

## Research Article

# Impact of Socioeconomic Factors and Health Insurance Coverage on Out-of-Pocket Health Expenditure among Ghanaian Women: Implications for Health Financing Policy

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**Background.** The cost of health financing is an age-long social challenge in resource-constrained settings. Out-of-pocket (OOP) health spending adversely affects maternal healthcare provisions and use, making health insurance one of the most effective social interventions. **Objective.** The purpose of this research was to study the effect of OOP health expenditure on socioeconomic factors and health insurance coverage among Ghanaian women. **Materials and Methods.** Secondary statistical data pulled out from Ghana Demographic and Health Survey (GDHS)—2014 was investigated. A sample of 9,396 women whose ages ranged from 15 to 49 years was studied. We used marginal predictive model to examine the interaction effect between socioeconomic factors and health insurance coverage on OOP health expenditure. The significance level was determined at 5%. **Results.** Overall, about 41.9% (95% CI: 39.4%–44.4%) of Ghanaian women reported OOP health expenditure for drugs and services. Amongst those covered by health insurance, this was 37.9% (95% CI: 35.3%–44.4%). The marginal interaction effects of OOP health expenditure were higher for women in the lowest neighborhood socioeconomic disadvantage group (42.6%) than those in the highest neighborhood socioeconomic disadvantage group (26.0%) who were covered by health insurance. In addition, the marginal interaction effects of OOP health expenditure were found to be greater among women who had higher education (43.8%) compared with those who had no formal education (34.0%) who were covered by health insurance. Furthermore, the marginal interaction effects of OOP health expenditure were higher for rural (39.0%), than their urban counterpart (36.6.0%) who were under the covering of health insurance. **Conclusion.** There is a gap in health insurance coverage, which leads to increased OOP health expenditure. The OOP health expenditure effect was more concentrated among high socioeconomic women with health insurance. The healthcare system's stakeholders should implement policies aimed at eliminating OOP health expenditure for maternal health services.

## 1. Background

The Ghanaian health insurance scheme was a structure launched to be major tool to remove barriers to healthcare access. The Act (Act 650) that established the National Health Insurance scheme was completed in 2003, and the

goal was to improve economic as well as pecuniary access for healthcare services among the population [1]. The scheme is renewable each year and is based on client contributions, and those who are cardholders are the only ones that are certified to access the will have access to the National Health Insurance Authority health-certified facilities [2]. The uniqueness of the

health insurance contribution is such that a cardholder only pays in accordance to his/her income, whereas the receipt of health services is based on individual needs. In essence, the individuals' healthcare costs are being supported by the health insurance, while those who are well-to-do financially or wealthy are left to pay for those in their own household, both the elderly and the underprivileged [3].

Over the years, healthcare financing has taken numerous shots and turns in Ghana. Prior to the independence of Ghana from the British in 1957, healthcare was primarily funded by individuals paying from their out-of-pocket (OOP). Due to the fact that OOP health expenditure had a deep impact on the population, Ghana became the first country in Sub-Saharan Africa (SSA) to implement a health insurance scheme in order to improve the plight of its citizens [1, 4]. Regardless, a client can enroll into health insurance and still be uninsured; by extension, an individual may be a carrier of a legal or authentic insurance card and he/she still does not have access to every services available from a health scheme [5]. For instance, it is until an individual has completed all the paperwork, including full payment of the premium that he/she is assumed to have fully registered and as such can access full coverage. Otherwise, the client is considered partially enrolled or covered. Despite the fact that many women may have paid part of the enrolment fees and/or done some registration paperwork with health management organizations, only approximately 66% are covered by an insurance scheme [6].

In general, providing universal admittance into healthcare services to the populace is a crucial intervention for furthering socioeconomic development [7, 8]. Up to this point, designing and implementing an effective healthcare financing strategy has led to a debate among policymakers and experts in the field of public health, particularly in resource-limited settings/environments [7, 9, 10], where healthcare systems are frequently under-resourced [11]. The implementation of the Structural Adjustment Programs in the 1980s caused a number of low-resource settings to imposed that individuals should pay for healthcare services at the point of service, and this was done in order to raise funds and mobilize resources for their health systems [12–14].

Whereas these user fees paid by individual client have been situated as a vital source of raising funds for governments as well as the healthcare providers. They have also been a major source of poor access to healthcare services, predominantly amongst the poor [7, 11, 15]. Given the issues associated with demanding for user fees when a client goes for health services and the manner it has prevented people from gaining healthcare, the global community has recently supported social health insurance. This is designed to remove monetary barriers to healthcare use, particularly in financially poor backgrounds [16]. Health insurance schemes, in addition to improve access and use of health facilities by the population, also serve as funds raising and mobilization avenue for healthcare personnel, thereby sustaining the system [7, 16].

The sustainable development goals have highlighted financial risk protection for healthcare costs through the strengthening of national policies especially in emerging

economies. In addition to socioeconomic inequalities, financial access toward essential healthcare has emerged as a critical condition for achieving universal health coverage [7, 10]. It has been stated that well over 150 million persons face financial disaster, while roughly 100 million are forced into financial lack each year as a result of practical OOP health expenditure globally [17]. Payment of healthcare services from individual pocket has an undesirable influence on the life quality of an individual and household income allocation to essential needs [4, 18]. As a result, healthcare systems must launch financial safety for the common people against the weight of health challenges. In this context, the Resolution 58.33 of the World Health Assembly urged her members to set a goal of achieving universal health coverage [16], through fairness and parity to accessing healthcare services utilization, particularly once needed or required, without any financial constraints. Multifaceted strategic plans are required such that the proportion of people and costs of health and range of services covered is in congruent with the intention and target of WHO's UHC [10]. The objective of this research was to study the effect of OOP health expenditure by socioeconomic factors and coverage on health insurance among reproductive aged Ghanaian women.

## 2. Materials and Methods

*2.1. Data Source.* The 2014 GDHS, a secondary data were utilized for this study. This study included a total of 9,396 women of reproductive age. DHS are intended to collect information on family planning, child health, the human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS), sexual and reproductive health, and other topics. Reproductive aged women were typically the survey's target population, depending on the topic the survey considered. Household selection was utilized to identify those women that meet eligibility criteria for the interviews conducted on individual woman. A Household Questionnaire and Women's Questionnaire were mainly the two questionnaires employed by DHS. The data used in this research are available in the public domain and are accessible at <http://dhsprogram.com/data/available-datasets.cfm>. DHS employs a multistage stratified cluster research design which are based on a list of enumeration areas (EAs). These EAs are systematically and carefully chosen units from localities that comprise the local government areas (LGAs). The DHS sampling procedure was described in detail in a previous study [19].

