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Relationship between health insurance enrolment and unintended pregnancy in Ghana

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Abstract

Context: The effect of health insurance coverage on sexual and reproductive health, especially unintended pregnancy, has scantly been researched. Using the 2014 Ghana Demographic and Health Survey, the study examined the links between women's health insurance enrolment on unintended pregnancy in Ghana.
Method: The sample consisted of 9,396 women aged 15-49 years, but the analysis was limited to the 4,544 women who were pregnant in the two years preceding the survey. The effects of health insurance enrolment on unintended pregnancy was examined with the propensity score matching. The health insurance enrolment was the treatment variable and unintended pregnancy as the outcome variable.
Results: This study showed that 66.0% of all women surveyed had health insurance coverage and 31.8% of all women of childbearing age who were currently or had previously been pregnant reported having at least one unintended pregnancy. Thirty percent of insured women had an unintended pregnancy, compared to 37% of uninsured women. The results showed that education, household wealth index, religion, and type of marital union were significant predictor of health insurance coverage among Ghanaian women. The PSM split the women based on their health insurance status. After matching, the difference between the insured and uninsured women reduces significantly. Results demonstrated that, the probability of unintended pregnancy was 0.312 among insured women and 0.351 among those not insured in Ghana. This implies that having health insurance coverage will help in reducing the likelihood of women experiencing unintended pregnancy.
Conclusions: Results highlight the importance of the target of universal health coverage under the sustainable development goal 3 and demonstrate that expanding existing health insurance schemes within Ghana could contribute to reducing the number unintended pregnancies experienced each year.

Keywords: Health Insurance; Unintended pregnancy; contraceptive; universal health coverage; Women; Ghana

Unintended pregnancy is a widespread public health issue globally, but there is evidence that it has decreased over the years. The recent estimate of unintended pregnancy is 121 million pregnancies per year in 2015-2019, which is less than two-fifths of the previous estimate of 210 million unintended pregnancies per year (Bearak *et al.*, 2020). Furthermore, it is estimated about two-fifths are mistimed or unwanted at the time of conception (Bearak *et al.*, 2018). Of those unintended pregnancies, 61% ended in abortion with remaining either miscarried or carried to term (Bearak *et al.*, 2020). There is no doubt that unintended pregnancy, which includes either unwanted or mistimed pregnancies, pose health risks to both mother and baby. Because unintended pregnancy is often a surprise, there is a high likelihood of prenatal care being neglected or foregone (Hajizadeh & Nghiem, 2020) due to economic or psychological reasons (Heaman *et al.* 2014). Studies have shown

that births resulting from unintended pregnancies are associated with higher rates of adverse health, social, and economic outcomes for mother and baby (Oyediran *et al.*, 2011; Logan *et al.*, 2007; Gipson *et al.*, 2008; Filonenka *et al.*, 2019). Such adverse health outcomes including low birthweight, shorter duration of breastfeeding, parenting stress, and negative physical and mental impacts for children such as poor development and potential behavioural health issues (Brieger *et al.*, 2001; Logan *et al.*, 2007; Gipson *et al.*, 2008; Dude *et al.*, 2021). Furthermore, unwanted pregnancies are more likely to end in abortion than intended pregnancies (Finer & Lindberg, 2010), and given that many abortions in restrictive legal context are unsafe, this is problematic for the health and safety of women (Bankole *et al.*, 2020).

Several women and couples wish to plan the timing and spacing of birth or pregnancy for health, social, and economic reasons, thus, timely access to highly effective contraception would lower the rate of unintended pregnancy among those who are not trying to become pregnant. But access to family planning remains a challenge in most countries in sub-Saharan Africa, particularly in West African nations where contraceptive uptake remains low. Many households are living in abject poverty and find it difficult to access health services except through out-of-pocket health expenditures (Kagaigai *et al.*, 2021). Thus, state-actors and stakeholders are in search of approaches to increase access to essential health services including the uptake and quality of family planning services, and the most important one has been the institutionalization of health insurance schemes.

Family planning is central to sustainable development goal 3 (SDG 3), particularly targets 3.1, reduced maternal mortality and 3.8 achieving universal health coverage. In addition, family planning will contribute to accomplishing SDG 5 on gender equality, with target 5.6 specifically targeted at ensuring universal access to sexual, reproductive health, and reproductive rights. There are signs and efforts by countries demonstrating strong commitment to achieving universal health coverage, and health insurance is being advancing as a strategy of meeting the goal of universal health coverage (Naik, Morgan & Wright, 2014; Perehudoff, Alexandrov & Hogerzeil, 2019; Warner *et al.*, 2020). One of the ways that these countries work to achieve their goal of universal health coverage is through the implementation of the health insurance scheme. Health insurance can empower women to access health services, including contraception by defraying their financial constraint which is often a major barrier cited for non-use of family planning (Guttmacher Institute & International Planned Parenthood Federation, 2010; Fox & Barfield, 2016).

Ghana's National Health Insurance Scheme (NIHS) was established in 2003 and operationalized in 2005 with the goal of providing a broad range of healthcare services while working to increase affordability and utilization among the more vulnerable populations across the country. The NIHS benefit package which covers "95% of disease conditions that afflict Ghanaians." This package includes a variety of outpatient services including diagnostic testing and basic procedures as well as most in-patient services including most surgeries, hospital accommodation, and specialist care. It also includes a provision for oral health, all maternity care related services, and all drugs on the official medicines list but no specificity of sexual and reproductive health services (Blanchet *et al.*, 2012).

