A Comparative Cross-sectional Study of the Prevalence and Determinants of Health Insurance Coverage between Nigeria and South Africa: A Multi-country Analysis of Demographic Health Surveys

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Abstract

**Background:** The core Universal Health Coverage (UHC) objectives are to ensure universal access to healthcare services by reducing all forms of inequalities. However, financial constraints are major barriers to accessing healthcare, especially in countries like Nigeria and South Africa. The findings of this study may possibly aid in informing and communicating health policy to increase financial access to healthcare and its utilization in South Africa and Nigeria. The objectives were to estimate the prevalence of health insurance coverage, and to explore the socio-demographic factors associated with health insurance in South Africa and Nigeria. 

**Methods:** This was a cross-sectional study using the 2018 Nigeria Demographic Health Survey and 2016 South Africa Demographic Health Survey. The 2018 Nigeria Demographic Health Survey data on 55,132 and the 2016 South Africa Demographic Health Survey on 12,142 individuals were used to investigate the prevalence of health insurance associated with socio-demographic factors. Percentages, frequencies, Chi-square and multivariate logistic regression were employed, with a significance of p<0.05.

**Results:** About 2.8% of the Nigerian and 13.3% of the South African population were insured (Nigeria: males-3.4%; females-2.7% vs. South Africa: males-13.9%; females-12.8%). The multivariate logistics regression analyses showed that higher education was significantly more likely to be associated with health insurance, independent of other socio-demographic factors in Nigeria (Model I: OR: 1.43; 95% CI: 0.34-1.54, p<0.05; Model II: OR: 1.34; 95% CI: 0.28-1.42, p<0.05) and in South Africa (Model I: OR: 1.33; 95% CI: 0.16-1.66, p<0.05; Model II: OR: 1.76; 95% CI: 0.34-1.82, p<0.05). Respondents with higher wealth index and who were employed were independently associated with health insurance uptake in Nigeria and South Africa (p<0.001). Females were more likely to be insured (p<0.001) than males in both countries, and education had a greater impact on the likelihood of health insurance uptake in rich wealth index households among both male and females in Nigeria and South Africa.

**Conclusion:** Health insurance coverage was low in both countries and independently associated with socio-demographic factors such as education, wealth, and employment. There is a need for continuous sensitization, educational health interventions and enabling employment opportunities for citizens of both countries to participate in uptake of wide health insurance coverage.

**Keywords:** Health; Health Demography; Insurance Coverage; Nigeria; South Africa; Socio-demographic factors.
1. Introduction/Background

In this contemporary era, societies are becoming increasingly diverse, with rapid changes, and they are being confronted with expanding inequalities and a growing need for accessibility of social facilities such as healthcare services. Thus, universal health coverage (UHC) has become a priority in many low- and middle-income countries, because UHC was introduced to provide equitable access to quality healthcare. Financial protection, which has to do with medical expenses paid out of pocket, is an essential factor towards achieving universal health coverage [1,2]. Studies have shown that considerable dependence on out of-pocket payments (OOP) as the most important source of payment intended for medical needs not only has an inauspicious consequence on demand for services, but also an increasing financial burden among families, leading to deprivation [3,4]. In addition, existing studies have indicated that per capita income expenditure on health and welfare in many low- and middle-income countries is likely to increase quickly in the long run [5,6]. Also, the prevention of extremely harmful health disbursements and the necessity to strive towards universal health coverage have drawn the attention of governments and several stakeholders to provide health insurance schemes that will offer subsidized fees and healthcare accessibility to their citizens, especially in developing countries such as Nigeria and South Africa [3,4].

In Nigeria, OOP payments contribute over 70% of the spending on health, significantly surpassing the recommended 30% threshold [7,8]. This percentage is amongst the highest in the world, and certainly highest in Africa, bringing financial ruin to many family circles [7,8]. Nigeria has established remarkable but unspecified significant commitments in decreasing OOP in order to ensure increased access of her citizens to quality primary healthcare services through ratifying into law the National Health Act in 2014. The National Health Act states that “all Nigerians shall be entitled to a Basic Minimum Package of Health Services (BMPHS) funded by a basic healthcare provision fund (BHCPF) by deducting from the contributions of not less than 1% of the Consolidated Revenue Fund (CRF) of the Federal Government of Nigeria” [2]. Pertaining to BHCPF expenditure formulated strategies, just about 50% of the basic healthcare provision fund is anticipated to go in the direction of expansion and funding of the basic minimum package of health services that will influence instituting a State Contributory Health Insurance Scheme (SCHIS). Thus, the prospects and expectations of the BHCPF have stirred many States in Nigeria to set in motion the aim and execution of a Bill on a State Social Health Insurance Scheme (SHIS). The Nigerian government has tried out many forms of SHIS in the past two decades. In year 2000, the National Health Insurance Scheme (NHIS) was introduced with a coverage of about 4% of the entire population, where most of them were federal civil service employees [9,10]. However, the SHIS providers did not make many efforts to allow the easy participation of employed individuals within the informal sector to pay health insurance premiums. Several factors have been attributed to the low coverage of SHIS, such as an absence of acceptability and refusal to pay premiums, specifically within the informal sector [11,10]. This is in agreement with previous studies, which showed that accomplishing economic sustainability and effective cross-subsidization through admission charges, particularly within the informal sector, are absolutely necessary contributing factors in implementing SHIS [12,13]. Health financing is key in closing the inequality gaps through instituting a health insurance system in ensuring accessibility to health services across the populations of countries [14,15]. There are strong indications of the need to implement a working health insurance system that will include employees within the formal and informal sectors, as an effective intervention to address OOP payments. Studies have cited that health insurance uptake has been extremely slow in Nigeria owing to the fact that NHIS funding is contributed to by
government and individuals who are working in government organizations [11,16]. In the post-independence era, health funding was largely done by the government alone, in the form of free and universal healthcare, mainly in public facilities [17–20]. Recently, the informal sector makes up about 70% of Nigeria’s labour force, and it is key to evaluate the practicability of the scheme’s funding through premium payments by looking into the Nigerian population’s willingness to enroll in the proposed scheme and pay premiums.

In South Africa, the government has made UHC one of the top priorities of the sustainable development goals to protect the vulnerable population from medical financial risks and to increase participation in the uptake of health insurance [4]. Despite progress made in certain aspects of the country after the end of apartheid in 1994, a well-established healthcare system is structured around a strict referral mechanism, yet wide disparities still continue to exist between the public and private health systems, amid escalating medical costs and inequalities of underlying socio-economic factors, which have followed as a consequence of the apartheid regime [17–18]. Providing UHC for its citizens is to first recognize the significance of population health in the national health policy agenda [2,3]. The NHI scheme was instituted to avert OOP payments for medical burden, to provide financial risk protection to poorer households by reducing direct medical costs, and to protect low-income households from OOP medical expenses and financial catastrophe related to healthcare services [2,3]. Several factors were cited in studies that, even though health reforms were undertaken to integrate existing private schemes into NHI, medical aid providers were making huge profits from insurers and the majority of them were not getting fair value for their premium contributions, especially those within the private sector. Also, many individuals were losing trust in public institutions and in the reformed NHI scheme, as fear exists that pooled resources from insurers’ contributions might not be used as intended for the masses.

