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Confidence in the health system and health insurance enrollment among the informal sector population in Lusaka, Zambia

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ABSTRACT

Background: To improve equitable access to quality essential services and reduce financial hardship, low-and-middle-income countries are increasingly relying on prepayment strategies such as health insurance schemes. Among the informal sector population, confidence in the health system to provide effective treatment and trust in institutions can play an important role in health insurance enrollment. The objective of this study was to examine the extent to which confidence and trust affect enrollment into the recently introduced Zambia National Health insurance.

Methods: We conducted a regionally representative cross-sectional household survey in Lusaka, Zambia collecting information on demographics, health expenditure, ratings of last health facility visit, health insurance status and confidence in the health system. We used multivariable logistic regression to assess the association between enrollment and confidence in the private and public health sector as well as trust in the government in general.

Results: Of the 620 respondents interviewed, 70% were enrolled or planning to enroll in the health insurance. Only about one-fifth of respondents were very confident that they would receive effective care in the public health sector 'if they became sick tomorrow' while 48% were very confident in the private health sector. While confidence in the public system was only weakly associated with enrollment, confidence in the private health sector was strongly associated with enrollment (Adjusted odds ratio (AOR) 3.40 95% CI 1.73 – 6.68). No association was found between enrollment and trust in government or perceived government performance.

Conclusions: Our results suggest that confidence in the health system, particularly in the private health sector, is strongly associated with health insurance enrollment. Focusing on achieving high quality of care across all levels of the health system may be an effective strategy to increase enrollment in health insurance.

1. Introduction

Health insurance schemes are being used increasingly as one of the main strategies to make progress towards universal health coverage in low-and-middle-income countries (LMICs) (Barasa et al., 2021). However, despite substantial efforts made by many countries, health insurance coverage remains low in most countries, with only one third of the population currently covered by health insurance in LMICs (Hooley et al., 2022), and often large socioeconomic disparities in enrollment (Osei Afriyie et al., 2022; Barasa et al., 2021).

One of the main challenges in expanding health insurance coverage in LMICs are the often large informal populations. In sub-Saharan Africa, 85.8% of total employment occurred in the informal sector in 2018 (International Labor Organization, 2018). The enrollment of the informal sector into formal social protection programs is challenging because the informal sector genearlly comprises a highly diverse population that is highly unregulated, with low and often irregular incomes from self-employment (International Labor Organization, 2018). This diversity makes it difficult for social programs such as insurance schemes to assess households' needs, but also to identify them and collect contributions from them. Therefore, even in countries such as Ghana and Kenya where their national health insurance schemes have been operational for many years, health insurance coverage is still very low; 56% and 20% respectively (Amu et al., 2018; Kazungu and Barasa,

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2017).

To increase health insurance coverage of the informal sector, several studies have assessed the determinants of health insurance demand in LMICs. In general, socio-demographic characteristics such as age, gender, place of residency (rural vs urban) are significant factors for health insurance enrollment (Salari et al., 2019; Shao et al., 2022; Van der Wielen et al., 2018). Studies have also shown that occupation, income, wealth and education are important for health insurance demand (Akokuwebe and Idemudia, 2022; Aregbeshola and Khan, 2018; Kimani et al., 2014; Yadav and Mohanty, 2021). Models of adverse selection suggest that with voluntary enrollment in general, only those with the highest health needs will enroll in health insurance (Akerlof, 1970; Belli, 2001; Cutler and Zeckhauser, 1998). Few studies have examined how the health system characteristics contribute to health insurance enrollment.

With health insurance, which generally requires individuals to make monthly or yearly contribution, confidence in the health system may be an important concern (Thornton et al., 2010). Confidence and trust, two related theoretical concepts, capture patients' experiences with health systems and shape personal health practices and decisions. This study contributes to the understanding of the determinants of health insurance enrollment among the informal sector in LMICs by assessing how confidence in the health system influences informal sector health insurance enrollment in Lusaka, Zambia. Confidence is related to the expected technical competency and ability of systems to deliver its goals based on experiences and rationality (Smith, 2005). Trust can be defined as the moral competency for action and generally captures an interpersonal relation with individuals or institutions (Smith, 2005). Our main hypothesis is that having low confidence in the health system will decrease the odds of enrolling in the national health insurance. We made a distinction between the public and private health sector as, at the the time of the study, the majority of accredited providers in Lusaka were in the public health sector with a few private health providers (pharmacies and diagnostic centers) accredited to serve the insurance's beneficiaries. We hypothesize that individuals who have more confidence in either sector are more likely to benefit from the health insurance later as public health facilities and some private providers are accredited to serve health insurance enrollees. We also hypothesize that individuals not trusting the government may be more reluctant to contribute to a public social health protection program and thus may be more likely to opt out of social health insurance.

1.1. Theories of decision-making and empirical hypothesis

A broad economic and social science literature has analyzed how individuals make decisions under uncertainty, including decisions regarding health insurance (Schneider, 2004). In expected utility models, rational agents assess their expected utility with insurance versus their expected utility without insurance (Kirigia et al., 2005; Mathauer et al., 2008). Rational agents will enroll in health insurance if the utility gains exceed the cost of insurance (Schneider, 2004). Prospect theory is also commonly used to analyze health insurance demand whereby individuals insure based on gain prospect and loss aversion rather than against uncertainty (Schneider, 2004). Both theories have been criticized for not taking into consideration societal context and human behavior (Thaler, 2016). Income smoothing and risk aversion are clearly not the only determinants of enrollment. Insurance also provides access to services that will otherwise be unaffordable to an individual with limited means (Nyman, 1999).

Other social science studies found that confidence in institutions influences decision-making (Schneider, 2005). In the context of health insurance, based on personal experiences with the health system and reports in the media, individuals may form their perception about the competence of the public health system to provide effective care. Their confidence in the public and private health providers may influence their decision to enroll in the national health insurance. Willingness to enroll in a health insurance scheme may even be lower if individuals have limited financial means and perceive their need for care in the future to be low.

The hypothesis we tested in this paper is whether high confidence in the health system is associated with higher probability in enrolling in the health insurance. As explained in further details below, we distinguish two types of confidence: confidence in the public health sector and confidence in the private health sector. As the health insurance is implemented by a semi-autonomous government agency, we also tested whether trust and perceived performance of the government influence enrollment.

1.2. National health insurance in Zambia

In Zambia, public, faith-based and private providers provide health services. All health facilities in the country are regulated and licensed by the Health Professional Council of Zambia (HPCZ). The public health system consists of the primary health care (PHC) services, which includes health posts, health centers and level-1 hospitals. Specialized services such as obstetrics, internal medicine and surgery are provided by level-2 and level-3 hospitals. In 2012, the government abolished user fees at the entire PHC level in public health facilities. All services under these health facilities are supposed to be free-of-charge. In addition, patients referred from these PHC facilities to level-2 and level-3 hospitals are supposed to be treated free of charge. This policy decreased out-of-pocket expenditures for households (Lépine et al., 2018), however widespread shortage of drugs and inadequate funding to the health sector, galvanized the establishment of a national health insurance.

