)	28(6.9)	356(88.3)	403(100.0)			
Would you be able to pay the financial cost of healthcare services at any of the healthcare facilities?								
Yes	3(1.5)	2(1.0)	13(6.5)	183(91.0)	201(100.0)			
No	14(6.9)	0(0.0)	5(2.5)	173(85.6)	202(100.0)	9.54	3	0.023*
Total (N)	17(4.2)	2(0.5)	28(6.9)	356(88.3)	403(100.0)			
Who mostly bears the cost of health care services when you are sick?								
Household head	14(4.2)	2(0.6)	28(8.5)	287(86.7)	331(100.0)			
Myself	0(0.0)	0(0.0)	0(0.0)	6(100.0)	6(100.0)	7.37	6	0.288
NHIS/HMO	3(4.5)	0(0.0)	0(0.0)	63(95.5)	66(100.0)			
Total (N)	17(4.2)	2(0.5)	28(6.9)	356(88.3)	403(100.0)			
What is the status of health insurance for the Household?								
Insured	11(9.2)	0(0.0)	6(5.0)	102(85.7)	119(100.0)			
Not insured	6(2.1)	2(.07)	22(7.8)	254(89.4)	284(100.0)	11.96	3	0.008*
Total (N)	17(4.2)	2(0.5)	28(6.9)	356(88.3)	403(100.0)			
What is the type of illness suffered in the Household?								
Chronic illness	0(0.0)	0(0.0)	6(40.0)	9(60.0)	15(100.0)			
Non-chronic illness	6(1.83)	2(0.6)	16(4.9)	303(92.7)	327(100.0)	0.27	1	0.6
I don't know	11(18.0)	0(0.0)	6(9.8)	44(72.1)	61(100.0)			
Total (N)	17(4.2)	2(0.5)	28(6.9)	356(88.3)	403(100.0)			
Geopolitical zone								
Kogi West	0(0.0)	0(0.0)	6(40.0)	9(60.0)	15(100.0)			
Kogi Central	6(1.83)	2(0.6)	16(4.9)	303(92.7)	327(100.0)	0.27	1	0.01
Kogi East	11(18.0)	0(0.0)	6(9.8)	44(72.1)	61(100.0)			
Total (N)	17(4.2)	2(0.5)	28(6.9)	356(88.3)	403(100.0)			

**Statistically significant at P<0.05*

Table 5 above shows a significant association between the types of healthcare facility used by the Household, the ability to pay for the cost of healthcare services at any healthcare facilities, the status of the health insurance scheme of the Household, and the education of the household head, ($p < 0.05$).

There is an association between the education of the household head and catastrophic health spending. This implies that education and the types of healthcare facility used by the Household, the ability to pay for the cost of healthcare services at any healthcare facilities, the status of the health insurance scheme of the Household has a significant association with the education of the household head.

Lastly, who bears the cost of healthcare services when sick and the type of illness suffered in the Household were not statistically significant ($p > 0.05$). This implies that the education of the household head has no relationship with who pays the cost of healthcare services when sick and the type of illness suffered in the Household.

Table 6: Logistic Regression Model

	Beta Coefficient	Standard Error	Wald Statistics	Degree of Freedom	P-value	Odds Ratio (OR)
Constant	0.753	0.107	49.772	1	0.000	2.124

**Statistically significant at P<0.05*

The model was used to test if medical bills by any of the family members have contributed to the family's poor living standard (β=0.753, df=1, p<0.05). The overall model in table 6 revealed that the factors identified were good predictors of the dependent variable. The model was based on dichotomous response variables – No (0) and Yes (1) and categorical explanatory variable(s), which are statements on catastrophic health expenditures.

Table 7: Logistics regression model of relevance and socio-demographic characteristics out of the pocket expenditure

Dependent Variable: Medical bills by any of the family members contribute to poor living standard	Beta Coefficient	Standard Error	Wald Statistics	Degree of Freedom	P-value	Odds Ratio (OR)	95% C.I. for Odds Ratio	
							Lower	Upper
Constant	-2.373	2.253	1.110	1	0.292	0.093		
Age	-0.683	0.171	15.869	1	0.000*	0.505	0.361	0.707
Gender	-0.099	0.261	0.143	1	0.705	0.906	0.543	1.511
Marital Status	1.716	0.436	15.475	1	0.000*	5.562	2.366	13.07
Educational level	0.346	0.454	0.582	1	0.446	1.413	0.581	3.438
Employment Status	-0.358	0.324	1.216	1	0.270	0.699	0.370	1.321
Religion	0.550	0.318	2.981	1	0.084	1.733	0.928	3.234
Ethnic Group	0.845	0.161	27.610	1	0.000*	2.328	1.699	3.191
Geopolitical Zone	-0.896	0.213	17.650	1	0.000*	0.408	0.269	0.620
Children in the house	1.405	0.389	13.059	1	0.000*	4.074	1.902	8.729
Older people in the house	-1.125	0.521	4.662	1	0.031*	0.325	0.117	0.901

