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Original Research Article

Effect of health insurance on outpatient health service utilization among households affected by non-communicable diseases in busia county, Kenya

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ABSTRACT

Background: Non-communicable diseases (NCDs) are increasingly becoming important agents of illness and premature deaths globally, killing up to 41 million people annually, 77% of which occur in LMICs. In Kenya, major NCDs are cancer, diabetes, cardio-vascular and chronic respiratory diseases. They account for 50% of all hospital admissions and 39% of hospital deaths. Patients with NCDs go through expensive treatment regiments, restraining them from utilizing available care. NCDs deepen inequality and are the major drivers of unending poverty. Kenya successively reformed the National Health Insurer to include a package that cover the blight of NCDs and transform it into a primary enabler for achieving Universal Health Coverage. There is however no evidence whether health insurance (HI) improves utilization of outpatient NCDs care. This study examined whether health insurance has an effect on utilization of outpatient NCDs care among households of people with NCDs.
Methods: A quasi-experimental design was conducted among eligible households with HI cover and those without, involving a representative sample of 350 households. Interviewers conducted interviews at baseline and after 1 year among household heads.
Results: Utilization of outpatient NCDs care improved by 1.24 (95% CI=1.048-1.474) times among insured households, (p=0.012).
Conclusions: Health insurance improves utilization of outpatient NCDs care. To accelerate progress towards UHC, national government should scale up the program to all counties. County government and partners should ensure availability of essential NCDs commodities.

Keywords: Health Insurance, NCDs care, Outpatient health service utilization

INTRODUCTION

NCDs are increasingly becoming important agents of illness and premature deaths globally, killing up to 41 million people annually, out of which 77% occur in LMICs.[1] Evidence from the 2019 Global Burden of Disease study established that 9 out of the top 10 drivers of raising disability-adjusted life years (DALYs) were NCDs.[2] In Kenya, the major NCDs are cancers, diabetes, chronic respiratory diseases and cardio-vascular diseases that account for more than 50% of all hospital admissions and 39% of hospital deaths.[3] Patients with NCDs go through lengthy treatment regiments with most of their drug combinations being expensive, as a result of often erratic supply of essential medicine.[4] NCDs deepen inequality and are the major drivers of un ending poverty. There is also evidence suggesting that most patients with NCDs have unequal utilization to care including

screening and treatment due to low capacity in primary health care institutions.[5] World leaders in 2015 UN General Assembly resolved to address the devastating consequences of NCDs as a developmental challenge under Sustainable Development Goals (SDGs).[2] Universal health coverage (UHC) is a primary target of the SDG3, which compels countries to ensure that everyone can access and utilize good quality healthcare without suffering financial ruin. Kenya integrated SDGs into her health sector goals and committed to achieve UHC by the year 2022.[6] The government successively reformed the National Health Insurance Fund (NHIF) to include a package of services that address the blight of NCDs and build its capacity to deliver UHC.[7] All Kenyans are eligible to enroll into the scheme with a fixed monthly household premium of Kenya shillings 500 for the informal sector and a monthly premium graduated based on monthly earnings deducted from salary for the formally employed. NHIF contracted public and private health care facilities to provide care to its members and reimbursed them using capitation and case-based systems.[8] In 2018, NHIF rolled out a Pilot HI program in 4 counties of Machakos, Kisumu, Isiolo and Nyeri, targeting more than 3 million residents.[9] This initiative was replicated by other County governments in collaboration with their development partners. In Busia County, AMPATH (a partnership between Moi University College of Health Sciences, Moi Teaching and Referral Hospital and a consortium of North-American Universities led by Indiana University) together with NHIF initiated a HI program.