In 2018, the Zambian government passed its National Health Insurance Act with the aim of providing 'universal access to quality insured health services' (Government of Zambia, 2018). The act explicitly mandates all residents and citizens 18 years and above to register as a member of the scheme. Formal sector employees are automatically enrolled through a 1% contribution of their monthly basic salary with employers equally matching (Government of Zambia, 2019). Those self-employed or in the informal sector are required to contribute 1% of declared income. According to the National Labor Survey in 2020, nearly 60% of the employed population were in informal employment (Zambia Statistics Agency, 2020). Principal members can have six dependents who must be their registered spouse and children under 18 years. According to the Act, NHIMA is required to cater for those classified as poor and vulnerable, those over 65 and mentally or physically disabled populations. According to NHIMA, the health insurance has 1, 748,349 principal members with 417,881 members in the informal sector for an estimated coverage of 24% (National Health Insurance Management Authority, 2022b).

The scheme commenced implementation of its benefit package in February 2020. The scheme operates only from level-1 hospitals upwards although level-1 hospitals are part of the primary health care services. At the time of the study in 2020, the national health insurance management authority (NHIMA) had accredited public health facilities and some private providers, which were pharmacies and diagnostic centers. Private health facilities were the next phase of providers to be included under the scheme. Currently, the scheme has 276 accredited health providers- 38% are public; 47% private and 15% faith-based providers (National Health Insurance Management Authority, 2022a). The benefit package covered by the scheme is comprehensive and it includes outpatient consultations, minor and major surgical procedures, maternal and newborn interventions, physiotherapy and rehabilitation services, vision care, dental and oral health, cancer services and mental health. The package also includes blood and pharmaceutical products. The medicines are a subset from the national essential medicines list that are generic. The package does not include procedures for cosmetic purposes, or treatment abroad. In addition, to minimize cost, outpatient visits are limited to three visits per episode and new enrollees can only access services after three months of enrollment (National Health

Insurance Mangement Authority, 2020).

2. Methods

2.1. Study design

This study is based on a regionally representative cross-sectional household survey among the informal sector population in Lusaka district, Zambia, implemented from November 6 to December 19, 2020. We selected Lusaka as it is the most densely populated district in Zambia with nearly 12% of the country's population living within an area of 418 square kilometers. According to the 2020 Labor survey, 58% of the working population in Lusaka province were in the informal sector (Zambia Statistics Agency, 2020). Furthermore, the district has the largest share of private health providers in the country with one fifth of service providers being the private health sector (Health Professions Council of Zambia, 2019).

A two-stage cluster random sampling was used to obtain the sample. First, we randomly selected 35 enumeration areas (EAs) out of the 1225 EAs used in the 2010 Zambia Census of Population and Housing. In the second stage, we selected 20 households by systematically selecting every fourth household within each EA for an interview. Heads of households were the primary targets for the interviews. In case, they were unavailable, their spouses were interviewed. We used a deductive approach to identify the informally employed by asking whether heads of households had a formal employment contract and contributed to the National Pension Scheme Authority (NAPSA). Eligible household heads or their spouses were provided information about the study, and those who consented were interviewed using the questionnaire. Following the Ghana Demographic and Health Surveys (Ghana Statistical Service, 2015; 2017) we targeted an average cluster size of 20 and assumed an intra-cluster correlation coefficient (ICC) of 0.05, resulting in a design effect of 1.95. Based on these assumptions, a total sample size of 693 household heads was required to detect a 25% difference in enrollment rates between high and low confidence groups with power 0.8.

A structured questionnaire was administered using the Open data kit (ODK) software on hand-held tablets to collect information on socio-demographics, household assets, health status, healthcare utilization behavior, access to health facilities, health expenditure patterns, child health, confidence in the health system, trust in the general government, political affiliation and health insurance status. Data collectors who were fluent in English, Nyanja and Bemba were trained on the data collection tools and procedures. Data collectors spoke the preferred language of respondents and translated the questions during the interview using vocabulary agreed upon during data collection training.

2.2. Measures

2.2.1. Health insurance enrollment

The main study outcome of interest was enrollment in the National Health Insurance Scheme, which was derived from the questions: "Are you currently enrolled in the NHIS?" or "Will you enroll in the scheme if I explain how the scheme works?" (Appendix 1 for survey tool) Respondents who were interested in enrolling were provided with information on how to enroll in the scheme including the application form, bank and contact details for the health insurance authority. Data collectors followed up with respondents who were interested via telephone after three weeks to check their progress with enrollment and provided guidance.

2.2.2. Confidence in the health system

We based our survey questions on the Lancet Commission for High Quality Health System framework (Kruk et al., 2018). As Zambia has a distinct mixed health system (public and private health sector), we measured confidence in the two sectors separately. We used health facilities as a proxy for the larger health sector. Respondents were asked; "How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the public health facilities" and "How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the private health facilities?" (Frederico Guanais, 2018; Kruk et al., 2018) The responses were on a Likert scale from "Not at all confident," "Not very confident, "Somewhat confident, and "Very confident (Appendix 1 for survey tool).

2.2.3. General trust in the national government and perceived performance of the government

As health insurance involves management and the use of insurance funds, trust in governments and institutions is equally important. Reports of corruption in the media and other governance factors can influence health insurance enrollment. To measure trust in the government, we adapted questions from the WHO World Health survey (WHS): "How much of the time do you think you can trust the National government to do what is right?" with responses "always, "most of the time", "some of the time", "hardly ever and "never" (World Health Organization, 2002). To have the trust variable on a similar scale as the other predictors, we recoded the values in Likert scale in reverse: whereby "never" took a value of 1 and "always" took a value of 5. To measure perceived performance of the government, we also adapted the WHO WHS, "How well do you think the current government is doing in performing their duties?" with responses being "very badly", "fairly badly", "fairly well", "very well" and "don't know or have not never heard" (World Health Organization, 2002). The value of "don't know or refused to answer" was recoded as neutral taking a value of 3.

2.3. Analysis

Descriptive statistics including frequencies and percentages were calculated to describe the demographics, socio-economic, health system, and political factors by health insruance enrollment status. Differences between the two groups was determined using chi-square test and fisher's exact test where expected frequencies in any combination is less than 10. Next, we estimated health insurance enrollment using two logistic regression models. The first, measures the association between health insurance enrolment and the main predictors of interests-confidence in the public health sector, confidence in the private health sector, trust in the government and perceived government performance. The dependent variable, health insurance enrollment, was binary taking a value of either 1 or 0 for enrolled orplanning to enroll and not planning to enroll, respectively. The probability model assumes that the probability of enrolling $y_i = 1$ is associated with a vector of explanatory variables as follows:

$$\log\left(\frac{y_i}{1-y_i}\right) = \beta_0 + \beta_1 x_i + u_i$$

Where $y_i/1\text{-}y_i$ is the odds of being enrolled or planning to enroll, β_0 is the intercept and β_1 is a vector of coefficients estimated for the main predictors of interest. To facilitate interpretation, we transformed the four-predictor variables to a 0–1 range using the following function: $z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$

Where z_i is the ith-normalized response of individual i and $x = (x_1 \ldots, x_n)$. This approach assumes that each-step of responses (example, from "Very confident," to "Somewhat confident, and "Not very confident" to Not all confident) corresponds to an equal increase.