### 2.2. Variables Selection and Measurement

*2.2.1. Outcome Variable.* The outcome variable was measured dichotomously as described by the women; "pay out-of-pocket for drugs and services." The response "yes" was coded as "1" and "0" if otherwise. This was computed from the variable name: S1020—"Pay out of pocket for drugs and services" and women responded "yes" if payments were made, or "no" if there were no payments. The kind of services women have to spend out-of-pocket (OOP) include: family planning, laboratory investigations, antenatal care, postnatal care, care for newborn for up to 3 months amongst others.

**2.2.2. Socioeconomic Variables.** According to previous studies, women's education attainments, wealth quintiles of their households, their places of residence, their employment status were employed for assessing their socioeconomic status [20–22]. Women's educational attainment was divided into four categories: no formal education at all, only primary level of education, up-to-secondary level of education, and at least higher education. The residence location urban versus rural. Their employment status was categorized into yes versus no if employed or not employed respectively. The principal component analysis (PCA) technique was employed to allocate the weights of the wealth indicator. Household possessions such as the type of walls, the type of floor, the type of roof, the source of water supply, the available sanitation facilities, any radio, presence of electricity, possession of television, and refrigerator. Others include the type or source of cooking fuel, availability of furniture, and room occupancy. These were employed to allocate and homogenize the variables for wealth indicator scores. Thereafter, the  $z$ -scores and the factor loadings were computed. Each household pointer values were subjected to multiplication by the factor loadings and were summarized to yield the value for the wealth index for that household. The general scores were divided into wealth quintiles using the homogenous  $z$ -score; that is poorest, poorer, middle, and the richer and richest quintiles [23, 24]. Furthermore, using PCA, an index of neighborhood socioeconomic disadvantage was constructed from four variables. The variable quantities were the percentage of women who have not any formal education, those who were unemployed, live in rural areas, and are poor (that is those with asset index that is below 20% poorest quintile). This index yielded a consistent score with a mean of 0 and a standard deviation of 1. We divided these into quartiles, with quartile 1 signifying the lowest level of neighborhood socioeconomic disadvantage, whereas we denoted quartile 4 to represent the neighborhood with highest level of disadvantage socioeconomically [25, 26].

### 2.2.3. Explanatory Variables

- (1) Health insurance coverage was dichotomously measured; yes versus no if a woman was covered or not covered, respectively.
- (2) Marital status was categorized into women who were single at the time of the survey, those who were currently married/in union at the time of the survey and those who were formerly married.
- (3) Age (years) was categorized into 15–19 years, 20–24 years, 25–29 years, 30–34 years, 35–39 years, 40–44 years, and 45–49 years.
- (4) Region: Volta, Ashanti, Brong Ahafo, Central, Eastern, Greater Accra, Northern, Upper East, Upper West, and Western.
- (5) Sex of the household head was categorized into male versus female.
- (6) Frequency of reading newspaper or magazine was categorized into those who do not read at all, those

who read less than once a week, and those who read at least once a week.

- (7) Frequency of listening to radio was categorized into those that do not listen at all, those that listen less than once a week, and those that listen at least once a week.
- (8) Frequency of watching television (TV) was categorized into those that do not watch at all, those that watch less than once a week, and those that watch at least once a week.

## 3. Ethical Consideration

We used a population-based dataset which is available in the public-domain, for this study. The dataset had no participant identifiers attached in accordance with normal practices on ethical issues in maintaining confidentiality. Permission was sought from MEASURE DHS/ICF International by the authors, to download and use the data for the purposes of this study, and permission was granted. Notably, the DHS project got ethical approvals from the appropriate research and ethics committees in Ghana, prior to the study to guarantee that the procedures are in accordance by means of the regulations of the Department of Health and Human Services of the USA, for the protection of human subjects. Participants were informed of the advantages and disadvantages of taking part in the survey. Prior to administering the Household Questionnaire or the Women's Questionnaire, the qualified respondents' informed consents were gotten directly. The survey was entirely optional. The identification numbers and names of the respondents were not included in the final datasets. With regard to the above information, no further approval was required for this study. Further details on the ethical standards and data can be gotten from <http://goo.gl/ny8T6X>.

## 4. Analytical Approach

We employed the survey module (svy) command for the sampling design adjustment. Multicollinearity, a known major source of regression models concern was determined by using factor of 10 of variance inflation [27]. Nonetheless, no variables were excluded from the model since they remained unrelated. The percentage and the chi-square tests were determined using univariate and bivariate analyses respectively. On the other hand, all significant variables in the bivariate analysis were included in the multivariable binary logistic and predictive marginal effect models (with corresponding 95% CI). Below is the representation of the predictive marginal effect model:

$$Pr \left( Y = 1 | \text{Set}[E = e] = \sum_z \hat{p}_{ez} Pr(Z = z), \right) \quad (1)$$

where set  $[E = e]$  assumes putting all together the observations to a single exposure level  $e$ , and  $Z = z$  is known to be a set of observed values used for covariate vector  $Z$ .

Additionally,  $\hat{p}_{ez}$  is the predicted probabilities of OOP for health service for any  $E=e$  and  $Z=z$ . Marginal effects designate a weighted average above the distribution of the covariates and remain equivalent to approximations got by standardizing to the whole populace. The exposure  $E$ , as a postlogit test, was set to the level  $e$  for all the women participants in the dataset, and the logit coefficients were utilized to calculate predicted probabilities for every participants at their experiential covariate design and newly exposure value. For the reason that predicted probabilities were calculated under the same distribution of  $Z$ , it presupposes that no covariate of the corresponding effect measure is estimated [28, 29]. In addition, an interaction effect modeling was also conducted to examine the interdependence of selected explanatory variables on the outcome variable for the study. Interaction effect modeling is a valuable tool in regression analysis for understanding how the relationship between variables changes based on the values of other variables, providing deeper insights into the underlying mechanisms driving the outcome variable. The statistical significance was determined at  $p < 0.05$ . Stata version 14 (StataCorp., College Station, Texas, USA) was used for data analysis.

## 5. Results

The results showed that approximately 41.9% (95% CI: 39.4%–44.4%) of Ghanaian women reported OOP health expenditure for drugs and services.

