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Health insurance uptake, poverty and financial inclusion in the Democratic Republic of Congo

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Abstract

This study estimates the prevalence of health insurance coverage and associated socioeconomic factors in the Democratic Republic of Congo (DRC). Using the nationally representative household survey of the 2017/2018 DRC Multiple Indicator Cluster Survey (MICS), we applied weighted logistic regression models to identify regions and subgroups with low health insurance coverage. The study's findings revealed a low insurance coverage of less than 5%, with significant disparities across provinces and socioeconomic status. Additionally, three factors were strongly associated with the low health insurance coverage rates: education, wealth, and financial inclusion proxied by bank account ownership. Consequently, we recommend that the government, the private sector, and donors prioritize programs targeting provinces with less coverage and individuals without formal education to increase health insurance coverage. This study encourages the government to establish national programs to improve financial inclusion, which could positively impact poverty reduction and health insurance coverage. We also propose that the government initiates pilot projects for premium exemptions and through subsidies for vulnerable populations in the short term, and ensure formal employment for the majority of the population in the long term to facilitate the proper collection of premiums for individuals. Overall, this study contributes to the literature on health insurance in the DRC and sub-Saharan Africa by identifying the socioeconomic factors that explain the prevalence of health insurance coverage. The findings of this study have important policy implications for the government, the private sector, and donors to promote health insurance coverage and achieve universal health coverage.

KEYWORDS

Democratic Republic of the Congo, education, financial inclusion, health insurance, poverty

1 | INTRODUCTION

Achieving Universal Health Coverage in the context of under-resourced health systems is challenging. In the Democratic Republic

of Congo (DRC), 90% of health financing originates from private households out of pocket (OOP) (Nyamugira et al., 2022). The high volume of OOP expenditure is a primary indicator of the poor financial protection provided by the health financing system in the DRC.

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Additionally, government expenditure using domestic resources for health is also low, that is, it was less than 1 dollar (USD 0.84) per capita over 2007–2017 and accounted for only 8.1% of the total health expenditure over 2000–2018 (Barroy et al., 2014; Nyamugira et al., 2022). The DRC received comparably strong financial support from international donors, but its health system has been undermined by several years of war and a continuing lack of government financing (Lordemus, 2022).

Many high-income countries have relied on government- or employer-based Health Insurance (HI) or a mix of both to achieve UHC (Savedoff et al., 2012). By contrast, many low-income countries rely more on Community-Based Health Insurance (CBHI) schemes as alternative health financing options to OOP payments. However, CBHI plays a minor role in the DRC, as only 10% of the insured population in the DRC is covered under a CBHI scheme in comparison to 81% covered by employer-based HI. Moreover, many Congolese people in the informal sector are excluded from the insurance system (INS, 2019).

In addition, access to health insurance in the DRC is linked to household income and economic status. Using data from the Demographic and Health Survey (DHS 2013/2014), Barroy et al. (2014) confirmed that 0.7% of men and 1% of women in the poorest quintile reported that they had insurance, whereas 12% of men and 15.3% of women in the richest quintile had an insurance.

Empirical research has identified various socioeconomic and demographic patterns of health insurance coverage in low-income countries (LIC). These factors include marital status, age, gender, level of education, household income, wealth index, religion, place of residence, sex of the household head, household size, ethnicity, poor health quality, health characteristics etc. (Adebayo et al., 2015; Agbadi et al., 2021; Allcock et al., 2019; Anaba et al., 2022; Kazungu & Edwine, 2017; Kimani et al., 2014). One factor that is also crucial for the HI coverage but frequently neglected, is financial inclusion. There is some evidence that the fact whether potential customers have a bank account or not determines whether they will have a health insurance coverage (Dupas & Robinson, 2013; Prina, 2015). Worldwide, about 64% of adults have financial institution accounts (Demirgüç-Kunt et al., 2018), the respective figure for Sub-Saharan Africa is about 35% (World Bank Group, 2015) while only 17% of the population of DRC had a bank account. The interdependency between the financial dimension and health of a population seems to be closer than many people think.

In addition, a number of systematic reviews show that health insurance in LIC is associated with a positive impact on financial protection, an improvement in access to healthcare and a moderate effect on the health of the insured (Comfort et al., 2013; Erlangga et al., 2019; Gabani et al., 2022; Habib et al., 2016; Rahman et al., 2022). On the other hand, empirical results confirm that in LIC, health insurance programs support better-off population sub-group while leaving behind underserved populations (Doris et al., 2022; Umeh, 2017; Wagstaff, 2010).

Based on these insights, health insurance systems were improved, but coverage remains low until today, that is, more reforms are required to increase coverage and strive to achieve UHC.

The Democratic Republic of Congo is in the process of reforming its health financing to achieve UHC. However, these reforms are hardly based on evidence as most research on health insurance coverage was conducted outside the DRC. Consequently, there is limited empirical evidence on health insurance coverage in the DRC. To maximize the effects of strategies and policies towards achieving UHC, health insurance policies should target the sub-groups in the population with the highest needs. Therefore, identifying and targeting this sub-groups in the population is crucial to ensure the highest level of health insurance coverage.

Building on a nationally representative cross-sectional survey conducted in 2017–18 (INS, 2019), this study intends to provide evidence on the socioeconomic and demographic patterns of health insurance in the DRC. The objective of this research is to assess the prevalence of Health Insurance (HI) among the sub-groups in the Congolese population. This study aims to identify the sub-groups and regions of residence of the Congolese population with the highest needs of health insurance coverage in order to support health-policy makers in this country with an evidence-based approach to stimulate focus on those groups, which need the most, support so that health insurance coverage can be increased and UHC eventually achieved.

2 | METHODS

2.1 | Data collection

DRC Multiple Indicator Cluster Survey (MICS) is a nationally representative cross-sectional survey conducted in the DRC by the National Institute of Statistics (Institut National de la Statistique) of the DRC's Ministry of Planning with technical and financial support from UNICEF. The primary concern of MICS surveys is the generation of reliable social and health statistics; for this purpose, core indicators on mortality, nutrition, child health, and further are collected in general but also with a special focus on women and children. Among the six rounds of the MICS, DRC has only taken part in MICS1 (1995), MICS2 (2001), MICS4 (2010), and MICS6 (2017–2018).

Our study uses the MICS6 which comprises survey data collected by a total of 620 trained supervisors, team leaders and enumerators who conducted face to face interviews using standardized questionnaires. Enumerators visited the households selected in the sample, where they directly asked the respondents the survey questions and documented their responses. Data was collected from a large and geographically spread group of people and covers the whole country of the DR Congo. A small group of the population was selected at each stage of the survey.

Data in MICS survey was collected using the following standard questionnaires: Household questionnaire (with water quality testing questionnaire, when included), questionnaire for individual women age 15–49 years, questionnaire for individual men age 15–49 years, questionnaire for children age 5–17 years, and questionnaire for children under 5 years of age. The MICS database used in this study are specifically designed to gather reliable, internationally comparable data on approximately 130 key indicators, enabling the assessment of the

well-being of children, women, and men across the domains of health, education, and child protection (MICS, 2019).

2.2 | Study design and settings

This study uses individual and household datasets from the 2017/2018 DRC Multiple Indicator Cluster Survey (MICS) (INS, 2019). The global MICS program was developed by UNICEF in the 1990s as an international household survey program to support countries in collecting internationally comparable data on a wide range of indicators related to the situation of children and women and the living conditions of populations (INS, 2019). The survey generates key indicators providing disaggregated data on health, education, nutrition, social protection, and domestic violence, along with socio-economic, demographic, and geographic characteristics at the individual and household levels. In this study existence of a health insurance represents the primary outcome.

The DRC MICS's sampling frame used for the implementation of the survey design was based on the last Population and Housing Census of 1984, which is 33 years before the start of the survey. Compared with the first census in 1984, the sampling in 2017/18 was modified with respect to the change in the primary units (cities, towns, and villages) based on diverse factors such as population displacement and the security situation to account for changes in the administrative

structure. Details of the MICS design and methodology are described elsewhere (INS, 2019).

Following a standardized protocol, the survey employed a multi-stage, stratified cluster probability sampling design to establish a representative sample of households proportional to population size at the national and provincial levels. A decentralization process initiated in 2015 set the number of provinces from 11 to 26, including the city capital of Kinshasa. This new decentralization was accounted for in the 2018 MICS. Within each province, urban areas (towns and cities) and rural areas were defined as the main sampling strata. Households were selected in the following stages. Within each stratum, a specified number of clusters were selected systematically with probability proportional to size. Subsequently, the HH samples were selected from the sampled clusters. In total, 30 HH were selected from each sampled cluster using systematic random sampling method. Thus, 721 clusters and 21,630 households were selected. Of these, 20,792 households, 21,756 women (15–49 years), and 6113 men (15–49 years) were successfully interviewed. Figure 1 summarizes the results of the sampling of the 2018 MICS in the DRC.

