

Access to primary healthcare services and associated factors in urban slums in Nairobi-Kenya

Peter O. Otieno (✉ pootienoh@gmail.com)

African Population and Health Research Center <https://orcid.org/0000-0001-6828-8301>

Elvis Omondi Achach Wambiya

African Population and Health Research Center

Shukri M Mohamed

African Population and Health Research Center

Martin Kavao Mutua

African Population and Health Research Center

Peter M Kibe

African Population and Health Research Center

Bonventure Mwangi

African Population and Health Research Center

Hermann Pythagore Pierre Donfouet

African Population and Health Research Center

Research article

Keywords: Access to primary healthcare, Universal health coverage, Urban slums, Penchansky and Thomas's model

Posted Date: November 8th, 2019

DOI: <https://doi.org/10.21203/rs.2.17010/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published on June 22nd, 2020. See the published version at <https://doi.org/10.1186/s12889-020-09106-5>.

Abstract

Background: Access to primary healthcare is crucial for the delivery of Kenya's universal health coverage policy. However, disparities in healthcare have proved to be the biggest challenge for implementing primary care in poor-urban resource settings. In this study, we assessed the level of access to primary healthcare services and associated factors in urban slums in Nairobi-Kenya.

Methods: The data were drawn from the Lown scholars' study of 300 randomly selected households in Viwandani slums (Nairobi, Kenya), between June and July 2018. Access to primary care was measured using Penchansky and Thomas' model. Access index was constructed using principal component analysis and recoded into tertiles with categories labeled as poor, moderate and highest. Generalized ordinal logistic regression analysis was used to determine the factors associated with access to primary care. The adjusted odds ratios and 95 percent confident intervals were used to interpret the strength of associations.

Results : The odds of being in the lowest versus combined moderate and highest access tertile were significantly higher for female than male-headed households (AOR 1.91 [95% CI 1.03-3.54]; $p < .05$). Households with an average quarterly out-of-pocket healthcare expenditure of $\geq \$30$ had significantly lower odds of being in the lowest versus combined moderate and highest access tertile compared to those spending $\leq \$5$ quarterly (AOR 0.33 [95% CI 0.50-1.90]; $p < .001$). Households that sought care from private facilities had significantly higher odds of being in the lowest versus combined moderate and highest access compared to the public facilities (AOR 3.77 [95% CI 2.16-6.56]; $p < .05$).

Conclusion : In Nairobi slums in Kenya, the gender of the household head, out of pocket healthcare expenditure, and source of primary care are significantly associated with access to primary care. Therefore, the universal health coverage program in this setting should be designed with an equity lens so that the most vulnerable groups within the community can have access.

Background Information

Access to primary healthcare is widely acknowledged as key to reducing the global burden of morbidity and mortality (1–3). In 1978, the World Health Organization launched the Alma Ata declaration in a bid to promote access to essential healthcare services while acknowledging health as “a foremost human right” (4). While this agreement was ratified by a majority of low and middle-income (LMIC) countries, time has shown that the resolutions of the Alma Ata declarations remains unfulfilled globally (5). In LMIC countries, access to primary care remains low (6). Identifying the factors associated with access to primary healthcare in resource limited settings is an essential undertaking, particularly, following the inclusion of universal health coverage (UHC) in the sustainable development goals (7). In particular, access to primary healthcare services serves as an important proxy measure of UHC, and thus can be used to evaluate the performance of a healthcare system and identify untapped potential for advancing UHC (8).

Kenya typifies urban growth and slumization in sub-Saharan Africa. Majority (60%–80%) of urban slum dwellers in Kenya live in informal settlements characterized by poor sanitation and hygiene, overcrowding and poor housing, and inadequate public healthcare services (9, 10). Studies have also shown the burden of illness in urban informal settlements in Kenya tend to be high with poor coverage of effective preventive and therapeutic interventions (11–14). The near absence of basic public amenities in slums settings in Kenya has resulted in the mushrooming of several small substandard clinics that are unable to offer integrated primary healthcare yet they serve a huge slum population (15). This has negative implications on access to healthcare services among slum residents (16). Even though the private health facilities have attempted to bridge the gap in demand for primary healthcare services in slum areas, previous studies have shown that they lack the capacity and do not guarantee service quality due to their profit centric nature (17). In spite of the recent efforts made by the Kenyan government to expand UHC, the paucity of evidence on predictors of access to healthcare services has put performance of the primary healthcare system far below the acceptable levels (18).