Table 1 shows the prevalence of OOP health expenditure among Ghanaian women. Women from the lowest neighborhood socioeconomic disadvantage level had the highest OOP health expenditure for drugs and services (50.1%; 95% CI: 45.6%–54.5%). Furthermore, higher educated women (53.6%; 95% CI: 47.7%–59.5%), women who came from the richest household (48.6%; 95% CI: 44.7%–52.6%), women who were employed (42.9%; 95% CI: 40.2%–45.8%), urban dwellers (47.0%; 95% CI: 43.9%–50.1%) as well as women that does not have health insurance covered by health insurance had the highest OOP health expenditure for drugs and services, respectively. The results details are presented in Table 1.

In Table 2, we presented the measures of association for the factors associated with OOP health expenditure for drugs and services. The odds of interaction between women from the highest neighborhood socioeconomic disadvantage group who are covered by health insurance showed 76% reduction in OOP health expenditure for drugs and services, when compared with women from the lowest neighborhood socioeconomic disadvantage group and covered by health insurance (OR = 0.24; 95% CI: 0.10–0.62). In addition, women with education were more likely to have OOP health expenditure for drugs and services, when they are compared with those women who had no formal education. Those women with secondary education and are covered by health insurance had 42% reduction in OOP health expenditure for drugs and services, when they compared with those with those with no formal education who were also covered by health insurance (OR = 0.58; 95% CI: 0.38–0.88). Poorer

women had 42% reduction in OOP health expenditure for drugs and services, when compared with poorest women (OR = 0.58; 95% CI: 0.34–0.99). The details are presented in Table 2.

Table 3 shows the marginal interaction model for OOP health expenditure by socioeconomic factors and health insurance coverage. This model of marginal prediction was conducted to decode how socioeconomic factors affect OOP health expenditure as it adjusts for other women's characteristics. From the results, with an assumption that all the factors were kept constant and remained unchanged, but every woman was in the lowest neighborhood socioeconomic disadvantage level, we would expect 45.2% of OOP health expenditure. If every woman was covered by health insurance, we would expect 57.8% of OOP health expenditure. Interactively, if every woman was in the lowest neighborhood socioeconomic disadvantage level and covered by health insurance, we would expect 42.6% of OOP health expenditure. Furthermore, if it is assumed that every woman who participated in the study had higher education, or that they had higher education as well as covered by health insurance, we would expect 49.0% or 43.8% of OOP health expenditure. This implies that an increased marginal interaction effect exists between higher education and health insurance coverage than no formal education and health insurance coverage. If otherwise, other factors distribution remains the same, nonetheless every woman is assumed to be in the richest household and are health insurance covered, we would be expecting 35.9% of OOP health expenditure. The details of the predictive marginal interaction effects of OOP health expenditure by socioeconomic factors and health insurance are shown in Table 3.

Figure 1 shows the marginal effects plot of OOP health expenditure by neighborhood socioeconomic disadvantage and health insurance. The marginal interaction effects of OOP health expenditure were higher for women in the lowest neighborhood socioeconomic disadvantage group, than those in the highest neighborhood socioeconomic disadvantage group who also had the health insurance coverage. In addition, the marginal interaction effects of OOP health expenditure were higher amongst women who had no health insurance coverage (blue line) across neighborhood socioeconomic disadvantage quartiles (lowest, Level 2, Level 3, and highest).

Figure 2 shows the marginal effects plot of OOP health expenditure by educational level and health insurance. The marginal interaction effects of OOP health expenditure were greater amongst women with higher educational level, than those who had no formal education and were covered by health insurance. In addition, the marginal interaction effects of OOP health expenditure were greater amongst women who were not covered by health insurance (blue line) across educational levels (no education, primary, secondary, and higher).

In Figure 3, we presented the marginal effects plot of OOP health expenditure according to the wealth of household and health insurance. The marginal effects of OOP health expenditure was observed to be higher in women who are not health insurance covered (blue line) across

TABLE 1: Distribution of out-of-pocket expenditure in Ghana ( $n = 9,396$ ).

| Variable                                | $n$ (%)      | Prevalence of out-of-pocket expenditure,<br>95% CI | $p$     |
|---|--------------|--|---------|
| <i>Socioeconomic variables</i>          |              |  |         |
| Neighborhood socioeconomic disadvantage |              |  | <0.001* |
| Lowest                                  | 2,363 (25.1) | 50.1 (45.6–54.5)                                   | —       |
| Level 2                                 | 2,349 (25.0) | 44.9 (40.2–49.7)                                   | —       |
| Level 3                                 | 2,345 (25.0) | 37.1 (31.6–43.0)                                   | —       |
| Highest                                 | 2,339 (24.9) | 27.9 (24.4–31.6)                                   | —       |
| Education                               |              |  | <0.001* |
| No formal education                     | 2,281 (24.3) | 31.8 (28.6–35.2)                                   | —       |
| Primary                                 | 1,747 (18.6) | 38.4 (34.8–42.2)                                   | —       |
| Secondary                               | 4,854 (51.7) | 44.7 (41.6–47.9)                                   | —       |
| Higher                                  | 514 (5.5)    | 53.6 (47.7–59.5)                                   | —       |
| Household wealth quintile               |              |  | <0.001* |
| Poorest                                 | 2,335 (24.9) | 30.3 (26.7–34.2)                                   | —       |
| Poorer                                  | 1,759 (18.7) | 32.6 (28.6–36.9)                                   | —       |
| Middle                                  | 1,902 (20.2) | 43.5 (39.4–47.8)                                   | —       |
| Richer                                  | 1,771 (18.8) | 47.9 (43.4–52.4)                                   | —       |
| Richest                                 | 1,629 (17.4) | 48.6 (44.7–52.6)                                   | —       |
| Employment                              |              |  | 0.018*  |
| Yes                                     | 6,761 (72.0) | 42.9 (40.2–45.8)                                   | —       |
| No                                      | 2,626 (28.0) | 39.0 (35.9–42.1)                                   | —       |
| Residential status                      |              |  | <0.001* |
| Urban                                   | 4,602 (49.0) | 47.0 (43.9–50.1)                                   | —       |
| Rural                                   | 4,794 (51.0) | 35.9 (32.2–39.7)                                   | —       |
| <i>Other women's characteristics</i>    |              |  |         |
| Health insurance coverage               |              |  | <0.001* |
| Yes                                     | 6,197 (66.0) | 37.9 (35.3–44.4)                                   | —       |
| No                                      | 3,196 (34.0) | 56.0 (51.7–60.2)                                   | —       |
| Marital status                          |              |  | 0.002*  |
| Single women                            | 3,041 (32.4) | 39.4 (36.4–42.5)                                   | —       |
| Currently married/in union women        | 5,456 (58.1) | 42.1 (39.2–45.0)                                   | —       |
| Formerly married women                  | 899 (9.6)    | 48.9 (43.9–53.8)                                   | —       |
| Age                                     |              |  | <0.001* |
| 15–19                                   | 1,756 (18.7) | 33.2 (29.7–36.9)                                   | —       |
| 20–24                                   | 1,571 (16.7) | 40.4 (36.8–44.1)                                   | —       |
| 25–29                                   | 1,564 (16.6) | 42.4 (38.8–46.2)                                   | —       |
| 30–34                                   | 1,343 (14.3) | 44.0 (39.6–48.5)                                   | —       |
| 35–39                                   | 1,260 (13.4) | 43.9 (39.6–48.4)                                   | —       |
| 40–44                                   | 1,032 (11.0) | 46.7 (42.5–50.9)                                   | —       |
| 45–49                                   | 870 (9.3)    | 46.8 (41.8–51.9)                                   | —       |
| Region                                  |              |  | <0.001* |
| Ashanti                                 | 1,040 (11.1) | 44.5 (38.4–50.7)                                   | —       |
| Brong Ahafo                             | 1,005 (10.7) | 26.4 (22.7–30.5)                                   | —       |
| Central                                 | 941 (10.0)   | 33.3 (23.8–44.4)                                   | —       |
| Eastern                                 | 907 (9.6)    | 59.8 (49.6–69.2)                                   | —       |
| Greater Accra                           | 999 (10.6)   | 54.9 (50.1–59.7)                                   | —       |
| Northern                                | 1042 (11.1)  | 26.5 (21.6–32.0)                                   | —       |
| Upper East                              | 914 (9.7)    | 37.8 (31.5–44.5)                                   | —       |
| Upper West                              | 726 (7.7)    | 20.1 (13.1–29.5)                                   | —       |
| Volta                                   | 795 (8.5)    | 44.6 (37.1–52.4)                                   | —       |
| Western                                 | 1,027 (10.9) | 36.8 (30.5–43.8)                                   | —       |