The impact of the NIHS has been documented in multiple studies. For instance, Mensah and colleagues found that pregnant women covered under the NHIS were more likely to receive prenatal care and give birth at a health facility (Mensah *et al.*, 2010). Evidence regarding the impact of health insurance on sexual and reproductive health outcome is important in the context of debate around universal health coverage from both health and public policy perspectives. Prior research suggests that health insurance is associated with an increased likelihood of health service coverage including contraception (Kavanaugh *et al.*, 2019). However, scant research has examined whether health insurance coverage is a predictor of unintended pregnancy in the West Africa sub-region, particularly in Ghana where health insurance coverage is high among the population. Thus, with increased attention on universal health coverage and health insurance schemes, it is important to examine potential relationship between health insurance coverage and various health outcomes, such as the links between health insurance coverage and unintended pregnancy among women of reproductive age in Ghana.

Materials and methods
Data

This is a further analysis of the 2014 Ghana Demographic and Health Survey (GDHS) (2014 GDHS) (Ghana Statistical Service, Ghana Health Service & ICF International, 2015); a national survey conducted every five years. The survey was funded by numerous donors including, United States Agency for International Development (USAID), United Nations Development Program (UNDP), United Nations Fund Population Activities (UNFPA), United Nations Children Fund (UNICEF), among others with technical oversight from ICF. The GDHS covers issues such as unintended pregnancy, family planning, nutrition, fertility, health insurance, prenatal care, choice of place of delivery and postnatal care, women empowerment, infectious diseases, and domestic violence (Ghana Statistical Service, Ghana Health Service & ICF International, 2015). The 2014 GDHS interviewed 9,396 women aged 15–49 years in 11,835 households selected from 427 clusters using a two-stage sample design (Ghana Statistical Service, Ghana Health Service & ICF International, 2015). The goal was to derive estimates for the key indicators at the national and ten regions as well as for the urban and rural areas. The survey used the updated frame from the 2010 Population and Housing Census (PHC) and had a response rate of 97%. The 2014 GDHS dataset was accessed from the DHS website following approval from the program (Ghana Statistical Service, Ghana Health Service & ICF International, 2015).

Statistical analysis
Descriptive statistics

The descriptive analysis was conducted to show the distribution of women by the key variables. The descriptive statistics include percentages and means for categorical and continuous variables, respectively. The analytical techniques involve logistic regression and propensity scoring matching (PSM). PSM was employed to examine the effect of health insurance coverage on women's experiencing an unintended pregnancy (Zhehui, Gardiner & Bradley, 2010). Weight was applied to adjust for differences in the probability of selection and to adjust for non-response to produce the proper representation. Individual weights were used for descriptive statistics.

Propensity score matching

A propensity score is the probability of being exposed to a treatment or an intervention given a set of observed covariates. This method was developed as a means to balance the treatment and control units so that a direct comparison would make a valid conclusion. PSM therefore makes it feasible to create an unexposed comparison group that is statistically equivalent on the average to subjects who are exposed to the treatment (Rosenbaum & Rubin, 1983; Heckman, Ichimura & Todd, 1998). For research survey, a single score for matching is generated using statistically regressing exposure on all of the variables that determine exposure and also may be related to the outcome variable (Kincaid & Do, 2006). This technique requires a two-stage process. Stage 1 involves the use of a logistic regression model to calculate all respondents' propensity for experiencing a treatment of interest, in this case, enrolled in health insurance coverage. The propensity score is defined as follows (Rosenbaum & Rubin, 1983):

$$p(T) \equiv Pr2 = E\{T \mid S\}$$

Where $p(T)$ is the propensity to be enrolled into health insurance, T indicates that a woman was uninsured, and S is a vector of covariates influencing whether the woman did or did not have health insurance coverage. In Stage 2, propensity scores estimated in stage 1 was used to match women who are insured and uninsured. The analysis applies the stratification matching which uses all treatment and control cases to obtain the full sample. Using the STATA 16.0 "psmatch2"

command, the full range of sample members' propensity scores is divided into propensity score strata, or blocks, each of which includes treatment and control cases with the same or nearly the same propensities for receiving the treatment. The number of appropriate strata depends on the number necessary to gain a balanced propensity score. Within each of these strata, the ATT is calculated, and then the ATT's across strata are averaged to produce a final ATT.

The standard error for each of the five strata identified follows Shoemaker's (1972) method of calculating unbiased parameters of sub-classification of propensity scores was used to obtain the standard errors for the adjusted probabilities in order to completely eliminate any initial bias that may have been caused by the covariates used in the matching.

The propensity score analysis was used to stimulates randomisation by matching the women by outcome status (unintended pregnancy vs. intended pregnancy) for the predictors that reduce the likelihood of bias in the treatment effects (Heckman *et al.*, 1996). The approach tries to reduce the bias associated with confounding factors that may exist in an estimate of the treatment effect obtained from simply comparing outcomes among subjects that were exposed to the treatment and those that were not. The differences in the characteristics of women that experienced unintended pregnancy with and without health insurance coverage were accounted for by using the propensity score technique. The sample included woman between the ages of 15-49 who provided a birth history within the five-year period preceding the survey, and the analysis was restricted to 4,544 women who were pregnant or had a birth. The women were further ask about the planning status of their last child in the 2 years preceding the survey or current pregnancy. The breakdown showed that 3,097 of the women either desired their last child or pregnancy when it occurred while the remaining (1,447) women reported the birth or pregnancy as on unintended.