A few studies have cited corruption in the health sector as one of the major barriers in preventing pooled NHI funding from being publicly administered [3,21]. As regards uptake of health insurance premiums, employment-based social health insurance premiums are restricted to the formal sector, which excluded most of the unemployed or employed individuals in the informal sector [22,23]. This has gradually make it difficult for individuals in the informal sector to have access to or procure a medical aid plan for themselves and their families. Employees are made to contribute up to two-thirds of an employee’s total monthly health insurance premium as part of tax deductible benefits [24–26]. Thus, the insured who can pay medical aid premiums are allowed to have good accessibility to first-world healthcare via the private sector, and those who cannot afford medical aid are left to rely on public hospitals, which are largely unreliable and fail to offer adequate medical attention to those of their clients without cover and who pay a lot out of their
pockets for medical bills [5]. Thus, health financing is not only designed to generate funds for healthcare delivery, but also to use pooled financial resources to support citizens who cannot afford medical aid premiums [27]. Hence, it is imperative to reflect on the background factors that may restrict or facilitate what can be implemented and achieved in South Africa [27,28].

Utilization of health insurance is ascertained by several underlying causes, comprising demographic, social and economic, as well as health status [24–26]. Understanding these factors that impede the uptake of health insurance will assist policy makers and relevant stakeholders to institute new effective interventions that will improve health insurance coverage to alleviate disease burden in the population. While there is dearth of empirical studies on the comparative cross-sectional study of the factors influencing health insurance coverage in Nigeria and South Africa, studies conducted at individual country level have shown that socio-demographic factors such as education, age, wealth status, residence, economic activities, religion, health status, parity, sex of head of the household, exposure to media, perception, and willingness to become health insurance subscribers significantly influence health insurance coverage [29,30]. To bridge the existing knowledge gap for a comparative cross-sectional survey for a multi-country study through empirical observations, we analysed the prevalence and predictors of health insurance coverage in Nigeria and South Africa, using nationally-representative demographic and health survey (DHS) data. We adopted logistic regression to achieve robust comparative analysis outcomes of the individual level factors influencing coverage of health insurance in both countries. Our findings could inform policy-makers and relevant health stakeholders of the factors which need careful deliberation when contriving and implementing effective health insurance-related interventions geared towards improving health outcomes by tackling poverty, increasing health insurance coverage, and reducing impoverishment accompanying payment for health services. This also will contribute to the World Health Organization (WHO)’s mission of the right to the highest achievable standard of health, “to Health for All and the SDGs” (SDG 3.8.1 and SDG 3.8.2) in achieving the UHC in Nigeria and South Africa.

2. Methodology

2.1 Study settings

This study uses data from the 2018 Nigeria Demographic Health Survey (NDHS) and the 2016 South Africa Demographic Health Survey (SADHS) that were conducted in each country. These countries have similarities and differences as far as geographical population structure and socio-economic environment are involved. The similarities and differences between Nigeria and South Africa are presented in Table 1. These two countries were non-randomly selected to provide the comparative analysis of the geographical population distribution as well as differences in socio-economic disparities that are of concern to the study, taking into account the evaluation of their influence on health insurance coverage. Hence, the geographical distribution and socio-economic differences of two population groups are concomitant with large disparities in health resources distribution between different population groups, arising from social conditions [31,32].

2.2 Study design

The present analysis is based on nationally representative datasets from two cross-sectional, population-based surveys conducted in Nigeria and South Africa. The 2018 NDHS was conducted in 2018 while the 2016 SADHS was conducted in 2016. The two Demographic Health Surveys (DHS) adopted a multi-stage cluster sampling methodology to arrive at the selected sample of adults aged 15–59 [33,34]. The two surveys used systematically sampled enumeration areas of the regions and districts to collect representative data for 15–59 age groups. The DHS was based on
all persons in the household but all of the data used in this study were restricted to those aged 15–59 years. The DHS adopted a stratified two-stage probability sampling design to produce a sample representative of the target population. A detailed report on the methodology of the DHS conducted in Nigeria and South Africa have been presented elsewhere and cited in several studies using these demographic health surveys [10,11].

### Table 1: Geographical and Socio-economic Comparison of Study Settings

| Description                 | Nigeria                           | South Africa                      |
|-----------------------------|-----------------------------------|-----------------------------------|
| Region                      | Western Africa                    | Southern Africa                   |
| Topography                  | Coastal with varied landscape     | Coastal high and low lands        |
| Total land area             | 923,769 km²                       | 1,213,090 km²                     |
| Total population            | 211,400,708                       | 60,093,707                        |
| % rural population          | 48.04%                            | 33.3%                             |
| % urban population          | 51.96%                            | 66.7%                             |
| Labour force categories     | Mainly engaged in Professional (Federal, State and Local government, Ministries, Departments and Agencies). Few are engaged in non-professional (technical, skilled manual, unskilled manual and agriculture) | Few are engaged in formal sector (non-agricultural). Mainly engaged in informal sector (non-agricultural), agriculture and private households |
| Country unemployment rate   | 32.5%                             | 32.6%                             |
| Country employment rate     | 66.7%                             | 38.0%                             |
| Labour force participation rate | 53.41%                        | 56.4%                             |
| % of age dependency ratio   | 86.7%                             | 52.23%                            |
| NHIS coverage (%) by gender |                                    |                                   |
| Women                       | 3%                                | 16%                               |
| Men                         | 3%                                | 17%                               |

**Source:** Adapted from Duku SKO (2018) [35].

### 2.3 Data sources

To draw inferences on the statistical distribution of the prevalence and socio-demographic determinants of health insurance coverage with its associated underlying factors, the study is based on nationally-representative household surveys (2018 NDHS and 2016 SADHS), that provided data for a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition. Both surveys covered the following topics: the household, individual woman, individual man, caregiver, and biomarkers. The two surveys covered different age groups (women aged 15–49 years and men aged 15–59 years) and the survey analysis was restricted to adults aged 15–49 years old in order to make the analysis comparable between Nigeria and South Africa. Subsequently, data used in the surveys represent only the sampled respondents; the data were weighted to make them nationally representative of the respondents aged 15–59 years. This was employed so that the design weights can be adjusted for household non-response and individual non-response to obtain the sampling weights for households and for women and men aged 15–49.

### 2.4 Sampling procedures

A multistage stratified sampling technique was used in the two countries’ demographic health surveys; the use of standard statistical methods for analyzing the data would produce incorrect standard errors for the survey estimates since the methods used assume a simple random sampling procedure. As such, during analysis of data, a complex sample module from SPSS was adopted to ensure that the estimated standard errors for the survey estimates were robust to bias and correctly reflected sampling variability. Thus, the sampling strategy adopted in the 2018 NDHS was a two-stage stratified design, where stage one involved the selection of enumeration areas (EAs) using stratified proportional to size selection. Stage two constituted the random selection of around 30
households within each of the selected EAs [33,34]. From the 2018 NDHS, data were collected from 41,668 households of which 40,666 were occupied, which comprised in-depth individual data on 41,821 women and 13,311 men, adding up to 55,132 individuals yielding a response rate of 99% for both men and women interviewed completely [33]. Furthermore, the sampling strategy employed in the 2016 SADHS was a stratified two-stage sample design, where stage one involved the selection of primary sampling units (PSU) using probability proportional to size selection [34]. Stage two constituted the systematic random selection of about 750 PSUs (primary sampling units) from 26 sampling household strata within each of the selected PSUs, and a systematic selection of 20 residential dwelling units (DUs) per cluster were selected. From the 2016 SADHS, data were collected on 15,292 households of which 13,288 households were occupied, including in-depth individual data on 8,514 women and 3,618 men. The sampled PSUs yielded a sample of 12,132 sum of men and women interviewed completely with a response rates of 86% and 73%, respectively [34].