**Statistically significant at P<0.05*

In table 7 above, the logistics regression model revealed a significant association between the age of any family member who pays more for medical bills and the family's low economic standard of living. Age was 0.505 times more likely to affect family financial standards and was statistically significant ($\beta = -0.683$, $Odd\ Ratio\ [OR] = 0.505$, $CI = 0.361 - 0.707$, $p < 0.05$). This implies that the age of a family member would influence medical bills that will affect the economic and financial standing of the family.

Also, marital status was 5.562 times more likely to influence the ability to pay medical bills and was statistically significant ($\beta = 1.716$, $Odd\ Ratio\ [OR] = 0.505$, $CI = 2.366 - 13.07$, $p < 0.05$). This implies that marital status has a lot to do with paying medical bills and determining the family's financial standing.

There was a statistical association between the Geopolitical zone and the ability to pay medical bills. Geopolitical zones were 0.408 times more likely to influence the ability to pay medical bills ($\beta = -0.896$, $Odd\ Ratio\ [OR] = 0.408$, $CI = 0.269 - 0.620$, $p < 0.05$). This implies that zones also have to do with out-of-pocket expenditure through medical bills that contributed to the family's economic and financial standard of living.

There was a statistical association between a household with children and out of pocket expenditure by paying medical bills. household with children was 4.074 times more likely to influence out of pocket expenditure of medical bills ($\beta = 1.405$, $Odd\ Ratio\ [OR] = 4.074$, $CI = 1.902 - 8.792$, $p < 0.05$). This implies that a household with children has a lot to do with out-of-pocket expenditure through medical bills that contribute to the family's economic and financial standard of living.

Table 8: Determinants of Catastrophic Health Expenditure

Variables	Unadjusted Odds Ratio			Adjusted Odds Ratio		
	10%	20%	40%	10%	20%	40%
Gender of Household head						
Male						
Female	1.2135**	1.2259*	1.193	1.6202	1.7274	1.0581
Age of Household head						
31 - 40 years						
41 - 50 years	1.1206	1.1206	1.1354	3.0255**	3.4297***	2.4764***
51 - 60 years	1.4671***	1.4671***	1.5020***	2.0127	2.0765*	2.2857**
61 years and above	2.8110***	2.8110***	3.1416***	2.5213	2.8308*	1.9765
Employment status of Household head						
Employed						
Unemployed	1.5388***	1.6709***	1.7043***	2.5941**	1.9193**	2.4531***
Marital Status of Household Head						
Single						
Married	3.2058***	3.6806***	3.3311***	5.7656**	1.8305	3.8890*
Widowed	3.6806***	3.4742***	4.0147***	2.0539	0.6653	2.69899
At least one Hospitalized Member						
Yes	21.027***	18.98954***	18.7614***	1.0193	1.1246	0.9761
No						
Household size						
Less than 5	1.1255	1.0424	1.0088	1.0295	0.7359	1.1204
More than 5						
Health Insurance						
Insured						
Uninsured	1.6000***	1.6570***	1.9762***	0.7299	1.9087	1.5172
Type of Health Facility Used						
Public						
Private	0.6424	.05442**	0.5961***	0.7117	0.5471**	0.6714*
Geo-political zone						
Kogi West	1.3487***	1.4651***	1.2586*	0.4787	0.8313	1.0251
Kogi East	1.6077***	1.3024**	1.1774	0.5524	1.0833	0.7228
Kogi Central	0.8804	0.8456	0.8175*	1.3189	1.2666	0.7916
Residence						
Rural	1.5849***	1.64774***	1.7215***	1.2771	1.6599**	1.2908
Urban						

Dependent variable =1 if the household experienced catastrophic health expenditure. *, **, *** indicate significance at 10%, 5% and 1% level respectively

From table 8 above, the results of the logistic regression at the 40% threshold confirmed the statistically significant effects of a household's economic status on CHE, using households that are in rural areas. The result shows that the odds of incurring CHE increased by 14.8%, 12.9% and 19.8% among households headed by an individual whose age is between 41-50 years, 51-60 years and 61 years and above.

The odds of incurring CHE also increased by 14.5% among households headed by an unemployed person. In the same vein, the odds of incurring CHE were more than 23 times as high among households with at least one hospitalized member than households with no hospitalized member. Interestingly, the odds of incurring CHE decreased by 13.0% among households who utilized a private health facility as compared to those who used a public health facility.