The objective of this study was to assess the factors associated with access to primary healthcare in urban slums in Nairobi, Kenya. Our study contributes to existing knowledge in two major ways. First, access to essential healthcare services is a critical indicator in the evaluation of UHC. Therefore, knowledge of healthcare services accessibility and associated factors in resource poor urban settings may be used in planning and delivery of evidence based interventions to optimize health service delivery and achieve sustainability. Second, using Penchansky and Thomas' model of access to healthcare (19), we consider a broader analysis of multiple indicators of access to primary healthcare ranging from health insurance coverage, timeliness of care, and distance to the nearest primary care center, availability of essential healthcare services, affordability, acceptability to quality of care and treatment procedure.

Methods

Study Design and Setting

The data for this study are drawn from the Lown scholars survey on healthcare gaps in informal-settlements conducted between June 2018 and July 2018 in Viwandani slums (Nairobi, Kenya). A total of 300 randomly selected households from the Nairobi Urban Health Demographic Surveillance System (NUHDSS) were surveyed in the Lown scholars study. The respondents comprised of adults aged 18 years and over who were either household heads or permanent household members.

Data Collection

A structured interviewer-administered questionnaire was used to collect data from the respondents. The interview questions consisted of healthcare utilization patterns; health insurance coverage, timeliness of care, distance to the nearest primary care center, availability of essential healthcare services, affordability, acceptability, quality of care and treatment procedure. Other questions included; perceived health status, out-of-pocket healthcare expenditure and average monthly expenditure on health insurance. The responses were electronically recorded in a tablet. Secondary data on wealth tertile of the selected

households were obtained from the latest NUHDSS data, which is run by African Population and Health Research Center in Viwandani and Korogocho slum settlements.

Research model

Our study is underpinned by Panchansky and Thomas' theory of access to primary healthcare (19). Previous studies in Nigeria (20) and Istanbul (21) have also adopted this model. Panchansky and Thomas' theory proposes a taxonomic definition of "access." This theory summarizes a set of specific metrics that describe the fit between the healthcare system and the general population. These metrics are; availability, accessibility, accommodation, affordability, and acceptability of healthcare services. In particular, Panchansky and Thomas' metrics of access form a formidable chain of access to primary care that is no stronger than its weakest link (19).

Using Panchansky and Thomas' theory, we conceptualized seven independent and interconnected dimension of access. These dimensions are health insurance coverage, timeliness of care, distance to the nearest primary care center, and availability of essential healthcare services, affordability, and acceptability, quality of care and treatment procedure. Health insurance coverage measures the extent of financial protection of patients from unexpected or high cost of healthcare services, distance to the nearest primary care center measures geographic accessibility of healthcare services. Timeliness of care measures the level of responsiveness of the health facility to the needs of the patient. Affordability measures the relationship between the costs of healthcare services versus the willingness and the ability of the patient to pay for the services. Availability determines the presence of requisite healthcare resources, such as infrastructure, personnel, technology and essential supplies needed to meet the healthcare needs of the patients. Quality of care and treatment procedure reflects the operational organization of the provider in a manner that meets the preferences of the patients. Acceptability measures the extent of comfortability of the patients with immutable characteristics of the healthcare service provider such as sex, age, ethnicity, and social class.

Measurements

Dependent variable

A proxy index for access to primary care was created based on healthcare utilization variables including timeliness of care, distance to the nearest primary care center, availability of essential healthcare services, affordability, acceptability, quality of care and treatment procedure. Access index was finally computed using principal component analysis (PCA) and varimax rotation method. Principal components are weighted averages of the variables used to construct them. The computed index was finally used to classify the sampled households into three categories (tertiles): poorest, middle, and highest. The first eigenvalue of the PCA was 1.72 and the proportion of variance explained by the first three components was 58%.