Logistic regression

Logistic regression was used as a propensity score estimation algorithm and nearest neighbour matching as matching algorithm. Each woman was matched with health insurance coverage with the closest propensity score on a ratio of 1.5 using the nearest neighbour algorithm with no replacement. Women's sociodemographic characteristics were presented as percentages in the first step of the analysis. The health insurance coverage according to the women's socio-economic and demographic characteristics. In addition, chi-square (χ^2) test was performed to check for significant associations between the explanatory variables and unintended pregnancy. Variables that were found to be significantly associated in the χ^2 tests (at $p < 0.25$) were selected for final regression analysis. In the final step, binary logistic regression model was used to calculate the odds ratios (OR) of the associations between unintended pregnancy and health insurance coverage. STATA 16.0 package was used for the complete analysis.

The logistic regression was used to determine the explanatory variables with a significant effect on the outcome variable. Below is the regression model equation.

Where, where p is the probability that the event Y occurs, coefficient 'b' is the factor by which the odds change with unit increase in independent variable. If "b" is positive, odds ratio will increase, as this factor will be greater than 1. Contrary to that if 'b' is negative, odd ratio will decrease. When 'b' is 0, the factor exponential of 'b' equal to 1 and, therefore the odds remain unchanged.

$$Logit \ p = \log \frac{p}{1-p} = \log \Omega = b_0 + b_1 x_1 + b_2 x_2 + \cdots \ldots + b_k x_k$$

Dependent and independent variables

Dependent variable

The outcome variable was unintended pregnancy that captured the pregnancy intention at the conception. During the survey, women reported retrospectively if their last pregnancy (the index

child) was wanted then (planned), wanted later (mistimed) or not wanted at all (unwanted). These three responses were reclassified into a dichotomous variable in two ways; that is using unintended pregnancy vs. intended pregnancy and using unwanted pregnancy vs. wanted pregnancy categories. In the first scenario, women who reported that their most recent pregnancy (in the last two years) was wanted later or not wanted at all were categorised as unintended pregnancies and intended if they reported otherwise. In the second instance, women who reported that their most recent pregnancy as wanted then or wanted later were categorised as wanted pregnancies and unwanted if they reported the pregnancy was not wanted at all.

Independent variables

The main independent variable included in the analyses was health insurance coverage. The GDHS asked respondents whether they were covered at the time of interview and, if covered, the type of health insurance by which they are covered. A dichotomous measure of health insurance coverage was constructed with women who reported to be registered with the **National Health Insurance Scheme** (NHIS) was equal to one and zero otherwise. Other covariates of unintended pregnancy included in the analysis were informed by the previous studies (Ahinkorah, 2020; Nyarko, 2019; Ameyaw et al., 2019; Bain, Zweekhorst & de Cock Buning, 2020) and availability in the GDHS datasets. Other covariates included were women's age, education, religious affiliation, type of marriage, place of residence, household wealth status, number of living children, and administrative region of residence. In addition, women's position and status related factors such as working status, mass media exposure to family planning message and decision-maker for contraceptive use and health-related issues.

Women's education was categorized into "no education," "primary education," and "secondary and above." The employment by earning status was categorized as "not working", "working receiving cash", working and receiving cash/in-kind", and "working but not compensated in cash or in-kind."

To explore the relationship between mass media exposure and unintended pregnancy, a composite score of the media exposure was developed from women's responses to their exposure to the family planning messages through listening to the radio, watching television, and reading newspapers: if a woman read newspapers more than once a week, she scored "1" and "0" otherwise. A woman who had listened to the radio more than once a week was scored "1" and "0" otherwise. A woman who watched television more than once radio, a week was scored "1" and "0" otherwise. Thereafter, the score for each woman was aggregated and ranged between 0 and 3, with a score of 0 meaning that the woman had no exposure to any mass media and a score of 3 meaning that she had access to all three. Scores were categorized into 0 "no media exposure," 1 "exposed to one source of media," 2 "exposed to two sources of media," and 3 "exposed to three sources of media."

Geographical variables included are: place of residence (urban vs. rural) and administrative region. Ghana consists of twelve distinct administrative regions. Household wealth is an ordinal measure describing the poorest, poorer, middle, richer, and the richest households. Some fertility-related variables including women's age (15–24 years, 25–34 years, > = 35 years) and type of marital union (never married, monogamous, polygamous, and previously married) are included in the analysis. The number of living children (parity) was grouped into four categories: 0, 1–2, 3–4, and 5 or more. It is expected that women in polygamous relationship and those who have more living children are more likely to have an unintended pregnancy than their monogamous counterparts and those with fewer number of living children, respectively.

Women's status as a variable was constructed from respondent's decision-making capacity within the household from four items (person who usually decides on the respondent's health care, person

who usually decides on large household purchases, person who usually decides on visits to family or relatives, and person who usually decides what to do with husband's earning). For each item, each woman reported whether the decision was made by the respondent alone, respondent with husband/partner, husband/partner alone, someone else or other. A dichotomous variable was constructed from each item by re-coding the responses as 1 for those who reported "respondent alone" or "respondent and husband/partner" and 0 for those who reported "husband/partner alone" or someone else or other." An index with a value of 0-4 was created from these dichotomous variables with 0 indicating "no decision-making power" in household decision-making and 1-4 indicating participation in the household decision-making process.

Results

Sample profile

The socio-demographic characteristics of the studied women were depicted in Table 1. Sixty-six percent of the 9,396 women interviewed during the 2014 GDHS reported health insurance coverage. Nearly half (48.4%) of the 9,396 women interviewed reported ever being pregnant, 31.8% of whom reported that at least one of their pregnancies was unintended. Among those women who reported an unintended pregnancy, 65.0% had health insurance covered as compared to the 72.1% of women who did not have an unintended pregnancy who had health insurance.

