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Prevalence and factors associated with health insurance coverage in resource-poor urban settings in Nairobi, Kenya: a cross-sectional study

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ABSTRACT

Objective To determine the prevalence of health insurance and associated factors among households in urban slum settings in Nairobi, Kenya.

Design The data for this study are from a cross-sectional survey of adults aged 18 years or older from randomly selected households in Viwandani slums (Nairobi, Kenya). Respondents participated in the Lown scholars' study conducted between June and July 2018.

Setting The Lown scholars' survey was nested in the Nairobi Urban Health and Demographic Surveillance System in Viwandani slums in Nairobi, Kenya.

Participants A total of 300 randomly sampled households participated in the survey. The study respondents comprised of either the household head, their spouses or credible adult household members.

Primary outcome measure The primary outcome of this study was enrolment in a health insurance programme. The households were classified into two groups: those having at least one member covered by health insurance and those without any health insurance cover.

Results The prevalence of health insurance in the sample was 43%. Being unemployed (adjusted OR (aOR) 0.17; p<0.05; 95% CI 0.06 to 0.47) and seeking care from a public health facility (aOR 0.50; p<0.05; 95% CI 0.28 to 0.89) was significantly associated with lower odds of having a health insurance cover. The odds of having a health insurance cover were significantly lower among respondents who perceived their health status as good (aOR 0.62; p<0.05; 95% CI 1.17 to 5.66) and those who were unsatisfied with the cost of seeking primary care (aOR 0.34; p<0.05; 95% CI 0.17 to 0.69).

Conclusions Health insurance coverage in Viwandani slums in Nairobi, Kenya, is low. As universal health coverage becomes the growing focus of Kenya's 'Big Four Agenda' for socioeconomic transformation, integrating enabling and need factors in the design of the national health insurance package may scale-up social health protection.

Strengths and limitations of this study

► To the best of our knowledge, this is among the first studies to determine prevalence and factors associated with health insurance coverage among poor urban slum residents in Kenya and serves as a basis for laying the foundation for the sustainability of universal health coverage.
► The findings of this study provide useful insights for scaling-up health insurance coverage in resource-poor urban settings in Kenya.
► The inclusion of only one urban slum settlement in this study may limit the generalisability of the findings to all other slum settlements in Kenya.

countries in Sub-Saharan Africa have poor healthcare financing systems.[1 4] Research on healthcare financing identifies health insurance coverage as a key pillar for the sustainability of UHC.[5 6] Similarly, the 2010 WHO report on UHC focused on health insurance as a key pillar for sustainable UHC, and in 2011, at the 64th WHO assembly, the WHO urgently called for member states to enhance financial protection and promote equity and efficiency in their health systems.[7]

While the Kenyan government has included UHC as one of the items in the 'Big Four Agenda', efforts to improve health insurance coverage in the resource-poor urban settings have been very minimal.[8] Employment-based social health insurance schemes are limited to the formal sector and exclude the majority of slum dwellers in the informal sector.[9] Recently, the Kenyan government commissioned the National Hospital Insurance Fund (NHIF) 2014–2018 Strategic Plan to reduce the burden of healthcare financing by improving health insurance coverage in informal settlements.[10] However, very few attempts have been made to determine the health insurance status of urban slum dwellers.[11] In Kenya, large proportions

INTRODUCTION

Universal health coverage (UHC) and protection of populations from impoverishing costs of seeking healthcare services have dominated policy discussion at both the national and international level.[1–3] However, most

(60%–80%) of the urban population live in informal settlements (UN-HABITAT, 2008;[12] UN-HABITAT, 2010[13]). Most Kenyans living in resource-poor urban settings are low-income earners involved in informal employment with lack of entitlements, such as health insurance.[14] An estimated 89% of the slum dwellers in Kenya experience annual impoverishing shocks related to healthcare expenditure.[15]

The objective of this study was to assess the prevalence and factors associated with health insurance coverage among urban slum residents in Nairobi city. The justification for this study is twofold. First, the costs of healthcare constitute a significant financial barrier to healthcare access in a country where the majority of urban slum dwellers live below the poverty line.[16–18] Therefore, a sound understanding of the prevalence and determinants of health insurance status is imperative in providing evidence-based information that can be aligned to the UHC strategy. Second, health insurance is a major anchor for the viability and sustainability of UHC. Hence, effective healthcare financing interventions in resource-poor urban settings should integrate the factors shown to predict health insurance status. Our study contributes to existing knowledge in two major ways. First, we consider a broader analysis of drivers of health insurance status rather than exploring the determinants of a particular type of health insurance. Second, using the theoretical framework proposed by Andersen and Newman,[19] we examine multiple predictors of health insurance in the context of the underlying (predisposing and enabling factors) and proximate determinants (need factors).