Table 9: Rotated Component Matrix

Factors	Components				
	1	2	3	4	5
Who mostly bears the cost of health care services when you are sick	0.37	-0.618	0.209	0.3	-0.274
Distance from your house to the health facility you use	-0.194	0.213	0.395	0.434	0.282
Distance to any government or private healthcare facility ever hindered you from accessing the quality of care	0.288	0.504	-0.341	0.03	-0.212
Have you considered the length of hospitalization in discouraging you from accessing the quality of care	0.471	0.254	-0.523	0.277	0.247
What is the status of health insurance for the Household	-0.374	0.709	-0.184	-0.24	-0.123
What is the type of illness suffered in the Household	0.296	-0.389	-0.376	-0.259	0.589
Did you or any family member hospitalize in the last six months	0.433	-0.158	0.433	-0.329	0.12
Have you or any family members ever had any sickness you cannot pay the bills	0.64	0.132	0.213	-0.396	0.284
What is the estimated household health spending monthly	-0.272	0.353	0.305	0.474	0.44
Has medical bills contributed to a decline in your financial status	0.76	-0.008	-0.041	0.201	0.084
Have you or any of your family members' medical bills contributed to poor living standards	0.798	0.157	-0.263	0.149	-0.021
Have you ever had the cause to sell household property/items to pay hospital bills	0.547	0.395	0.354	-0.165	-0.178
Have you ever had a situation where other household members go hungry so you can pay hospital bills	-0.608	0.143	0.091	-0.286	0.278
Have medical bills landed you into getting a loan from any financial institutions	0.594	0.367	0.42	-0.015	-0.023

Table 9 shows the different factors responsible for catastrophic expenditure among Kogi State households. Factor analysis was used purposely for data reduction to identify a few factors that explain most of the variance observed in a much larger number of manifest variables.

Factor analysis attempts to identify underlying However, five (5) factors were identified; the first component was most highly correlated with medical bills by respondents or any of the family members contributing to poor living standards. The second component was the status of health insurance for the Household. The third component was the length of hospitalization. The fourth component was estimated household health spending and the last type of illness suffered in the Household. All the factors were better representatives of the factors responsible for catastrophic health expenditure among Kogi state households. This suggests that the focus should be on the five identified factors most relevant to catastrophic health expenditure in the Household.

Discussion

Chi-square and Logistic regression models offer insight into the household characteristics and pattern of catastrophic health expenditures among Kogi state households. This study indicates that some factors are associated with catastrophic health expenditure among households in Kogi state; it is still important to pay attention to these incidences and implement measures to eradicate catastrophic health expenditures in the State.

The following characteristics are positively correlated with catastrophic health spending in the Kogi state: male-headed households, age of household head, formal educational attainment, rural and urban settlements, Geopolitical zone, type of healthcare facility utilized by the Household and the health insurance scheme utilization. Among the socio-demographic factor, the level of education of household heads, such as having no education, having primary education, and having secondary education, was significantly associated with catastrophic health expenditure in this study. In a similar study in Nigeria, Aregbeshola, B. S., & Khan, S. M. (2018b) also support these findings.

This study revealed that health insurance status, such as lack of health insurance, was a significant determinant of catastrophic health expenditure. This could be due to the poor health insurance coverage in Nigeria, which is less than 10%. However, this is in line with studies in Nigeria; Obinna Onwujekwe et al. (2019) also support this finding. Geopolitical zones, such as households living in the Kogi central zone, the Kogi eastern zone, and the Kogi western zone, were associated with catastrophic health expenditure. This could be due to the variation in the Financing, delivery, and provision of health care services across the three geopolitical zones.

However, similar studies in Oyo Obembe & Bankole. (2020) also supports this finding.
Location, such as living in an urban area, increased the probability of incurring catastrophic health expenditure. This could be due to the high cost of health care services in urban areas compared to rural areas. Also, urban areas have many private hospitals that charge high out-of-pocket payments. Households in rural areas may not seek health care due to the inability to pay for health care services. In contrast, a study by Uzochukwu, B. S. C et al (2018) found that location was not a significant determinant of catastrophic health expenditure

The respondent's declined financial status and gender were not associated with catastrophic health expenditure, which is in contrast to a study. Employment status was also found to be significant in many studies Akinkugbe et al. (2020), Barasa EW, Maina T, Ravishankar N (2016), and Aregbeshola, B. S., & Khan, S. M. (2018a) that found heads of household who are not working or are self-employed are at a greater risk of incurring CHE as they have no regular income. This was supported by another finding identified in this review, namely that households headed by a woman had a higher probability of CHE in high- and middle-income countries Arsenault et al. (2013), Barasa EW, Maina T, Ravishankar N (2016).

There was a lack of insurance or other prepayment schemes that would have mitigated the high level of CHE that was found. More than 70% of payments for healthcare by consumers were

made using OOPS. However, protecting households from high OOPs is an important health system goal.