2.5 Measures
2.5.1 Outcome variables
The dependent variable in this study is health insurance coverage. The households were classified into two groups based on individuals’ responses whether they were insured or covered by any health insurance (coded as 1), and those with responses that they were uninsured or not covered by any health insurance (coded as 0).

2.5.2 Independent variables
The independent variables used for analysis in this study were selected on the basis of a literature review and on the availability of the limited socio-demographic variables collected by the 2018 NDHS and 2016 SADHS. The following variables were collected in all the surveys: gender, age, education, place of residence, region, province, race, wealth index, marital status, and employment status. Age was recoded into ten-year groups and categorized as follows: 15–24, 25–34, 35–44 and 45–59. The education variable was placed into four categories: No education, Primary (including primary incomplete and primary complete), Secondary (including secondary incomplete and secondary complete) and higher (More than secondary). However, in both surveys, the educational level reflects the highest educational status of the respondent attended [36], but does not inevitably mean that the level of education was completed. Wealth index was recoded into three categories: Poor (including lowest and second), Middle, and Rich (including fourth and highest). The wealth quintile variable is based on a wealth index factor score created using principal components analysis derived from data collected about a household’s cumulative living standard [36,37]. Therefore, the wealth quintile is a composite measure of a household’s cumulative living standard. Marital status was recoded into three categories as follows: Never married, currently married (including married or living together) and previously married (divorced, separated and widowed). Employment status was classified as unemployed or employed. It is imperative to mention that the surveys have a few variables that were described as similar or equal, such as region/provinces and urban-rural or urban-non-urban, except for population group. This is peculiar to the South African population (Black African and Others – White, Coloured, Indian/Asian and Other) and was recoded into two categories, and included as an important variable in the analyses. Other key socio-demographic factors such as religion and ethnic group were not used in the analyses owing to the fact that these variables were low on the list of main concern as informed by the users of census data, and thus, these variables were not included in the final list of data items [38]. Therefore, to
maintain consistency across surveys, and with inclusion of ‘population group’, only those variables in both surveys were used.

2.6 Statistical analysis
The data were weighted using sample weights to adjust for degree of differences in probability selections as the sample design involves more than one stage of selection. This ensured that data were cleaned and are representative of the target population, in this case, those aged 15–59 years. Descriptive analyses were first performed to describe the characteristics of the study respondents. Proportions were computed to describe the prevalence of health insurance ownership by country and gender. The Pearson’s chi-squared test ($\chi^2$) was used to test the association between health insurance coverage and predictor variables (socio-demographic factors). Multivariate logistic regression analysis was used to determine the factors associated with health insurance coverage. Unadjusted Model 1 and adjusted Model 2 were constructed in the logistics binary regression, and only socio-demographic variables were included to bring out interested findings for this study. Hence, confidence intervals (CIs) were used to estimate the precision of the odds ratios (ORs); ORs and 95% CIs after unadjusted Model 1 and adjusted Model 2 for covariates were estimated and presented. All analyses were carried out using STATA 17 software package (StataCorp: College Station, TX, USA).

2.7 Ethical considerations
All data were obtained from the 2018 NDHS and 2016 SADHS. Informed consent was obtained from each respondent before the interviews. We obtained approval to use the data from the DHS repository (http://dhsprogram.com/data/available-datasets.cfm).

2.8 Patient and public involvement
The study used secondary data from DHS and therefore the dependent and independent variables used in the study were those already in existence in the datasets. Hence, no patients were included in the design, development of research question and outcome measures. The findings will be disseminated to study respondents through the preparation of policy briefs and presentations in symposiums.

3. Results

3.1 Demographic characteristics of the respondents
Table 2 presents the distribution of the respondents by demographic characteristics. The proportion of the study respondents by gender indicated that there were more females (Nigeria – 71.3%; South Africa – 51.6%) than males (Nigeria – 28.7%; South Africa – 48.4%) who participated in the survey. Findings revealed that respondents between the ages of 15–24 years constituted 35% in Nigeria and 34.8% in South Africa respectively. The majority of the respondents were educated to secondary level in South Africa (75.2%) compared to Nigeria (41.5%), while more respondents were educated to tertiary level in Nigeria (12.0%) compared to South Africa (10.0%).
Table 2. Distribution of the population by socio-demographic characteristics, stratified by sex in South Africa and Nigeria