The first panel of Table 1 shows the distribution of the women by selected socio-demographic and behavioural attributes. The mean ages of all women in the sample were 29.7 years and 29.9 years for those who had health insurance coverage. The women are almost equally distributed by the age group with nearly two-thirds of women were under 35 years of age. Over half (57.2%) of women reported having secondary or higher education. Regarding economic status, 72.0% of the women reported they were currently working, and about 43.6% reported to be living in the poorest households (first and second wealth quintiles). The results showed that a fairly high percentage (35.5 %) of women reported living in female headed households, and 46.6% of the women were in monogamous unions. An overwhelming majority (76.3%) of the women were Christians. Nearly equal percentages of women lived in rural and urban areas (51.0% vs. 49.0%). A significant number of women (54.2%) reported to be participating in household decision-making, and 63.7% were married at 18 years or older.

Panel 2 of Table 1 showed that the prevalence of health insurance coverage varied significantly across women's population sub-groups. The prevalence of health insurance coverage had an inverted U-shaped association with age. Women aged 15-24 years were significantly less likely to have health insurance coverage than those aged 25 years and above. The findings further revealed that women who participated in household decision-making, women who are Muslims, and women who were exposed to family planning messages through three mediums of mass media were more likely than women who have not participated in household decision-making, women who are Christians, and women who were not exposed to family planning message to report health insurance coverage. See Table 1 for more details on the relationship between women's characteristics and health insurance enrolment.

Table 2 details the logistic regression analysis of the correlation of women's health insurance coverage in Ghana. The findings showed that women's age, education, religious affiliation, region of residence, household wealth index, type of marital union, and exposure to mass media were significant predictors of the health insurance enrolments among women in Ghana. For instance, women with post-secondary education are more likely to be enrolled in health insurance ($OR = 2.68$, $p < .0001$) compared with those who are not educated. Also, women in the household on the fifth quintile of the wealth index are more likely to have health insurance coverage

Table 1. Socioeconomic characteristics of the women and background attribute as predictor of health insurance coverage, 2014 Ghana demographic and Health Survey

Characteristics	Panel 1		Panel 2
	Frequency	Percent	% with health insurance coverage
Total	9,396	100	66.0
Age group			
15-24	3,327	35.4	62.3***
25-34	2,907	30.9	69.6
35 and above	3,162	33.7	66.5
Mean age at survey time	29.7	29.9	
Highest educational level achieved			
None	2,281	24.3	64.8***
Primary	1,747	18.6	61.1
Secondary	4,854	51.7	66.8
Post-secondary	514	5.5	80.2
Religious affiliation			
Christians	7,169	76.3	64.8***
Muslim	1,726	18.4	74.0
Traditionalist/no religion	500	5.3	55.4
Ethnic affiliation of respondent			
Akan	3,876	41.3	60.4***
Ewe	1,118	11.9	67.1
Mole/Dagbani	2,270	24.2	74.1
Others	2,132	22.7	66.8
Place of residence			
Rural	4,794	51.0	64.1***
Urban	4,602	49.0	67.9
Region of residence			
Western	1,027	10.9	63.6***
Central	941	10.0	50.1
Greater Accra	999	10.6	58.8
Volta	795	8.5	69.9
Eastern	907	9.7	67.7
Ashanti	1,040	11.1	51.4
Brong-Ahafo	1,005	10.7	75.8
Northern	1,042	11.1	70.1
Upper-East	914	9.7	71.1
Upper-West	726	7.7	88.0

(*Continued*)

Table 1. (*Continued*)

Characteristics	Panel 1		Panel 2
	Frequency	Percent	% with health insurance coverage
Sex of household head			
Male	6,064	64.5	67.8***
Female	3,332	35.5	62.6
Household economic status			
Poorest	2,335	24.9	67.3***
Poorer	1,759	18.7	61.7
Middle	1,902	20.2	63.3
Richer	1,771	18.9	66.1
Richest	1,629	17.3	71.6
Marital union			
Never married or single	3,041	32.4	61.9***
Married monogamous	4,382	46.6	70.1
Married polygamous	1,074	11.4	67.6
Previous married	899	9.6	57.7
Age at first union			
Married 17 years or younger	2,307	36.3	63.6***
Married 18 or older	4,048	63.7	70.4
Participation in household decision-making			
Yes	5,092	54.2	69.6***
No	4,304	45.8	61.7
Working status			
Currently working	6,761	72.0	65.8
Not currently working	2,626	28.0	66.3
Exposure to FP message through mass media			
No exposure	3,608	38.4	62.6***
One source exposure	2,335	24.9	66.0
Two	2,991	31.8	69.0
Three	464	4.9	72.2
Use of modern method			
Yes	1,735	18.5	65.6
No	7,661	81.5	66.0
Unintended Pregnancy (n = 4,544)			
Yes	1,447	31.8	65.0***
No	3,097	68.2	72.1

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 2. Logistic Regression Analysis of the Factors Influencing Health Insurance Coverage among women in Ghana

Variables/factors	Odds ratio	p-value	95% confidence Interval
Age group			
15-24	Ref		
25-34	1.24	0.055	0.9954774 1.546017
35 and above	1.18	0.133	0.9495626 1.478526
Educational level			
None	Ref		
Primary	1.08	0.472	0.8796643 1.319278
Secondary	1.51	0	1.244445 1.842203
Post-secondary	2.68	0.000	1.676791 4.269261
Religious affiliation			
Christians	Ref		
Muslim	1.59	0.000	1.26332 1.991276
Traditionalist/no religion	0.7	0.013	0.5259038 0.9264759
Ethnic affiliation of respondent			
Akan	Ref		
Ewe	1.15	0.305	0.8805317 1.50227
Mole/Dagbani	1.12	0.408	0.8525081 1.480446
Others	0.99	0.935	0.8027735 1.223948
Place of residence			
Rural	Ref		
Urban	0.962259	0.691	0.7960613 1.163155
Region of residence			
Western	ref		
Central	0.45	0	0.3376721 0.5890345
Greater Accra	0.5	0	0.3808852 0.6669303
Volta	1.5	0.018	1.072022 2.111335
Eastern	1.02	0.861	0.787927 1.329757
Ashanti	0.56	0.000	0.4336937 0.7209926
Brong-Ahafo	2.02	0.000	1.541577 2.660178
Northern	1.82	0.000	1.304105 2.534192
Upper-East	1.77	0.000	1.250421 2.516707
Upper-West	4.49	0.000	2.77352 7.259803
Sex of household head			
female	Ref		
male	0.97	0.778	0.8096164 1.171248
Household economic status			
Poorest	Ref		
Poorer	1.04	0.737	0.8220491 1.319188