METHODS
Study design and setting
The data for this study are from a cross-sectional survey of adults aged 18 years or older from randomly selected households in Viwandani slums (Nairobi, Kenya). Respondents participated in the Lown scholars' survey on healthcare gaps in urban slums conducted between June and July 2018. This study is nested in the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) which is managed by African Population and Health Research Center in Viwandani slums in Kenya.

The sample and sampling procedure
This study is based on the data from all households that participated in the Lown scholars' survey. The sample size for the original study was calculated using the formula for calculating sample size for cross-sectional studies (Cochran, 1977); $n = z^2 \times p \times (1-p)/e^2$ where z, p and e are the standard normal deviation set at 95% confidence level ($z = 1.96$), the population proportion assumed to have health insurance cover ($p=25\%$) and the margin error ($e=5\%$), respectively. Using a non-response rate of 4%, the final sample was 300. To select the 300 households, simple random sampling was performed in the NUHDSS database using a random number generator in MS Excel software. The software randomises the

households using random numbers to create a random list. The first 300 households from the randomised list were selected as the sample for the study.

Data collection
Interviewer-administered structured questionnaires were used to collect information from the respondents by trained field interviewers. The questionnaire was pretested before data collection. The study respondents comprised of either the household head, their spouses or credible adult household members. All visiting adults who were not residents of Viwandani were excluded. Also, respondents with emotional or mental disabilities that hindered their successful participation in this study were excluded. Respondents were asked questions about healthcare access in terms of quality, cost, availability and accessibility. Other questions included healthcare utilisation patterns, enrolment in health insurance, cost and types of health insurance. The responses were electronically recorded in a tablet. Secondary data on wealth quintile were obtained from the latest round NUHDSS. Detailed information on the estimation of wealth quintile among households in NUHDSS have been previously documented.[20]

Research model
The current study is underpinned by Andersen and Newman's behavioural model of health service utilisation.[19] This model has also been used in a previous study in Ghana.[21] According to this model, three categories of variables (predisposing, enabling and need factors) may be used to explain the odds of having a health insurance cover. Predisposing factors refer to underlying socio-demographic predictors of the need for a health insurance cover. These factors include age, sex, and level of education among others. Enabling factors are resources required to access health insurance coverage. These include personal enabling resources (socioeconomic status) and community-level resources (primary healthcare system). The need factors are the most proximate determinants of health insurance coverage. They include both subjective and objective well-being.[19]

Measurements
Dependent variable
The dependent variable in this study is enrolment in a health insurance programme. The households were classified into two groups based on enrolment in a health insurance programme; those having at least one member covered by any health insurance (coded as 1) and those without any health insurance cover (coded as 0).

Independent variables
Three categories of variables (predisposing, enabling and need factors) derived from Andersen's behavioural model were conceptualised as predictors of health insurance coverage.[19] Predisposing factors comprised of age, sex and level of education. Enabling factors comprised of employment status, the primary source of healthcare, wealth quintile (computed using principal component analysis and

categorised into five quintiles: poorest, poor, middle, rich and richest), and satisfaction with quality and procedure of care. The need factors comprised of perceived health status (measured using Likert scale items: very good, good, moderate, poor and very poor) and self-reported illness in the 12 months preceding the survey (coded as 1 when at least one household member was ill, else 0).

Data analysis

Descriptive analyses were first performed to describe the characteristics of the study respondents. Proportions were computed to describe the prevalence of health insurance coverage. The Pearson's chi-squared test (χ^2) was used to test the association between enrolment in a health insurance programme and predictor variables. Multivariate logistic regression analysis was used to determine the factors associated with health insurance coverage. In the first model, only predisposing factors were included. Model 2 included both predisposing and enabling factors. Finally, model 3 included predisposing, enabling and need factors. The selection of the predictor variables in models 1, 2 and 3 was informed by the Andersen's behavioural model.[19] The likelihood-ratio test was used to assess the goodness-of-fit of the model including enabling and need variables against the reduced model containing only predisposing factors. We used the Mantel-Haenszel test to test for confounding of predisposing variables, including age and sex. The strength of association was interpreted using the adjusted OR (aOR) and 95% CI. All analyses were done using Stata V.15.

Consent to participate

All study participants were briefed of the study and their rights before enrolment and were required to provide written informed consent prior to participation in the interviews.