Independent variables

We conceptualized two categories of predictor variables (individual and household level factors). Individual factors comprised of age, sex, level of education, employment status and perceived health status. Household level factors comprised of the sex of the household head, household size, wealth quintile, out-of-pocket expenditure on health and expenditure on insurance and primary source of care. A wealth index was generated using PCA from socio-economic variables including: type of dwelling, ownership of the dwelling, construction materials of the dwelling, source of cooking fuel, the source of lighting fuel, household possessions/goods, the source of water for household consumption and type of sanitation facility. The households were grouped into tertiles based on the generated wealth index (lowest, middle, and highest).

Data analysis

The outcome variable for this study is access to primary healthcare services. Descriptive statistics were used to summarize the background characteristics of the respondents and the frequency distribution of access to primary care with individual, household and community level factors. The outcome variable assumes an increasing order. Hence a multivariate ordered logistic regression was conducted. We fitted a proportional odds model; however, following the Brant test, we found that the critical assumption of parallel slopes was violated in some of the covariates (age group, education level and primary source of care). Consequently, we implemented a partial proportional odds model, which is less restrictive, and relaxes the proportional odds assumption, allowing the effect of the explanatory covariates to vary (22). More information on the partial proportional odds model is available in numerous sources (23, 24). All explanatory variables in the unadjusted partial proportional odds model that were associated with the outcome were added to the adjusted partial proportional odds model. Results of the multivariate logistic regression compare a continuum of households ranging from those that have low access, moderate access to those that have adequate access to healthcare. We used Stata version 15.1 and statistical significance defined as a p -value less than 0.05 (2-sided). The `gologit2` (25) Stata command was used to fit the partial proportional odds model.

Ethical considerations

The protocol for this study was reviewed and approved by the African Medical and Research Foundation based in Nairobi, Kenya (P482/2018).. Written informed consent was sought from all respondents prior to participation.

Results

Socio-demographic characteristics of the respondents

Table 1 shows the demographic characteristics of the respondents from 300 household that participated in this study. Male respondents constituted a slightly higher proportion of the sample population (51.7percent). Approximately 44 percent of the respondents were aged between 30-44 years. Fifty seven percent of the respondents were married or living

together. Thirty three percent of the respondents had completed secondary education. Most of the households (61 percent) consisted of between one and three members. About 33 percent of the respondents were in lowest, moderate and highest wealth tertile respectively.

Table 1: Socio-demographic characteristics of the respondents

	N	Percent
Sex		
Male	155	51.7
Female	145	48.3
Age group		
18-29	115	38.3
30-44	133	44.3
45-59	42	14.0
60 and above	10	3.3
Marital status		
Married/living together	171	57.0
Divorced/ separated	43	14.3
Widowed	8	2.7
Never married/never lived together	57	19.0
Others	21	7.0
Level of education		
No formal schooling	4	1.3
Primary	120	40.0
Secondary	156	52.0
College/university	20	6.7
Religion		
Roman catholic	96	32.0
Protestants	178	59.3
Other Christians.	6	2.0
Muslim	9	3.0
No religion	11	3.7
Household size		
1-3	183	61.0
4-6	104	34.0
7+	13	4.3
Wealth tertile		
Lowest	100	33.3
Middle	100	33.3
Highest	100	33.3

Distribution of the respondents by access to primary care

We reported the findings from the univariate analysis. *Table 2* shows the distribution of respondents by access tertile. The age group 45 years and above had the highest percentage of respondents in the highest access tertile at 38.5 percent. A higher percentage of households headed by males (38.2 percent) were in the highest access tertile compared to those headed by females (16.4 percent). Respondents with primary level of education constituted the highest percentage of those in the highest access tertile at 36.3 percent. Households with 1-3 members had the highest proportion of those in the highest access tertile at 36 percent. Respondents whose main source of income is casual work constituted the highest percentage of those in the highest access tertile at 35.5 percent.