(*Continued*)

Table 2. (*Continued*)

Variables/factors	Odds ratio	p-value	95% confidence Interval
Middle	1.29	0.064	0.9858276 1.676526
Richer	1.35	0.062	0.984709 1.847407
Richest	1.82	0.001	1.263522 2.617122
Marital union			
Married monogamous	Ref		
Married polygamous	0.81	0.033	0.6628494 0.9833049
Previous married	0.49	0.000	0.341036 0.6976679
Age at first union			
Married 17 years or younger	0.87	0.065	0.7556331 1.008273
Married 18 or older	ref		
Participation in household decision-making			
Yes	0.79	0.111	0.5904231 1.055626
No	ref		
Working status			
Currently working	0.89	0.247	0.7297925 1.084359
Not currently working	ref		
Exposure to FP message through mass media			
No exposure	Ref		
One source exposure	1.2	0.039	1.008959 1.428496
Two	1.47	0.000	1.228121 1.748218
Three	1.33	0.151	0.9004435 1.97616
Use of modern method			
Yes	0.92	0.345	0.7823411 1.089752
No	ref		
Intercept	1.39	0.202	0.8369987 2.316377

(OR = 1.82, p = .001) compared with those in the first wealth quintile. Religious affiliation of the women also shown to be an important predictor, with Muslim women significantly more likely than their Christian counterparts to enrol for health insurance. For the type of marital union, polygamous married women (OR = 0.81, p = .033) and previously married (OR = 0.49, p, .0001) were statistically significantly more likely than those who are monogamously married to have health insurance coverage.

Differentials in unintended pregnancy and health insurance coverage status

Table 3 report the percentage of women that experienced unintended pregnancy according to the health insurance coverage status at the time of the interview as defined by their socio-demographic and behavioural characteristics. The results showed that about 30% of women who had health

Table 3. Prevalence of unintended pregnancy among women of reproductive age according to the socioeconomic characteristics by health insurance coverage, 2014 GDHS

Characteristics	Health insurance coverage status	
	Yes	No
Unintended Pregnancy	29.6	37.0
Age group		
15-24	48.2***	53.6***
25-34	23.7	31.6
35 and above	25.8	30.9
Educational level		
None	19.2***	24.2***
Primary	34.3	40.0
Secondary and above	37.5	45.5
Religious affiliation		
Christians	33.8***	40.7***
Muslim	17.1	26.2
Traditionalist/no religion	27.5	26.4
Ethnic affiliation of respondent		
Akan	37.0***	45.0***
Ewe	52.3	55.7
Mole/Dagbani	17.9	21.7
Others	22.3	25.3
Place of residence		
Rural	29.6	37.8
Urban	29.7	35.6
Region of residence		
Western	20.0***	23.3***
Central	35.7	47.2
Greater Accra	33.5	36.2
Volta	55.9	67.4
Eastern	52.1	58.0
Ashanti	39.8	47.4
Brong-Ahafo	33.1	31.5
Northern	11.0	12.1
Upper-East	16.3	17.7
Upper-West	18.6	29.6
Sex of household head		
Male	26.9***	32.7***
Female	38.4	47.1

(*Continued*)

Table 3. (*Continued*)

Characteristics	Health insurance coverage status	
	Yes	No
Household economic status		
Poorest	21.8***	27.0***
Poorer	38.5	43.4
Middle	39.9	48.4
Richer	29.2	37.2
Richest	21.3	25.5
Marital union		
Never married or single	67.4***	62.0***
Married monogamous	26.7	34.6
Married polygamous	20.3	25.1
Previous married	34.9	40.4
Age at first union		
Married 17 years or younger	28.8**	36.3
Married 18 or older	24.7	31.8
Participation in household decision-making		
Yes	25.7***	33.3***
No	44.8	46.4
Working status		
Currently working	26.7***	34.7***
Not currently working	39.9	46.4
Exposure to FP message through mass media		
No exposure	30.5**	36.2**
Exposed to one source	32.3	38.5
Exposed to two sources	26.6	36.1
Exposed to three sources	29.3	44.1
Use of modern method		
Yes	28.9	414**
No	29.8	35.5

$*p < 0.05$; $**p < 0.01$; $***p < 0.001$.

insurance coverage experienced unintended pregnancy compared with 37% among women who had no health insurance coverage, meaning the proportion of women reporting unintended pregnancy was lower among insured women than uninsured women. The analysis revealed that women that reported unintended pregnancy according to the health insurance coverage status varied significantly across the population sub-groups, as defined by their socio-demographic and behavioural attributes (See Table 3). Irrespective of the health insurance coverage, unintended pregnancy appears to differ by age. For instance, among those with health insurance coverage, women aged 15-24 years were significantly more likely to experience unintended pregnancy than those aged 25 years and above. The same pattern was observed among women without health

insurance coverage. Results further revealed that unintended pregnancy was associated with use of modern family planning method among women without health insurance coverage, while unintended pregnancy did not appear to differ by the use of the modern family methods among women with health insurance coverage. Other characteristics associated with unintended pregnancy irrespective of the health insurance coverage are: education, religious affiliation, ethnicity, region of residence, household wealth quintile, and women status related factors such as participation in household decision-making, working etc.