2.3 | Study population

The study used data from all the respondents regardless of the health insurance providers, which can be a Community-Based Health

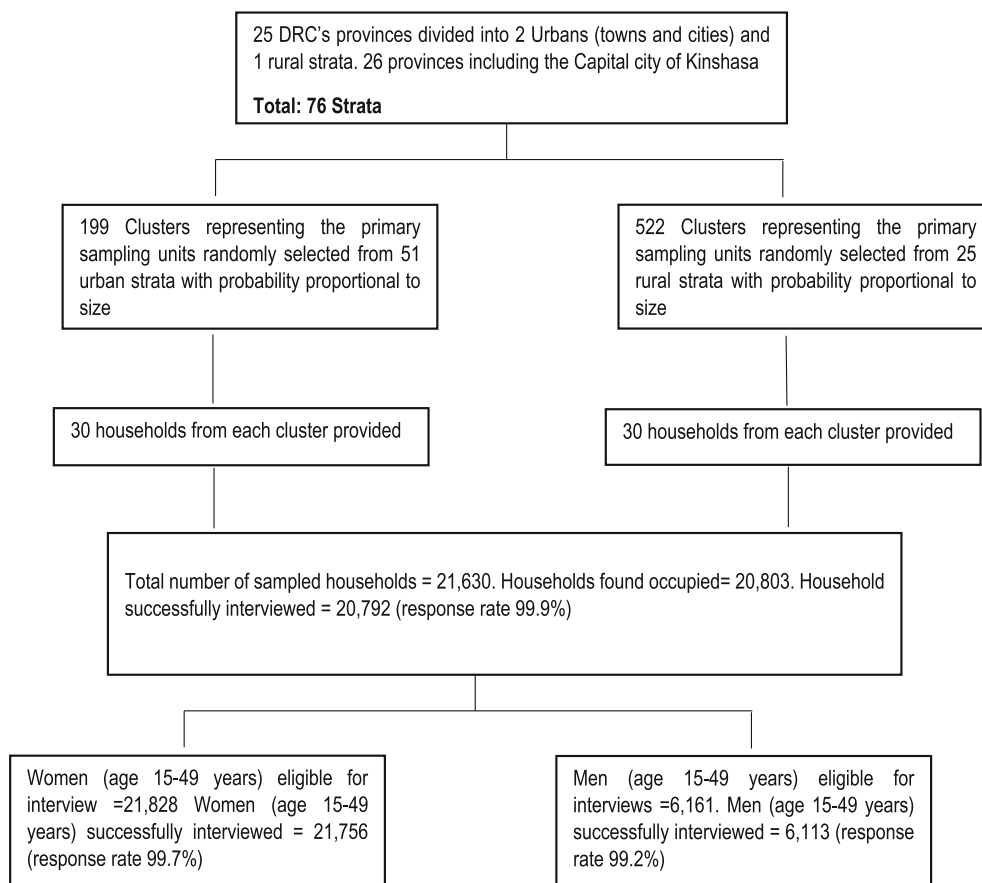


FIGURE 1 Flow chart showing the selection of the study population. Source: own, based on (INS, 2019).

Insurance, HI provided by the employer, social security funds, a private HI, or any other HI provider, that is, the study population of this study is identical to the study population of the MICS-Palu 2018 population. The MICS survey collects data on households and administers questionnaires to women and men aged 15–49 years. Therefore, it is possible that household heads are (much) older than 50 years. Likewise, the children of the respondents included in the sample could be younger than 15 years.

2.4 | Study variables

2.4.1 | Outcome variable

The outcome variable used in this study was health insurance coverage provided by Community-Based Health Insurance, HI provided by the employer, social security funds, a private HI, or any other HI provider. Our dependent variable determines the health insurance status of the respondent, providing information on whether the respondent is insured or not. This was a dichotomous variable with a “Yes” or “No” response option where “Yes” indicates that the respondent is covered by any health insurance.

2.4.2 | Covariates

Based on empirical research, we selected variables on the socio-economic characteristics of respondents, and their households and geographical conditions. At the individual level, the variables included marital status (1: married and 0: not married), age, education level, place of residence (urban and rural), province of residence, and the wealth quintile. At the household level, we retained the following variables: religion of the HH head, ethnicity of the HH head, education level of the HH head, gender of the HH head, age of the HH head and wealth index quintile of the HH.

The age of the respondents was categorized into four groups (1: 15–19 years; 2: 20–29 years; 3: 30–39 years; 4: 40–49 years). For the age of the HH head, we added one category comprising respondents aged 50 years old and above. The education level of the respondent and household head was categorized into four groups (0: without formal education; 1: primary; 2: high school; 3: higher).

In 2015, governmental decentralization increased the number of provinces from 11 to 26. In the DRC MICS 2017–2018, most of the newly created provinces do not have sufficient information on health insurance. Therefore, to make the province categories relevant for the analysis of health insurance status, we recategorized the provinces in MICS 2017–2018 into 11 old provinces: Kinshasa, Bas Congo, Bandundu, Equateur, Province Orientale, Nord Kivu, Sud Kivu, Maniema, Katanga, Kasai Oriental, and Kasai Occidental.

The wealth index is a composite indicator of wealth. This indicator was used as a proxy measure of the socioeconomic status of a household. To construct the wealth index, a principal component analysis is conducted using information on the ownership of consumer

goods, dwelling characteristics, access to water and sanitation, and other assets related to the household's wealth. The DRC MICS dataset provides five categories for the wealth index variable: 1: poorest; 2: second; 3: third; 4: fourth and 5: richest (INS, 2019).

2.4.3 | Data analysis

Descriptive statistics

Given that the DRC MICS is cross-sectional and based on a multistage sampling design, we used the *svy* command in STATA to adjust for sample design and sample weight during all analyses in this study. Data analysis was performed using STATA version 16. The characteristics of the study population were described using frequencies and percentages. Chi-square tests were used to examine the association between participant characteristics and health insurance uptake.

We calculated Lorenz curves to document the distribution of health insurance coverage across the wealth status of the respondents (Gastwirth, 1972). Overall, on the x-axis, we plotted the respondents from the lowest to the highest wealth quintile. The y-axis plots the cumulative distribution of the share of health insurance coverage. A perfect equality would mean that the cumulative distribution of HI coverage coincides with a straight diagonal line. The Gini coefficient was calculated to support inequality analysis. A Gini coefficient of 1 indicates perfect inequality while a coefficient of 0 indicates that health insurance coverage is equally distributed over the wealth group of the population.

Consideration of sampling design (weighting)

With regard to the cross-sectional and multistage sampling design, we use 76 strata composed of towns, cities, and rural areas as our first stage. The *Primary Sampling Units* (PSU), which was available in the MICS dataset, served as the main sampling unit. The household number was used thereafter as the stratum within our sampling units, which is our first and only stage of analysis. Sampling weight observations were available in the MICS dataset and calculated as follows:

$$W_{hi}^l = \frac{1}{f_{hi}^l} \text{ for } i = 1 \dots n_i, h = 1 \dots n_h, l \in \{\text{town, quarters, villages}\}$$

with

W_{hi}^l	Sampling weight for PSU i in stratum h in location l ; $i = 1 \dots n_i$, $h = 1 \dots n_h$, $l \in \{\text{town, quarters, villages}\}$
f_{hi}^l	Probability of inclusion of a household for the PSU i in the stratum h ; $i = 1 \dots n_i$, $h = 1 \dots n_h$, $l \in \{\text{town, quarters, villages}\}$
p_{shi}^l	Probability of selection of the sampling unit at the stage s of the PSU i within the stratum h for location l ; $i = 1 \dots n_i$, $h = 1 \dots n_h$, $l \in \{\text{town, quarters, villages}\}$
n_i	Number of PSU
n_h	Number of strata
π	Probability of insurance coverage

Because the primary sampling units are of different types, the method to compute the probability of inclusion is specific to each type of stratum for the following variables: marital status, age of the respondents, education, place of residence, province, and wealth quintile. At the HH level, we use the religion of the HH head, ethnicity, size of the HH, gender of the HH head, education, age of the head of the HH, and bank account ownership (see Table 1).

For each stratum, the probability of inclusion is calculated as

$$f_{hi}^l = P_{1hi}^l \cdot P_{2hi}^l \cdot P_{3hi}^l \text{ for } i = 1 \dots n_i, h = 1 \dots n_h, l \in \{\text{town, quartiers, villages}\}$$

Aligned with the sampling plan, the sampling probabilities were considered in this study using survey methodology implemented in STATA. The details of this computational method are described elsewhere (INS, 2019). The record linkage between different MICS datasets and the consideration of sampling weights were aligned with the recommendations created by MICS officials. The Stata command merge was used to account for the different units of analysis between individuals and household files. We use key variables to uniquely identify each case to facilitate the merging (MICS, 2019). Consequently, the variables cluster numbers and household numbers were retained as the key variables. Individual data were used as the base, and the correct household for each member was located. Details on merging MICS data are described elsewhere (INS, 2019).

Regression models

Weighted logistic regression models were used to assess the association between the independent variables and insurance uptake. We used logistic regression to estimate the univariate odds ratios of each candidate variable as well as the adjusted odds ratio after considering further covariates (marital status, age of the respondents, education, place of residence, province, and wealth quintile). At the HH level, we use the religion of the HH head, ethnicity, size of the HH, gender of the HH head, education, age of the head of the HH, and bank account ownership. Finally, logistic regression was employed to identify relevant predictors of health insurance uptake among participants. Our results were reported at a 95% confidence level.

3 | RESULTS

3.1 | Descriptive summary

The descriptive statistics for the demographic and socio-economic characteristics of respondents aged 15–49 are presented in Table 3 and were stratified by the health insurance status (insured versus uninsured). Out of 21,692 women, about 95.7% were non-insured and 4.3% were insured. Almost similarly for men, out of 6104, about 95.9% were non-insured and 4.1% were insured. The majority of the women were married, belonged to the age group of 20–29 years, attended high school education, lived in rural residences, were from

TABLE 1 Variables collected in MICS DRC utilized in this study.