Next, we adjusted for the models controlling for an extensive set of potential confounders. We controlled for variables related to health insurance enrollment, including demographics (age, sex, marital status, religion, number of children) and socioeconomic status (wealth, highest educational attainment). We also included individuals' experiences during their last health facility visit (waiting times, knowledge of the

provider, respect by the provider, time spent with provider). The overall index for health facility experiences and asset-based wealth were calculated using principal component analysis (Vyas and Kumaranayake, 2006). Other health system variables were frequency of health facility visits (number of health facility visits in the last year), largest health expenditure ("What was the largest health-related expenditure your household had last year?") and payment mode for their largest expenditure. Political affiliation was also included ("Do you want a change in government in the next election?"). Clustering of outcomes at the community level was taken into account during the analysis by using community random-effects. Data were analyzed using Stata 16 (StataCorp, 2015). We used The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting cross-sectional studies (Appendix 2 for the checklist).

We also conducted sensitivity analysis to test the robustness of the results. First, as being registered with a health insurance has been shown to be associated with confidence in the health system (Roder-DeWan et al., 2020), we excluded the individuals who already have health insurance. Second, we excluded the individuals that responded "don't know" or "I have never heard" for perceived performance of the government. Lastly, we stratified the results by wealth quintile as previous studies have found that socioeconomic status affects patients' perception of health care and social trust (Arpey et al., 2017; Brandt et al., 2015).

3. Results

The survey team approached 753 randomly selected households. Nine household heads (1.2%) were excluded because the respondents were above 65 years of age, 43 household heads (5.7%) could not be reached and 26 (3.5%) mentioned they were busy or not interested in the study. Forty-eight household heads (6.4%) were employed in the formal sector, and were excluded from the study. Three enumeration areas had less than four eligible households due to high formal sector employment in these areas. We excluded households in those areas from the analysis (N = 7, 0.9%) resulting in a final sample of 620 household heads.

Characteristics of respondents and group differences by health insurance enrollment status are presented in Table 1. Respondents were young on average with the majority being less than 40 years (58.2%) and had completed at least some secondary schooling (66.6%). About 23% were males and nearly 69% were married or cohabiting. Nearly half of (49.6%) respondents indicated that there were no children under five years living in household. Over three quarters of respondents, (87.5%) rated their health status as at least moderate and a few (11%) had not visited a health facility in the past year. Participants generally had a positive experience about their last health facility; over 60% rated their experience as good, very good, or excellent. The vast majority of the participants (94.0%) had visited a government-owned health facility at their last visit. Most of the respondents (70.5%)'s largest health expenditure in the past year was less than 500 kwacha (33 USD). The majority (73.4%) of respondents paid their largest health expenditure on their own while 23.7% of respondents had to borrow money or sell their assets to pay.

The largest health expenditure was higher for those insured or planning to enroll than for those who did not intend to enroll. In addition, those currently insured or planned to enroll were more likely to borrow money or sell their assets to pay for health services compared to those who refused to enroll.

About 20% of respondents were very confident in 'receiving effective treatment if sick tomorrow' from the public sector (Fig. 1a). On the other hand, in answering the same question for the private sector, nearly half (48.4%) of respondents mentioned that they were very confident (Fig. 1b). In regards to their trust in the national government, 52% respondents expressed that they could trust the government some of the time while 20% stated that, they could never trust the government in

Table 1
Health insurance enrollment and characteristics of respondents.

Characteristics	Full sample N (%)	Enrolled/ Plans to enroll N (%)	Does not intend to enroll N (%)	p-value
Confidence in the public health sector				
Very confident	161 (26.0)	128 (26.5)	33 (24.3)	0.597
Somewhat confident	171 (27.6)	134 (27.7)	37 (27.2)	
Not very confident	167 (26.9)	133 (27.5)	34 (25.0)	
Not at all confident	121 (19.5)	89 (18.4)	32 (23.5)	
Confidence in the private health sector				
Very confident	57 (9.2)	36 (7.4)	21 (15.4)	0.001
Somewhat confident	103 (16.6)	72 (14.9)	31 (22.8)	
Not very confident	160 (25.8)	124 (25.6)	36 (26.5)	
Not at all confident	300 (48.4)	252 (52.1)	48 (35.3)	
Trust in government				
Always	99 (16.0)	77 (15.9)	22 (16.2)	0.733
Most of the time	122 (19.7)	98 (20.3)	24 (17.7)	
Some of the time	324 (52.3)	247 (51.0)	77 (56.6)	
Hardly ever	49 (7.9)	41 (8.5)	8 (5.9)	
Never	26 (4.2)	21 (4.4)	5 (3.6)	
Perceived performance of government				
Very well	27 (4.4)	21 (4.4)	6 (4.4)	0.878
Fairly well	278 (44.8)	215 (44.4)	63 (46.3)	
Neutral	45 (7.3)	35 (7.2)	10 (7.4)	
Fairly badly	190 (30.7)	153 (31.6)	37 (27.2)	
Very badly	80 (12.9)	60 (12.4)	20 (14.7)	
Age				
18–29	175 (28.3)	137 (28.3)	38 (27.9)	0.686
30–39	186 (30.0)	145 (30.0)	41 (30.2)	
40–49	141 (22.7)	114 (23.5)	27 (19.8)	
≥50	118 (19.0)	88 (18.2)	30 (22.1)	
Gender				
Male	143 (23.1)	107 (22.1)	36 (26.5)	0.286
Female	477 (76.9)	377 (77.9)	100 (73.5)	
Marital status				
Married/Cohabiting	426 (68.7)	330 (68.2)	96 (70.6)	0.593
Single/Divorced/ Separated/Widow	194 (31.3)	154 (31.8)	40 (29.4)	
Religion				
Catholic	150 (24.2)	120 (24.8)	30 (22.1)	0.065
Protestant	405 (65.3)	311 (64.3)	94 (69.1)	
Muslim	18 (2.9)	11 (2.3)	7 (5.1)	
Other	47 (7.6)	42 (8.7)	5 (3.7)	
Highest educational attainment				
None	111 (17.9)	79 (16.3)	32 (23.5)	0.266
Primary	291 (46.9)	230 (47.5)	61 (44.9)	
Secondary	122 (19.7)	97 (20.0)	25 (18.4)	
Tertiary +	96 (15.5)	78 (16.1)	18 (13.2)	
Wealth quintile index				
Poorest	137 (22.1)	100 (20.7)	37 (27.2)	0.129
Poorer	111 (17.9)	90 (18.6)	21 (15.4)	

(continued on next page)

Table 1 (*continued*)