Respondents in the highest wealth tertile constituted the highest percentage of those in the highest access tertile at 37 percent. Respondents whose average out-of-pocket healthcare expenditure in the three months preceding the survey was below \$5 constituted the highest percentage of those in highest access tertile at 39 percent. Respondents whose ethnic background is Luo constituted the highest percentage of those in the highest access tertile at 47 percent. A higher percentage of respondents who sought care from a private health facility (50 percent) were in the highest access tertile compared to those who sought care from a public health facility (14.8 percent).

[Insert table 2 here]

Factors associated with access to primary care

We first conducted the Brant test of the the parallel lines assumption/proportional odds on the ordered logistic regression. The Brant test suggests that this hypothesis is violated ($\chi^2 = 20.95$, $p\text{-value} = 0.051$). Hence, we reported the results of the multivariate analysis using the generalized ordinal logistic regression in *table 3*.

The odds of being in the lowest access tertile verses the combined moderate and highest access tertiles were about twice higher for female than male headed households, other variables held constant (AOR 1.91 [95% CI 1.03-3.54]; $p < .05$). In the same vein, the odds of being in the combined categories of lowest and moderate access tertile verses highest access tertile was 3.4 times higher for female than male headed households, given the other variables are held constant (AOR 3.43 [95% CI 1.59-7.37]; $p < .001$).

The odds of being in the in the lowest access tertile verses the combined moderate and highest access tertiles were 77 percent lower for households with an average quarterly out-of-pocket healthcare expenditure of \$30 and above compared to those with a quarterly

expenditure of less than \$5, given that other variables are held constant (OR 0.33 [95% CI 0.50-1.90]; $p < .001$). Likewise, the odds of being in the combined categories of lowest and moderate access tertile versus highest access tertile was 68 percent lower for households with an average quarterly out-of-pocket healthcare expenditure of \$30 and above compared to those with a quarterly expenditure of less than \$5, given the other variables are held constant (OR 0.32 [95% CI 0.15-0.68]; $P < .001$).

The odds of being in the lowest access tertile versus the combined moderate and highest access tertiles was 3.8 times higher for households that sought care from private facilities compared to public, given the other variables are held constant (AOR 3.77 [95% CI 2.16-6.56]; $p < .05$). In the same vein, the odds of being in the combined categories of lowest and moderate access tertile versus highest access tertile was 7.2 times higher for households that sought care from private facilities compared to public, given the other variables are held constant (AOR 7.15 [95% CI 3.85-13.29]; $p < .001$).

[Insert table 3 here]

Discussion

In this study, we assessed the level of access to primary healthcare services and associated factors in urban slums in Nairobi-Kenya. Our findings revealed the gender of the household head, out of pocket healthcare expenditure, and source of primary care are significantly associated with access to primary care.

Our results suggest a systematic disadvantage of female versus male-headed households in access to primary care. Previous studies have also consistently revealed widespread gender differences in access to primary care (26–28). Several explanations have been offered. These disparities may be associated with gender inequalities in access to health insurance coverage (29, 30). Our findings are consistent with the results of the 2013 Kenya Household Healthcare Expenditure and Utilization Survey (KHEUS) which suggest that women are more likely to have poor access to primary healthcare services due to low health insurance coverage (31). In general, the most important determinants of health insurance coverage are employment-related factors and income (29, 32, 33). A possible explanation for these results could be the existence of gender differences in job opportunities with women more likely to engage in informal employment with lack of entitlements such as health insurance than men (28).

Our finding that out of pocket healthcare expenditure of \$30 versus \$5 was independently associated with increased odds of being in the lowest versus combined moderate and highest access tertiles is consistent with evidence from a number of recent studies (34–37). In particular, poor financial protection in low resources settings is attributable to inadequate funding, fragmentation of healthcare resources and inadequate health insurance coverage (32). Similar to the findings of our study, previous studies have also shown that direct (out of pocket) OOP costs place a huge burden of bearing the costs of illness to the sick person and their households, and is, therefore, a major contributor to inequities (38–42).

Providing financial risk protection to reduce OOP health expenditure as envisaged in the Sustainable Development Goals and UHC agendas is critical to improve access to primary healthcare in resource-poor urban settings.