Variables	Definition
Individual characteristics	
Marital status	1 = married or living with a partner; 0 = never been in union, widowed, divorced or separated
Age	Categorical variable from 15 to 49 years old. MICS data interviews both men and women aged 15–49 years. 1:15–19 years; 2:20–29 years; 3:30–39 years; 4:40–49 years.
Education	Level of education of the respondents. 0: Pre-Primary/None; 1: Primary; 2: high school; 3: Higher Note: In the DRC, the primary and high schools last for 6 years each. Looking at the MICS questionnaire, it is important mentioning that for individuals who started high school. It cannot be safely assumed that the high school was also completed.
Place of residence (Residence)	Categorical variable showing whether the respondent lives in urban: (1) or Rural (0).
Province	10 DRC's province plus the capital city of Kinshasa 1: Kinshasa; 2: Bas-Congo; 3: Bandundu; 4: Equateur; 5: Province Orientale; 6: Nord-Kivu; 7: Sud-Kivu; 8: Maniema; 9: Katanga; 10: Kasai Oriental; 11: Kasai Occidental
Wealth index quintile	Indicates the wealth of the respondent based on the household assets 1: Poorest; 2: Second; 3: Middle; 4: Fourth; 5: Richest
HH characteristics	
Religion of the head of the HH	Categorical variable defining the religious beliefs of the HH head. 1: Animism; 2: Catholic; 3: Protestant; 4: Other
Ethnicity of the head of the HH	Categorical variable defining the ethnicity group of the HH head. 1: Minority group (Other); 2: Bantou; 3: Soudanais.
Size of the HH	Represents the number of persons living in the same house. 1: 1–5 persons; 2: 5–10 persons; 3: 10+ persons
Education of the head of the HH	Level of education of the HH head. We use the same categories as for the individual respondent.
Gender of the head of the HH	Represents the gender of the head of the HH, which is either male (1) or female (0).
Age of the head of the HH	Categorical variable build on the available information from MICS 1:15–19 years; 2:20–29 years; 3:30–39 years; 4:40–49 years; 5: 50+ years
Bank account ownership	Yes/No response to the following question: Does any member of the HH have a bank account? Yes = 1; No = 0

Bandundu province, and belonged to the poorest and second wealth quintile.

The analysis of household heads demonstrated similar results. Most of the female respondents had a household head of Catholic or Protestant religions, belonged to the ethnicity of Bantou, had a high school education, had a male as a household head, fell into the age category of 50+ years, and belonged to a household in which only 10% reported having a bank account.

The results for male respondents were quite similar to those of their female counterparts. Most of the men were married and belonged to the age group of 20–29 years, had high school education, belonged to a rural residence, were living in Bandundu province, and belonged to the poorest and second wealth quintile. In comparison to the results of the characteristics of household heads for female respondents, most of the male respondents had a household head of Catholic religion, belonged to the ethnicity of Bantou, had a high school education, had a male as a household head, fell into the age group of 30–39 years and belonged to a household in which only 10% reported having a bank account.

Based on the results in Table 2, we find that the majority of the insured population in the DRC uses employer insurance. This is different from the idea that CBHI emerged in developing countries as an alternative health financing to OOP. Only 14% of the female insured population and 12% of the male insured population use CBHI, confirming the low rate of CBHI uptake. The uptake of the social security scheme, which is a government-led HI program, is as low as it is for the private-led HI scheme. The other type of insurance covers only 1% of the female respondents and 3% of the male respondents. In the MICS report, nothing specific is used to define modality in the “other category” of HI.

The analysis of the comparison for female respondents showed the same proportion of insured and non-insured married and unmarried; and an identical proportion of insured and non-insured women in the different age groups. Women with formal education and living in the urban areas were more likely to be insured. A higher proportion of women living in Kinshasa and Katanga had health insurance coverage compared to women from the provinces of Maniema and Equateur. Health insurance coverage was concentrated more in the fourth and richest wealth quintiles. Except for religion, ethnicity and HH size, there was strong evidence of associations between the socioeconomic and demographic characteristics of the HH head and health insurance

status (see *p*-value for chi-square test, Table 3). There was also a strong association between HI coverage and bank account ownership.

In comparison to female respondents, the results of male respondents show an identical proportion of insured and non-insured individuals among different age groups, independent of their marital status. Similar to the results for women, men with formal education living in urban areas were more likely to be covered by health insurance. Additionally, a higher proportion of men living in Kinshasa and Katanga had health insurance coverage than to men from the provinces of Maniema and Kasai Oriental. Health insurance coverage was concentrated more in the fourth and richest wealth quintile. Except for religion, HH size, gender, and age of the head of the HH, there was strong evidence of an association between socioeconomic and demographic characteristics of the HH head and health insurance status (see *p*-value for chi-square test, Table 4). There is also a strong association between HI coverage and bank account ownership. Figures 2 and 3 illustrate the DRC map showing the percentage per province of total insured respondents over the male and female population.

3.2 | Results from the regression model

The estimates of unadjusted odds ratios (OR) and adjusted odds ratios (adjOR) as well as corresponding 95% confidence intervals (CI) of weighted multiple regression models are presented in Tables 5 and 6. At the unadjusted analysis level, the results for women show that health insurance enrolment was significantly associated with education level, area and province of residence, individual's wealth quintile, education level of the head of the HH, age of the HH head, and bank account ownership ($p < .05$).

At the unadjusted analysis level, male respondents' results support that health insurance enrolment was significantly predicated by educational level, area and province of residence, wealth quintile, education level of the head of the HH, and bank account ownership.

At the adjusted analysis level, it was found that more educated women were roughly 8 times (adjOR: 7.69; 95% CI: 2.02–29.27) more likely to be covered by health insurance compared to women without formal education. There was almost no difference between women residing in the capital city of Kinshasa and women living in other provinces. However, women belonging to the higher wealth index quintile had a higher likelihood of being covered by health insurance than those in the poorest quintile. Women from the middle, fourth and richest wealth index quintiles were more than twice, eight times, and ten times more likely to be covered by health insurance compared to the poorest wealth quintile, respectively. However, except for HH who declared having a member with a bank account, household characteristics were not likely to explain the insurance coverage of women. A women belonging from a HH whose at least one member had a bank account were 2 times (adjOR: 1.78; 95% CI: 1.24–2.57) more likely to be covered by health insurance compared to a household without a bank account.

In comparison to their women counterparts, at the adjusted analysis level, the results show that at the 5% level, men belonging to the

TABLE 2 Health insurance providers by gender.

Type of insurance providers	Women		Men	
	<i>n</i>	%	<i>n</i>	%
CBHI	125	13.6%	31	12.4%
Employer	756	81.4%	203	82.2%
Social security	19	2.2%	3	1.0%
Private HI	21	2.4%	6	2.3%
Other	7	0.9%	9	3.4%
Total	930	100%	250	100%

Source: (INS, 2019).

TABLE 3 Demographic and socio-economic characteristics of female respondents by insurance status.

	Female respondents			
Variables	Frequency (weighted) (%)	Insured (%) (n = 930)	Non-insured (%) (n = 20,762)	p-value for chi-square test
Individual characteristics				
Marital status				
Not married	8996 (41.5)	4.77	95.23	.1345
Married	12,693 (58.5)	3.95	96.05	
Age (years)				
15–19	5215 (42.0)	4.37	95.63	.6015
20–29	7400 (34.1)	3.84	96.16	
30–39	5976 (27.5)	4.51	95.49	
40–49	3101 (14.3)	4.81	95.19	
Education status				
Pre-primary/none	3037 (14.0)	0.48	99.52	<.001
Primary	6105 (28.1)	1.21	98.79	
High School	11,200 (51.6)	5.41	94.59	
Higher	1349 (6.2)	17.51	82.49	
Residence				
Rural	11,194 (51.6)	1.33	98.67	<.001
Urban	10,498 (48.4)	7.45	92.55	
Province				
Kinshasa	3795 (17.5)	11.56	88.44	<.001
Bas-Congo	1541 (7.1)	3.91	96.09	
Bandundu	2634 (12.1)	1.51	98.48	
Equateur	1259 (5.8)	0.37	99.63	
Province Orientale	2494 (11.5)	2.76	97.24	
Nord-Kivu	1920 (8.9)	4.66	95.34	
Sud-Kivu	1692 (7.8)	5.79	94.21	
Maniema	212 (1.0)	0.00	100.00	
Katanga	3027 (14.0)	3.41	96.59	
Kasai Oriental	1504 (6.9)	0.32	99.68	
Kasai Occidental	1613 (7.4)	1.41	98.59	
Wealth index quintile				
Poorest	4026 (18.6)	0.44	99.56	<.001
Second	3988 (18.4)	0.68	99.32	
Middle	3973 (18.3)	1.30	98.70	
Fourth	4480 (20.7)	4.89	95.11	
Richest	5225 (24.1)	11.7	88.23	
Household characteristics				
Religion of the HH head				
Animism (traditional religion)	591 (2.7)	2.37	97.63	.2707
Catholic	6414 (29.6)	4.06	95.94	
Protestant	6015 (27.7)	5.37	94.63	
Other	8658 (39.9)	3.85	96.15	
Ethnicity of the HH head				
Minority group	461 (2.1)	3.67	96.33	.0456
Bantou	20,414 (94.1)	4.41	95.59	
Soudanese	815 (3.8)	1.53	98.47	