Characteristics	Full sample N (%)	Enrolled/ Plans to enroll N (%)	Does not intend to enroll N (%)	p-value
Middle	130 (21.0)	96 (19.8)	34 (25.0)	
Richer	118 (19.0)	100 (20.7)	18 (13.2)	
Richest	124 (20.0)	98 (20.2)	26 (19.1)	
Number of children under 5 years in household				
None	308 (49.7)	231 (47.7)	77 (56.6)	0.169
1–2	303 (48.9)	245 (50.6)	58 (42.7)	
3 or more	9 (1.5)	8 (1.7)	1 (0.7)	
Want change in government				
Yes	276 (44.5)	220 (45.4)	56 (41.2)	0.434
No	174 (28.1)	136 (28.1)	38 (27.9)	
Don't know	100 (16.1)	72 (14.9)	28 (20.6)	
Refused to answer	70 (11.3)	56 (11.6)	14 (10.3)	
Health status				
Very good	49 (7.9)	41 (8.5)	8 (5.9)	0.150
Good	166 (26.8)	118 (24.4)	48 (35.3)	
Moderate	328 (52.9)	264 (54.5)	64 (47.1)	
Bad	71 (11.4)	56 (11.6)	15 (11.0)	
Very bad	6 (1.0)	5 (1.0)	1 (0.7)	
Number of health facility visits in the last year				
None	69 (11.1)	47 (9.7)	22 (16.2)	0.094
1-2	259 (41.8)	203 (41.9)	56 (41.2)	
3 or more	292 (47.1)	234 (48.4)	58 (42.6)	
Quality index of last health facility visit				
Excellent	125 (20.2)	1109 (22.5)	16 (11.8)	0 < 0.0001
Very good	164 (26.4)	1109 (22.5)	55 (40.4)	
Good	94 (15.2)	76 (15.7)	18 (13.2)	
Fair	114 (18.4)	87 (18.0)	27 (19.9)	
Poor	123 (19.8)	1103 (21.3)	20 (14.7)	
Type of health facility last visited				
Government	583 (94.0)	454 (93.8)	129 (94.9)	0.164
Private/mission-owned	36 (5.8)	30 (6.2)	6 (4.4)	
Outside of Zambia	1 (0.2)	0 (0.0)	1 (0.7)	
Largest health expenditure in the last year				
0–100 Kwacha	138 (22.3)	99 (20.5)	39 (28.7)	0.005
101–500 Kwacha	299 (48.2)	226 (46.7)	73 (53.7)	
501–1000 Kwacha	90 (14.5)	77 (15.9)	13 (9.5)	
1000 + Kwacha	93 (15.0)	82 (16.9)	11 (8.1)	
Payment mode of largest health expenditure in the last year				
Borrowed/sold assets	147 (23.7)	127 (26.2)	20 (14.7)	0.02
Paid themselves	411 (66.3)	312 (64.5)	99 (72.8)	
Did not pay	2 (0.3)	2 (0.4)	0 (0.0)	
No health expenditure	60 (9.7)	43 (8.9)	17 (12.5)	
Number of observations	620	484	136	

'doing the right thing' (Fig. 2). In addition, respondents rated their government's performance in currently their duties highly whereby nearly half (49%) of respondents indicated that either the government is performing its doing very well or fairly well (Fig. 2b).

Table 2 shows unadjusted associations between our four main predictors of interest and insurance enrollment. In the bivariate analysis, confidence in the public sector was not a significant determinant in enrollment (OR 0.77 95% CI 0.45 to 1.32). However, a unit increase in the normalized confidence in the private sector was associated with 3.17 greater odds of enrollment (95% CI 1.83 to 5.47). Neither trust in the government (OR 1.80 95% CI 0.51 to 2.31) nor perceived government performance (OR 0.95 95% CI 0.50 to 1.81) were associated with enrollment. After controlling for all the main predictors (Table 2, column 4), there was even a stronger association between confidence in the private sector and health insurance enrollment (Adjusted odds ratio (AOR) 3.89 95% CI 2.16 to 6.99).

The association between confidence in the health system, trust in the government and perceived performance and health insurance enrollment controlling for sociodemographic characteristics, health status and other health system factors are presented in Table 3. After adjusting for these factors, the estimated odds ratio of enrollment increased slightly to 0.80 for a unit change in confidence in the public health sector but remained non-statistically significant (95% CI 0.43 to 1.51). The estimated odds ratio of enrollment decreased to 2.88 for a unit change in confidence in the private health sector (95% CI 1.56 to 5.29). After controlling for all covariates and other predictors, confidence in the public health sector and private health sector were associated with 1.02 and 3.40 greater odds (95% CI 0.42 to 1.51, and 1.56 to 5.28) of enrolling in the health insurance respectively. There was still no association between health insurance enrollment and neither trust in the government nor perceived performance of the government. The number of health facility visits and experience at last health facility visit were not associated with enrollment. Respondents who had over 1000 Kwacha (76 USD) as their largest health expenditure in the past year had 2.30 times higher odds (95% CI 1.02 to 5.21) of enrollment in all the models. In addition, those in the richer quintile were 2.08 times higher odds (95% CI 1.07 to 4.11) of enrolling compared to the poorest quintile. There was a decrease in the odds of enrollment for the richest wealth quintile, although it was not significant. Being Muslim and rating health status as good were associated with lower odds of health insurance enrollment in all the models.

Table 4 shows robustness checks as well as some stratified results. The results were robust to excluding those who already have health insurance (Table 4, column 1). When we exclude respondents who were not sure about government performance (N = 570), results for relative confidence in the private health sector are similar, and a negative and significant relationship between performance perception and enrollment emerges (Table 4, column 2). In columns 3 and 4 of Table 4, we stratify results by wealth quintiles: Results are noisy, but suggest generally stronger associations in the bottom than the top quintiles.

4. Discussion

Our study investigated the relationship between trust and confidence in government and health systems and health insurance enrollment in the context of Zambia's recently introduced National Health Insurance Scheme. We found that while trust in the government was not associated with enrollment, confidence in the health system - particularly in the private sector - was strongly and positively associated with health insurance enrollment. These findings suggest that enrollment decisions are not based primarily on the organization running the scheme (the government in this case), but rather by the subjectively perceived quality of services that can be obtained with health insurance. Our findings are similar to those of other studies conducted in LMICs that have examined quality of care and health insurance enrollment. A study iof a mutual health organization in Guinea-Conakry found that although respondents

