Impact of Ghana's fee exemption policy on maternal health service utilisation: an inverse probability of treatment weighting analysis of pooled national data

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Background Fee exemption policies are key strategies for reducing the barriers to accessing maternal health services and improving maternal and child health outcomes. This study used pooled national data to determine the impact of Ghana's user fee exemption policy on maternal health service utilisation since it was implemented in 2008.

Methods Using four rounds of cross-sectional data from national surveys on women with live births, we conducted an inverse probability of treatment weighting analysis to evaluate the causal effects of Ghana's user fee exemption policy intervention on the timing of first antenatal care (ANC) visit, completion of four or more ANC visits and facility-based delivery as indicators of maternal health service utilisation.

Results The average treatment effect of the fee exemption policy was an increase of 8%, 9%, and 21% in the utilisation of timely first ANC visit, completion of the recommended number of ANC visits, and facility-based delivery, respectively. Wealth index categorisation showed a clear stepwise increase in the likelihood of facility-based delivery. Compared to the poorest group, the odds were 1.48 times higher for the poorer group adjusted odds ratio (aOR) = 1.48 (95% confidence interval (CI) = 1.33–1.66), 2.27 times higher for the middle group aOR = 2.27 (95% CI = 1.95–2.64), 3.84 times higher for the rich group aOR = 3.84 (95% CI = 3.13–4.69), and 5.96 times higher for the richest group aOR = 5.96 (95% CI = 4.43–8.02). Women who reside in the Upper East region were more likely to utilise maternal health services.

Conclusions Ghana's fee exemption policy positively impacts maternal health service utilisation among pregnant women. However, there still exist disparities across geographical regions and wealth indexes.

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Over the past few decades, there has been a notable decline in global maternal and child mortality, largely driven by the policies and initiatives introduced under the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) [1,2]. Sustainable Development Goals target 3.1 aims to reduce maternal mortality to less than 70 maternal deaths per 100 000 live births by 2030. As of 2020, the global maternal mortality ratio (MMR) was estimated at 233 maternal deaths per 100 000 live births, with sub-Saharan Africa accounting for approximately 67% of these deaths worldwide [2,3]. Maternal health service utilisation has been

reported to have a positive impact on maternal and child health outcomes, and the huge burden of maternal deaths, especially in low- and middle-income countries (LMICs), is linked with unequal access to maternal health care services [4]. Available evidence shows that inequalities in income primarily influence the decision of pregnant women to access maternal health services [5,6]. Several studies have reported health insurance policies that exempt user fees as a strategy to improve maternal health service utilisation in many sub-Saharan countries [7–10].

Recent studies done in LMICs reveal that about half of all childbirths do not occur in health facilities [11,12]. In Nigeria, studies report that about 24% of pregnant women accessed their first ANC visit within the first trimester of pregnancy and 54% had the recommended number of ANC visits before delivery [13,14].

Ghana's health insurance system, the National Health Insurance Scheme (NHIS), was established in 2003 and became fully operational by 2005 [15]. Its primary aim is to promote equitable access to health care services for all citizens. The NHIS replaced the previous 'cash and carry' system, under which individuals were required to pay the full cost of health care at service delivery facilities [16]. Designed to address most of Ghana's disease burden, the NHIS benefits package includes essential health care services, such as maternity care [17]. Funding for the scheme comes from a combination of premiums, a dedicated health insurance tax, contributions from the Social Security and National Insurance Trust, government allocations, and investment income [17]. Under the NHIS, Ghana implemented a user fee exemption policy for maternal health services in 2008 after the successful piloting of the policy in the Upper East and Upper West Regions [18]. The policy requires pregnant women to register with the NHIS and hold a valid NHIS card at the point of service. The policy provides a full complement of maternal health services, which cover antenatal care visits, free facility-based delivery, and post-natal care services [7,18,19]. Despite the implementation of the maternal health service fee exemption policy in 2008 to remove financial barriers to accessing maternal health services for pregnant women, Ghana reported an MMR of 310 maternal deaths per 100 000 live births in 2022 [7,19]. The reported relatively high MMR seems to suggest a disconnect between the impact of the access improvement policy and the expected maternal health outcomes. This study assessed the impact of the 'fee exemption policy' on maternal health service utilisation in Ghana by utilising pooled nationally representative data. We hypothesised that Ghana's fee exemption policy has no significant positive effect on maternal health service utilisation.

Although some studies have assessed the impact of the fee exemption policy on maternal and child mortality, few studies have explored the impact of the policy on maternal health service utilisation [20–22]. We present the first study that uses robust causal methods to analyse nationally representative data, including the most recent survey, to determine the effect of Ghana's fee exemption policy on maternal health service utilisation. The findings of this paper also address the gap in the literature of robust causal methods in analysing nationally representative data to determine the impact of Ghana's fee-exemption policy on maternal health service use.