The program aimed to scale up NCDs management in the region through strengthening primary care services, linking patients to different levels of care and with NHIFs cover.[10] Despite the shifting epidemiological trend in Kenya from communicable diseases to NCDs, there's no evidence that NHIF reforms addressed the needs of households with NCDs in relation to health service utilization. Given that the country has embarked on a highly ambitious plan to attain UHC, there is urgent need for evidence whether HI is capable of improving access and utilization of NCDs care in the country. Kenya is among the LMICs in the sub-Sahara Africa region. The hierarchy of Health delivery structure is organized into Government institutions (facilities operated by County and those operated by the National Government), Private not-for-profit institutions and Private for-profit institutions. Government owned hospitals are structured from level 1 community units without physical structure to highly specialized level 6 referral centers.[11] Kenya's new constitution in 2013 devolved delivery of health services to the 47 County governments, with an exception of level 6 facilities. Health policy, standards, regulation and training functions were also retained at National level.[12]

The study was conducted in Busia County, located in the western part of Kenya. Fishing is the ascendant economic activity along the shores of Lake Victoria which extends to the County. Busia County covers an area of 1,696 square kilometers; with a population of 893,653 where 426,252 are male and 467,401 are female.[13,14] The study objective was to assess whether HI has an effect on outpatient health service utilization among households of people with NCDs.

METHODS

Study design

A quasi-experimental (Pretest- posttest non-equivalent control group) design was conducted since the HI program was rolled out by the partners, thus randomization was not possible. Whenever participants in a study are not randomized, resulting groups are non-equivalent.[15,16] Household registers created during registration of beneficiaries were used to recruit households into an intervention group (with cover) and a control group (without cover). The 2 groups were interviewed for pretest between October - December 2022 before roll out of HI scheme and 1 year later between October-December 2023, for posttest when intervention group had enjoyed the HI scheme.

Study population

Study Population comprised households that had at least 1 member living with NCDs and had either been enrolled (cover paid) or enlisted (waiting list) for HI program. To participate, the household needed to have sought at least 1 outpatient hospital visit 4 weeks preceding the survey or to have had at least 1 case of hospitalization 12 months preceding the survey.

Creation of comparison group

Given that non-randomization can introduce selection bias, the study employed PSM to match each intervention unit to a non-intervention unit of similar baseline characteristics based on calculated propensity scores. As recommended by Stuart, covariates were selected following an extensive literature review of related studies.[17,18] The study used logistic regression to compute the scores and Nearest neighbor method with caliper adjustment approach to create matches from propensity scores. Households were only matched whenever their propensity scores felt within the designated caliper or otherwise discarded. To ensure that intervention group households had a distribution of propensity scores similar to those of comparison group, we checked quality of matches by computing Standardized Mean Differences (SMD) and Variance Ratios (VR) as recommended by other studies.[18,19] The study considered covariate balance as an absolute SMD value less than 0.1 and a VR near 1, recommended by other scholars.[19,20] Using the formula in equation (1), the study included 4 continuous covariates in calculation of SMD. These were age of household

head, household size, income and household propensity score. For dichotomous variables, using the formula in equation (2), the study included gender of household head, marital status, level of education, geographical location of household, household NCD morbidity and NCD comorbidity.

Equation (1).

$$SMD\ of\ X = \frac{\left|\bar{X}_{intervention} - \bar{X}_{comparison}\right|}{\sqrt{\frac{Var_{intervention} + Var_{comparison}}{2}}}$$

Where, $\bar{X}_{intervention}$ and $\bar{X}_{comparison}$comparison is the sample means for the insured and uninsured groups respectively while $Var_{intervention}$and $Var_{comparison}$ are the sample variances for the insured and uninsured groups respectively.

Equation (2).

$$SMD\ of\ x = \frac{|\hat{p}_1 - \hat{p}_2|}{\sqrt{[\hat{p}_1(1-\hat{p}_1) + \hat{p}_2(1-\hat{p}_2)]/2}}$$

Where, $\hat{p}_1$ and $\hat{p}_2$ and e prevalence of dichotomous variables in the insured and uninsured groups respectively.

Sample size and sampling

Using a formula suggested by Sullivan, the study estimated that a minimum sample size of 175 households per group would have power of 80% using a 2-sided alpha of 0.05 and a medium effect of 0.3. Power of 80% or greater is appropriate to establish a statistically significant difference.[21,22] To ensure the total sample size of 350 was available for analysis at 12 months, an additional 15% was added to each group to cater for those that would be lost during matching and follow up. The study aimed and achieved a response rate of 100%.