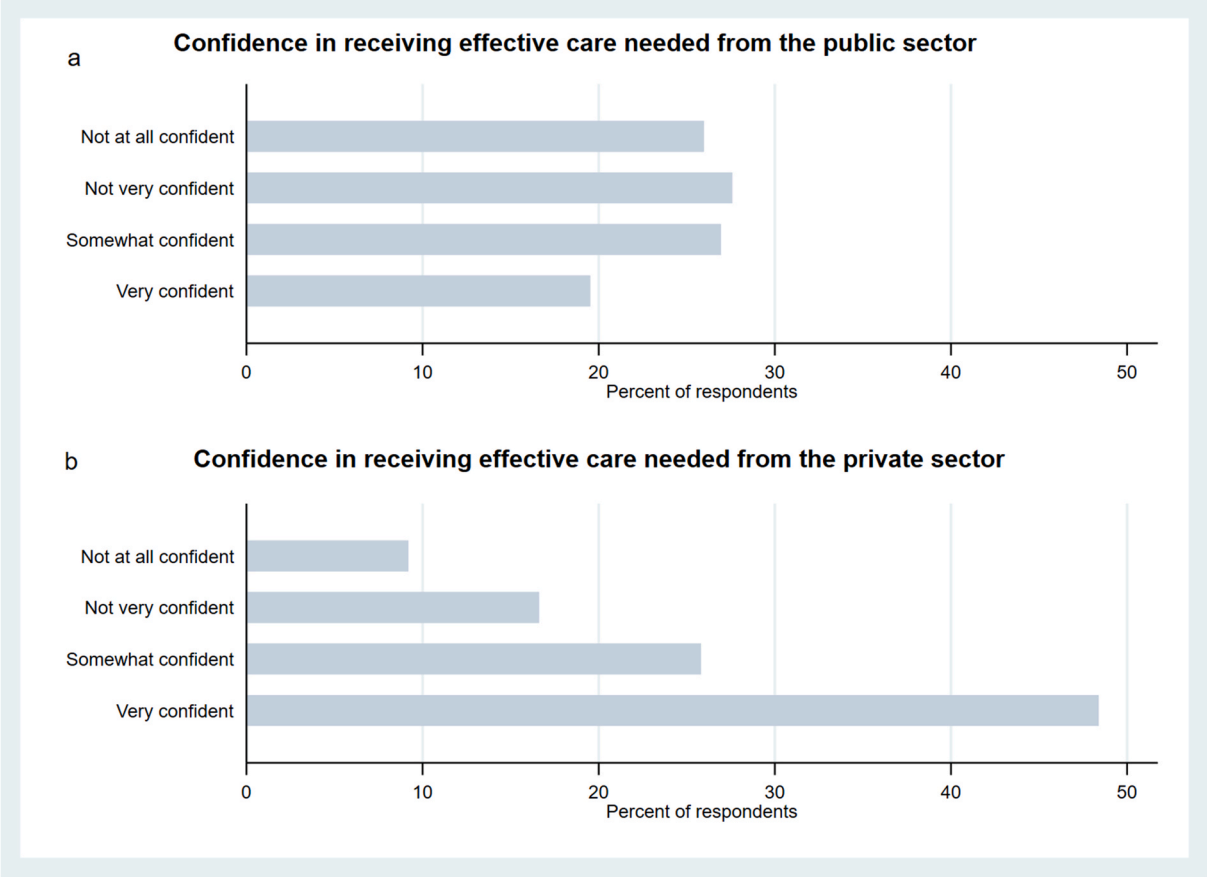

Fig. 1. Confidence in receiving effective care needed from the public and private sector.

had a good understanding of the principles and concepts behind health insurance, and valued its redistributive effects, quality concerns in the health system was a major deterring factor for enrollment (Criel and Waelkens, 2003). A study in Ghana also found that negative provider attitudes, and the perception of the technical quality of care, did not increase the odds of health insurance ownership (Jehu-Appiah et al., 2011). In Nicaragua, quality concerns in the public sector was a deterring factor in health insurance enrollment, and respondents had a preference for private providers (Thornton et al., 2010). Interestingly, the type of health facility (public vs private) visited last and the number of visits were not associated with health insurance enrollment. We measured experiences and overall quality of care during the last visit in our study too but neither were associated with health insurance enrollment. Perhaps this is because the majority of respondents rated their experiences and quality of care as good, very good, or excellent. Our finding illustrates the importance of measuring confidence in the health system, as experiences or quality rating of their last health facility visit may not capture fully how individuals perceive the whole system.

However, we also found that trust and perceived performance of the government were not significant predicators of enrollment. This finding differs from the results of a qualitative study conducted in Nigeria, whereby potential enrollees where skeptical about the government's abilityto successfully ran the health insurance due to its failure in implementating programs in other sectors. Perhaps in Zambia, the role of the government may not be an important factor for potential enrollees due to how the health insurance was established. The establishment of a national health insurance had been an ongoing discussion in Zambia among health stakeholders since the 1990s and it had not been a push from a specific ruling party. Meanwhile, in other countries such as Ghana, the establishment of its national health insurance scheme (NHIS) was often part of the political agenda during the general election campaigns. In fact, it has been argued that the political nature of the NHIS made it a significant determinant of enrollment (Alatinga, 2011).

Our findings also show that individual factors are associated with health insurance enrollment. Those in the richer wealth quintile had higher odds of enrollment, which is consistent with previous studies (Fenny, 2017; Jehu-Appiah et al., 2011) and suggests that credit-constraints may also explain restricted enrollment in some populations. Interestingly, enrollment was not very high in the top wealth quintile. People whose largest health expenditure in the past year was above 1000 Kwacha (76 USD) were more than twice as likely to enroll in the health insurance. This is likely because health insurance may be attractive to those expecting to pay high medical expenditure and who perceive that enrolment in the health insurance would be cost saving (Baillon et al., 2022). Surprisingly, conditional on sociodemographic factors, including wealth, gender and marital status, and higher education (above secondary) had no additional explanatory power, which is different than findings from Ghana and Kenya (Kimani et al., 2014; Salari et al., 2019) but similar to a study in Nicaragua (Thornton et al., 2010). This difference may be due to the overall high level of educational attainment in our sample that may different from the general population in Zambia and elsewhere.

There are several limitations with our study. Although Lusaka is a relatively heterogeneous district with a population in both the formal and informal sector, a few pockets have predominantly people employed in the formal sector. Some of these few small areas were in our sample, which made it difficult to identify the required number of informal sector households in these areas. Lusaka is a big city and the capital of Zambia, and its population tends to be wealthier, more educated, and younger than the general population of the entire country (Aurick et al., 2017; International Labor Organization, 2018). In addition, our results may not be generalizable to rural areas, which have fewer private health