Similar to previous studies (43–45), our results suggest that households that primarily sought healthcare services from private facilities had higher odds of being in the lower versus combined medium and higher access tertiles. A plausible explanation for these findings could be due to the fact that healthcare provision in urban slums in Kenya is largely dominated by privately owned, sub-standard and often unlicensed clinics which provide poor quality healthcare services (12). Our findings reinforce the continued need for the Kenyan government to address the weaknesses of the public health sector and regulate private health facilities in urban slum settlements by providing technical support to bring quality health services closer to slum populations.

Our findings have three key policy implications. First, within the healthcare system in Viwandani slums in Nairobi, Kenya, there is an urgent need for implementation of policies and programs that take into account the gender disparity in access to primary care. Second, there is a need to scale up efforts for expanding health insurance coverage in the study community to cushion households against OOP expenditures. Third, proper mechanisms should be developed to regularly monitor the quality of healthcare services offered by private facilities in urban slums by the relevant authorities. Technical support is also required for them to improve the quality of healthcare services.

Limitations

This study did not disaggregate health expenditure into the various components of direct and indirect healthcare spending. There is therefore little room to draw conclusive arguments on costs such as transport to access healthcare, time lost from work and other informal costs which households may incur in the process of seeking access to care. In addition, the fact that the study was conducted in one urban slum settlement may have a bearing on its generalizability to other urban slums in Kenya. Despite these limitations, our study findings provide useful insights on the level of access to primary healthcare services and associated factors in urban slums in Nairobi, Kenya and serve as a basis for more rigorous investigations in other urban slum settings in Kenya and sub-Saharan Africa.

Conclusions

This study shows that access to primary healthcare services for slum residents is poor and varies by the gender of the household head, source of primary care and OOP healthcare expenditure incurred. Our study provides important results particularly highlighting the lower access to primary healthcare among female-headed households. Multiple approaches to primary healthcare access are needed to address this issue among slum residents. Therefore, policies that encourage economic growth in female-headed households are likely to create economic empowerment and improve access to primary healthcare in these settings. Similarly, public programs that offer protection against out of pocket spending are likely to

improve access to primary healthcare. In addition, private health facilities need to improve the quality services provided

List Of Abbreviations

AOR: Adjusted odds ratio

CI: Confidence interval

KHEUS: Kenya household healthcare expenditure and utilization survey

LMIC: Low and middle-income countries.

NUHDSS: Nairobi urban health demographic surveillance system

OOP: Out of pocket payment

PCA: Principal component analysis

UHC: Universal health coverage.

Declarations

Ethics approval and consent to participate:

This study was approved by the Ethical Review Board of AMREF Foundation based in Nairobi, Kenya (reference number: P482/2018). The respondents went through an informed consent process and their participation was voluntary and anonymous. Written consent was provided before participation.

Consent for publication

Not required.

Availability of data and materials

Data are available upon reasonable request. Study materials and de-identified data that support the findings in this study are available by contacting Shukri Mohamed at the African Population and Health Research Center in Kenya via email address smohamed@aphrc.org.

Competing interest

The authors declare that they have no competing interest

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors

Author contributions: POO conceptualized the study, reviewed literature and contributed to data analysis. SM, EW, HD, MKM, PMK and BM made substantive contributions to the conceptualization of the study and reviewed the manuscript. All authors read and approved the final manuscript