(Continues)

TABLE 3 (Continued)

Variables	Female respondents			p-value for chi-square test
	Frequency (weighted) (%)	Insured (%) (n = 930)	Non-insured (%) (n = 20,762)	
Size of the HH				
1–5 persons	8775 (40.5)	3.44	96.56	.2519
6–10 persons	10,815 (49.9)	4.83	95.17	
10+ persons	2101 (9.7)	5.03	94.97	
Education of the HH head				
Pre-primary/none	2396 (11.0)	0.95	99.05	<.001
Primary	4890 (22.6)	1.29	98.71	
High School	11,773 (54.3)	3.56	96.44	
Higher	2625 (12.1)	16.22	83.78	
Gender of the HH head				
Female	6186 (28.5)	2.71	97.29	.0003
Male	15,505 (71.5)	4.92	95.08	
Age of the HH head				
15–19	170 (0.8)	0.19	99.81	.0031
20–29	2819 (13.0)	1.16	98.84	
30–39	6204 (28.6)	4.13	95.87	
40–49	5875 (27.1)	5.56	94.44	
50+	6623 (30.5)	4.74	95.26	
Bank account ownership				
No	19,438 (89.6)	2.93	97.07	<.001
Yes	2253 (10.4)	16.01	95.71	

Note: Others include: Armée du salut, Kimbanguiste, Musulman, Eglise de reveil, Temoin de Johavah, without religion; Minority group comprises: other ethnicity, pygmée, chamite and nilotique.

Source: (INS, 2019).

richest wealth quintile were twenty times (adjOR: 20.12; 95% CI: 2.96–36.69) more likely to be covered by health insurance compared to men in the poorest wealth quintile. Similar to women's results, the results show that men's household characteristics do not explain the probability of being covered by health insurance, except for the variable bank account ownership. A man belonging to a HH where at least one member had a bank account were 2 times (adjOR: 2.27; 95% CI: 1.11–4.68) more likely to be covered by health insurance compared to a household without a bank account.

4 | INEQUALITY IN HEALTH INSURANCE COVERAGE

Figure 4 provides the average health insurance coverage (with a 95% confidence interval) over the wealth index quintiles and bank account ownership with respect to the total population in the respective quintile, and bank account ownership status. Although insurance coverage is generally low in the DRC, the figure confirms that almost the entire population in the poorest wealth quintile is not covered by health insurance, whereas the coverage ratio steadily increases with wealth. The same results are observed for bank account ownership, as HI

coverage is predominant among the people from household with a member holding a bank account. However, even for the richest quintile, less than 15% of the population was insured. Similarly, the results show that less than 20% of the respondents from households owning a bank account are covered by HI. Figure 5 and 6 shows Lorenz-Charts as an instrument to demonstrate inequality in health insurance coverage among different income groups, as well as bank account ownership. Health insurance coverage was disproportionately distributed among the population from the poorest to the wealthiest group. The results also confirm disproportionate HI coverage among HH reporting having a bank account compared to those without a bank account. This result is confirmed by the value of the Gini coefficient, which is approximately 98%, demonstrating a high inequality in accessing health insurance in the wealth quintile of the population from poorest to richest; and for HH with a bank account in comparison to HH without a bank account (Figure 6).

5 | DISCUSSION

The study investigated the subgroups and regions of residence of the Congolese population with the highest need for health insurance.

TABLE 4 Demographic and socio-economic characteristics of male respondents by insurance status.

	Male respondents			
Variables	Frequency (weighted) (%)	Insured (%) (n = 250)	Non-insured (%) (n = 5854)	p-value for chi-square test
Individual characteristics				
Marital status				
Not married	3043 (49.9)	3.98	96.02	.8423
Married	3054 (50.1)	4.22	95.78	
Age (years)				
15–19	1474 (24.2)	2.19	97.81	.1874
20–29	1874 (30.7)	4.64	95.36	
30–39	1693 (27.7)	4.42	95.58	
40–49	1062 (17.4)	5.22	94.78	
Education status				
Pre-primary/none	516 (8.5)	0.10	98.90	<.001
Primary	1385 (22.7)	1.68	98.32	
High School	3532 (57.9)	3.03	96.97	
Higher	669 (11.0)	17.74	82.26	
Residence				
Rural	3127 (51.2)	1.01	98.99	<.001
Urban	2977 (48.8)	7.32	92.68	
Province				
Kinshasa	1067 (8.4)	8.79	91.21	.0015
Bas-Congo	463 (3.6)	1.46	98.54	
Bandundu	7318 (57.7)	0.35	99.65	
Equateur	404 (3.2)	1.84	98.16	
Province Orientale	710 (5.6)	2.60	97.40	
Nord-Kivu	498 (3.9)	8.03	91.97	
Sud-Kivu	427 (3.4)	9.30	90.70	
Maniema	68 (0.5)	0.89	99.11	
Katanga	905 (7.1)	4.20	95.80	
Kasai Oriental	382 (3.0)	0.00	100.00	
Kasai Occidental	448 (3.5)	0.51	99.49	
Wealth index quintile				
Poorest	1011 (16.6)	0.31	99.69	<.001
Second	1177 (19.3)	0.63	99.37	
Middle	1138 (18.6)	1.27	98.73	
Fourth	1288 (21.1)	4.10	95.90	
Richest	1490 (24.4)	11.53	88.47	
Household characteristics				
Religion of the HH head				
Animism (traditional religion)	159 (2.6)	1.93	98.07	.6107
Catholic	1915 (31.4)	4.82	95.18	
Protestant	1565 (25.7)	3.38	96.62	
Other	2462 (40.4)	4.13	95.87	
Ethnicity of the HH head				
Minority group	145 (2.4)	0.59	99.41	.0081
Bantou	5718 (93.7)	4.30	95.70	
Soudanese	240 (3.9)	1.23	98.77	

(Continues)

TABLE 4 (Continued)

Variables	Male respondents			p-value for chi-square test
	Frequency (weighted) (%)	Insured (%) (n = 250)	Non-insured (%) (n = 5854)	
Size of the HH				
1–5 persons	2819 (46.2)	4.64	95.36	.2375
6–10 persons	2908 (47.6)	3.26	96.74	
10+ persons	377 (6.2)	6.39	93.61	
Education of the HH head				
Pre-primary/none	516 (8.5)	0.10	99.90	<.001
Primary	1385 (22.7)	1.68	98.32	
High School	3533 (57.9)	3.03	96.97	
Higher	669 (11.0)	17.74	82.26	
Gender of the HH head				
Female	906 (14.8)	4.36	95.64	.7885
Male	5198 (85.2)	4.04	95.96	
Age of the HH head				
15–19	63 (1.0)	0.00	100.00	.5970
20–29	900 (14.7)	2.73	97.27	
30–39	1802 (29.5)	4.74	95.26	
40–49	1616 (26.5)	4.93	95.07	
50+	1722 (28.2)	3.48	96.52	
Bank account ownership				
No	5469 (89.6)	2.69	97.31	<.001
Yes	634 (10.4)	16.21	83.79	

Source: (INS, 2019).

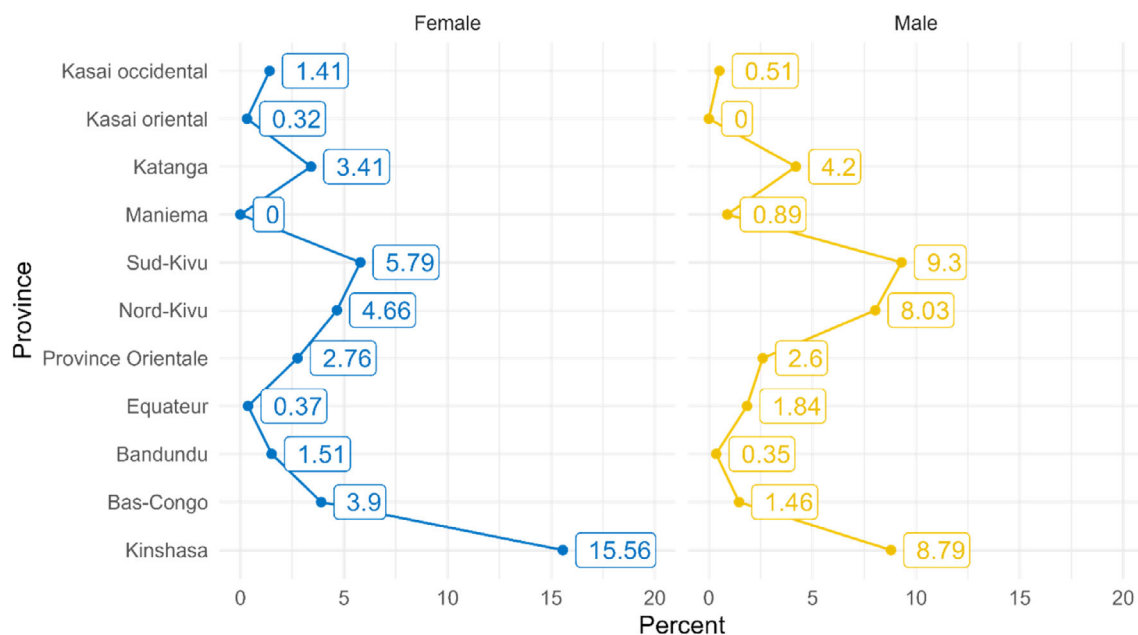


FIGURE 2 Health insurance coverage in the DRC. Source: own, based on (INS, 2019).