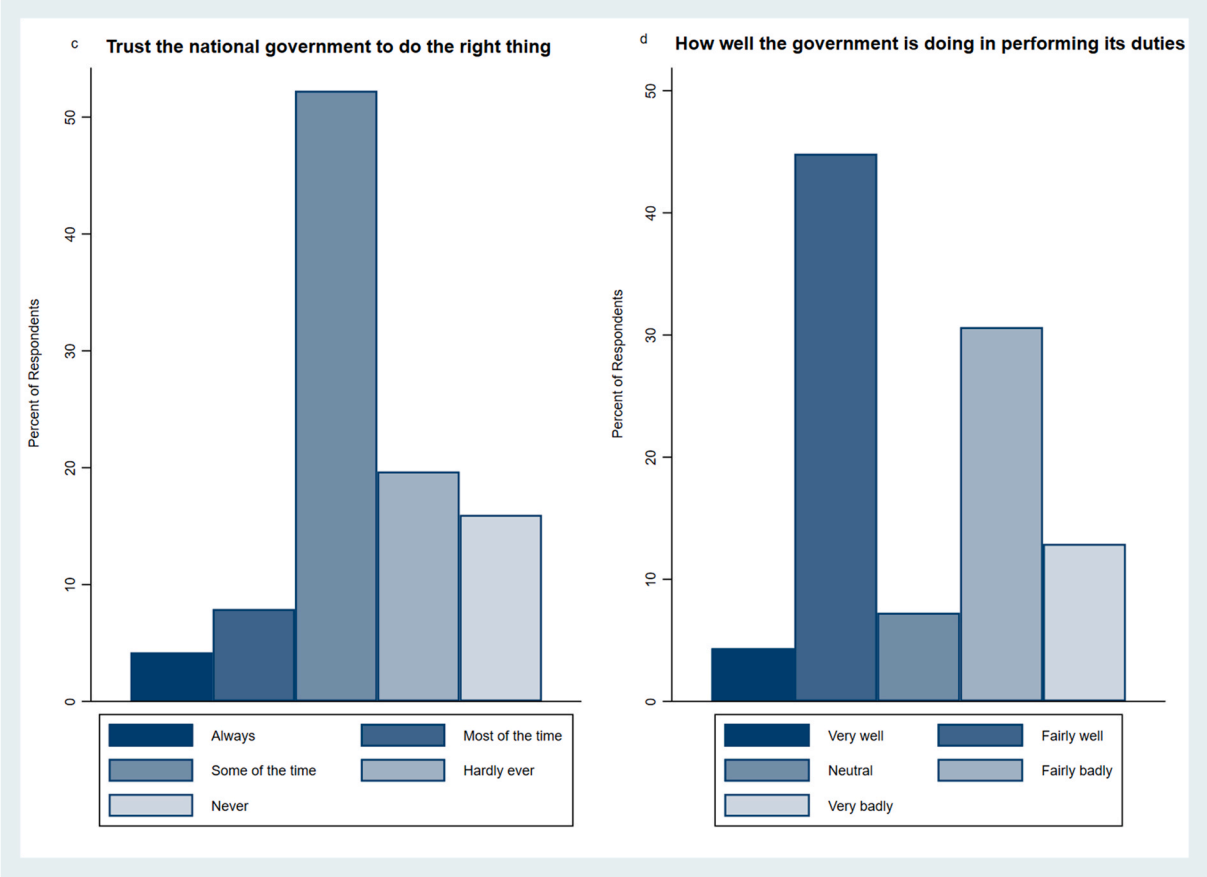

Figure 2. Trust and perceived performance of the national government among respondents.

Table 2
Health insurance enrollment and main predicator variables.

	Bivariate	Adjusted for main predicators
Main predictor	OR (95% CI)	
Confidence in the public health sector	0.77 (0.45–1.32)	1.10 (0.60–2.01)
Confidence in the private health sector	3.17 (1.83–5.47)	3.89 (2.16–6.99)
Trust in the government	1.08 (0.51–2.31)	1.80 (0.73–4.41)
Perceived performance of government	0.95 (0.50–1.81)	1.13 (0.54–2.34)

Note: Original scales of responses were transformed into continuous variables ranging from 0 to 1.

providers than in urban settings such as Lusaka. Finally, as an observational study, our models are subject to omitted variable bias. We attempted to control for as many confounders associated with health insurance enrollment and confidence in the health system, but we did not examine all possible factors. First, household size, which has been found as a determinant for enrollment was omitted in our model. However, we included the number of children in the household in our model. In addition, we did not control for the health status of the other members of the household. As principal members of the scheme can have additional six beneficiaries under them, having a household member with a chronic illness may influence enrollment.

Our study may have policy implications. There is a crucial need to make fundamental improvements across the entire health system to achieve high quality of care, which can increase enrollment in health insurance. Major global reports have emphasized four main strategies to improve quality: 1) leadership and governance specifically focused on quality, 2) highly trained health workforce, 3) better use of information systems, and 4) applying evidence-based practices such as the use of clinical guidelines (Braithwaite et al., 2020). These actions are beyond the national health insurance scheme and will require concerted efforts with the Ministry of Health and other key stakeholders. However, it is unclear the extent that improvements in the quality of care can increase individuals' confidence (Bleich et al., 2009).

Confidence in the private sector is a strong determinant in health insurance enrollment and its inclusion in the health insurance scheme seems to align with individuals' preferences. Although the majority of the respondents relied on public health facilities, they report a high confidence in the private sector. Since the study, NHIMA has accredited a number of private health facilities, and it is gradually adding more every month across the country. However, there needs to be careful planning of the inclusion of the private sector as overreliance by people who believe it is superior to public institutions may jeopardize the financial sustainability of the scheme. The private sector has higher reimbursement rates than the public sector due to the former receiving subsidization from the government. Attention should also be drawn to training, and quality improvement in private sector, as though it may be perceived as having high quality of care, this often sometimes may not be the reality (Mackintosh et al., 2016; Montagu and Goodman, 2016). In addition, strong linkages in care coordination and information systems between the two sectors will be essential (Morgan et al., 2016).

Finally, our study demonstrated that vulnerable groups are less likely to enroll in the national health insurance. The implication is that with equitable access being one of the main priorities of the health insurance, more efforts will be required to reach the poorest groups. The National Health Insurance Act requires NHIMA to facilitate access to the scheme for the poor and vulnerable groups. In addition, any person classified by

Table 3
Adjusted associations between health insurance enrollment and main predicator variables.