TABLE 1: Continued.

| Variable                                | <i>n</i> (%) | Prevalence of out-of-pocket expenditure,<br>95% CI | <i>p</i> |
|---|--------------|--|----------|
| Sex of household head                   |              |  | 0.002*   |
| Male                                    | 6,064 (64.5) | 39.8 (37.3–42.3)                                   | —        |
| Female                                  | 3,332 (35.5) | 45.5 (42.1–49.0)                                   | —        |
| Frequency of watching TV                |              |  | <0.001*  |
| Not at all                              | 2,826 (30.1) | 35.2 (31.6–38.9)                                   | —        |
| Less than once a week                   | 2,198 (23.4) | 39.4 (35.6–43.4)                                   | —        |
| At least once a week                    | 4,372 (46.5) | 46.0 (43.1–48.9)                                   | —        |
| Frequency of listening to radio         |              |  | 0.070    |
| Not at all                              | 1,613 (17.2) | 40.9 (36.8–45.2)                                   | —        |
| Less than once a week                   | 2,926 (31.1) | 39.5 (36.1–43.1)                                   | —        |
| At least once a week                    | 4,857 (51.7) | 43.6 (40.7–46.5)                                   | —        |
| Frequency of reading newspaper/magazine |              |  | 0.002*   |
| Not at all                              | 7,818 (83.3) | 40.6 (38.1–43.1)                                   | —        |
| Less than once a week                   | 874 (9.3)    | 44.3 (39.5–49.2)                                   | —        |
| At least once a week                    | 699 (7.4)    | 51.0 (44.3–57.4)                                   | —        |

\*Significant at  $p < 0.05$ .

TABLE 2: Measures of association out-of-pocket health expenditure of between health insurance coverage and socioeconomic factors of in Ghana.

| Variable  | Adjusted odds ratio | 95% CI     | <i>p</i> |
|---|---------------------|------------|----------|
| <i>Socioeconomic variables</i>                                      |                     |            |          |
| Neighborhood socioeconomic disadvantage                             |                     |            |          |
| Lowest  | 1.00                | —          | —        |
| Level 2   | 0.86                | 0.53–1.40  | 0.547    |
| Level 3   | 1.36                | 0.67–2.73  | 0.394    |
| Highest   | 1.83                | 0.79–4.27  | 0.160    |
| Health insurance coverage   |                     |            |          |
| No  | 1.00                | —          | —        |
| Yes   | 0.56                | 0.25–1.27  | 0.163    |
| Neighborhood socioeconomic disadvantage # health insurance coverage |                     |            |          |
| Lowest # Yes  | 1.00                | —          | —        |
| Level 2 # Yes   | 1.04                | 0.61–1.75  | 0.893    |
| Level 3 # Yes   | 0.54                | 0.26–1.12  | 0.096    |
| Highest # Yes   | 0.24                | 0.10–0.62* | 0.003    |
| Education   |                     |            |          |
| No formal education   | 1.00                | —          | —        |
| Primary   | 1.58                | 1.05–2.39* | 0.030    |
| Secondary   | 2.15                | 1.46–3.17* | <0.001   |
| Higher  | 2.90                | 1.21–6.92* | 0.017    |
| Education # health insurance coverage                               |                     |            |          |
| No formal education # Yes   | 1.00                | —          | —        |
| Primary # Yes   | 0.67                | 0.42–1.08  | 0.099    |
| Secondary # Yes   | 0.58                | 0.38–0.88* | 0.011    |
| Higher # Yes  | 0.54                | 0.22–1.33  | 0.179    |
| Household wealth quintile   |                     |            |          |
| Poorest   | 1.00                | —          | —        |
| Poorer  | 0.58                | 0.34–0.99* | 0.045    |
| Middle  | 0.90                | 0.53–1.53  | 0.708    |
| Richer  | 0.84                | 0.45–1.59  | 0.596    |
| Richest   | 0.80                | 0.40–1.57  | 0.511    |

TABLE 2: Continued.