Data collection and analysis

Trained assistants using structured questionnaires collected data at baseline and posttest. The tool was pre-tested and Cronbach's Alpha reliability mean value of 0.67 was obtained. Validity was assured by adopting and modifying the questions used in related studies. Descriptive analysis was computed so as to summarize data. Under inferential analysis, since outcome data was discrete (counts) negative binomial regression was run to predict the number of household outpatient visits from household HI status, presence of NCDs comorbidity and number of household members with NCDs each independently, while controlling for baseline out-patient utilization.

RESULTS

Socio-demographic characteristics of households

Table 1 illustrates the households' socio-demographic and economic characteristics.

Table 2 outlines the NCDs types in the study area. CVDs were most prevalent as a result of enhanced screening undertaken by AMPATH in the study area. For the households with comorbidity, CVDs with diabetes was most prevalent due to the high prevalence for CVDs and the shared underlying risk factors for CVDs and diabetes.

Table 1: Socio-demographic and economic characteristics of respondents.

Covariate	Level	Intervention		Comparison	
Dichotomous		**Frequency**	**%**	**Frequency**	**%**
Gender	Male	109	29.9	111	30.5
Marital status	Married	107	29.4	103	28.3
Education level	Not attained secondary	100	27.5	94	25.8
Residence location	Rural	140	38.5	138	37.9
NCD morbidity	More than one in HI	14	4	13	3.7
NCD comorbidity	Present in HI	33	9.4	34	9.7
Wealth quintiles (monthly income in Kenya shillings)	1,000 to 5,000	80	22.7	79	22.6
	Over 5,000 to 9,000	62	17.7	67	19.1
	Above 9,000 to 14,500	33	9.4	29	8.3
Continuous	**Level**	**Mean**	**SD**	**Mean**	**SD**
Age (years)	Household head	55.40	12.61	56.0	12.25
No. of people	Household	4.82	1.33	5.0	1.23
Monthly income	Household	6198.9	3033.87	6105.71	2643.36

Table 2: NCDs types affecting households in the study area.

S. no.	NCD type	Intervention	Comparison	Total	(%)
		Frequency	Frequency		
1.	Cancer	11	10	21	6
2.	Diabetes	29	30	59	16.9
3.	CVDs	55	55	110	31.4
4.	CRDs	33	33	66	18.9
5.	Diabetes with CVDs	28	28	56	16
6.	CVDs with CRDs	11	11	22	6.3
7.	Diabetes with CRDs	5	5	10	2.8
8.	Cancer with CVDs	3	3	6	1.7
	Total	175	175	350	100

Table 3. Negative binomial regression model output.

Parameters (1= Insured)	B	Std error	95% Wald CI		Hypothesis			Exp (B)	95% Wald CI for Exp(B)	
			Lower	Upper	Wald $\chi 2$	Df	Sig		Lower	Upper
(Intercept)	0.251	0.1527	- 0.048	0.551	2.711	1	0.100	1.286	0.953	1.734
HI status 1	0.217	0.0870	0.047	0.388	6.247	1	0.012	1.243	1.048	1.474
Baseline HI status 1	-0.026	0.0890	- 0.200	0.149	0.084	1	0.772	0.975	0.819	1.160
Comorbidity 1	0.400	0.1341	0.137	0.662	8.873	1	0.003	1.491	1.146	1.939
No. With ncds 1	0.589	0.1700	0.256	0.923	12.011	1	0.076	0.803	0.292	1.516
Wealth highest 1	-0.030	0.0603	- 0.148	0.088	0.250	1	0.617	0.970	0.862	1.092
Wealth lowest 1	0.241	0.1351	0.1078	0.462	9,643	1	0.001	1.256	1.092	1.601
Scale	1a									
Negative binomial	2.10E-9b	.	.	.						

Association between household HI status and utilization of out-patient NCDs care

Our primary outcome of interest was the number of household outpatient hospital visits to seek NCDs care. Overall, out-patient hospital visits went up by (25.3%) during the study period. Insured households reported more outpatient visits by (18.6%) as compared to uninsured households (6.7%).