| Variables                  | Nigeria All No. (%) | Nigeria Men No. (%) | Nigeria Women No. (%) | South Africa All No. (%) | South Africa Men No. (%) | South Africa Women No. (%) |
|----------------------------|---------------------|---------------------|-----------------------|--------------------------|--------------------------|-----------------------------|
| **Age**                    |                     |                     |                       |                          |                          |                             |
| 15-24                      | 19286 (35.0)        | 4019 (30.2)         | 15267 (36.5)          | 4220 (34.8)              | 1307 (36.1)              | 2913 (34.2)                 |
| 25-34                      | 16569 (30.1)        | 3369 (25.3)         | 13200 (31.6)          | 3620 (29.8)              | 928 (25.7)               | 2692 (31.6)                 |
| 35-44                      | 12751 (23.1)        | 3288 (24.7)         | 9463 (22.6)           | 2670 (22.0)              | 674 (18.6)               | 1996 (23.4)                 |
| 45-59                      | 6526 (11.8)         | 2635 (19.8)         | 3891 (9.3)            | 1622 (13.4)              | 709 (19.6)               | 913 (10.7)                  |
| **Education**              |                     |                     |                       |                          |                          |                             |
| No education               | 17344 (31.5)        | 2946 (22.1)         | 14398 (34.4)          | 324 (2.7)                | 134 (3.7)                | 190 (2.2)                   |
| Primary                    | 8297 (15.0)         | 1914 (14.4)         | 6383 (15.3)           | 1467 (12.1)              | 605 (16.7)               | 862 (10.1)                  |
| Secondary                  | 22898 (41.5)        | 6200 (46.6)         | 16698 (39.9)          | 9129 (75.2)              | 2548 (70.4)              | 6581 (77.3)                 |
| Higher                     | 6593 (12.0)         | 2251 (16.9)         | 4342 (10.4)           | 1212 (10.0)              | 331 (9.2)                | 881 (10.4)                  |
| **Place of residence**     |                     |                     |                       |                          |                          |                             |
| Urban                      | 22690 (40.8)        | 5506 (41.4)         | 16984 (40.6)          | 6826 (56.3)              | 2021 (55.9)              | 4805 (56.4)                 |
| Rural                      | 32642 (59.2)        | 7805 (58.6)         | 24837 (59.4)          | 5306 (43.7)              | 1597 (44.1)              | 3709 (43.6)                 |
| **Wealth quintile**        |                     |                     |                       |                          |                          |                             |
| Poor                       | 20967 (38.0)        | 4874 (36.6)         | 16093 (38.5)          | 5230 (43.1)              | 1602 (44.3)              | 3628 (42.6)                 |
| Middle                     | 11717 (21.3)        | 2858 (21.5)         | 8859 (21.2)           | 2800 (23.1)              | 844 (23.3)               | 1956 (23.0)                 |
| Rich                       | 22448 (40.7)        | 5579 (41.9)         | 16869 (40.3)          | 4102 (33.8)              | 1172 (32.4)              | 2930 (34.4)                 |
| **Marital status**         |                     |                     |                       |                          |                          |                             |
| Never married              | 15774 (28.6)        | 5105 (38.4)         | 10669 (25.5)          | 7375 (60.8)              | 2241 (61.9)              | 5134 (60.3)                 |
| Currently married          | 36906 (66.9)        | 8018 (60.2)         | 28888 (69.1)          | 4035 (33.3)              | 1194 (33.0)              | 2841 (33.4)                 |
| Previously married         | 2452 (4.5)          | 188 (1.4)           | 2264 (5.4)            | 722 (5.9)                | 183 (5.1)                | 539 (6.3)                   |
| **Employment status**      |                     |                     |                       |                          |                          |                             |
| Unemployed                 | 16508 (29.9)        | 1742 (13.1)         | 14766 (35.3)          | 7735 (63.8)              | 1961 (54.2)              | 5774 (67.8)                 |
| Employed                   | 38624 (70.1)        | 11569 (86.9)        | 27055 (64.7)          | 4397 (36.2)              | 1657 (45.8)              | 2740 (32.2)                 |
| **Region**                 |                     |                     |                       |                          |                          |                             |
| North Central              | 10187 (18.5)        | 2415 (18.1)         | 7772 (18.6)           | -                        | -                        | -                           |
| North East                 | 10086 (18.3)        | 2447 (18.4)         | 7639 (18.3)           | -                        | -                        | -                           |
| North West                 | 13089 (23.7)        | 2960 (22.2)         | 10129 (24.2)          | -                        | -                        | -                           |
| South East                 | 7326 (13.3)         | 1755 (13.2)         | 5571 (13.3)           | -                        | -                        | -                           |
| South South                | 6777 (12.3)         | 1697 (12.8)         | 5080 (12.1)           | -                        | -                        | -                           |
| South West                 | 7667 (13.9)         | 2037 (15.3)         | 5630 (13.5)           | -                        | -                        | -                           |
| **Province**               |                     |                     |                       |                          |                          |                             |
| Western Cape               | -                    | -                    | -                      | 876 (7.2)                | 220 (6.1)                | 656 (7.7)                   |
| Eastern Cape               | -                    | -                    | -                      | 1516 (12.5)              | 475 (13.1)               | 1041 (12.2)                 |
| Northern Cape              | -                    | -                    | -                      | 1017 (8.4)               | 299 (8.3)                | 718 (8.4)                   |
| Free State                 | -                    | -                    | -                      | 1190 (9.8)               | 336 (9.3)                | 854 (10.0)                  |
| KwaZulu-Natal              | -                    | -                    | -                      | 1884 (15.5)              | 524 (14.5)               | 1360 (16.0)                 |
| North West                 | -                    | -                    | -                      | 1291 (10.6)              | 428 (11.8)               | 863 (10.1)                  |
| Gauteng                    | -                    | -                    | -                      | 1279 (10.5)              | 416 (11.5)               | 863 (10.1)                  |
| Mpumalanga                 | -                    | -                    | -                      | 1519 (12.5)              | 465 (12.8)               | 1054 (12.4)                 |
| Limpopo                    | -                    | -                    | -                      | 1560 (12.9)              | 455 (12.6)               | 1105 (12.0)                 |
| **Population group**       |                     |                     |                       |                          |                          |                             |
| Black/African              | -                    | -                    | -                      | 10509 (86.6)             | 3150 (87.1)              | 7359 (86.4)                 |
| Other                      | -                    | -                    | -                      | 1623 (13.4)              | 468 (12.9)               | 1155 (13.6)                 |

Significant p-values: \( p<0.05; \) \( p<0.001; \) 95% Confidence intervals (CI)
More than half of the Nigerian respondents (59.2%) were found to be residing in rural areas compared to South Africans (56.3%) who were mostly found residing in urban areas. In South Africa, a majority of the respondents were Black Africans (86.6%) compared to the ‘Other’ population groups (13.4%) who participated in this study. A majority of the respondents in South Africa were in the poor wealth quintile (43.1%) while 40.7% of the respondents in Nigeria were in the rich wealth quintile. As regards employment status, most of the respondents in Nigeria were working (70.1%) compared to 36.2% of South Africans that were in employment (Table 2).

3.2 Distribution of Health Insurance Coverage by Country
Overall, we found that more than 50% of these DHS populations have no health insurance coverage. From this study findings, the prevalence of health insurance coverage was 2.8% in Nigeria and 13.3% in South Africa. This finding further revealed that a higher proportion of respondents (97.2%) were not insured in Nigeria compared to uninsured respondents in South Africa (86.7%), as this infers inequalities in health insurance coverage in both countries (Figure 1).

3.3 Distribution of Health Insurance Status by Gender in Nigeria and South Africa
Figure 2 presents the distribution of respondents by health insurance status by gender in Nigeria and South Africa. This study findings revealed that male respondents who had health insurance coverage was higher in both countries (Nigeria – 3.4% and South Africa – 13.9%) compared to the female respondents (Nigeria – 2.7% and South Africa – 12.8%). However, health insurance ownership was much lower among both the male and females respondents in Nigeria compared to those in South Africa. Female respondents in Nigeria had the lowest proportion of health insurance coverage (2.7%) compared to females in South Africa (12.8%).

Figure 1: Distribution of health insurance ownership in Nigeria and South Africa
3.4 Distribution of respondents by health insurance status and socio-demographic factors

Table 3 presents the distribution of respondents by health insurance status and socio-demographic factors. Apart from the gender variable, the Chi-square test revealed significant association between socio-demographic factors (age, education, place of residence, region, province, race, wealth quintile, marital status and employment status) and respondents’ health insurance status in both Nigeria and South Africa (p<0.05).