Effect of health insurance coverage on unintended pregnancy

Women's demographic, socio-economic and behaviour factors before and after propensity score matching are shown in Table 4. Before matching, the analysis revealed that the unintended pregnancy according to the women's health insurance status varied significantly across the population subgroups, as defined by their demographic, socio-economic, and behavioural factors. Those who were insured with unintended pregnancy were younger women compared those who were uninsured with unintended pregnancy. Insured women with unintended pregnancies were more likely to be living in poorer households, urban dwellers, and attained secondary education and above. The results showed that 2,867 insured women with unintended pregnancies were successfully matched to 1,204 women who were uninsured with unintended pregnancies. The findings revealed that after propensity score matching, the difference in the unintended pregnancy among those who were insured and uninsured across the population subgroups by their socio-demographic and behavioural characteristics was reduced. In addition, the absolute standardized differences of the propensity score after matching were below 10% for most of the variables, indicating good quality matches (Table 4).

The estimated likelihood of an unintended pregnancy for each identified strata of insured and uninsured women was calculated using propensity score matching. Women were divided into strata groups based on the propensity score to predict the probability of unintended pregnancy by health insurance enrolment (Table 5). The overall probability of unintended pregnancy was 0.312 among insured women and 0.351 for those women who are uninsured. According to the table, insured women have a lower probability of unintended pregnancy than uninsured women across all strata groups except for those in Strata One. Both insured and uninsured women in Strata One have equal probability to experience unintended pregnancy. Each strata group had an equal amount of women, with a difference of eight women between the strata with the highest and lowest numbers of women. The directly adjusted probability of unintended pregnancy was an average of the subclass total weight for insured and uninsured women.

Discussion

Unintended pregnancy remains an important public health and social issues for policy makers and donors as well as program implementers in sub-Saharan African (SSA) nations, especially among young women (Singh & Darroch, 2000; Oyediran, Ishola & Adewuyi, 2002). Poor health outcomes and socio-economic consequences have been associated with an unintended pregnancy. High preterm birth and low birthweight have been associated with unintended pregnancies (Cleland et al., 2011; Cheng et al., 2009; Oyediran, Ishola & Bankole, 2020). In addition, an unintended pregnancy often obstructs educational and career goals that may severely affect future earning potential and family well-being. On the other hand, studies have demonstrated that health insurance increased access to health care and decreased poor sexual and reproductive health outcomes (Kavanaugh, Douglas-Hall & Finn, 2019; Sommers et al., 2015; Dixon et al., 2014). No study has investigated the relationship between unintended pregnancies and health insurance coverage in SSA despite that unintended pregnancy has become endemic in the region. The paper

Table 4. Standardised Differences across Covariates: before Matching and after Matching

Characteristics	After matching				Before matching			
	Yes, HIC	No, HIC	p-value	%bias*	Yes, HIC	No, HIC	p-value	%bias*
Age (years)								
15-24								
25-34	0.33	0.28	0.000'	10.8	.50'	0.47	0.015	7.0'
35 and above	0.34	0.33	0.393	1.9	0.33	0.35	0.105	−4.3
Educational level								
None								
Primary	0.17	0.21	0.000'	−10.3	0.18	0.15	0.004	7.3
Secondary and above	0.59	0.54	0	10.7	0.47	0.49	0.267	−3
Religious affiliation								
Christians								
Muslim	0.21	0.14	0.000'	17.4	0.23	0.24	0.217	−3.7
Traditionalist/no religion	0.04	0.07	0	−10.8	0.06	0.06	0.702	1.1
Ethnic affiliation of respondent								
Akan								
Ewe	0.12	0.12	0.395	1.9	0.11	.10'	0.444	1.9
Mole/Dagbani	0.27	0.18	0.000'	20.9	.30'	0.33	0.074	−5.3
Others	0.23	0.22	0.353	2	0.24	0.22	0.035	5.6
Place of residence								
Rural								
Urban	0.5	0.46	0	8.6	0.43	0.41	0.103	4.3
Region of residence								
Western								
Central	0.08	0.15	0.000'	−22.7	0.08	0.07	0.205	2.8
Greater Accra	0.09	0.13	0.000'	−10.8	0.08	0.08	0.885	−0.3
Volta	0.09	0.07	0.013	5.5	0.09	0.08	0.848	−0.5
Eastern	.10'	0.09	0.244	2.6	0.09	0.08	0.422	2.0'
Ashanti	0.09	0.16	0.000'	−22.0'	0.08	.10'	0.096	−3.9
Brong-Ahafo	0.12	0.08	0.000'	15.8	0.12	0.13	0.098	−4.9
Northern	0.12	.10'	0.003	6.5	0.15	0.15	0.438	2.4
Upper-East	.10'	0.08	0.001	7.7	0.11	.10'	0.305	2.9
Upper-West	0.1	0.03	0	31.1	0.11	0.11	0.966	0.1
Sex of household head								
Female								
Male	0.66	0.61	0	11	0.8	0.81	0.287	−2.3

(Continued)

Table 4. (*Continued*)