The results showed that approximately 4% of male and female respondents had health insurance coverage in the DRC with hardly any difference between the genders which is a very low rate even for

African standards. This result is consistent with the findings of Dimbuene et al. (2022) who reported a low HI uptake of 5% for women of reproductive age in the DRC. Shao et al. (2022) also confirmed a low

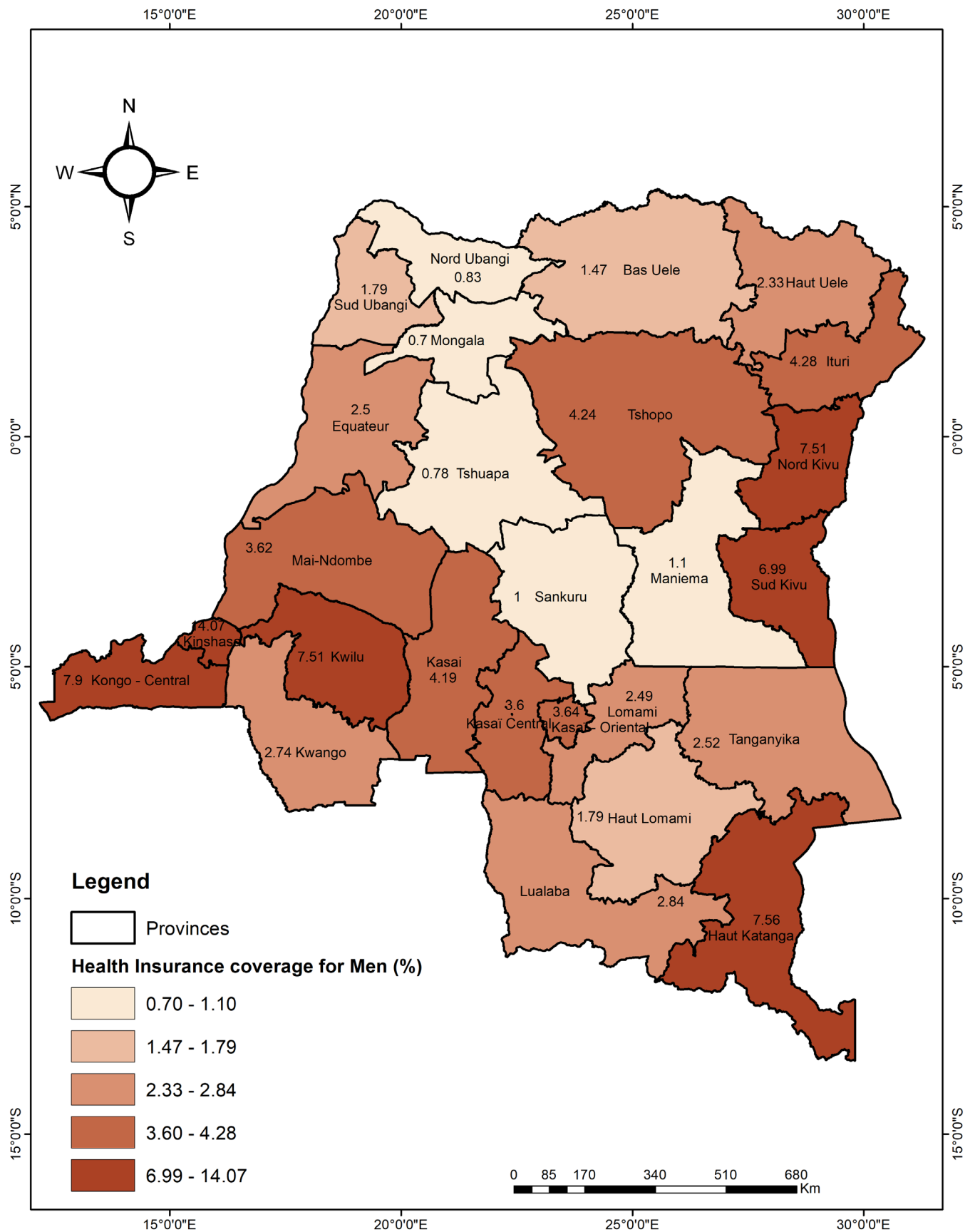


FIGURE 3 Health insurance coverage in the DRC for male respondents. Source: own, based on (INS, 2019) using ArcGIS.

TABLE 5 Results of the regression: determinants of health insurance uptake in DRC (MICS, 2019), *N* women = 21,692.

Variables	Women			
	Odds ratio (95% confidence interval)			
	Unadjusted OR	<i>p</i> -value	Adjusted OR	<i>p</i> -value
Individual characteristics				
Marital status				
Not married	1.00		1.00	
Married	0.82 (0.64–1.06)	.135	1.41 (0.89–2.22)	.143
Age (years)				
15–19	1.00		1.00	
20–29	0.87 (0.61–1.26)	.469	0.65 (0.45–0.96)	.029
30–39	1.03 (0.76–1.41)	.832	0.76 (0.47–1.23)	.256
40–49	1.11 (0.73–1.67)	.635	0.83 (0.52–1.32)	.435
Education status				
Pre-primary/none	1.00		1.00	
Primary	2.54 (0.66–9.79)	.174	2.41 (0.61–9.57)	.209
High School	11.87 (3.49–40.41)	<.001	4.42 (1.33–14.69)	.016
Higher	44.05 (12.50–155.25)	<.001	7.69 (2.02–29.27)	.003
Residence				
Rural	1.00		1.00	
Urban	5.99 (3.40–10.55)	<.001	0.59 (0.25–1.36)	.215
Province				
Kinshasa	1.00		1.00	
Bas-Congo	0.31 (0.10–0.94)	.039	0.52 (0.21–1.28)	.156
Bandundu	0.12 (0.05–0.25)	<.001	0.52 (0.21–1.26)	.149
Equateur	0.03 (0.01–0.05)	<.001	0.93 (0.04–0.23)	<.001
Province Orientale	0.22 (0.11–0.45)	<.001	0.65 (0.31–1.37)	.258
Nord-Kivu	0.37 (0.18–0.76)	.007	0.43 (0.23–0.80)	.008
Sud-Kivu	0.47 (0.19–1.16)	.102	0.62 (0.22–1.72)	.361
Maniema	NA		NA	
Katanga	0.27 (0.12–0.61)	.002	0.55 (0.24–1.26)	.155
Kasai Oriental	0.02 (0.00–0.07)	<.001	0.92 (0.29–0.30)	<.001
Kasai Occidental	0.11 (0.03–0.36)	<.001	0.77 (0.21–2.88)	.701
Wealth quintile				
Poorest	1.00		1.00	
Second	1.55 (0.54–4.45)	.413	1.20 (0.42–3.38)	.736
Middle	2.99 (0.88–10.14)	.079	2.04 (0.61–6.80)	.243
Fourth	11.68 (3.31–41.22)	<.001	8.22 (2.60–25.98)	<.001
Richest	30.30 (9.19–99.86)	<.001	10.42 (2.96–36.69)	<.001
Household characteristics				
Religion of the HH head				
Animism (traditional religion)	1.00		1.00	
Catholic	1.74 (0.54–5.65)	.353	0.93 (0.27–3.25)	.914
Protestant	2.34 (0.71–7.68)	.160	2.10 (0.61–7.17)	.238
Other	1.65 (0.50–5.43)	.408	0.78 (0.23–2.63)	.684
Ethnicity of the HH head				
Minority group	1.00		1.00	
Bantou	1.21 (0.52–2.82)	.657	1.21 (0.49–3.00)	.69
Soudanese	0.41 (0.15–1.10)	.077	1.95 (0.75–5.12)	.172

TABLE 5 (Continued)

Variables	Women			
	Odds ratio (95% confidence interval)			
	Unadjusted OR	p-value	Adjusted OR	p-value
Size of the HH				
1–5 persons	1.00		1.00	
6–10 persons	1.42 (0.98–2.08)	.067	1.09 (0.71–1.68)	.692
10+ persons	1.49 (0.77–2.88)	.239	0.89 (0.50–1.61)	.709
Education of the HH head				
Pre-primary/none	1.00		1.00	
Primary	1.36 (0.47–3.99)	.569	0.99 (0.32–3.02)	.984
High School	3.86 (1.56–9.56)	.004	1.23 (0.43–3.55)	.695
Higher	20.24 (8.70–47.08)	<.001	2.27 (0.86–5.95)	.096
Gender of the HH head				
Female	1.00		1.00	
Male	1.86 (1.32–2.62)	<.001	1.42 (0.94–2.15)	.095
Age of the HH head				
15–19	1.00		1.00	
20–29	6.01 (1.36–26.55)	.018	3.09 (0.61–15.56)	.172
30–39	22.06 (5.15–94.49)	<.001	7.60 (1.52–38.05)	.014
40–49	30.18 (6.83–133.45)	<.001	8.50 (1.66–43.47)	.010
50+	25.51 (5.98–108.75)	<.001	6.35 (1.17–34.27)	.032
Bank account ownership				
No	1.00		1.00	
Yes	6.31 (4.54–8.78)	<.001	1.78 (1.24–2.57)	.002

Note: Other include: Armée du salut, Kimbanguiste, Musulman, Eglise de reveil, Temoin de Johavah, without religion.