References

1. Glass DP, Kanter MH, Jacobsen SJ, Minardi PM. The impact of improving access to primary care. *Journal of evaluation in clinical practice*. 2017;23(6):1451–8.
2. Gulliford M. Access to primary care and public health. *The Lancet Public health*. 2017;2(12):e532-e3.
3. Jamison DT, Alwan A, Mock CN, Nugent R, Watkins D, Adeyi O, et al. Universal health coverage and intersectoral action for health: key messages from Disease Control Priorities, 3rd edition. *Lancet* (London, England). 2018;391(10125):1108–20.
4. World Health Organization. *From Alma Ata to the year 2000: reflections at the midpoint*. 1988.
5. Ji JS, Chen L. UHC presents universal challenges. *Health Systems & Reform*. 2016;2(1):11–4.
6. Kruk ME, Porignon D, Rockers PC, Van Lerberghe W. The contribution of primary care to health and health systems in low-and middle-income countries: a critical review of major primary care initiatives. *Social science & medicine*. 2010;70(6):904–11.
7. Moreno-Serra R, Smith PC. Does progress towards universal health coverage improve population health? *The Lancet*. 2012;380(9845):917–23.
8. Fullman N, Lozano R. Towards a meaningful measure of universal health coverage for the next billion. *The Lancet Global Health*. 2018;6(2):e122-e3.
9. UN-HABITAT. *The State of African Cities 2008 - A Framework for Addressing Urban Challenges in Africa*. UN-HABITAT: Nairobi; 2008.
10. UN-HABITAT. *The State of African Cities 2010: Governance, Inequality and Urban Land Markets*. United Nations: Nairobi; 2010.
11. Chuma J, Gilson L, Molyneux C. Treatment-seeking behaviour, cost burdens and coping strategies among rural and urban households in Coastal Kenya: an equity analysis. *Tropical Medicine & International Health*. 2007;12(5):673–86.
12. Kyobutungi C, Ziraba AK, Ezeh A, Yé Y. The burden of disease profile of residents of Nairobi's slums: Results from a Demographic Surveillance System. *Population health metrics*. 2008;6(1):1.

13. Muriithi MK. The determinants of health-seeking behavior in a Nairobi slum, Kenya. *European Scientific Journal*, ESJ. 2013;9(8).
14. Ziraba AK, Mills S, Madise N, Saliku T, Fotso J-C. The state of emergency obstetric care services in Nairobi informal settlements and environs: Results from a maternity health facility survey. *BMC health services research*. 2009;9(1):46.
15. Amendah DD, Buigut S, Mohamed S. Coping strategies among urban poor: Evidence from Nairobi, Kenya. *PloS one*. 2014;9(1):e83428.
16. Buigut S, Ettarh R, Amendah DD. Catastrophic health expenditure and its determinants in Kenya slum communities. *International journal for equity in health*. 2015;14:46.
17. Ezeh A, Oyebode O, Satterthwaite D, Chen Y-F, Ndugwa R, Sartori J, et al. The history, geography, and sociology of slums and the health problems of people who live in slums. *The lancet*. 2017;389(10068):547–58.
18. Fotso JC, Mukiira C. Perceived quality of and access to care among poor urban women in Kenya and their utilization of delivery care: harnessing the potential of private clinics? *Health policy and planning*. 2011;27(6):505–15.
19. Penchansky R, Thomas JW. The concept of access: definition and relationship to consumer satisfaction. *Medical care*. 1981;127–40.
20. Chimezie RO. A case study of primary healthcare services in Isu, Nigeria. 2011.
21. Paköz MZ, Yüzer MA. Access to healthcare: A field survey in Istanbul. *AJ Z ITU Journal of the Faculty of Architecture*. 2014;11(2):271–90.
22. Ananth CV, Kleinbaum DG. Regression models for ordinal responses: a review of methods and applications. *International journal of epidemiology*. 1997;26(6):1323–33.
23. Ananth CV, Kleinbaum DG. Regression models for ordinal responses: a review of methods and applications. *International journal of epidemiology*. 1997;26(6):1323–33.
24. Williams R. Generalized ordered logit/partial proportional odds models for ordinal dependent variables. *Stata Journal*. 2006;6(1):58–82.
25. Williams R. Generalized ordered logit/partial proportional odds models for ordinal dependent variables. *The Stata Journal*. 2006;6(1):58–82.
26. Iyer A, Sen G, Östlin P. The intersections of gender and class in health status and health care. *Global public health*. 2008;3(S1):13–24.