Table 3: Distribution of health insurance coverage by socio-demographic characteristics in South Africa and Nigeria

| Variables | Nigeria | | | | | South Africa | | |
|-----------|---------|-------|-------|-------|-------|-----------|-------|-------|
|           | No (%)  | Yes (%)| P-value| No (%)  | Yes (%)| P-value |
| Gender    |         |       |        |         |       |         |
| Male      | 12861   | 450   | 0.132  | 3114    | 504   | 0.145   |
| Female    | 40704   | 1117  | 0.000* | 3656    | 537   | 0.000*  |
| Age       |         |       |        |         |       |         |
| 15-24     | 18984   | 302   | 0.000* | 2479    | 244   | 0.000*  |
| 25-34     | 16113   | 456   | 0.000* | 1988    | 274   | 0.000*  |
| 35-44     | 12205   | 546   | 0.000* | 1372    | 291   | 0.000*  |
| 45-59     | 6263    | 263   | 0.000* | 931     | 232   | 0.000*  |
| Education |         |       |        |         |       |         |
| No education | 17230 | 114  | 0.000* | 221    | 9     | 0.000*  |
| Primary   | 8237    | 60    | 0.000* | 979    | 48    | 0.000*  |
| Secondary | 22407   | 491   | 0.000* | 3140   | 667   | 0.000*  |
| Higher    | 5691    | 902   | 0.000* | 430    | 317   | 0.000*  |
| Place of residence | | | | | | |

Figure 2: Distribution of health insurance status by gender in Nigeria and South Africa
### Urban vs. Rural

|       | Urban       | Rural       |
|-------|-------------|-------------|
|       | 21413 (40.0) | 32152 (60.0) |
|       | 1077 (68.7)  | 490 (31.3)  |
|       | 3603 (53.2)  | 3167 (46.8) |
|       | 772 (74.2)   | 269 (25.8)  |

### Wealth index

|       | Poor       | Middle     | Rich       |
|-------|------------|------------|------------|
|       | 20875 (39.0) | 21106 (39.4) | 11584 (21.6) |
|       | 92 (5.9)    | 33 (8.5)   | 133 (8.5)  |
|       | 3238 (47.8) | 3238 (47.8) | 1670 (24.7) |
|       | 133 (12.8)  | 155 (14.9) | 269 (25.8)  |

### Marital status

|       | Never married | Currently married | Previously married |
|-------|---------------|-------------------|--------------------|
|       | 15403 (28.8)  | 35758 (66.7)      | 2404 (4.5)         |
|       | 371 (23.7)    | 1148 (73.2)       | 48 (3.1)           |
|       | 4365 (64.5)   | 2009 (29.7)       | 396 (5.8)          |
|       | 449 (43.1)    | 546 (52.5)        | 46 (4.4)           |

### Employment status

|       | Unemployed   | Employed       |
|-------|--------------|----------------|
|       | 16142 (30.1) | 37423 (69.9)   |
|       | 366 (23.4)   | 1201 (76.6)    |
|       | 4465 (65.9)  | 2305 (34.1)    |
|       | 362 (34.8)   | 679 (65.2)     |

### Region

|       | North Central | North East | North West | South East | South South | South West |
|-------|---------------|------------|------------|------------|-------------|------------|
|       | 9777 (18.3)   | 9969 (18.6) | 12712 (23.7)| 7135 (13.3)| 6599 (12.3) | 7373 (13.8) |
|       | 410 (26.2)    | 117 (7.5)   | 377 (24.1) | 191 (12.2) | 178 (11.4)  | 294 (18.7)  |

### Province

|       | Western Cape  | Eastern Cape | Northern Cape | Free State | KwaZulu-Natal | North West | Gauteng | Mpumalanga | Limpopo |
|-------|---------------|--------------|---------------|------------|---------------|------------|---------|------------|---------|
|       | -             | -            | -             | -          | -             | -          | -       | -          | -       |
|       | -             | -            | -             | 875 (12.9) | 87 (8.4)      | 701 (10.4) | -       | 701 (10.4) | -       |
|       | -             | -            | -             | 563 (8.3)  | 108 (10.4)    | 121 (11.6) | -       | 139 (13.4) | -       |
|       | -             | -            | -             | 670 (9.9)  | 889 (13.1)    | 705 (10.4) | -       | 905 (13.4) | -       |
|       | -             | -            | -             | 1089 (16.1)| 126 (12.1)    | 139 (13.4) | -       | 119 (11.4) | -       |
|       | -             | -            | -             | 373 (5.5)  | 143 (13.7)    | 723 (69.4) | 732 (69.4)| 318 (30.6) |         |

### Population group

|       | Black African | Other       |
|-------|---------------|-------------|
|       | -             | -           |
|       | 6078 (89.8)   | 692 (10.2)  |
|       | 723 (69.4)    | 318 (30.6)  |

*Significant p-values: p<0.05; 95% Confidence intervals (CI)*

3.5 **Determinants of health insurance coverage**

Table 4 presents the findings of the binary logistic regression analysis for the variations of health insurance coverage in Nigeria and South Africa among male and female respondents. In Model I and II, the study results showed that female respondents were more likely to have health insurance coverage than their male counterparts in both countries (p<0.05). In only the adjusted Model II,

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the respondents’ age (25–59 years) was found to have increased odds of having health insurance compared to those aged 15–24 years in South Africa (p<0.05). In Nigeria, respondents aged 15–59 years were found to have decreased odds of having health insurance coverage in both Models (p<0.05). Respondents with tertiary education in Nigeria were 14% and 13% more likely to have health insurance cover compared with those with no education (uOR 1.43; 95% CI 0.34 to 0.54, p<0.05; aOR 1.34; 95% CI 0.28 to 0.42, p<0.05). While in South Africa, respondents with tertiary education were 13% and 18% more likely to have health insurance compared with those with no education (uOR 1.33; 95% CI 0.16 to 0.66, p<0.05; aOR 1.76; 95% CI 0.34 to 1.72, p<0.05). In Nigeria, rural respondents had 32% and 11% higher odds of having health insurance coverage compared with those in urban areas (uOR 3.23; 95% CI 2.89 to 3.63, p<0.05; aOR 1.07; 95% CI 0.94 to 1.23). In South Africa, Model I showed that rural respondents had 25% higher odds of having health insurance associated with those in an urban place of residence (uOR 2.52; 95% CI 2.15 to 2.95, p<0.05), whereas Model II showed that rural respondents had 6% decreased likelihood of having health insurance cover than those in an urban residence (aOR 0.60; 95% CI 0.47 to 0.77, p<0.05).

Regarding region and provinces, male and female respondents from other regions other than South West and North West regions have higher odds of being insured compared to those from North Central (p<0.05). In the uOR of Model I, male and female respondents in all the provinces in South Africa have higher odds of being insured compared to those from Western Cape while in the aOR of Model II, those in provinces such as Eastern Cape, North West, Gauteng and Limpopo have lower odds of being insured. The likelihood of health insurance uptake increased with wealth status, as respondents in the rich wealth quintile have more likelihood of being insured than those in poor wealth quintile in both countries. Also, working respondents and those who are previously married have more likelihood of having health insurance cover in both Nigeria and South Africa. By population group, the ‘Other’ population group has an increased likelihood of being insured than the Black African population group in both Models.