Characteristics	After matching				Before matching			
	Yes, HIC	No, HIC	p-value	%bias*	Yes, HIC	No, HIC	p-value	%bias*
Household economic status								
Poorest								
Poorer	0.18	0.21	0.000'	−9.0'	0.19	0.21	0.051	−5.2
Middle	0.19	0.21	0.005	−6.0'	0.18	0.18	0.732	0.9
Richer	0.19	0.19	0.913	0.2	0.16	0.14	0.030'	5.3
Richest	0.19	0.14	0	11.8	0.15	0.15	0.482	−1.8
Marital union								
Never married or single								
Married monogamous	.50'	0.41	0.000'	17.3	0.77	0.75	0.240'	2.7
Married polygamous	0.12	0.11	0.227	2.6	0.18	0.18	0.336	−3.1
Previous married	0.08	0.12	0	−11.6	0.06	0.06	0.576	−1.2
Age at first union								
Married 17 years or younger	0.34	0.41	0	−15.1	0.33	0.32	0.517	1.7
Married 18 or older								
Participation in household decision-making								
No								
Yes	0.57	0.48	0	17.5	0.87	0.87	0.722	−0.6
Working status								
Not currently working								
Currently working	0.72	0.72	0.694	−0.9	0.8	0.81	0.502	−1.6
Exposure to FP message through mass media								
No exposure								
Exposed to one source	0.25	0.25	0.940'	9.2	0.26	0.26	0.857	0.5
Exposed to two sources	0.33	0.29	0.000'	6.5	0.34	0.33	0.655	1.2
Exposed to three sources	0.05	0.04	0.004	17.5	0.04	0.05	0.155	−3.6
Use of modern method								
Yes	0.18	0.19	0.766	−0.6	0.24	0.25	0.645	−1.3
No								

Note: HIC = Health Insurance Coverage.
*The standardised percentage bias. The standardised % bias is the % difference of the sample means in the treatment and control (full or matched) sub-samples as a percentage of the square root of the average of the sample variances in the treated and non-treated groups (McLemore *et al.*, 2021).

examined effect of health insurance coverage on unintended pregnancy with the analysis of the 2014 GDHS.

The important finding of this study is that insured women were less likely to experience unintended pregnancy as compared to uninsured women regardless of their socio-demographic characteristics. The study demonstrated the effect of health insurance coverage of reducing

Table 5. Subclass probabilities of unintended pregnancy among insured and uninsured women in Ghana, GDHS, 2014

| Strata Group[a] | Treatment group | Number of women | Unintended Pregnancy | | 95% CI |
			Predicted probabilities	Standard Error	
Strata One	Insured	447	0.465	0.0236	[0.419, 0.512]
	Uninsured	462	0.465	0.0232	[0.420, 0.511]
Strata Two	Insured	569	0.323	0.0196	[0.285, 0.362]
	Uninsured	344	0.337	0.0255	[0.287, 0.387]
Strata Three	Insured	629	0.296	0.0182	[0.260, 0.331]
	Uninsured	276	0.304	0.0277	[0.250, 0.359]
Strata Four	Insured	714	0.261	0.0164	[0.228, 0.293]
	Uninsured	195	0.308	0.0331	[0.243, 0.372]
Strata Five	Insured	814	0.216	0.0144	[0.188, 0.244]
	Uninsured	94	0.340	0.0489	[0.245, 0.436]
Directly Adjusted Across Subclasses	Insured		0.312	0.0365[b]	
	Uninsured		0.351	0.0477[b]	

Note: CI = confidence interval.
[a]Based on estimated propensity score.
[b]Standard errors for the adjusted probabilities were calculated following the method described by David M. Shoemaker (1972).

unintended pregnancy if those without health insurance had insurance coverage. For instance, the study showed that probability of insured women experienced an unintended pregnancy was 0.312 compared with 0.351 among uninsured women. Studies have demonstrated that health insurance coverage influence contraceptive use because enrollment in NHIS have found to reduce inequalities in access to sexual and reproductive health services including contraception (Nearns, 2009; Kost, Finer & Singh, 2012; Arthur, 2012; Finlayson & Downe, 2013). This result implies that health insurance coverage may facilitate women access to contraceptive methods that women can use to prevent pregnancy, especially among those at risk of pregnancy but may not be able to meet the cost of contraception. More importantly, women with insurance coverage may access methods that require interaction with the health care system like long-acting reversible contraception (LARC) methods and shorter-acting hormonal methods such as the pill, injectable (Pickle, Wu & Burbank-Schmitt, 2014). This study demonstrates that health insurance coverage can play a significant role in reducing unintended pregnancy in Ghana and sub-Saharan African in general. Because the implementation of health insurance scheme has the potential of aiding access to contraceptive methods, especially those methods that are more effective, costly, or provide long-term coverage but require consultation with a health care provider in order to access. In addition, health insurance coverage is a mechanism that works to remove the financial barriers, and improves access to birth control, in turn, reducing the burden of unplanned pregnancies experienced (Peipert *et al.*, 2012).

The study showed that a significant percentage (66%) of Ghanaians had health insurance coverage for women who had had births in the previous 2 years, in contrast to the reported health insurance coverage of less than 5 percent among women and men interviewed in thirty low-middle-income countries (Wang, Temsah & Mallick, 2013). The results show that health insurance coverage varied according to the women's individual and household level factors. For instance, the findings revealed an inverted U-shaped relationship between women's age and health insurance coverage. For instance, the health insurance coverage peaked (69.6%) among women aged 25-34 years. The findings are consistent with the previous studies that demonstrated

an increased probability of enrolment for health insurance with advanced age (Salari *et al.*, 2019; Mulenga *et al.*, 2021; Kazungu & Barasa, 2017). An inverted U-shaped relationship between women's age and health insurance enrolment may be attributed to the likelihood of women in 25-34 years to be working with employer health insurance coverage or working spouse with employer insurance coverage. In addition, the increased risk of developing health conditions associated with aging could further explain higher rates of enrolment in health insurance as compared with those below 25 years of age (Kiplagat, Muriithi & Kioko, 2013).