	Confidence in public sector	Confidence in private sector	Trust in the government	Perceived performance of government	All
	(1)	(2)	(3)	(4)	(5)
OR (95% CI)					
Confidence in the public sector	0.80 (0.43–1.51)	_	_	_	1.02 (0.52–1.98)
Confidence in the private sector	_	**2.88 (1.56– 5.29)**	_	_	**3.40 (1.73 –6.68)**
Trust in the government	_	_	1.46 (0.50–4.23)	_	1.97 (0.70–5.56)
Perceived performance of government	_	_	_	1.48 (0.76–2.89)	1.57 (0.75–3.27)
Age					
18–29	References	References	References	References	References
30–39	0.96 (0.53–1.73)	0.95 (0.52–1.73)	0.98 (0.54–1.76)	0.96 (0.53–1.74)	0.97 (0.53–1.80)
40–49	1.32 (0.74–2.33)	1.33 (0.77–2.30)	1.30 (0.74–2.28)	1.28 (0.72–2.26)	1.35 (0.76–2.39)
≥50	0.87 (0.47–1.61)	0.97 (0.53–1.79)	0.89 (0.48–1.66)	0.86 (0.46–1.61)	1.00 (0.53–1.91)
Sex					
Males	References	References	References	References	References
Females	1.11 (0.73–2.02)	1.20 (0.70–2.05)	1.20 (0.70–2.04)	1.17 (0.68–2.02)	1.18 (0.67–2.07)
Religion					
Catholic	References	References	References	References	References
Protestant	0.82 (0.50–1.33)	0.83 (0.52–1.32)	0.80 (0.50–1.27)	0.80 (0.50–1.28)	0.80 (0.49–1.31)
Muslim	**0.35 (0.12 – 0.99)**	**0.33 (0.12 – 0.95)**	**0.35 (0.12 – 0.98)**	0.36 (0.13–1.02)	**0.35 (0.13 – 0.94)**
Other	3.03 (0.95–9.65)	3.29 (1.03–10.5)	3.00 (0.94–9.61)	3.20 (1.00–10.2)	3.58 (1.06–12.08)
Highest educational attainment					
None	References	References	References	References	References
Primary	1.64 (0.89–3.04)	1.46 (0.77–2.74)	1.70 (0.91–3.18)	1.70 (0.92–3.12)	1.54 (0.81–2.92)
Secondary	1.65 (0.84–3.23)	1.53 (0.76–3.07)	1.70 (0.87–3.34)	1.68 (0.87–3.25)	1..63 (0.81–3.26)
Tertiary +	1.88 (0.92–3.81)	1.69 (0.77–3.70)	2.00 (0.99–4.01)	**2.05 (1.05 – 3.99)**	1.89 (0.86–4.18)
Marital status					
Single/Divorced/Separated/Widow	References	References	References	References	References
Married/Cohabiting	0.82 (0.47–1.44)	0.83 (0.46–1.48)	0.81 (0.47–1.41)	0.80 (0.45–1.40)	0.80 (0.44–1.45)
Wealth quintile index					
Poorest	References	References	References	References	References
Poorer	1.62 (0.84–3.13)	1.52 (0.78–2.95)	1.66 (0.86–3.20)	1.66 (0.86–3.20)	1.52 (0.80–2.89)
Middle	1.14 (0.65–2.03)	1.14 (0.63–2.05)	1.15 (0.65–2.05)	1.15 (0.65–2.06)	1.14 (0.64–2.03)
Richer	**2.19 (1.17 – 4.11)**	**2.06 (1.07 – 3.98)**	**2.20 (1.17 – 4.15)**	**2.23 (1.19 – 4.19)**	**2.08 (1.07 –4.01)**
Richest	1.11 (0.58–2.11)	0.98 (0.52–1.87)	1.11 (0.59–2.09)	1.13 (0.60–2.12)	0.99 (0.53–1.87)
Number of children in household					
None	References	References	References	References	References
1–2	1.40 (0.84–2.31)	1.42 (0.86–2.34)	1.38 (0.83–2.29)	1.39 (0.84–2.31)	1.42 (0.86–2.33)
3 or more	2.13 (0.25–18.2)	1.62 (0.20–13.09)	2.28 (0.25–20.7)	2.14 (0.24–18.7)	1.52 (0.17–13.3)
Want change in government					
Yes	References	References	References	References	References
No	1.11 (0.71–1.75)	1.23 (0.79–1.92)	1.00 (0.64–1.56)	0.95 (0.58–1.55)	1.00 (0.62–1.62)
Don't know	0.72 (0.41–1.28)	0.74 (0.42–1.33)	0.67 (0.38–1.21)	0.64 (0.36–1.14)	0.62 (0.34–1.11)
Refused to answer	0.99 (0.53–1.83)	1.03 (0.51–2.09)	0.88 (0.47–1.67)	0.85 (0.44–1.62)	0.84 (0.44–1.59)
Health status					
Very good	References	References	References	References	References
Good	**0.45 (0.23 – 0.86)**	**0.48 (0.25 – 0.95)**	**0.45 (0.24 – 0.85)**	**0.45 (0.24 – 0.87)**	**0.50 (0.25 – 0.98)**
Moderate	0.83 (0.43–1.61)	0.86 (0.44–1.71)	0.84 (0.42–1.67)	0.85 (0.43–1.66)	0.93 (0.46–1.88)
Bad	0.76 (0.29–1.96)	0.78 (0.28–2.13)	0.75 (0.29–1.95)	0.79 (0.31–2.00)	0.84 (0.31–2.29)
Very bad	0.50 (0.03–7.73)	0.37 (0.03–4.67)	0.45 (0.03–6.47)	0.50 (0.04–6.67)	0.30 (0.03–3.29)
Number of health facility visits in the last year					
None	References	References	References	References	References
1–2	1.55 (0.90–2.65)	1.60 (0.96–2.66)	1.54 (0.89–2.64)	1.54 (0.89–2.65)	1.56 (0.92–2.65)
3 or more	1.41 (0.72–2.77)	1.46 (0.78–2.76)	1.43 (0.74–2.78)	1.43 (0.74–2.75)	1.48 (0.79–2.78)
Type of health facility					
Public	References	References	References	References	References
Private/mission-owned	1.33 (0.60–2.94)	1.20 (0.54–2.67)	1.42 (0.65–3.12)	1.49 (0.68–3.26)	1.28 (0.56–2.94)
User-experience index	1.01 (0.88–1.16)	0.99 (0.87–1.13)	1.04 (0.90–1.19)	1.04 (0.90–1.19)	1.03 (0.89–1.20)
Largest health expenditure in the last year					
0–100 Kwacha	References	References	References	References	References
101–500 Kwacha	1.09 (0.62–1.91)	1.04 (0.59–1.83)	1.09 (0.62–1.92)	1.07 (0.60–1.90)	1.06 (0.59–1.91)
501–1000 Kwacha	1.85 (0.89–3.85)	1.82 (0.86–3.86)	1.93 (0.91–4.09)	1.85 (0.89–3.84)	1.92 (0.90–4.08)
1000 + Kwacha	**2.35 (1.08 – 5.11)**	**2.28 (1.01 – 5.11)**	**2.38 (1.10 – 5.13)**	**2.34 (1.08 – 5.08)**	**2.30 (1.02 –5.21)**
Payment mode of largest health expenditure in the last year					
Borrowed/sold assets	References	References	References	References	References
Paid themselves	0.58 (0.32–1.05)	0.60 (0.33–1.08)	0.58 (0.33–1.05)	0.58 (0.32–1.04)	0.62 (0.34–1.12)
No health expenditure	0.71 (0.27–1.87)	0.76 (0.29–1.97)	0.73 (0.27–1.92)	0.73 (0.28–1.92)	0.80 (0.31–2.05)

Note: Logistic regression model for each predicator and covariates are displayed in columns (1) through (4). Logistic regression model for all predictors and covariates are displayed in column (5). Confidence intervals are in parentheses. Original scales of the predictor responses were transformed into continuous variables ranging from 0 to 1.

Table 4
Health insurance enrollment after restricting main predictors and wealth.