27. Merzel C. Gender differences in health care access indicators in an urban, low-income community. *American journal of public health*. 2000;90(6):909.
28. Suda C. Gender Disparities in the Kenyan Labour Market. *Nordic journal of African studies*. 2002;11(3):21-.
29. Kimani JK, Ettarh R, Warren C, Bellows B. Determinants of health insurance ownership among women in Kenya: evidence from the 2008–09 Kenya demographic and health survey. *International journal for equity in health*. 2014;13(1):27.
30. Witter S, Govender V, Ravindran TS, Yates R. Minding the gaps: health financing, universal health coverage and gender. *Health policy and planning*. 2017;32(suppl_5):v4-v12.
31. MOH. 2013 Kenya Household Health Expenditure and Utilisation Survey. Nairobi: Government of Kenya. 2014.
32. Buigut S, Ettarh R, Amendah DD. Catastrophic health expenditure and its determinants in Kenya slum communities. *International journal for equity in health*. 2015;14(1):46.
33. Mathauer I, Schmidt JO, Wenyaa M. Extending social health insurance to the informal sector in Kenya. An assessment of factors affecting demand. *The International journal of health planning and management*. 2008;23(1):51–68.
34. Ciapponi A, Lewin S, Herrera CA, Opiyo N, Pantoja T, Paulsen E, et al. Delivery arrangements for health systems in low-income countries: an overview of systematic reviews. *The Cochrane database of systematic reviews*. 2017;9:Cd011083.
35. Herrera CA, Lewin S, Paulsen E, Ciapponi A, Opiyo N, Pantoja T, et al. Governance arrangements for health systems in low-income countries: an overview of systematic reviews. *The Cochrane database of systematic reviews*. 2017;9:Cd011085.
36. Pantoja T, Opiyo N, Lewin S, Paulsen E, Ciapponi A, Wiysonge CS, et al. Implementation strategies for health systems in low-income countries: an overview of systematic reviews. *The Cochrane database of systematic reviews*. 2017;9:Cd011086.
37. Wiysonge CS, Paulsen E, Lewin S, Ciapponi A, Herrera CA, Opiyo N, et al. Financial arrangements for health systems in low-income countries: an overview of systematic reviews. *The Cochrane database of systematic reviews*. 2017;9:Cd011084.
38. Barasa EW, Maina T, Ravishankar N. Assessing the impoverishing effects, and factors associated with the incidence of catastrophic health care payments in Kenya. *Int J Equity Health*. 2017;16(1):31.
39. Bonfrer I, Gustafsson-Wright E. Health shocks, coping strategies and foregone healthcare among agricultural households in Kenya. *Glob Public Health*. 2017;12(11):1369–90.

- 40.Barasa E, Nguhiu P, McIntyre D. Measuring progress towards Sustainable Development Goal 3.8 on universal health coverage in Kenya. *BMJ global health*. 2018;3(3):e000904.
- 41.Maina JM, Kithuka P, Tororei S. Perceptions and uptake of health insurance for maternal care in rural Kenya: a cross sectional study. *The Pan African medical journal*. 2016;23:125.
- 42.Atake EH, Amendah DD. Porous safety net: catastrophic health expenditure and its determinants among insured households in Togo. *BMC health services research*. 2018;18(1):175.
- 43.Acharya LB, Cleland J. Maternal and child health services in rural Nepal: does access or quality matter more? *Health policy and planning*. 2000;15(2):223–9.
- 44.Chakraborty N, Islam MA, Chowdhury RI, Bari W, Akhter HH. Determinants of the use of maternal health services in rural Bangladesh. *Health promotion international*. 2003;18(4):327–37.
- 45.Falkingham J, Akkazieva B, Baschieri A. Trends in out-of-pocket payments for health care in Kyrgyzstan, 2001–2007. *Health policy and planning*. 2010;25(5):427–36.