| Variable  | Adjusted odds ratio | 95% CI     | <i>p</i> |
|---|---------------------|------------|----------|
| Household wealth quintile # health insurance coverage |                     |            |          |
| Poorest # Yes   | 1.00                | —          | —        |
| Poorer # Yes  | 1.48                | 0.81–2.70  | 0.202    |
| Middle # Yes  | 1.21                | 0.67–2.19  | 0.535    |
| Richer # Yes  | 1.38                | 0.64–2.94  | 0.409    |
| Richest # Yes   | 1.18                | 0.56–2.47  | 0.662    |
| Employment  |                     |            |          |
| Yes   | 1.01                | 0.76–1.35  | 0.931    |
| No  | 1.00                | —          | —        |
| Employment # health insurance coverage                |                     |            |          |
| Yes # Yes   | 1.08                | 0.77–1.50  | 0.657    |
| No # Yes  | 1.00                | —          | —        |
| Residential status                                    |                     |            |          |
| Urban   | 1.00                | —          | —        |
| Rural   | 0.69                | 0.42–1.16  | 0.162    |
| Residential status # health insurance coverage        |                     |            |          |
| Urban # Yes   | 1.00                | —          | —        |
| Rural # Yes   | 1.61                | 0.91–2.84  | 0.099    |
| <i>Other women's characteristics</i>                  |                     |            |          |
| Marital status  |                     |            |          |
| Single women  | 1.00                | —          | —        |
| Currently married/in union women                      | 1.13                | 0.91–1.40  | 0.286    |
| Formerly married women                                | 1.13                | 0.87–1.46  | 0.351    |
| Age   |                     |            |          |
| 15–19   | 1.00                | —          | —        |
| 20–24   | 1.16                | 0.92–1.46  | 0.210    |
| 25–29   | 1.31                | 0.99–1.73  | 0.052    |
| 30–34   | 1.43                | 1.07–1.92* | 0.016    |
| 35–39   | 1.44                | 1.07–1.93* | 0.015    |
| 40–44   | 1.62                | 1.20–2.18* | 0.002    |
| 45–49   | 1.71                | 1.27–2.30* | <0.001   |
| Region  |                     |            |          |
| Western   | 1.00                | —          | —        |
| Ashanti   | 1.15                | 0.77–1.72  | 0.493    |
| Brong Ahafo   | 0.69                | 0.47–0.99* | 0.050    |
| Central   | 0.77                | 0.42–1.39  | 0.380    |
| Eastern   | 2.64                | 1.54–4.52* | <0.001   |
| Greater Accra   | 1.89                | 1.30–2.74* | 0.001    |
| Northern  | 1.18                | 0.72–1.94  | 0.513    |
| Upper East  | 1.45                | 0.89–2.38  | 0.132    |
| Upper West  | 0.75                | 0.39–1.45  | 0.393    |
| Volta   | 1.53                | 1.00–2.33* | 0.050    |
| Sex of household head                                 |                     |            |          |
| Male  | 1.00                | —          | —        |
| Female  | 1.11                | 0.96–1.27  | 0.150    |
| Frequency of watching TV                              |                     |            |          |
| Not at all  | 1.00                | —          | —        |
| Less than once a week                                 | 0.96                | 0.79–1.16  | 0.653    |
| At least once a week                                  | 1.16                | 0.95–1.43  | 0.141    |
| Frequency of reading newspaper/magazine               |                     |            |          |
| Not at all  | 1.00                | —          | —        |
| Less than once a week                                 | 0.98                | 0.79–1.23  | 0.878    |
| At least once a week                                  | 1.12                | 0.85–1.50  | 0.397    |

\*Significant at  $p < 0.05$ .

TABLE 3: Marginal interaction effect of OOP health expenditure by socioeconomic factors and health insurance coverage.

| Variable  | Marginal predictive effect | 95% CI    | <i>p</i> |
|---|----------------------------|-----------|----------|
| <i>Socioeconomic variables</i>                                      |                            |           |          |
| Neighborhood socioeconomic disadvantage                             |                            |           |          |
| Lowest  | 45.2                       | 38.9–51.5 | <0.001*  |
| Level 2   | 42.4                       | 37.4–47.4 | <0.001*  |
| Level 3   | 41.1                       | 34.7–47.6 | <0.001*  |
| Highest   | 35.3                       | 27.5–43.1 | <0.001*  |
| Health insurance coverage   |                            |           |          |
| No  | 57.8                       | 54.0–61.7 | <0.001*  |
| Yes   | 37.6                       | 35.0–40.2 | <0.001*  |
| Neighborhood socioeconomic disadvantage # health insurance coverage |                            |           |          |
| Lowest # No   | 54.7                       | 44.6–64.7 | <0.001*  |
| Lowest # Yes  | 42.6                       | 35.8–49.3 | <0.001*  |
| Level 2 # No  | 51.3                       | 44.7–57.9 | <0.001*  |
| Level 2 # Yes   | 39.9                       | 34.2–45.7 | <0.001*  |
| Level 3 # No  | 61.3                       | 52.7–70.0 | <0.001*  |
| Level 3 # Yes   | 35.4                       | 28.2–42.5 | <0.001*  |
| Highest # No  | 67.6                       | 56.5–78.8 | <0.001*  |
| Highest # Yes   | 26.0                       | 17.4–34.7 | <0.001*  |
| Education   |                            |           |          |
| No formal education   | 35.9                       | 32.0–39.9 | <0.001*  |
| Primary   | 39.3                       | 35.5–43.2 | <0.001*  |
| Secondary   | 43.4                       | 40.7–46.2 | <0.001*  |
| Higher  | 49.0                       | 42.2–55.7 | <0.001*  |
| Education # health insurance coverage                               |                            |           |          |
| No formal education # No  | 44.1                       | 36.3–52.0 | <0.001*  |
| No formal education # Yes   | 34.0                       | 29.7–38.2 | <0.001*  |
| Primary # No  | 54.8                       | 47.8–61.8 | <0.001*  |
| Primary # Yes   | 35.3                       | 30.9–39.7 | <0.001*  |
| Secondary # No  | 61.8                       | 56.6–67.0 | <0.001*  |
| Secondary # Yes   | 38.5                       | 35.6–41.5 | <0.001*  |
| Higher # No   | 68.2                       | 53.0–83.3 | <0.001*  |
| Higher # Yes  | 43.8                       | 36.5–51.1 | <0.001*  |
| Household wealth quintile   |                            |           |          |
| Poorest   | 42.7                       | 36.3–49.2 | <0.001*  |
| Poorer  | 37.4                       | 32.7–42.2 | <0.001*  |
| Middle  | 43.7                       | 40.0–47.5 | <0.001*  |
| Richer  | 44.4                       | 40.3–48.4 | <0.001*  |
| Richest   | 40.5                       | 35.7–45.3 | <0.001*  |
| Household wealth quintile # health insurance coverage               |                            |           |          |
| Poorest # No  | 62.4                       | 51.8–73.0 | <0.001*  |
| Poorest # Yes   | 37.3                       | 30.1–44.4 | <0.001*  |
| Poorer # No   | 50.1                       | 41.1–59.0 | <0.001*  |
| Poorer # Yes  | 34.1                       | 28.6–39.5 | <0.001*  |
| Middle # No   | 60.2                       | 54.0–66.4 | <0.001*  |
| Middle # Yes  | 39.2                       | 35.1–43.3 | <0.001*  |
| Richer # No   | 58.6                       | 51.4–65.8 | <0.001*  |
| Richer # Yes  | 40.5                       | 35.5–45.5 | <0.001*  |
| Richest # No  | 57.3                       | 48.5–66.2 | <0.001*  |
| Richest # Yes   | 35.9                       | 30.9–40.9 | <0.001*  |
| Employment  |                            |           |          |
| Yes   | 42.3                       | 37.6–43.9 | <0.001*  |
| No  | 40.7                       | 39.7–44.9 | <0.001*  |