Patient and public involvement

No patient was involved.

RESULTS

Demographic characteristics of the respondents

Of the total 300 respondents, there were slightly more males (51.7%) than females (48.3%). About 44% of the respondents were aged between 30 and 44 years. More than half (57%) of the respondents were married or living together. A third of the respondents had completed secondary education, while 38% of the respondents were employed as casual workers. Approximately two-thirds (61%) of the households consisted of between one and three members. Table 1 presents the distribution of the respondents by demographic characteristics.

Distribution of respondents by health insurance status

Table 2 presents the distribution of respondents by health insurance status. The prevalence of health insurance coverage in the study sample was 43.0%. The proportion of respondents with health insurance coverage was highest among those aged 18–39 years (43.5%), females (43.5%), those who were married or living together (47.4%) and

Table 1 Demographic characteristics of the respondents

Demographic characteristics	Frequency (n)	%
Sex		
Male	155	51.7
Female	145	48.3
Age group, years		
18–29	115	38.3
30–44	133	44.3
45 and above	52	17.3
Marital status		
Married/living together	171	57.0
Divorced/separated/widowed	51	17.0
Never married	78	26.0
Level of education		
Primary and below	124	41.3
Secondary	156	52.0
Tertiary	20	6.7
Employment status		
Employed worker	62	20.7
Casual worker	114	38.0
Trader	83	27.7
Unemployed	41	13.7
Wealth quintile		
Lowest	63	21.0
Second	57	19.0
Middle	60	20.0
Fourth	60	20.0
Highest	60	20.0
Household size		
1–3	183	61.0
4–6	104	34.0
7+	13	4.3

those who had completed tertiary education (70.0%). The χ^2 test revealed no significant association between predisposing factors (age, sex, marital status and level of education) and health insurance coverage (p>0.05).

With regards to enabling factors, the proportion of respondents with health insurance coverage was highest among those who were employed (77.4%), those who were in the middle wealth quintile (41.5%) and those who sought care from private health facilities (48.7%). The prevalence of health insurance coverage was also highest among those who were satisfied with the procedure of care (40.7%) and those who were satisfied with the cost of treatment (46.4%). The χ^2 test revealed a significant association between enabling factors (employment, primary source of care, and satisfaction with the procedure and cost of care) and health insurance coverage (p<0.05).

Table 2 Distribution of respondents by health insurance status

Predisposing factors	N	Proportion of respondents with health insurance cover (%)	Pearson χ^2 (p value)
Age group, years			
18–29	115	43.5	>0.05
30–44	133	42.9	
45 and above	52	42.3	
Sex			
Male	155	42.6	>0.05
Female	145	43.5	
Marital status			
Married/living together	171	47.4	>0.05
Divorced/separated/widowed	51	37.3	
Never married/never lived together	78	37.2	
Level of education**			
Primary and below	124	39.5	<0.05
Secondary	156	42.3	
Tertiary	20	70	
Enabling factors			
Employment status***			
Employed	62	77.4	<0.001
Casual worker	114	28.1	
Trader	83	38.6	
Unemployed	41	41.5	
Wealth quintile*			
Poorest	63	38.1	<0.1
Poor	57	38.1	
Middle	60	35.6	
Rich	60	45.8	
Richest	60	40.91	
Primary source of healthcare**			
Public	142	36.6	<0.05
Private	158	48.7	
Satisfaction with quality of care			
Procedure of care***			
No	27	18	<0.05
Yes	273	40.7	
Cost of care**			
No	67	22.3	<0.05
Yes	233	77.6	
Need factors			>0.05
Perceived health status			
Good	240	41.7	
Poor	60	48.3	
Self-reported illness in the past 12 months***			

Continued

Table 2 Continued

Predisposing factors	N	Proportion of respondents with health insurance cover (%)	Pearson χ^2 (p value)
Yes	240	47.9	<0.001
No	60	23.3	
Total	300	43.0	

*significant at p<0.1, **significant at p<0.05 and ***significant at p<0.001.

Determinants of health insurance status

Table 3 presents the findings of the multivariate logistic regression analysis on the determinants of health insurance coverage. In the first model, only predisposing factors were included. Respondents with tertiary education had about four times the odds of having health insurance cover compared with those with no education (aOR 3.8; 95% CI 1.34 to 10.72).