Generally, although improved utilization of outpatient NCDs services was reported across the two groups, utilization among households with no cases of comorbidity was noted to be higher compared to utilization by households with comorbidity regardless of insurance status. Households with no case of comorbidity had an increase of (22.3%) compared to households with comorbidity that reported an increase of only (3%). Outpatient service utilization among insured households with cases of comorbidity improved by (7.2%) while that of uninsured declined by (4.2%).

Under inferential analysis, Table 3 illustrates the Negative binomial regression model output.

First, the study established that for every household with HI cover, outpatient utilization improved by 1.243 times (95% CI=1.048, 1.474), (p=0.012) compared to households without cover. This finding could be attributed to the role played by HI cover in eliminating financial barriers to access, among insured households.

Secondly, we established that outpatient health service utilization among insured households afflicted by NCDs comorbidity went up by 1.491 (95%CI = 1.146 -1.939) times, (p = 0.003) compared to uninsured group with comorbidity. This finding may have been due to financial barriers that denied uninsured households' chance to utilize available care given that NCDs comorbidities are expensive to manage.

Thirdly, the study noted that outpatient utilization shoot by 0.970 (95% CI 0.862 – 1.092) times among insured households in the highest wealth quintiles compared to uninsured households in the highest wealth quintiles. This finding was however not significant (p = 0.617). Meanwhile, outpatient health service utilization improved by 1.256 (95% CI 1.092 – 1.601) times among households with cover in the lowest wealth quintiles compared to households without cover in the lowest wealth quintiles, (p = 0.001).

Fourth, there was no evidence that outpatient health service utilization was different among insured and

uninsured households, if a household had more than one member afflicted by NCDs, 0.803 (95% CI 0.292-1.516), p=0.076. The sample for households in the highest wealth quintile and that of household with more than one member afflicted by NCDs was relatively small; hence this limitation could have reduced the power of the study to detect the effect of insurance cover in these groups.

DISCUSSION

The study found evidence that households with health insurance cover utilized outpatient care more compared to those without cover. Related prior studies have reported similar findings in other LMICs.[23-25] In Vietnam for instance, insured households of people with NCDs were 2.5 times more likely to utilize outpatient services than those without.[25] Other related studies in Zambia and in Vietnam however reported contrary findings that HI had no significant association with utilization of out-patient health services by people with NCDs. The authors in the Zambian study argued that the sample size for people with HI cover and those with NCDs was relatively small, a limitation that reduced the power of the study.[26] In Vietnam, the authors asserted that the limited effect of insurance cover was because the study was conducted in the city, while most people live in rural areas hence were unable to access quality services.[25] In this study, increased utilization among insured households as compared to uninsured may be explained by the effect of HI that reduced financial barriers to access, given the high cost of NCDs management. The study noted that increased utilization of outpatient NCDs care happened across the 2 groups despite 1 group lacking HI cover. This was possibly as a result of the rising demand for NCDs care in the country owing to the shifting epidemiologic disease burden and also increased demand for NCDs care in the study area owing to the presence of the AMPATH program that sensitized residents on the need for screening, prevention and management of NCDs.

Utilization of outpatient care for all NCDs comorbidities declined among the households in comparison group. This finding was consistent with others.[25-38] This may be explained in relation to financial barrier, where households are unable to pay for the required services. This study identified follow up tests as the main reason for high OOP health expenditure, with uninsured households paying a higher proportion than insured. Given that patients with NCDs comorbidities have to undergo follow up tests over a long period of time and most of these tests are expensive, it is possible that the high OOP expenditure denied uninsured households opportunity to utilize care.

CONCLUSION

The study concluded that HI improves outpatient health service utilization among households of people with NCDs. National government should scale up the HI program to all counties so as to enable the growing number of households with NCDs access and utilize outpatient services. The scale up should focus on covering all NCDs care needs including follow up tests. County governments and partners should ensure that health systems at primary level are well equipped for all outpatient NCDs care needs. Self-reporting by respondents could have caused minimal measurement errors due to recall bias, however effort was made to minimize bias by using different recall periods for different questions and also by requesting respondents to keep a diary of care seeking events during the study period. One year could have been short to evaluate the effect of HI.

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