Table 4: Logistic regression analysis identifying associations between socio-demographic factors and health insurance coverage in Nigeria and South Africa

|                | Nigeria                                      | South Africa                                 |
|----------------|----------------------------------------------|----------------------------------------------|
|                | Model 1 (uOR) OR (95% CI)                    | Model 2 (aOR) OR (95% CI)                    |
|                | Model 1 (uOR) OR (95% CI)                    | Model 2 (aOR) OR (95% CI)                    |
| Gender         |                                              |                                              |
| Male           | RC                                           | RC                                           |
| Female         | 1.28 (1.15-1.43)*                            | 1.85 (0.75-1.97)*                            |
|                | 1.06 (0.93-1.20) *                           | 1.91 (0.78-2.05) *                           |
| Age            |                                              |                                              |
| 15-24          | RC                                           | RC                                           |
| 25-34          | 0.53 (0.46-0.62)*                            | 0.80 (0.67-0.96)*                            |
|                | 0.76 (0.64-0.90) *                           | 1.82 (1.46-1.98)*                            |
| 35-44          | 0.36 (0.31-0.42)*                            | 0.49 (0.40-0.60)*                            |
|                | 0.52 (0.43-0.61)*                            | 1.29 (1.02-1.63)*                            |
| 45-59          | 0.36 (0.30-0.42)*                            | 0.40 (0.32-0.50)*                            |
|                | 0.36 (0.30-0.43) *                           | 1.01 (0.78-1.32)*                            |
| Education      |                                              |                                              |
| No education   | RC                                           | RC                                           |
| Primary        | 1.07 (0.78-1.09)*                            | 1.05 (0.04-1.20) *                           |
|                | 1.05 (0.03-1.11) *                           | 1.01 (0.05-1.24) *                           |
| Secondary      | 1.08 (0.06-1.10)*                            | 1.09 (0.95-1.88) *                           |
|                | 1.06 (0.05-1.28) *                           | 1.02 (0.15-1.67) *                           |
| Higher         | 1.43 (0.34-1.54)*                            | 1.34 (0.28-1.42) *                           |
|                | 1.33 (0.16-1.66) *                           | 1.76 (0.34-1.82)*                            |
| Place of residence |                                              |                                              |
| Urban          | RC                                           | RC                                           |
|                |                                               |                                              |
4. Discussion

We assessed the prevalence and determinants connected with health insurance uptake among men and women in Nigeria and South Africa. Our results showed that the prevalence of coverage of health insurance in South Africa was the highest (13.3%), while that of Nigeria was the lowest (2.8%). This stems from the fact that the level of importance attached to healthcare financing and financing of health insurance in South Africa is higher than that in Nigeria. Countries such as Ghana, Kenya, Tanzania and Uganda have a high coverage of health insurance, as cited by a few studies [39–40]. For instance, with an estimated population of 59,620,000, South Africa’s public expenditure on health in the year 2020 was R58.4 billion of the country’s total public expenditure [41]. With an estimated population of 206,139,589, Nigeria has 3.75% of its public expenditure out of $495 billion GDP going to the health sector (R7.4 million) [42,43]. This partly explains why
coverage of healthcare and insurance cover was highest in South Africa and lowest in Nigeria, leaving a huge proportion of the population potentially disadvantaged when accessing healthcare services. Also, South Africa’s highest coverage may be ascribed to the coordinated and combined public and private health insurance scheme, ensuring risk pooling and increases the confidence of potential subscribers or insurers in the health insurance system, hence encouraging them to subscribe [44,45]. Furthermore, the scheme is decidedly made to cover working individuals in government and private organizations, and those non-working individuals can also have access to other lower medical aid plans, which makes it likely for all impoverished individuals to subscribe without paying other fees for the required annual premiums [29,42]. Financial contributions to the National Health Insurance Department (NHID) in South Africa are designed in such a manner that premium payments are graded according to people’s wealth status and ability to pay; and individuals with a higher income are made to pay higher premiums compared with those with a lower income. Particularly, even though South Africa recorded the highest coverage in this study, it is still far from the universal health coverage target (80%), which was to be achieved with the transition from the Millennium Development Goals (MDGs) to SDGs [46].

Contrary to the coordinated and combined health insurance system in South Africa, where there are public and private health insurance schemes, the health insurance programme of Nigeria is a scheme public funded by government and insurers’ contributions, which are extremely uneven. This might likely adversely affect resource pooling and cause inefficiency on the part of the scheme’s providers which can create a sense of uncertainty about the scheme’s benefits among potential subscribers. Combined, this may have prevented them from subscribing to the schemes, especially in Nigeria, which recorded one of the lowest coverage rates in Africa [39,40]. The low health insurance coverage in Nigeria could be attributed to a cumbersome claiming processes and poor quality services provided in accredited health facilities [14,46]. In terms of health care, African governments are facing a number of challenges, including lack of funds and poor infrastructure as well as corrupt practices within the health sector [21]. Nigeria has a public health service financed through a national insurance scheme, yet it faces a number of difficulties including a low ratio of doctors to patients, low even on a global scale, and an infrastructure struggling to cope. This is compounded by epidemics, poverty and the brain drain of homegrown doctors moving abroad, in search of higher wages and a better standard of living [44,45]. Thus, strengthening health financing will assist indigents to access quality healthcare services without paying out-of-pocket for their medical treatment.

Our findings also showed that the prevalence of health insurance coverage by gender revealed 3.4% of men and 2.7% of women were insured in Nigeria, while 13.9% men and 12.8% of women were insured in South Africa. In South Africa, this findings corroborates evidence from the 2016 South Africa Demographic Health Survey report on health insurance coverage by gender [34], however the NDHS [33] reported a slight increase of health insurance cover among men (3.0%) than women (3.0%) compared to this study findings. The gender variable was a significant predictor for health insurance coverage and the likelihood of having health insurance cover were higher for male respondents in Nigeria and South Africa. Previous studies have shown that female respondents have higher levels of support for health insurance cover than men [47]. Thus, females are considered to be more active users of the health system compared to males [48]. Contrary to the presumption for females having health insurance cover given previous studies’ findings [17,27], the present study found that males have higher odds of having health insurance cover than females.
The direction of influence of gender on health insurance uptake is varied in literature, as a study did not find significant differences in health insurance cover based on sexual categories in Kenya [20]. Conversely, few researches have shown that decreased insurance uptake among males is a result of them seeming to be risk-takers [6,14], while further studies have reported that increased health insurance uptake by women was as a result of larger needs for healthcare services [14,6]. However, the decrease of women’s uptake of health insurance in both countries may be associated with the low socio-economic status of women relative to men. Women are more economically disadvantaged, and typically have poor access to health programmes owing to the extremely patriarchal pattern occurring in rural communities [49]. Women’s education was low, ensuing lower participation rates in social and health interventions, inferring that women may likely seek alternative healthcare services away from the orthodox health system.

The findings of the bivariate Chi-square test findings showed that the likelihood of respondents’ health insurance uptake were significantly increased by socio-demographic factors (age, education, place of residence, region, province, race, wealth index, marital status and employment status) in both countries (p<0.05). Previous studies have also shown that this study bivariate findings significantly predicts the higher probabilities of health insurance uptake in both countries. Similarly, the multivariate analysis findings revealed that the chances of having insurance cover are significantly increased by determinants of health insurance coverage in Nigeria and South Africa (p<0.05). The findings showed that gender has a positive impact on demand for health insurance (p<0.05) and the likelihood of having health insurance cover are 13% and 19% greater for females to have health insurance cover compared to males in Nigeria in both Model I and II. In South Africa, the likelihood of females of having health insurance cover were 11% and 19% compared to males in both Models. Thus, females were more likely to enroll to become beneficiaries compared to males in both countries. This is similar to previous studies that reported that women of reproductive age were more likely to get more information on health insurance than men [50,51]. Even though women were more likely to have lack of support system and poor participation in economic activities to purchase health insurance plans, studies have cited that women were more willing to pay to become active health insurance subscribers [52,53]. The association between gender and health insurance is more complex, by contrast to the present findings. Studies conducted in Central Malawi, North-West Cameroon and Ghana, identified males to have decreased odds of being insured than females [54–57]. Also, other studies have documented that women as caregivers are more conscious of the importance of health insurance, and are more likely to seek healthcare for themselves as well as for their families [56,57]. Even though several studies have cited that women were more likely to be insured than men, yet these studies could not establish a plausible explanation for this observation. It is important that future studies explore this inference.