With respect to the determinants of CHE, it was observed in both models that an improvement in the socio-economic status of households from the people in a rural area to the people in the urban area decreases the odds of incurring CHE since both the poor and the rich pay huge amounts for healthcare in the absence of health insurance. This is supported by the study (Adisa, 2015) which discovered that urban households are less likely to incur CHE when compared to rural households in Kogi state.

This study also revealed that households headed by an individual who is above 50 years of age are at a higher risk of CHE than those headed by individuals below 50 years old. Hence the age of the household head is strongly associated with CHE. This may be because human health deteriorates with age. Also, the employment status of the household head is a determining factor in CHE occurrence because employed individuals are expected to be in a better position financially and be able to finance healthcare costs better than the unemployed.

Households with at least one hospitalized member at the period of the survey significantly influenced the occurrence of CHE at all levels but using a private healthcare facility reduces the odds of CHE. This is unexpected and contrary to the findings of Aregbesola and Khan (2017) because private healthcare facilities in Kogi state are more costly than public health facilities. However, this may be because public healthcare facilities (especially tertiary facilities) provide specialized treatments which most private hospitals in Kogi do not provide, hence households patronize and pay more at private healthcare facilities than public facilities. In addition, variables such as the use of ITN, household size, and households with at least one elderly member did not significantly determine CHE after adjusting for other variables.

Conclusion

Findings from our study show that some household and individual characteristics are associated with catastrophic health expenditure in Kogi state. Many households experience catastrophic health payments due to age, education of household head, health insurance status, geopolitical zone, type of health facilities visited, and kind of illness suffered. This implies that many households and individuals still experience inequitable access to quality health care services and face financial hardship consequently. Governments are yet to find fair and innovative ways of financing the health system to reduce the financial burden of out-of-pocket payments on households and individuals in Kogi state.

Evidence suggests that increased allocation of public funds to the health sector leads to a decrease in OOP health expenditure and catastrophic OOP health spending (WHO, 2016). Thus, the insufficient public health financing over the years is a significant driver for high OOP health spending in Kogi state. There is an urgency with which policymakers need to increase public healthcare funding and provide social health protection plans against informal out-of-pocket health payments to provide financial risk protection which is currently absent among the high percentage of households in Kogi state.

Policymakers and political actors need to design equitable health financing policies that will increase financial risk protection for people in both the formal and informal sectors of the economy.

Contribution to the body of knowledge

This study significantly contributes to the existing body of knowledge on catastrophic health expenditure. By focusing on Kogi State, it fills a critical research gap in a region where data on this issue is scarce. The research provides empirical evidence on the prevalence of catastrophic health spending among households in the state, quantifying the extent of the problem. Furthermore, by identifying key factors associated with this phenomenon, the study offers valuable insights into its underlying causes. The findings of this research have important policy implications. The results can inform the development of targeted interventions and policies aimed at mitigating the financial burden of healthcare on households in Kogi State. Additionally, the data generated by this study can serve as a benchmark for future research and monitoring efforts, enabling researchers to track changes in catastrophic health expenditure over time.

Study limitation

This study encountered some limitations; this does not invalidate the research work. As is familiar with all national household surveys around the world, the estimates of catastrophic health expenditure in our study are affected by the structure of the questionnaire, mode of data collection, recall bias, as well as issues of validity, reliability, and comparability; it could affect the accuracy of data collected. Notwithstanding, the findings from this study provide significant

evidence on the pattern and factors responsible for catastrophic health among households in Kogi state, Nigeria. The results would inform policymakers on the need to stop the high reliance on Out-of-Pocket health payments toward achieving financial risk protection, a goal of Universal Health Coverage.

Acknowledgments

The authors express sincere gratitude to the ethical committee of the Kogi State Ministry of Health for granting research approval, to the diligent research assistants, and to all participants for their contributions. Special thanks to the academic mentor for invaluable guidance and support.

Authors' contribution

This research was conducted by Moses Luke in partial fulfillment of the requirements for the award of a Master's Degree. Under the expert guidance of Professor Abodunrin Oluwagbemiga, the study was undertaken. Jacob Ponmile provided invaluable support in data analysis, while Hannah Ojo contributed significantly to the refinement of the research through detailed proofreading.

Funding

No funding support for this research work.

Availability of data

No applicable

Ethics declarations

Ethical approval and consent to participate

Ethical approval for this study was obtained from the Kogi State Ministry of Health, ensuring adherence to ethical guidelines. All participants provided voluntary informed consent prior to data collection. Strict confidentiality measures were maintained throughout the research process.

Consent for publication

Not applicable.

Competing interest

The authors declare no competing interest.

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