Model 2, including both predisposing and enabling factors, showed that respondents who were casual workers, unemployed and traders had 88% (aOR 0.12; 95% CI 0.06 to 0.27), 81% (aOR 0.19; 95% CI 0.08 to 0.42) and 84% (aOR 0.16; 95% CI 0.06 to 0.44) lower odds of having health insurance compared with those who are employed, respectively. Households that primarily sought care from public health facilities had about half the odds of having health insurance coverage compared with those that sought care from private health facilities (aOR 0.47; 95% CI 0.26 to 0.82). Respondents who were not satisfied with the cost of care had 61% lower odds of having health insurance coverage (aOR 0.39; 95% CI 0.20 to 0.78) compared with those who were satisfied. Respondents who were not satisfied with the procedure of care had about five times the odds of having health insurance coverage (aOR 4.55; 95% CI 1.7 to 12.1) compared with those who were satisfied. The addition of enabling factors, such as education, employment, socioeconomic status, source of primary care, and satisfaction with cost and procedure of healthcare, to the reduced model with predisposing factors had a good model fit (Likelihood-ratio test (LRT) p<0.01).

Finally, model 3, including need factors, showed that respondents who were casual workers, unemployed and traders had 89% (aOR 0.11; 95% CI 0.05 to 0.25), 82% (aOR 0.18; 95% CI 0.08 to 0.44) and 84% (aOR 0.16; 95% CI 0.06 to 0.45) higher odds of having health insurance, respectively, compared with those who were employed. Households that primarily sought care from public health facilities had 50% higher odds of having health insurance cover compared with those that sought care from private health facilities (aOR 0.50; 95% CI 0.28 to 0.89). Compared with respondents who were satisfied, those who were unsatisfied with cost of care had 66% lower odds of having health insurance cover (aOR 0.34; 95% CI 0.17 to 0.69), while those who were not satisfied with

Table 3 Determinants of health insurance coverage

		Model 1			Model 2			Model 3		
		aOR	95% CI	p>z	aOR	95% CI	p>z	aOR	95% CI	p>z
Predisposing factors										
Age, years		1.01	0.99 to 1.03	0.50	1.01	0.98 to 1.03	0.54	1.01	0.98 to 1.03	0.66
Sex	Female (REF)									
	Male	0.94	0.58 to 1.50	0.78	0.90	0.47 to 1.70	0.74	0.97	0.51 to 1.85	0.93
Education	No formal/primary (REF)									
	Secondary	1.16	0.71 to 1.90	0.54	1.12	0.64 to 1.97	0.69	1.19	0.67 to 2.13	0.55
	College/university*	3.80	1.34 to 10.72	0.01	2.52	0.74 to 8.57	0.14	2.80	0.80 to 9.81	0.11
Enabling factors										
Employment status	Employed (REF)									
	Casual worker***				0.11	0.05 to 0.25	0.00	0.12	0.06 to 0.27	0.00
	Trader***				0.18	0.08 to 0.42	0.00	0.19	0.08 to 0.44	0.00
	Unemployment***				0.16	0.06 to 0.44	0.00	0.16	0.06 to 0.45	0.00
Wealth quintile	Poorest (REF)									
	Poor				1.02	0.42 to 2.47	0.96	1.02	0.42 to 2.50	0.96
	Middle				2.10	0.87 to 5.03	0.10	1.93	0.79 to 4.75	0.15
	Rich				1.47	0.64 to 3.35	0.36	1.53	0.65 to 3.59	0.33
	Richest				1.34	0.57 to 3.14	0.51	1.64	0.67 to 4.0	0.28
Source of primary care	Private health facility (REF)									
	Public health facility**				0.47	0.26 to 0.82	0.01	0.50	0.28 to 0.89	0.02
Satisfaction with cost of care	No (REF)									
	Yes**				0.39	0.20 to 0.78	0.01	0.34	0.17 to 0.69	0.00
Satisfaction with procedure of care	No (REF)									
	Yes**				4.55	1.7 to 12.1	0.00	3.96	1.44 to 10.90	0.01
Need factors										
Self-reported illness in the past 12 months*	None									
	At least one case							2.57	0.31 to 1.23	0.17
Perceived health status	Poor (REF)									
	Good**							0.62	1.17 to 5.66	0.02

n=300; *significant at p<0.1, **significant at p<0.05 and ***significant at p<0.001; LRT p<0.05.
aOR, adjusted OR; LRT, likelihood-ratio test; REF, reference category.

the procedure of care had about four times higher odds of having health insurance coverage (aOR 3.96; 95% CI 1.44 to 10.90) compared with those who were satisfied. Respondents who perceived their health status as good had 38% lower odds of having health insurance coverage compared with those who reported poor health status (aOR 0.62; 95% CI 1.17 to 5.66). Addition of the need factors to the predisposing and enabling factors model had a good fit (LRT p<0.05). Age and sex were not found to be confounders in the model.