TABLE 3: Continued.

| Variable                                       | Marginal predictive effect | 95% CI    | <i>p</i> |
|--|----------------------------|-----------|----------|
| Employment # health insurance coverage         |                            |           |          |
| No # No  | 57.6                       | 51.8–63.4 | <0.001*  |
| No # Yes                                       | 36.2                       | 32.6–39.8 | <0.001*  |
| Yes # No                                       | 57.9                       | 53.6–62.3 | <0.001*  |
| Yes # Yes                                      | 38.1                       | 35.2–41.0 | <0.001*  |
| Residential status                             |                            |           |          |
| Urban  | 42.0                       | 38.2–45.8 | <0.001*  |
| Rural  | 42.0                       | 36.6–47.4 | <0.001*  |
| Residential status # health insurance coverage |                            |           |          |
| Urban # No                                     | 61.6                       | 55.1–68.2 | <0.001*  |
| Urban # Yes                                    | 36.6                       | 32.4–40.7 | <0.001*  |
| Rural # No                                     | 53.4                       | 46.0–60.7 | <0.001*  |
| Rural # Yes                                    | 39.0                       | 33.0–45.0 | <0.001*  |
| <i>Other women's characteristics</i>           |                            |           |          |
| Marital status                                 |                            |           |          |
| Single   | 40.1                       | 36.3–43.8 | <0.001*  |
| Currently married/in union                     | 42.7                       | 39.7–45.6 | <0.001*  |
| Formerly married                               | 42.8                       | 38.2–47.3 | <0.001*  |
| Age  |                            |           |          |
| 15–19  | 35.8                       | 30.8–40.7 | <0.001*  |
| 20–24  | 38.9                       | 35.4–42.5 | <0.001*  |
| 25–29  | 41.6                       | 38.2–45.1 | <0.001*  |
| 30–34  | 43.6                       | 39.2–47.9 | <0.001*  |
| 35–39  | 43.6                       | 39.4–47.9 | <0.001*  |
| 40–44  | 46.2                       | 42.2–50.2 | <0.001*  |
| 45–49  | 47.5                       | 42.9–52.1 | <0.001*  |
| Region   |                            |           |          |
| Ashanti  | 39.5                       | 33.4–45.4 | <0.001*  |
| Brong Ahafo                                    | 28.7                       | 24.2–33.1 | <0.001*  |
| Central  | 30.8                       | 20.6–41.0 | <0.001*  |
| Eastern  | 58.6                       | 48.7–68.6 | <0.001*  |
| Greater Accra                                  | 50.9                       | 45.8–56.0 | <0.001*  |
| Northern                                       | 40.0                       | 31.1–48.7 | <0.001*  |
| Upper East                                     | 44.8                       | 36.3–53.4 | <0.001*  |
| Upper West                                     | 30.5                       | 19.2–41.7 | <0.001*  |
| Volta  | 45/9                       | 39.3–52.6 | <0.001*  |
| Western  | 36.4                       | 29.9–42.9 | <0.001*  |
| Sex of household head                          |                            |           |          |
| Male   | 41.0                       | 38.6–43.4 | <0.001*  |
| Female   | 43.3                       | 40.1–46.5 | <0.001*  |
| Frequency of watching TV                       |                            |           |          |
| Not at all                                     | 40.3                       | 36.5–44.2 | <0.001*  |
| Less than once a week                          | 39.4                       | 36.2–42.6 | <0.001*  |
| At least once a week                           | 43.7                       | 40.8–46.6 | <0.001*  |
| Frequency of reading newspaper/magazine        |                            |           |          |
| Not at all                                     | 41.7                       | 39.3–44.0 | <0.001*  |
| Less than once a week                          | 41.3                       | 36.4–46.2 | <0.001*  |
| At least once a week                           | 44.4                       | 38.0–50.7 | <0.001*  |

\*Means statistical significance at  $p < 0.05$ .

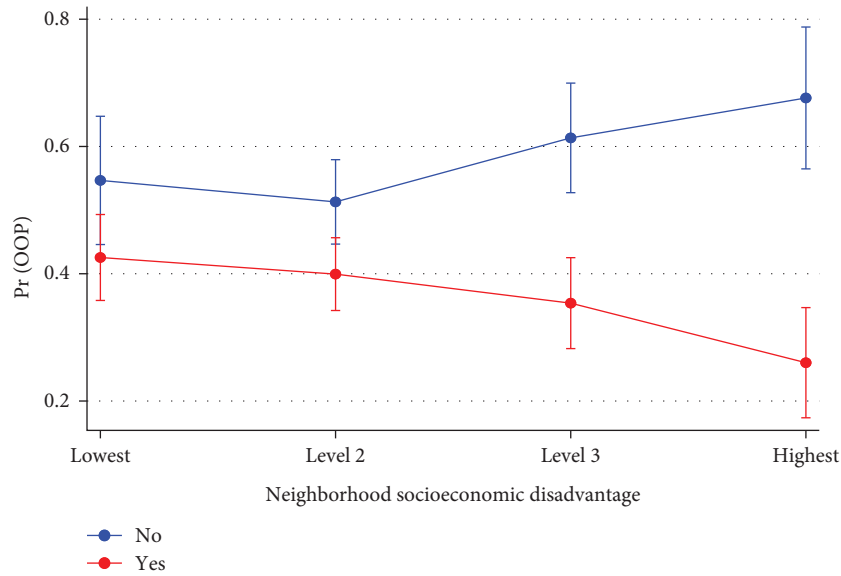


FIGURE 1: Predictive marginal effects of OOP health expenditure by neighborhood socioeconomic disadvantage and health insurance coverage.