The effect of age is positive, but a lower chance of having health insurance cover was found among respondents aged 25–59 years in Nigeria compared to those aged 15–24 (p<0.05) in both Models. This could be related to previous studies that reported that substantial proportion of individuals are unwilling to contribute to health insurance premiums, as they do not attach any significance to it [29,30]. In South Africa, respondents aged 25–34 years, 35–44 years and 45–59 years were found to be 18%, 13% and 10% more likely to have health insurance cover compared to the younger age group 15–24 (p<0.05). This could be as a result that younger age groups are mostly dependents and beneficiaries of health insurance cover purchased by their ‘significant
others\textsuperscript{1}, as they are living with their ‘significant others’ who will include them in their insurance cover \textsuperscript{[2,51]}. Regarding age, respondents aged 35–59 years are perceived to be energetic and employed, as they are more concerned with good health conditions and a strong sense of purpose for life. They are likely to engage in sporting alternatives at this stage of their lives, and adopt healthy behaviours in order to avoid declining health status, so they will opt for health insurance cover. Previous studies have indicated that older persons might tend to increase their participation as health insurance subscribers and beneficiaries compared to younger age groups \textsuperscript{[50,51]}. Consistent with earlier studies, our finding established the possibility of having health insurance cover trending by increasing age \textsuperscript{[14,58]}. One likely justification for this finding is that financial security increases with age, which in turn enhances health insurance policies acquisitions \textsuperscript{[8,14]}.

As anticipated, education increases the probability of taking up insurance of all types, with more educated individuals intending to have health insurance cover, as education plays an essential role in the levels of awareness of health insurance schemes. The odds of having health insurance cover among respondents with tertiary education were found to be greater than those who had no education in both the unadjusted and adjusted logistic regression models, and this finding was significant (p<0.05). The likelihood of having health insurance cover of those with tertiary education compared to primary and secondary education were highest in the multivariate analysis. Studies have shown that there is a directly proportional relationship between education level and subscribing to a health insurance scheme \textsuperscript{[1,59]}. The implication of this study finding is that education has the ability to expose one to information in a strategic discussion that will increase sensitization of health insurance benefits in both countries. A similar study confirmed that higher education is associated with an individuals’ increased level of knowledge and perception toward short- and long-term benefits of health insurance \textsuperscript{[60,61]}. Thus, educated individuals have the capacity, not only to acquire skills and knowledge, but also to make informed choices on health-related matters in order to avoid catastrophic health expenditures \textsuperscript{[62,64]}.

Regarding place of residence, Nigerian rural respondents had 32% and 11% higher odds of having health insurance coverage than their urban counterparts. In South Africa, rural respondents had 25% and 6% higher odds of having health insurance compared with those in urban areas. The variations associated with rural and urban residence might explain the likelihood of rural residents to opt for shared legal health insurance schemes, with the tendencies of coming together in social self-help groups to purchase health insurance cover in South Africa \textsuperscript{[65,66]}. However, in the rural areas of residence, individuals with poor self-assessed health status are more likely to be subscribed to health insurance by their ‘significant others’ who reside in the urban cities \textsuperscript{[65]}. This suggest that individuals with poor health in rural communities in both countries will self-select into health insurance schemes. Hence, understanding the fundamental principles and underpinnings surrounding rural residents with health insurance ownership which are different from their urban counterparts, pragmatic aspects such as adverse selection, risk aversion, affordability and trust in health insurance plans can give better explanations and put these findings into proper perspective, but these aspects are beyond the scope of this study.

Region of residence was also a significant predictor of health insurance ownership. To be precise, men and women residing in the geographical regions of North West, South East, South South and South West had increased odds of having health insurance compared to the North Central region in Nigeria. The geographical differential in health insurance coverage could be explained as most of these geographical regions are almost completely urban and have a greater

\textsuperscript{1} ‘Significant others’ – in Sociology, it describes any person or persons with a strong influence on an individual’s self-concept such as parents, close friends, spouse, siblings etc.
percentage of the population with rich status and higher literacy levels compared with the other geographical regions [1,33]. This outcome is consistent with earlier studies, which indicated that urban regions had increased odds of being insured [1,67]. In South Africa, province was found to be a significant predictor of health insurance ownership. To be precise, in model I, men and women residing in all the other provinces have increased odds of being insured compared to those from Western Cape, while in Model II, men and women residing in Eastern Cape, North West, Gauteng and Limpopo have lower odds of health insurance uptake. This outcome is consistent with earlier studies, which revealed that a larger proportion of the population was engaged in economic activities that might propel them to purchase a health insurance plan [34,68].

Race was also a significant predictor of health insurance coverage, with White, Coloured and Indian/Asian respondents having higher odds of health insurance cover compared to Black Africans, even though most users of the public health system and population in South Africa are Black Africans [69,70]. This finding is consistent with other studies that the ‘other’ population group (White, Coloured and Indian/Asian) tend to have more investment in healthcare and therefore they have a greater likelihood of uptake of health insurance cover compared to Black Africans. Few studies have reported that ‘other’ population group’s accessibility of health information and medical aid benefits has influenced their perceptions towards health insurance ownership [65,71]. In Nigeria and South Africa, health insurance schemes are designed to address health inequalities and ease financial burden on health expenditures, yet a majority of health insurance subscribers were mostly found in the wealthier quintiles, compared to those in the poor wealth quintile [1,66]. Also, household wealth status was also an essential contributing factor as the likelihood of being insured increased as one moves up the household wealth index. This finding is consistent with earlier studies which indicated that wealthier households have decreased odds of being insured as they can afford the health insurance plans [66,39]. Poor households with the likelihood of financial challenges in the future are therefore more likely to sacrifice their current earnings and contribute to health insurance cover to reduce future health risks [39,72].

With regards to the employment status, our findings suggest that employed respondents were more likely to have health insurance in both countries. These findings are indicative of the fact that the poor and unemployed persons have limited ability to pay the regular premiums for health insurance. Our findings are consistent with comparable studies, which have shown that most unemployed individuals rely heavily on out-of-pocket (OOP) payments for health costs [73,74] and self-medication when such individuals need medical attention [75,76]. The high coverage of health insurance among employed persons may be attributed to workplace insurance policies in government and big private organizations in Nigeria and South Africa. This implies that the governments of both countries should create platforms for formal employment opportunities for their citizens in order to increase health insurance coverage, especially in informal settlements or rural locations [77,78]. The study findings revealed that about 30% and 66% of unemployed respondents have no health insurance cover in Nigeria and South Africa, respectively. This infers that health insurance uptake by unemployed persons in the informal sector is likely to be considerably lower, with over 30% of the study population likely be involved in a form of menial jobs in the informal sector. Health insurance is mostly subscribed to by government employees [79–81].