DISCUSSIONS

We assessed the prevalence and factors associated with health insurance coverage among urban slum residents in Nairobi city. Our findings revealed that only 43% of slum residents in the study community had health insurance coverage. This is slightly higher than the 31% reported by the 2013 Kenya Household Health Expenditure and Utilization Survey (KHHEUS) in Nairobi.[22] This discrepancy could be partly due to the fact the respondents of the current study were sampled from an urban slum in Nairobi as opposed to the KHHEUS that targeted the entire urban population of Nairobi. Nonetheless, our findings corroborate empirical evidence from previous international studies which have shown that the majority of urban slum dwellers in Sub-Saharan Africa are not covered by health insurance.[23–25] A plausible explanation for these findings could be that most urban slum dwellers in low-income and middle-income countries are low-income earners involved in informal employment with lack of entitlements, such as health insurance.

The results of the multivariate analysis show that the odds of having health insurance coverage are significantly increased by enabling and need factors than predisposing factors. Our results suggest that having health insurance coverage is a function of enabling (employment status, the primary source of healthcare services, and satisfaction with cost and procedure of care) and need (perceived health status) factors. With regards to the enabling factors, our findings suggest that the unemployed respondents were less likely to have health insurance coverage. These results are indicative of the fact that the poor and unemployed urban slum dwellers have limited ability to pay the regular contribution for health insurance premiums required on enrolment. Our findings are consistent with similar studies which have shown that most unemployed slum dwellers rely heavily on out-of-pocket expenditure (OOP) payment for health expenditures.[26 27] The higher insurance coverage among employed members may also have been contributed by insurance policies at the workplace which is characteristic of many organisations in Kenya which points towards a need to increase formal employment opportunities in informal settlements.[28 29]

Similar to previous studies,[30 31] our results also show that households that primarily sought healthcare services from public health facilities were less likely to have health insurance coverage. A possible explanation for this observation is the fact that public provision of primary healthcare services

in Kenya is highly subsidised,[22] and hence, the majority of uninsured people seek care in these facilities. Our results show that the respondents who were unsatisfied with the cost of care were less likely to have health insurance coverage, while those who were not satisfied with the procedure of care provided were more likely to have health insurance coverage. These observations are indicative of the fact that satisfaction with care is a key determinant of patients' behavioural intention to have health insurance coverage. Previous studies have also shown that the level of patient satisfaction with the quality of care is correlated with enrolment in a health insurance programme.[32–34]

With reference to the need factors, our results suggest that the respondents who perceived their health status as good were less likely to have health insurance coverage. A likely explanation for this may be that slum dwellers who perceive themselves as healthy tend to skip out on health insurance to meet the cost of other basic needs as has been suggested in previous studies.[35 36] Previous studies have also shown that self-reported health status significantly predicts the odds of having health insurance coverage.[35 36]

Our findings have two key policy implications in this setting. First, the low prevalence of health insurance in the study community clearly highlights the urgent need for NHIF scale-up especially among the unemployed and informal sector workers. This has been proposed as a channel of ensuring equity and access to health services for the poor and those in the informal sectors.[37] Second, the evidence presented in this study suggests that enabling (employment status, the primary source of healthcare, and satisfaction with quality and procedure of care) and need (perceived health status) factors are significant predictors of health insurance coverage. Therefore, the policy options for scaling-up health insurance coverage in the study community should be modelled on the concept of enabling and need factors to achieve sustainability.

Strengths and limitations

To the best of our knowledge, this is among the first studies to determine prevalence and factors associated with health insurance coverage among the poor urban slum residents in Kenya and serves as a basis for laying the foundation for the sustainability of UHC.

Our study findings provide useful insights for scaling-up health insurance coverage in resource-poor urban settings in Kenya.

This study has one major limitation. The survey was conducted only in one urban slum settlement in Nairobi city; hence, the results may not generalisable to all other urban slum settings in Kenya. However, the findings provide useful insights for more rigorous investigations in other urban slum settings in Kenya and Sub-Saharan Africa.

Conclusion

The prevalence of health insurance coverage in Viwandani slums in Nairobi, Kenya, is low and associated with enabling and need factors. As UHC becomes the growing focus of Kenya's 'Big Four Agenda' for socioeconomic

transformation, redesigning the national social health insurance package with an equity lens based on enabling and need factors may scale-up health insurance coverage in Viwandani slums in Nairobi.

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