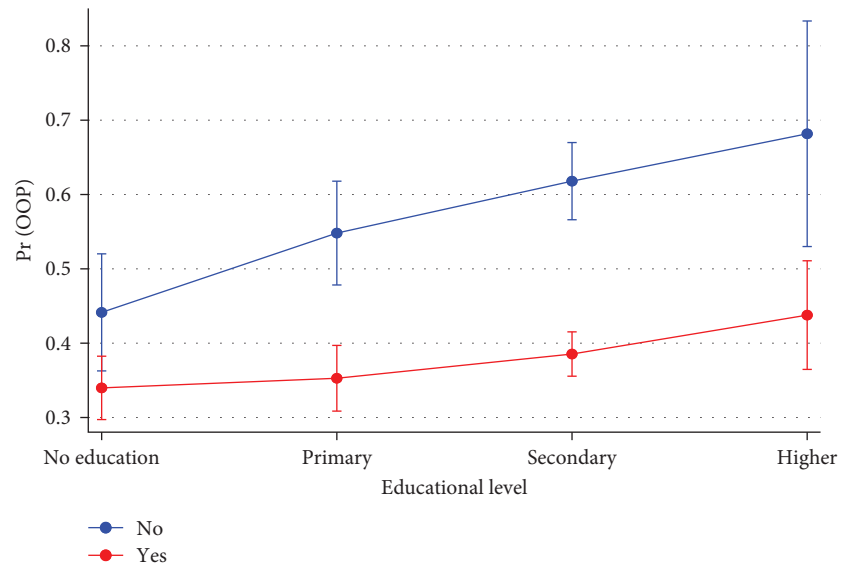


FIGURE 2: Predictive marginal effects of OOP health expenditure by educational level and health insurance coverage.

wealth quintile of households (i.e., poorest, poorer, middle, richer, and richest).

In Figure 4, we presented the model effects plot of OOP health expenditure by employment status and health insurance. The interaction effects of OOP health expenditure were greater in women who had no health insurance coverage (blue line) by employment status (yes versus no).

Figure 5 shows the marginal effects plot for OOP health expenditure by residence and health insurance. The interaction effects of OOP health expenditure were greater in women who had no health insurance coverage (blue line) by residential status (rural versus rural).

## 6. Discussion

We examined the predictive interaction effects of OOP health expenditure by socioeconomic factors and health insurance coverage among Ghanaian women. Overall, we found a high prevalence (41.9%) of OOP health expenditure and 37.9% among those with health insurance coverage. This is expected as a previous study reported approximately two-thirds (66%) of women had health insurance coverage [6]. Another previous study also reported a similar results that there was a health insurance coverage gap amongst Ghanaian women [30]. Unless this gap is addressed, the idea of

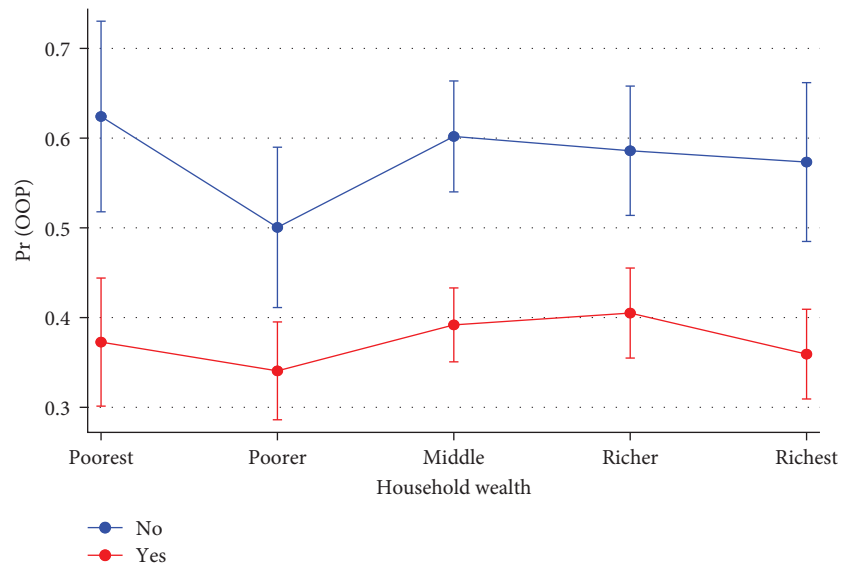


FIGURE 3: Predictive marginal effects of OOP health expenditure by household wealth and health insurance coverage.

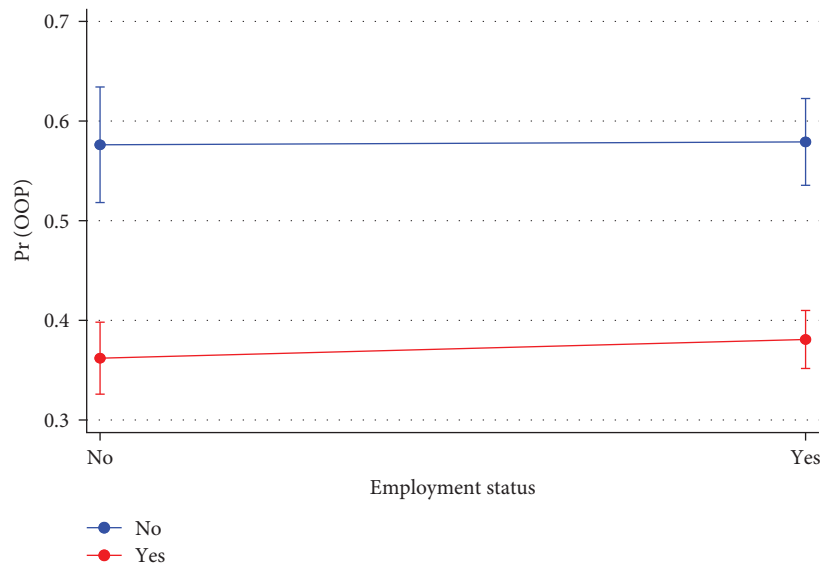


FIGURE 4: Predictive marginal effects of OOP health expenditure by employment status and health insurance coverage.