Source: own.

HI coverage in the DRC of 2.8%. Previous studies conducted in contexts similar to those of the DRC, and covering 36 SSA have also found low HI coverage with countries like Chad where only 0.9% of the population own a health insurance policy (Barasa et al., 2021; Dong et al., 2009; Doris et al., 2022).

Multi-country studies in Sub-Saharan Africa confirmed a low HI coverage of 8.5%, with significant cross-country variation ranging from the highest HI coverage of 62.4% in Ghana to the lowest level of coverage of 0.9% in Chad (Amu et al., 2021; Barasa et al., 2021). Similar results were found in a study of Shao et al. with coverage ranging from 57.9% in Gabon to 1.1% in Cameroon (Shao et al., 2022).

Similar to previous studies, the low level of insurance uptake in the DRC is mainly explained by a high prevalence of poverty, the dominance of the informal sector, and the weak commitment of the government to provide tax-funding HI mechanisms (Barasa et al., 2021; Lagomarsino et al., 2012).

The authors concluded that countries with the highest rate of HI coverage are those in which governments show a high commitment towards achieving UHC through social insurance schemes and innovative health financing strategies. These countries also have high GDP per capita and promote access to insurance for the vulnerable

population through premium exceptions or premium subsidization by the government (Amu et al., 2021; Shao et al., 2022). In their study, Barasa et al. (2021) concluded that countries with HI coverage greater than 20% featured substantial funding from tax revenues used to subsidize health insurance premiums of vulnerable populations. Consequently, the authors encourage LMICs to favor tax-funded HI mechanisms to enhance coverage.

Our findings reveal disparities in health insurance coverage among individuals residing in urban and rural areas depending on their provinces. For both male and female respondents, there was a higher prevalence of health insurance coverage among respondents living in the capital city of Kinshasa compared with respondents from other provinces. Previous studies found that urban dwellers are more likely to be covered by health insurance than rural populations (Agbadi et al., 2021; Anaba et al., 2022; Dong et al., 2009; Shao et al., 2022). From a statistical standpoint, there was no evidence of differences in HI coverage between rural and urban populations in our study when further covariates such as wealth index and education were considered in adjusted models. Our results align with those of Salari et al. whose findings indicate insufficient evidence that rural or urban residence impacts HI uptake (Salari et al., 2019). Therefore, the authors

TABLE 6 Results of the regression: determinants of health insurance uptake in DRC (MICS, 2019), *N* men = 6104.

Variables	Men			
	Odds ratio (95% confidence interval)			
	Unadjusted OR	<i>p</i> -value	Adjusted OR	<i>p</i> -value
Individual characteristics				
Marital status				
Not married	1.00		1.00	
Married	1.06 (0.58–1.94)	.842	1.84 (0.74–4.55)	.188
Age (years)				
15–19	1.00		1.00	
20–29	2.17 (0.90–5.24)	.084	1.83 (0.70–4.79)	.217
30–39	2.07 (0.86–4.94)	.103	0.99 (0.32–3.02)	.980
40–49	2.46 (1.13–5.32)	.023	1.01 (0.33–3.08)	.988
Education status				
Pre-primary/none	1.00		1.00	
Primary	5.03 (0.52–49.02)	.164	4.59 (0.12–169.40)	.407
High School	19.80 (2.64–148.40)	.004	10.64 (1.33–263.25)	.148
Higher	106.97 (13.79–829.57)	<.001	8.65 (0.43–174.82)	.159
Residence				
Rural	1.00		1.00	
Urban	7.71 (3.81–15.59)	<.001	0.66 (0.17–2.61)	.553
Province				
Kinshasa	1.00		1.00	
Bas-Congo	0.15 (0.02–1.07)	.059	0.43 (0.66–2.85)	.383
Bandundu	0.04 (0.01–0.15)	<.001	0.33 (0.68–1.58)	.164
Equateur	0.19 (0.08–0.45)	<.001	1.95 (0.69–5.50)	.206
Province Orientale	0.28 (0.12–0.64)	.003	1.76 (0.51–6.10)	.369
Nord-Kivu	0.91 (0.27–3.02)	.872	2.36 (0.93–5.97)	.069
Sud-Kivu	1.06 (0.28–4.07)	.927	4.80 (1.59–14.45)	.005
Maniema	0.09 (0.02–0.46)	.004	1.26 (0.21–7.64)	.804
Katanga	0.46 (0.18–1.18)	.106	1.44 (0.53–3.88)	.475
Kasai Oriental	NA		NA	
Kasai Occidental	0.05 (0.01–0.22)	<.001	0.59 (0.10–3.32)	.541
Wealth quintile				
Poorest	1.00		1.00	
Second	2.02 (0.40–10.33)	.397	2.00 (0.42–3.38)	.422
Middle	4.12 (0.85–19.93)	.078	3.42 (0.61–6.80)	.157
Fourth	13.68 (2.94–63.68)	.001	8.73 (2.60–25.98)	.045
Richest	41.71 (9.39–185.16)	<.001	20.12 (2.96–36.69)	.010
Household characteristics				
Religion of the HH head				
Animism (traditional religion)	1.00		1.00	
Catholic	2.57 (0.32–20.37)	.370	0.45 (0.43–4.70)	.504
Protestant	1.78 (0.21–14.84)	.595	0.34 (0.30–3.83)	.383
Other	2.19 (0.29–16.39)	.446	8.74 (0.45–4.80)	.520
Ethnicity of the HH head				
Minority group	1.00		1.00	
Bantou	7.54 (1.02–55.89)	.048	3.70 (0.38–35.92)	.259

TABLE 6 (Continued)

Variables	Men			
	Odds ratio (95% confidence interval)			
	Unadjusted OR	p-value	Adjusted OR	p-value
Soudanese	2.10 (0.21–21.18)	.530	2.73 (0.23–32.97)	.428
Size of the HH				
1–5 persons	1.00		1.00	
6–10 persons	0.69 (0.42–1.13)	.144	0.62 (0.35–1.12)	.111
10+ persons	1.40 (0.50–3.96)	.523	0.79 (0.25–2.53)	.693
Education of the HH head				
Pre-primary/none	1.00		1.00	
Primary	17.38 (1.98–152.46)	.010	22.91 (1.95–268.63)	.013
High School	31.89 (4.28–237.68)	.001	23.64 (2.57–217.15)	.005
Higher	219.71 (28.48–1695.334)	<.001	72.023 (6.13–845.75)	.001
Gender of the HH head				
Female	1.00		1.00	
Male	0.92 (0.52–1.65)	.789	0.41 (0.21–0.80)	.009
Age of the HH head				
15–19	1.00		1.00	
20–29	0.78 (0.21–2.85)	.703	0.63 (0.13–2.92)	.551
30–39	1.38 (0.69–2.76)	.362	1.47 (0.59–3.65)	.405
40–49	1.44 (0.72–2.86)	.303	1.74 (0.75–4.04)	.198
50+	Omitted		Omitted	
Bank account ownership				
No	1.00		1.00	
Yes	7.01 (3.70–13.29)	<.001	2.27 (1.11–4.68)	.026

Note: Other include: Armée du salut, Kimbanguiste, Musulman, Eglise de reveil, Temoin de Johavah, sans religion.

Source: own.

concluded that there was no difference in the probability of enrolling in an HI scheme between rural and urban residents.

Our results show consistent disparities in HI coverage between respondents with and without formal education. More educated women were eight times more likely to have HI than uneducated women. At the household level, male respondents whose HH heads had a formal education were 72 times more likely to own an HI than those whose HH heads were uneducated. Our results align with several studies conducted in other SSA contexts, whose findings support the idea that educational status is among the highest contributors to inequality in health insurance coverage (Adebayo et al., 2015; Barasa et al., 2021; Doris et al., 2022; Shao et al., 2022). A similar study conducted in the DRC using a different dataset found that one year of completed education increased by 10% the likelihood of owning HI among Congolese women of reproductive age (Dimbuene et al., 2022).

Following the argument of Shao et al. (2022), more educated individuals are generally informed about health-related expenditure and have sufficient income to pay for insurance plans. A study conducted in 36 SSA countries also found that high levels of education are

concentrated among the rich (Barasa et al., 2021). Moreover, less educated individuals are likely to encounter difficulty in understanding HI mechanisms and their benefits due to their inability to access information (Anaba et al., 2022). A similar study in Ghana has shown that access to information was a key factor in owning a HI, confirming that educated individuals are more empowered to make health-seeking decisions (Kansanga et al., 2018). In the context of the DRC, the correlation between education and access to information might not sufficiently explain the higher coverage rate of educated respondents. In fact, in many SSA and particularly in the DRC, more educated individuals are more likely to own formal employment in either the public or private sectors.