Another key factor that increases the probability of signing-up for health insurance is the educational level attained by women. This may be because education is an enabling and opportunistic variable. For instance, educated women would be informed and understand their health needs, thus, able to make informed choices (Alesane *et al.*, 2018), including a strategy to reduce out-of-pocket expenses during health care services. In addition, education creates the opportunity to get jobs that provides employer health insurance coverage or to get well-paying jobs that give a higher propensity to purchase private health insurance coverage (Mulenga *et al.*, 2021). The present study found an increased probability of health insurance coverage with the household wealth index. This implies that women in the highest household wealth quintile have the highest health insurance coverage. This result is consistent with a previous study carried out in low and middle-income countries (Wang, Temsah & Mallick, 2013) and four sub-Saharan African countries (Amu *et al.*, 2018).

The health insurance coverage was higher among urban dwellers than among the women residing in rural area. This may be due to the high likelihood of many urban dwellers working in blue-collar jobs that provides health insurance cover compared to rural dwellers that are mostly working in the informal sector. The informal sector such as artisan and farmers may find it challenging to sign-up for health insurance coverage due to financial costs (Ibok, 2012). In addition, people in rural areas are less educated and potentially working in low pay jobs.

Furthermore, the study showed a regional variation in the health insurance coverage among women in Ghana. The regional variation in the health insurance sign-up can be attributed to the differences in the demographic, socio-economic, and structural composition of the population. For instance, fertility and use of modern contraception varies by residence and region (Ghana Statistical Service, Ghana Health Service & ICF International, 2018). It means that the individual's plan on how to meet their reproductive health needs, including pregnancy goals, varies by region. Moreover, sexual and reproductive health interventions vary by region in Ghana, especially with donors supported activities not uniformly implemented at the regional level. Additional research is needed to understand the contextual factors that can enable or hinder health insurance enrolment and the ability to prevent unwanted pregnancies. Other women's individual or exposure variables that increased the probability of having health insurance coverage include: being monogamously married, married at age 18 years or older, ability to participate in household decision-making, and exposure to the more mass media channels. These attributes are the agency of women's ability to make decisions about sexual and reproductive health and rights. Thus, they can be described as an enabler or opportunistic factor that can increase women to sign-up for health insurance coverage.

Limitations and future research

This is the first study that examines the nexus between health insurance coverage and unintended pregnancy in Ghana. Other existing studies on health insurance coverage have focused on examining the prevalence of and factors associated with its sign-up. While few studies have examined the nexus between health insurance coverage and utilization of health care. This study established that health insurance coverage plays an important role in reducing unwanted pregnancy among women. Despite its strengths, the study had limitations. Many factors that influence health

insurance enrolments, such as premiums, benefits covered under health insurance, quality of health, among others, are not available in the GDHS. Thus, the analysis was restricted to the variables found in the 2016 GDHS despite that DHS has been widely adjudged a golden survey to measure fertility and health-related indicators. Although, the wealth index can be used as a proxy for premiums. So, future research on health insurance coverage should consider collecting the data that will help to capture premiums, quality of health, and benefits covered. In addition, the GDHS was cross-sectional, which can lead to a lack of clear understanding in the temporal ordering among variables. For example, if unintended pregnancy or ill-health has a causal relationship with health insurance coverage, or if health insurance coverage is a coping mechanism utilized after experiencing unintended pregnancy. There is a need to establish if experience of unintended pregnancy precedes the sign-up for health insurance coverage. In addition to the current study, there is a need for more research to examine the relationship between health insurance and sexual reproductive health, including contraceptive.

Despite the limitation, the study findings are significant because education negatively and positively associated with unintended pregnancy and health insurance coverage respectively is worth noting. Although higher education was not the only factor found in this study to have such a relationship with both unintended pregnancy and health insurance coverage, it is the only factor may help individuals and enables them to make informed choices. Hence, health insurance coverage would be boosted and lead to decline in unintended pregnancy by aiding access to contraceptive methods. In addition, implementing community health insurance schemes will enhance individuals and households working in the informal sector to sign-up for coverage

Conclusion

The study highlighted the importance of examining the nexus between health insurance coverage and sexual and reproductive health in countries in Sub-Sahara Africa, such as Ghana. Nearly two thirds of women reported health insurance with 30% of those with health insurance coverage reported unintended pregnancy and 37% of those without insurance coverage reported unwanted pregnancies. A key result is that health insurance coverage is significantly negatively associated with unintended pregnancy among women, indicating that health insurance coverage has a protective effect against unintended pregnancy. The result underscores the role of health insurance in aiding access to preventive measures that can be hindered by financial costs. Hence policy to strengthen health insurance schemes to ensure everyone participates in it would help meet universal health insurance coverage. For instance, those in the formal sector should be enrolled in health insurance schemes through their employer. While those engaged in the informal sector can be enrolled in the health insurance program through community-based societies. The insurance premium can be paid in-kind by such as agricultural products to encourage those who may not be able to pay cash to participate. The study further demonstrates that there are variations in the women's characteristics and factors influencing health insurance sign-up, the significant predictors, including age, education, religious affiliation, region of residence, household wealth, type of marital union, age at first cohabitation, and exposure to mass media. Similar factors and characteristics aforementioned associated with unintended pregnancies among Ghanaian women after controlling for health insurance coverage. This points to the fact that there are differentials in the factors that influence health insurance coverage and unintended pregnancies, and policymakers and donors should consider this in formulating policy and design of an intervention to ensure universal health coverage.

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