UHC which promotes health and well-being of the global population, thereby extending life expectancy by granting access to good, affordable, and quality healthcare [31], will remain unachieved. To attain the universal health coverage through the elimination of OOP health expenditure would imply unrestricted access to good and quality healthcare services that include financial risk protection for women. The idea of health insurance scheme was to prevent copayments, coinsurance payments, deductibles, or any other payments at the health facility. Previous studies have reported socioeconomic inequalities in child healthcare as well as maternal health service utilization [32–34].

Free drugs and services especially for maternal care are contained under the health insurance scheme [35]. Albeit, the results from this study and from a previous research [36],

have shown a large occurrence of OOP health expenditure even among those that are reportedly under health insurance coverage. There is a need for more research to determine the true causes of OOP health expenditures, particularly among those with health insurance. OOP health expenditure will continue to be a major impediment to achieving optimal healthcare uptake in Ghana. Even women with health insurance are required to pay for drugs and services, which is surprising. A previous investigation into the circumstances surrounding these payments revealed that, among other things, a nonexistence of stock at the health facilities or poor repayments of pharmacies by national health insurance were to blame [37]. According to a study that compared the expenses incurred for healthcare across SSA, it was that majority of countries continue to have calamitous health

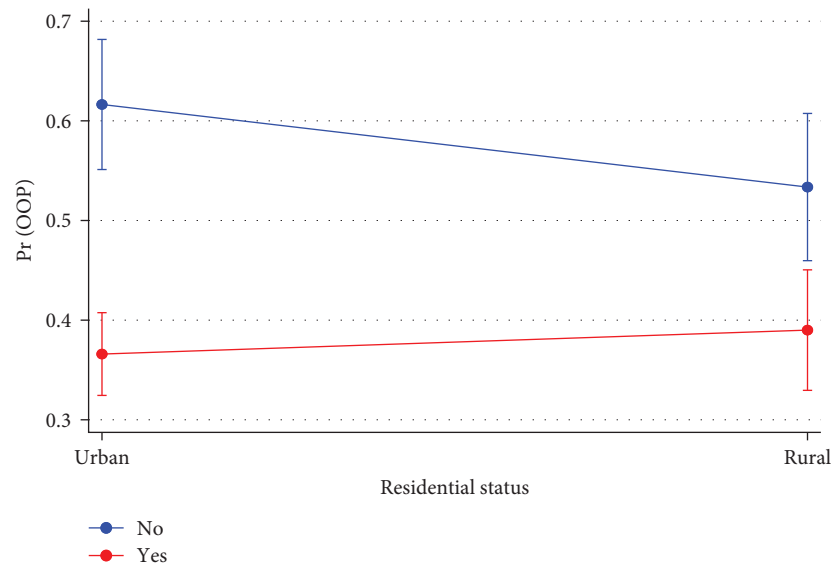


FIGURE 5: Predictive marginal effects of OOP health expenditure by residential status and health insurance coverage.

expenditures, while their OOP health expenditures ranges from a fifth to much more than two-thirds of overall health expenditures. This indicates that healthcare is still largely unaffordable across the region despite the fact that health insurance schemes were introduced in the region [38].

Furthermore, our study found increased marginal effect of OOP health expenditure by high socioeconomic status and health insurance coverage. Women from the lowest neighborhood socioeconomic disadvantage group or those with higher education who are covered by health insurance had the greater effect of OOP health expenditure. This was similar to the results from previous studies where participants from households with higher wealth quintiles were observed to have more likelihood of having OOP health expenditures, when compared with those from households with poor wealth quintiles [39–41]. More research is needed to determine the precise reasons why women from the poorest neighborhoods or those with a higher education have higher OOP health expenditures. This finding is in agreement with an earlier study [42]. The disparity in the OOP health expenditure by socioeconomic factors and health insurance coverage can be explained by the fact that when approved facilities are out of stock, women with high socioeconomic ranks have more likelihood to obtain drugs and services through alternative channels.

Health insurance serves to lessen the risk of OOP health expenditures for women seeking maternal healthcare services. Those who are covered should not be asked to pay for drugs or services. The study's findings indicate that achieving universal health coverage will necessitate scaling up and sustaining the health insurance scheme in order to avoid further payments; additionally, the scheme's operations must be efficient. It is also important that at the point of health service utilization, by-way costs are strongly avoided. For instance, while by legal implications, pregnant

women exempted from paying for premiums, additional unendorsed payments that hamper the utilization service needed to be discontinued. The fact that OOP health expenditure continues despite the availability of free services in relation to pregnancy may be due in part to a deficiency in suitable health facilities. Women who live in some communities that are difficult-to-reach may face the possibility of embarking on a long-distance journey in order to access healthcare, despite the fact that services are free. As a result, guaranteeing that healthcare facilities are located in easily nearby areas will be a positive development.

## 7. Strengths and Limitations

This study has some limitations. The study examined OOP health expenditure for maternal healthcare service utilization using a representatively national data. These data can be used to make reasonable judgements among reproductive aged women in Ghana, allowing for an analysis of the structure of OOP health expenditure and the variation in health insurance coverage. Nevertheless, using secondary data makes measuring certain relevant variables difficult, and caution was applied to the findings due to the cross-sectional nature of the data used.

## 8. Conclusion

In conclusion, a gap in health insurance coverage exists and this gap has led to higher OOP health spending. The OOP health expenditure was observed to be concentrated on women of high socioeconomic status who were also covered by health insurance. This, in turn, will be a barrier to coverage and extension to low-income earners and will mainly harm the target of attaining universal health coverage. Therefore, it is paramount that stakeholders in healthcare system and government implement policies that aim to eliminate OOP health expenditure for maternal healthcare services.

## Data Availability

Data for this study were sourced and available at <http://dhsprogram.com/data/available-datasets.cfm>.

## Ethical Approval

This study is a secondary data analysis of the GDHS which is publicly available, and approval was granted for its use. All methods were performed in accordance with the relevant guidelines and regulations.

## Consent

Written consent was obtained from mothers/caregivers (signed or thumb-printed) and data were recorded anonymously at the time of data collection during the GDHS 2014.

## Conflicts of Interest

The authors declare that they have no have no conflicts of interest.

## Authors' Contributions

Michael Ekholuenetale, Chimezie Igwegbe Nzopotam, Charity Ehimwenma Joshua, and Amadou Barrow conceptualized the study and prepared the study design, reviewed literature, conduct data analysis, and wrote the results. All the authors critically reviewed the manuscript for its intellectual content. Amadou Barrow had final responsibility to submit for publication.

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