From our results, it is evident that HI coverage in the DRC is concentrated among the wealthiest. Female respondents in the richest wealth quintile were ten times more likely to own HI than their counterparts in the poorest wealth quintile. The same results occurred for male respondents where respondents in the richest quintile were 20 times more likely to own HI. In the DRC, the demand for health insurance aligns with consumer theory, to the extent that a change in price and income influences the demand of rational consumers

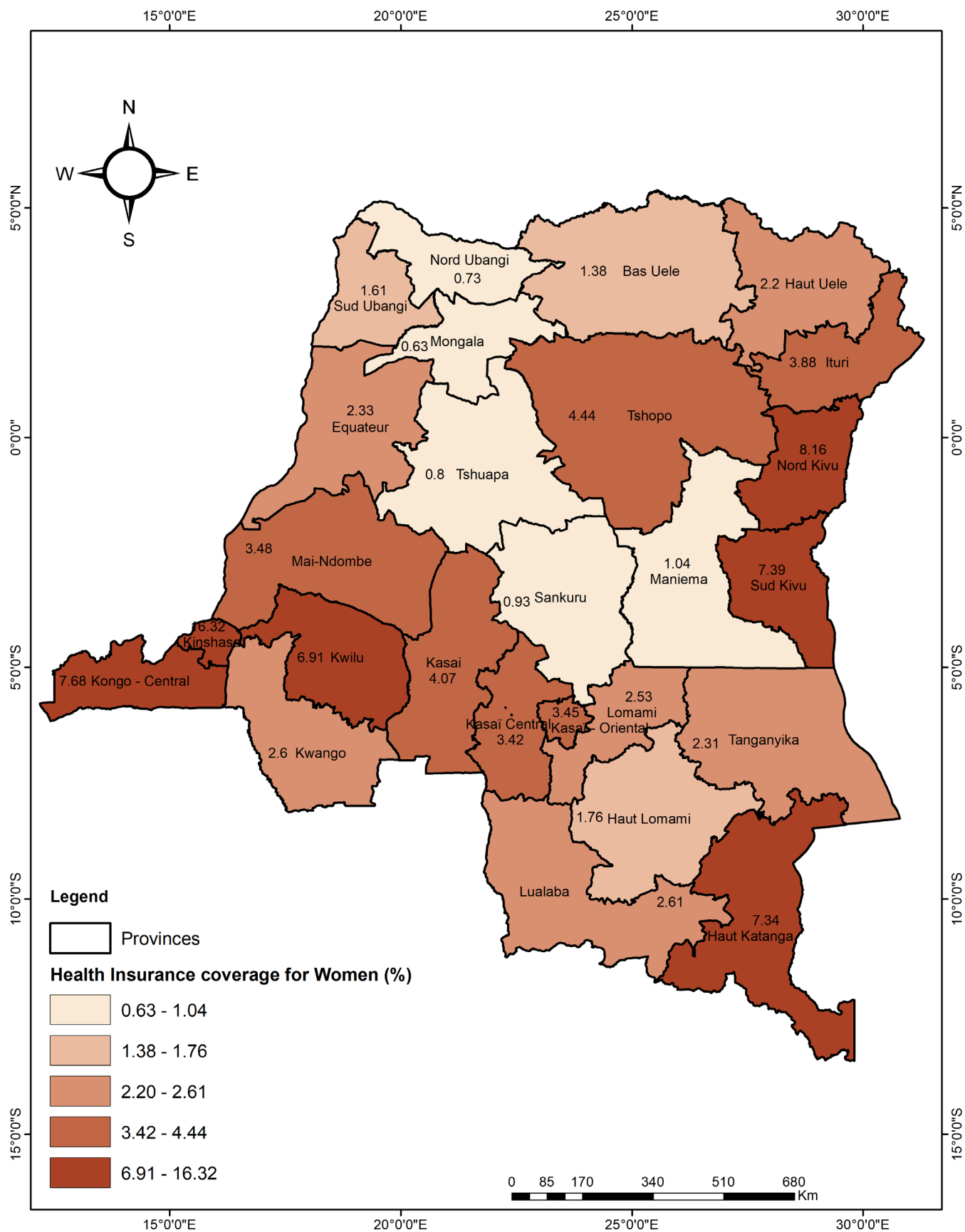


FIGURE 4 Health insurance coverage in DRC for female respondents. Source: own, based on (INS, 2019) using ArcGIS.

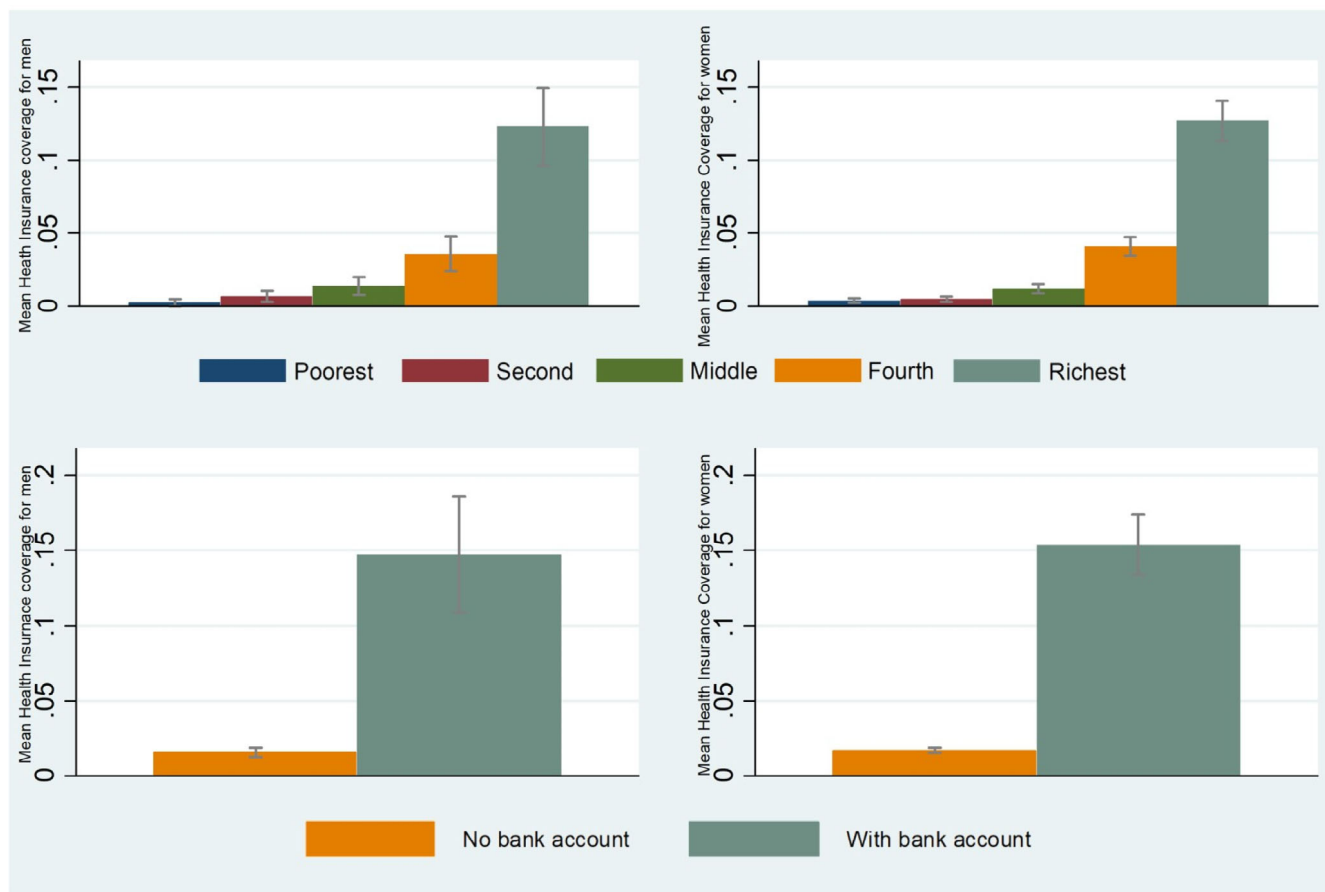


FIGURE 5 Health insurance coverage over wealth index quintiles and bank account ownership. Source: own, based on (INS, 2019).

(Begg, 2014). Consequently, HI is expected to be a normal good with a positive income elasticity of demand, implying that the richer are more likely to insure (Schneider, 2004). Our results corroborate the findings of Adebayo et al. (2015) who found that wealthier households and individuals were more likely to own HI than poor individuals in countries such as Cameroon, Burkina Faso, and Nigeria. In the same context as the DRC, Dimbuene et al. (2022) found similar results demonstrating that women of reproductive ages living in better-off households had higher chances of being covered by an HI compared to those from poor households. In their study, Doris et al. (2022) revealed that households in the lowest income quintile were 19% less likely to own HI than those in the wealthier group. Empirical research argues that enrollment and willingness to pay for HI in LMICs are pro-rich and explained by factors such as greater exposure of wealthier people to the media and higher income levels to purchase premiums (Barasa et al., 2021; Doris et al., 2022).

Overall, there is a lack of appropriate public policies to foster HI uptake among poor and marginalized people in the DRC. In a study conducted in 36 SSA countries, the authors demonstrated that countries with HI coverage greater than 20% are characterized by publicly owned HI that is significantly tax-funded as opposed to voluntary contributions. In addition, in these countries, all poor people receive full government subsidies, while people in the informal sector receive partial subsidies to ensure large HI coverage (Barasa et al., 2021).

Doris et al. (2022) showed that even in countries where governments target or subsidize the most vulnerable groups, rich people have almost twice the odds to own a HI compared to the poor population, that is, the discrepancy between the wealthiest and the poorest decreases compared to the current situation in DRC. Ghana's HI program provides premium exemptions for indigents, pregnant women, children, and people above 70 years of age while in Rwanda, the HI exempts the poorest 16% of households from premium. However, it is worth mentioning the study by Barasa et al. (2021) indicating that Ghana and Rwanda were among countries in the 36 SSA countries with the highest HI coverage of respectively 58.2% and 78.7%.