	Excluding already enrolled	Excluding no response for perceived government	Only top 2 wealth quintiles	Only bottom 2 wealth quintiles
OR (95% CI)				
Confidence in the public sector	1.11 (0.57–2.16)	0.97 (0.51–1.86)	2.36 (0.66–8.43)	1.34 (0.32–5.52)
Confidence in the private sector	**3.68 (1.84 – 7.35)**	**4.35 (2.07 – 9.16)**	3.19 (0.56–18.1)	3.90 (1.21–12.6)
Trust in the government	2.34 (0.81–6.77)	1.77 (0.55–5.70)	8.70 (0.86–88.1)	0.23 (0.05–0.99)
Perceived performance of government	1.72 (0.86–3.46)	**0.42 (0.18 – 0.95)**	2.49 (0.52–11.9)	2.04 (0.61–6.86)
Age				
18–29	References	References	References	References
30–39	0.93 (0.49–1.77)	0.82 (0.41–1.59)	1.58 (0.58–4.29)	0.69 (0.20–2.37)
40–49	1.27 (0.69–2.33)	1.08 (0.56–2.06)	1.47 (0.56–3.85)	1.48 (0.60–3.66)
≥50	0.88 (0.45–1.75)	0.91 (0.46–1.83)	1.51 (0.35–6.43)	0.81 (0.35–1.86)
Sex				
Males	References	References	References	References
Females	1.27 (0.74–2.18)	0.91 (0.50–1.65)	1.69 (0.67–4.26)	0.68 (0.24–1.94)
Religion				
Catholic	References	References	References	References
Protestant	0.75 (0.45–1.24)	0.80 (0.46–1.37)	0.62 (0.31–1.24)	0.99 (0.46–2.14)
Muslim	**0.36 (0.14 – 0.96)**	**0.34 (0.12– 0.92)**	0.36 (0.05–2.58)	0.11 (0.01–1.28)
Other	**4.06 (1.24 – 13.4)**	**16.8 (2.97 –95.7)**	1.70 (0.14–20.1)	3.11 (0.50–19.6)
Highest educational attainment				
None	References	References	References	References
Primary	1.45 (0.74–2.82)	1.37 (0.73–2.61)	0.59 (0.13–2.73)	1.31 (0.40–4.25)
Secondary	1.39 (0.67–2.86)	1.37 (0.60–3.11)	0.94 (0.19–4.66)	0.39 (0.11–1.34)
Tertiary +	1.55 (0.64–3.76)	1.84 (0.81–4.18)	0.81 (0.15–4.28)	_
Marital status				
Single/Divorced/Separated/Widow	References	References	References	References
Married/Cohabiting	0.76 (0.40–1.42)	0.75 (0.39–1.43)	0.50 (0.16–1.57)	1.08 (0.51–2.28)
Wealth quintile index				
Poorest	References	References	_	References
Poorer	1.61 (0.85–3.05)	1.42 (0.76–2.66)	_	1.57 (0.72–3.42)
Middle	1.12 (0.61–2.05)	1.11 (0.62–1.99)	_	_
Richer	**2.03 (1.03 – 3.99)**	**2.02 (1.03– 3.95)**	References	
Richest	0.83 (0.42–1.61)	0.87 (0.46–1.68)	0.54 (0.22–1.34)	_
Number of children in household				_
None	References	References	References	References
1–2	1.35 (0.81–2.23)	1.65 (0.93–2.93)	0.76 (0.30–1.90)	**2.90 (1.53 – 5.50)**
3 or more	1.50 (0.15–15.3)	1.11 (0.16–7.88)	_	1.66 (0.12–23.7)
Want change in government				
Yes	References	References	References	References
No	0.95 (0.59–1.55)	1.02 (0.60–1.73)	0.85 (0.26–2.76)	1.21 (0.53–2.76)
Don't know	0.56 (0.30–1.02)	0.50 (0.27–0.90)	0.39 (0.09–1.69)	0.55 (0.18–1.67)
Refused to answer	0.66 (0.35–1.24)	0.93 (0.41–2.13)	0.48 (0.16–1.48)	1.33 (0.47–3.73)
Health status				
Very good	References	References	References	References
Good	0.54 (0.26–1.13)	**0.37 (0.15–0.93)**	0.69 (0.28–1.66)	0.33 (0.05–2.14)
Moderate	0.99 (0.49–2.01)	0.75 (0.28–2.03)	1.84 (0.64–5.34)	0.36 (0.06–2.01)
Bad	0.93 (0.35–2.45)	0.62 (0.18–2.19)	1.09 (0.18–6.46)	0.59 (0.07–4.62)
Very bad	0.30 (0.03–3.42)	0.14 (0.01–2.31)	_	0.33 (0.00–25.9)
Number of health facility visits in the last year				
None	References	References	References	References
1–2	1.57 (0.88–2.77)	1.54 (0.86–2.75)	0.65 (0.19–2.20)	3.41 (1.04–11.2)
3 or more	1.47 (0.80–2.69)	1.58 (0.85–2.92)	0.75 (0.27–2.11)	2.29 (0.74–7.12)
Type of health facility				
Public	References	References	References	References
Private/mission-owned	0.92 (0.37–2.30)	1.46 (0.65–3.30)	2.46 (0.86–7.04)	_
User-experience index	1.09 (0.94–1.25)	1.05 (0.90–1.22)	1.00 (0.75–1.32)	1.11 (0.87–1.42)
Largest health expenditure in the last year				
0–100 Kwacha	References	References	References	References
101–500 Kwacha	1.24 (0.67–2.29)	1.07 (0.56–2.02)	0.69 (0.16–2.97)	0.42 (0.19–0.90)
501–1000 Kwacha	2.30 (1.03–5.14)	2.00 (0.91–4.43)	2.06 (0.36–11.9)	0.62 (0.18–2.08)
1000 + Kwacha	**2.64 (1.10 – 6.36)**	**2.49 (1.06 – 5.82)**	1.94 (0.49–7.66)	1.20 (0.24–6.06)
Payment mode of largest health expenditure in the last year				
Borrowed/sold assets	References	References	References	References
Paid themselves	0.61 (0.33–1.12)	0.68 (0.35–1.30)	0.55 (0.18–1.71)	0.38 (0.16–0.92)
No health expenditure	0.82 (0.31–2.15)	0.69 (0.25–1.94)	0..41 (0.06–2.95)	0.44 (0.09–2.22)
Number of Observations	570	573	238	235

Note: Logistic regression model for all predictors and covariates after restricting enrollment, perceived performance and stratifying wealth quintiles. Confidence intervals are reported in parentheses. Original scales of the predictor responses were transformed into continuous variables ranging from 0 to 1.

the Ministry responsible for social welfare may be exempted from contributions. These mandates by the Act will require active coordination with the Ministry of Community Development and Social Services (MCDSS) to identify recent vulnerable groups. MCDSS already has a cash transfer program for vulnerable groups but not all eligible are under the program. In addition, economic crisis over the years coupled with the COVID-19 pandemic have greatly affected Zambia and this could have pushed more households into poverty (Geda, 2021; Paul et al., 2021). Close monitoring of the effectiveness of the policy options at sub-national levels is essential. As those within the richest group were also less likely to enroll in the scheme, targeted policies, which address their concerns, may attract them to the scheme and may contribute to the viability of the scheme as they pay higher insurance contributions.

5. Conclusion

We found that confidence in health systems is a key predictor of health insurance enrollment. Improving quality of care in both the private and public sector may help increase future enrollment. To reach the most vulnerable groups, further coordination with other social protection programs may also be needed.

Credit author statement

Doris Osei Afriyie: Conceptualization, Methodology, Formal analysis, Visualization, Writing-original draft, Writing-reviewing and Editing **Felix Masiye:** Methodology, Writing-reviewing and Editing. **Fabrizio Tediosi:** Visualization, Writing-review and Editing. **Günther Fink:** Conceptualization, Methodology, Formal analysis, Writing-review and Editing, Supervision.

Ethical approval

We obtained ethical clearance from the University of Zambia Social Sciences and Humanities Ethical Clearance Committee as well as the permission to conduct this research from the National Health Research Authority. We also obtained ethical clearance from the Ethikkommission Nordwest-und Zentralschweiz (EKNZ) in Switzerland. An informed consent was obtained from each respondent before the interview started.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgement

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2023.115750.

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