The Nigerian dependency ratio is 86.7% and South African dependency ratio is 52.2%. This will possibly put further pressure on the active population who are unemployed but carrying out day-to-day activities in the formal sector to meet with their ‘daily bread’ [82,83]. It is therefore pertinent that stakeholders should employed subsidization and adjustable mechanisms of insurance
uptake by those in the informal sector by working with micro-finance banks and the informal sector, which is newly being piloted across some specific States in Nigeria [84,85]. Hence, government should also explore new opportunities to subsidize premiums to allow the non-working population to enroll in the scheme without facing further financial hardship in Nigeria and South Africa. This may take account of individual donor support and government matching subsidies on contributed premiums, which is comparable to the mechanism experimented in Tanzania where health insurance scheme was partly funded by Government, contributing towards achieving higher coverage rates in the country [3,86].

The study findings also show that marital status is a significant factor in explaining in having health insurance cover, and this variable has not been given much consideration in many studies conducted on factors that influence individuals’ decision to enroll in health insurance [67]. It is observed that being currently married is positively related to more likelihood to enroll for health insurance for both male and female respondents compared to being never married or previously married. For instance, the finding of this study revealed that respondents who are previously married reduced the odds of having health insurance coverage by 0.74 and 0.74 in Nigeria, and 0.38 and 0.53 in South Africa in both Model I and II respectively, compared to those who are never married. It could be infer that married persons may take better care of themselves since they have ‘significant others’ that are depending on them. There is limited evidence in the association between an individual’s marital status and health insurance coverage. Yet similar to previous studies, married individuals were more likely to have health insurance cover than those who were not married or previously married [67,87]. A possible explanation could be that married persons may need to protect themselves and their families from unexpected health disbursements and out-of-pocket payments.

Our findings have two significant policy implications in this multi-country setting. First, the low prevalence of health insurance coverage in Nigeria and South Africa obviously highlights the urgent need for government to adopt the ‘Kenya National Hospital Insurance Fund (NHIF) strategic Plan health insurance scale-up’ to decrease the healthcare financing burden, especially among women, the unemployed and poor households. Second, the evidence presented in this study suggests that demographic and socio-economic factors are significant predictors of health insurance coverage. Therefore, the policy options for scaling-up health insurance coverage in both countries ought to model on the concept of these factors to attain the sustainability of health insurance coverage. Our findings also point to the significant role of female education positively influenced women’s health decisions. For instance, there were higher odds of being insured among individuals with increasing education status in both countries.

This, therefore, is a justification in closing the gap of health inequalities and creating frameworks in promoting health equity, and fostering stringent advocacy across all stakeholders in playing a major role in the social contributing factors of health [88,89]. Education empowers women to look after their own health by seeking appropriate health care when they have an ailment. Therefore, being protected by health insurance supports them to shun catastrophic health expenses that they would have to make out-of-pocket when they fall sick and do not have health insurance cover [90,91], and being educated makes it likely for them to have an anticipation by insuring themselves against the unforeseen out-of-pocket costs [92,93].

**Strengths and limitations**

This study is based on nationally representative household surveys that reflect every locality in Nigeria and South Africa. To the best of our knowledge, this is among the first empirical researches to examine a comparative-cross sectional study of the prevalence and determinants associated with
health insurance coverage in Nigeria and South Africa. This finding supports the basis of stringent advocacy and capacity building that are tailored towards promoting the benefits of uptake of health insurance in both countries. However, the findings provide useful insights for more rigorous investigations to present generalizable findings in sub-Saharan African countries. The findings of this study were deeply-rooted in the study design; data was collected using standard methodologies, and sample sizes that were similar in the two countries. There are some potential limitations, however, that need to be highlighted. One of the limitations of this study is that, the nature of the cross-sectional design of the demographic health surveys made it impossible for causal inferences to be drawn from the findings of this study. Also, it should be noted that another limitation comes with self-reporting by respondents of the surveys, such as the ability to remember, bias, or under-reporting.

**Conclusion**

The prevalence of health insurance coverage in Nigeria is lower than in South Africa, although both countries were still below the WHO standardized internationally recognized measures of the health insurance coverage agenda. Nigeria and South Africa might not be able to achieve universal health coverage in meeting some of the sustainable development goals on health by the year 2030 if the present health insurance financing mechanisms still persist. To achieve UHC via health insurance schemes, various health insurance platforms can be harmonized as government and private health financing schemes that would maximize the risk pools and coverage of potential subscribers to opt for their choice of health insurance. It is important to explore the underlying determining factors, such as demographic and socio-economic, which play a vital role in the decision for uptake of health insurance in households. Basically, women’s education ought to be given more priority as it was found to be a strong predictor influencing increased coverage of health insurance. It might also be useful to both relevant stakeholders and policy-makers to better understand the factors that influence decisions to purchase health insurance as well as its associated coverage complexity. Policy-makers may wish to monitor developments to ensure wide coverage of health insurance in concurrence with national health policy goals in Nigeria and South Africa. In transforming health financing in both countries, it is imperative to implement programmes that will increase equity and access to health care services, especially among women in deprived socio-economic households, the unemployed, and vulnerable individuals.

**Key Messages:** Improving the public’s knowledge and perception about health insurance and its coverage is an important approach to boost healthcare utilization and reduce catastrophic health expenditure in South Africa and Nigeria. Future sensitization programmes and behavioural communication change (BCC) should be targeted towards the disadvantaged and vulnerable persons who are not insured and cannot afford health insurance premiums. This may help to inform health policy to improve financial access to healthcare for citizens in both countries.

**Abbreviations**

AIDS: Acquired Immunodeficiency Syndrome; BHCPF: Basic Health Care Provision Fund; CI: confidence interval; DHS: Demographic Health Survey; EAs:Enumeration Areas; FSSHIP: Formal Sector Social Health Insurance Programme; FSSHIP: Formal Sector Social Health Insurance Programme; GDP: Gross Domestic Product; HIV: Human Immunodeficiency Virus; NDHS: Nigeria Demographic Health Survey; NHIS: National Health Insurance Scheme; NHAct: National Health Act in Nigeria; OR: Odds ratio; OOP: out-of-pocket; RCSHIP: Rural Community Social Health Insurance Programme; SDG: Sustainable Development Goals; SSA: sub-Saharan Africa; SADHS: South Africa Demographic Health Survey USSHIP: Urban Self-Employed Social Health Insurance Programme; UHC: Universal Health Coverage.
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Availability of data and materials
The datasets analysed during the current study are available from the DHS Program: https://dhsprogram.com/data/available-datasets.cfm.

Authors’ contributions
MEA wrote, partly analysed the DHS datasets, interpreted the DHS data and was a primary contributor to the manuscript. MEA and ESI revised the manuscript and agreed on the findings and the views expressed within. All authors read and approved the final manuscript.

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Ethics approval
Ethical review and approval for procedures and questionnaires for standard DHS surveys are provided by ICF Institutional Review Board (IRB). Country-specific DHS survey protocols are reviewed by the ICF IRB and typically by an IRB in the host country.

Consent for publication
Not applicable

Competing interests
The authors declare that they have no competing interests.

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