Tables

Table 2: Distribution of respondents by access to primary care

	Access tertiles			
	N	(%) lowest	(%) moderate	(%) highest
Age group				
18-29	115	33.91	28.7	37.39
30-44	133	37.59	34.59	27.82
45 and above	52	25.00	36.54	38.46
Sex of the household head***				
Male	233	29.18	32.62	38.20
Female	67	50.75	32.84	16.42
Marital status				
Married/living together	171	33.33	31.58	35.09
Divorced/separated/widowed	51	43.14	35.29	21.57
Never married	78	29.49	33.33	37.18
Education				
Primary and below	124	33.87	29.84	36.29
Secondary	156	34.62	32.69	32.69
Tertiary	20	30.00	50.00	20.00
Household size				
1-3	183	29.51	34.43	36.07
4 and above	117	41.03	29.91	29.06
Occupation				
Employed worker	65	38.46	26.15	35.38
Casual worker	141	25.53	39.01	35.46
Trader	73	39.73	32.88	27.40
Unemployed	21	57.14	9.52	33.33
Wealth tertile				
Lowest	100	30.00	35.00	35.00
Middle	100	39.00	33.00	28.00
Highest	100	33.00	30.00	37.00
Quarterly healthcare expenditure**				
≤\$5	143	22.38	39.16	38.46
\$5- \$999	42	45.24	23.81	30.95
\$10- \$29.9	49	36.73	30.61	32.65
≥\$30	66	50	25.76	24.24
Ethnicity				
Kamba	107	28.97	31.78	39.25
Kikuyu	92	35.87	30.43	33.70
Kisii	20	50.00	30.00	20.00
Luhya	45	35.56	42.22	22.22
Luo	17	23.53	29.41	47.06
Others	19	42.11	31.58	26.32
Source of primary care***				
Public	142	46.48	38.73	14.79
Private	158	22.78	27.22	50.00
Total	300	34.00	32.67	33.33

Notes: CI 95% confidence interval. *significant at $p < 0.1$, significant at ** $p < 0.05$, *** significant at $p < 0.001$

Table 3: Generalized ordinal logistic regression

	Access tertile	Odds Ratio	Std. Err.	P>z	[95% Conf. Interval]	
Lowest						
Gender	Male (Ref)					
	Female**	1.91	0.60	0.04	1.03	3.54
Age group	18-29 (Ref)					
	30-44	1.02	0.30	0.96	0.57	1.81
	45-59	1.16	0.52	0.73	0.48	2.80
	>60	5.52	6.17	0.13	0.62	49.29
Education	Primary (Ref)					
	Secondary	0.87	0.25	0.64	0.50	1.53
	Tertiary	1.12	0.68	0.86	0.34	3.66
Wealth tertile	Poorest (Ref)					
	Middle	0.77	0.26	0.43	0.39	1.48
	Highest	0.97	0.33	0.93	0.50	1.90
Quarterly healthcare expenditure	≤\$5(Ref)					
	\$5- \$999***	0.30	0.12	0.00	0.13	0.65
	\$10- \$29.9***	0.40	0.16	0.02	0.18	0.88
	≥\$30***	0.23	0.08	0.00	0.11	0.46
Source of primary care	Public (Ref)					
	Private***	3.77	1.07	0.00	2.16	6.56
	_cons	1.37	0.61	0.48	0.57	3.26
Moderate						
Gender	Male (Ref)					
	Female**	3.43	1.34	0.00	1.59	7.37
Age group	18-29 (Ref)					
	30-44	0.66	0.20	0.18	0.36	1.21
	45-59	1.16	0.50	0.73	0.50	2.71
	>60	0.37	0.32	0.25	0.07	2.05
Education	Primary (Ref)					
	Secondary	0.63	0.19	0.13	0.35	1.14
	Tertiary	0.21	0.14	0.02	0.05	0.78
Wealth tertile	Poorest (Ref)					
	Middle	0.56	0.20	0.10	0.28	1.11
	Highest	1.00	0.35	0.99	0.51	1.98
Quarterly healthcare expenditure	≤\$5(Ref)					
	\$5- \$999***	0.49	0.21	0.09	0.22	1.12
	\$10- \$29.9***	0.47	0.20	0.07	0.20	1.07
	≥\$30***	0.32	0.12	0.00	0.15	0.68
Source of primary care	Public (Ref)					
	Private***	7.15	2.26	0.00	3.85	13.29
	_cons	0.17	0.09	0.00	0.06	0.49

Notes: CI 95% confidence interval. *significant at $p < 0.1$, significant at ** $p < 0.05$, *** significant at $p < 0.001$

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [STROBEchecklistcrosssectionalstudies.docx](#)