Households with bank accounts are more likely to have HI coverage. With regard to female and male respondents, an individual from an HH with a bank account had twice the odds of enrolling in health insurance compared with an individual from an HH where no members had a bank account. There is a lack of evidence to demonstrating the link between health insurance coverage and financial inclusion. Our study fills this research gap and shows that financial inclusion is very likely to contribute to inequality in health insurance coverage. Health insurance has the potential to reduce the risk of catastrophic healthcare expenditures and improve health outcomes. A Study in Ghana showed that access to financial services improved the utilization of health services (Asante et al., 2022). According to the study, the average older adults with access to financial services had 1.071

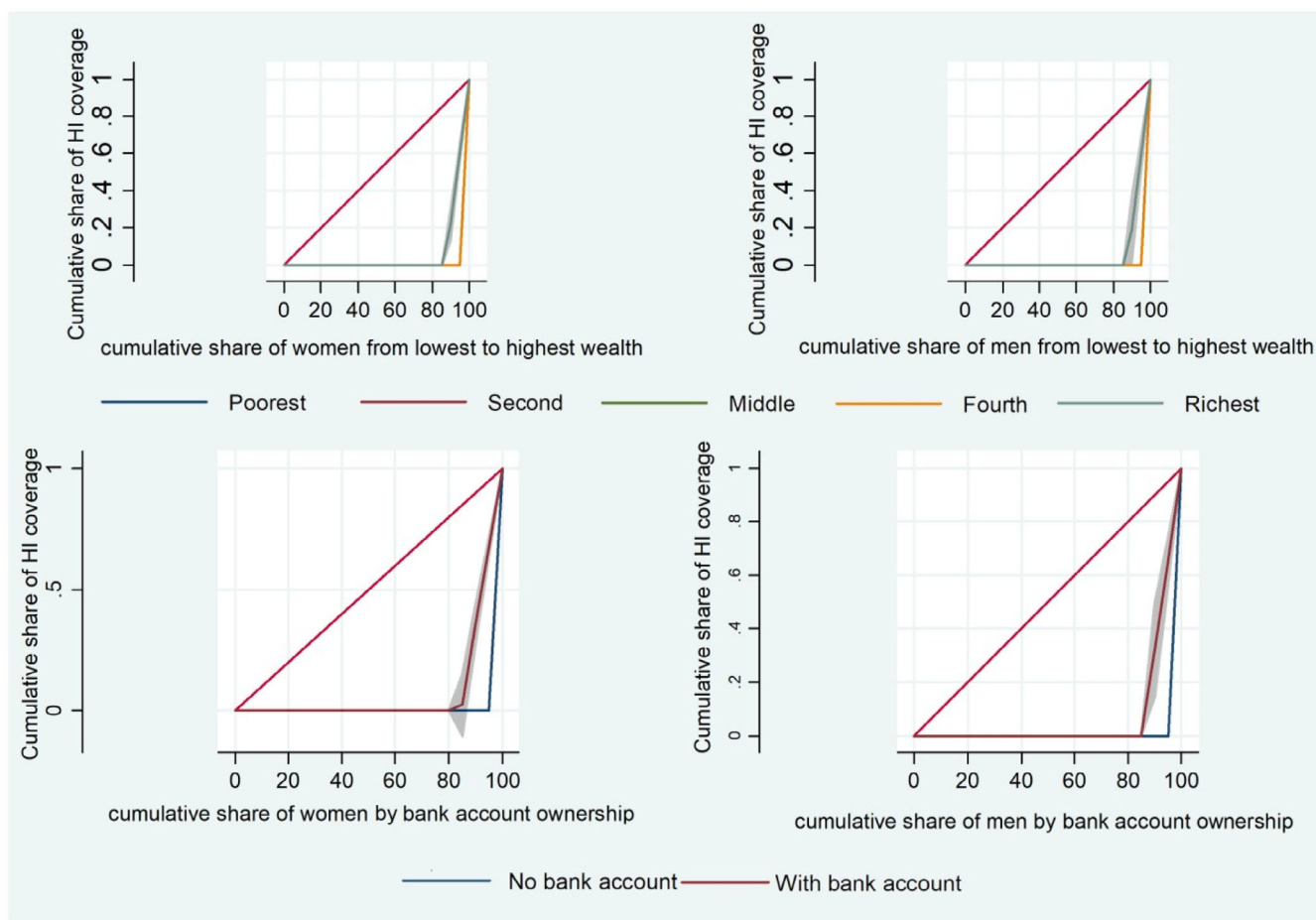


FIGURE 6 Concentration curves for health insurance coverage against wealth rank and bank account ownership. Source: own, based on (INS, 2019).

more chances to utilize health services than those with no access to financial services (Asante et al., 2022). Xiao and Tao (2022) investigated the link between financial inclusion and health in 18 Asian countries and found that financial inclusion had a positive impact on improving population health. Using data from 20 frontier markets, Ofusu et al. revealed that high financial inclusion causes higher levels of human development by ensuring equality of income distribution to the poor and the informal sectors (Ofosu-Mensah Ababio et al., 2021). Similar results were found by Churchill, supporting the idea that financial inclusion significantly reduces poverty and improves health (Churchill & Marisetty, 2020).

6 | POLICY IMPLICATIONS

6.1 | Access to information to the uneducated population

As our results demonstrated, health insurance coverage was concentrated at 80% among people with formal education. Therefore, to

reduce inequality in HI coverage, public policy should focus on individuals without formal education by designing health insurance mechanisms that adapt to their needs. On another level, more awareness campaigns should be designed to target less educated individuals. These campaigns should simplify health insurance mechanisms and benefits to ensure everyone, regardless of their education level, and whether they can understand and access the required information.

6.2 | Poverty alleviation and economic disparities

As the study shows, health insurance coverage was concentrated among the wealthiest in the DRC. Therefore, unless the country sets a strategy to focus on this subpopulation, they will remain neglected, and Universal Health Coverage in the DRC will take a long time to be achieved. Hence, it is crucial to design and implement health insurance mechanisms that are affordable and beneficial for low-income households. This could involve sliding scale premiums based on income, or government-subsidized programs for those in poverty.

6.3 | Promoting financial inclusion

Although there is a lack of research directly linking financial inclusion and health insurance coverage, our results support previous research showing that financial inclusion has a positive impact on health outcomes through poverty and inequality reduction. As a result, financial inclusion has the potential to accelerate HI coverage in the DRC and ensure UHC. From a public policy perspective, efforts should be devoted to improving financial inclusion through sound regulation and supervision of the financial sector, and the promotion of digital finance via mobile banking and financial education.

Overall, policies should also focus on fostering formal employment and ensuring these employment opportunities come with health insurance benefits. Given that, the government plays a crucial role in achieving Universal Health Coverage, policies should also be implemented at the national level to establish tax-funded health insurance mechanisms that can enhance coverage.

By implementing policies that address these areas, the DRC can improve health insurance coverage, reduce healthcare inequalities, and move closer to achieving Universal Health Coverage.

7 | LIMITATIONS

This study used cross-sectional data obtained from the MICS database. The database contains self-reported data on health insurance coverage, educational level, wealth, and information on bank account ownership. Although it is generally agreed that MICS data are of high quality, self-reported data may lead to misclassification and possible bias. For example, the information on educational level may be subject to information bias; participants who have attended high school do not need to have graduated from high school. Second, it is preferable to collect longitudinal data on health insurance coverage to ensure consistency in maintaining health insurance coverage. Consequently, a follow-up longitudinal study on the prevalence of health insurance coverage in the DRC would provide more robust insights about currently found associations, for example, associations between financial inclusion and HI coverage.

8 | CONCLUSION

To increase health insurance coverage in the DRC, government, private, and donor initiatives should prioritize programs with a focus on individuals without formal education. In most African contexts and the DRC in particular, formally educated individuals generally earn higher incomes, belong to wealthier subgroups of the population, and have access to information that is key to assessing the benefits of owning HI. Additionally, the DRC government should ensure that uneducated people receive as much information related to health and benefit from being covered by health insurance. In the short term, the Congolese government may initiate pilot projects with premium

exemptions and subsidization for vulnerable subgroups of the population. In the long run, the government should ensure formal employment for the majority of the population as a pre-requisite for a proper collection of premiums for individuals. Finally, increasing financial inclusion of the Congolese population may have additional impact on health insurance coverage. Previous studies conducted in Africa have demonstrated that financial inclusion is important to reduce poverty and inequality, in addition to improving health outcomes. Based on our results, we encourage the Congolese government to establish national programs to improve the financial inclusion of the country as this will have a positive impact on both poverty reduction and health insurance coverage.

AUTHOR CONTRIBUTIONS

Alexis Biringanine Nyamugira and Steffen Flessa conceived the research. Alexis Biringanine Nyamugira and Adrian Richter conceived, designed and performed the analysis. Alexis Biringanine Nyamugira, Adrian Richter and Steffen Flessa wrote the paper. Alexis Biringanine Nyamugira retrieved the data. Adrian Richter and Steffen Flessa validated the final manuscript. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

This research uses publicly available data from MICS-UNICEF and available elsewhere Surveys—UNICEF MICS. The permission to access and use the data was obtained.

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