METHODS

Study design and data source

This study used cross-sectional data from three rounds of the Ghana Demographic and Health Survey (GDHS) and one round of the Ghana Maternal and Health Survey (GMHS) conducted by the Ghana Statistical Service in collaboration with the Ministry of Health and supported by USAID. The surveys used in this study are nationally representative surveys performed periodically to collect health indicators distributed across sociodemographic characteristics. The required data for this study were obtained from the official Demographic and Health Survey (DHS) website: http://www.dhsprogram.com by email request. Details of the DHS data sampling method can be found elsewhere [23]. The protocol for DHS surveys is approved by the Ethics Committee of

ORC Macro Inc. This study used anonymised secondary data available in the public domain of DHS. The DHS program explicitly seeks the consent of survey respondents. However, the authors obtained approval from DHS for the reuse of the data. We included 19 155 respondents with complete data for exposure, outcome, and independent variables in our study. The breakdown of the sample population is detailed in Figure S1 in the **Online Supplementary Document**. This study adheres to the STROBE guidelines for reporting observational studies and a STROBE checklist for cross-sectional studies is reported in Appendix S1 in the **Online Supplementary Document**.

Study variables

Outcome variables

This study examined three indicators of maternal health service use based on the World Health Organization (WHO) and Ghana Health Service (GHS) recommended guidelines on essential maternal care services, including the timing of first antenatal care (ANC) visit, completion of the recommended number of ANC visit and facility-based delivery. The recommendations stipulate that the first ANC visit should be in the first trimester of pregnancy, a minimum of 4 ANC visits during pregnancy, and health facility-based delivery. This study extracted the variables m13 (timing of first antennal check in months), m14 (number of antenatal visits during pregnancy), and m15 (place of delivery) from the original data set of three DHS surveys (2008–2022) and Q409 (timing of first antennal check in months), Q412 (number of antenatal visits during pregnancy), and Q430 (place of delivery) from the 2017 GMHS to construct a binary outcome variable for the timing of first ANC visit, completing the recommended ANC visits during pregnancy and facility-based delivery. Other variables and harmonised coding from the four national surveys used in this study are described in Table S1 in the **Online Supplementary Document**).

Exposure variables

The fee exemption policy applies to women registered with the NHIS. Therefore, women who were insured with NHIS were classified as the treatment group, and uninsured women were classified as the control group.

Independent covariates

This study adjusted for maternal age, marital status, parity, level of education, religion, wealth index, media exposure (Radio and TV), residence type, and region of residence

Statistical analysis

The analysis was conducted using R version 4.4.1 (R Core Team, Vienna, Austria, 2024). We applied sample weighting to account for the complex design of the DHS data sets. This involved using the primary sampling units and the rural/urban area of residence. Hence, we selected the sample weight variables v005 (GDHS 2008–2022) and QWEIGHT (GMHS 2017), divided them by 1 000 000 to adjust for six decimal places, and used the survey package in subsequent analysis. We used descriptive statistics to summarise the baseline characteristics of the study population using the tableone package. We reported means, standard deviations, and *P*-values using the Wilcoxon rank-sum test for continuous variables. For categorical variables, we presented frequencies and percentages and assessed associations using the X^2 test. We performed a multivariate logistic regression to determine the effect of health insurance coverage on the likelihood of maternal health utilisation. We adjusted for maternal age, marital status, parity, level of education, religion, wealth index, media exposure (radio and TV), residence type, and region as independent covariates.

To estimate the causal effects of the 'fee exemption policy' on three binary outcomes, we employed the inverse probability of treatment weighting (IPTW) approach. Propensity scores were calcu-

lated using a logistic regression model in which enrolment in the NHIS (binary treatment variable) was regressed on a set of potential confounders: maternal age, marital status, parity, level of education, religion, wealth index, media exposure (radio and TV), residence type, and region. The dependent variable was NHIS enrolment, coded as 1 for insured and 0 for uninsured. This selection of confounders was informed by theoretical considerations and prior literature linking these factors to both NHIS enrolment and the outcomes of interest [24,25]. The WeightIt package was used to obtain IPTW weights under the Average Treatment Effect (ATE) estimand, weighted by the survey sampling weight. Using the calculated IPTW weights, we defined a survey design object with the svydesign function to account for the complex survey sampling structure of the GDHS and GMHS survey data sets. The design incorporated both the sampling weights and IPTW weights to accurately reflect the weighted population structure and reduce bias in effect estimation. The ATE of being enrolled in NHIS on the outcomes was assessed using a survey-weighted generalised linear model framework by modelling each outcome as a function of NHIS enrolment using the svyglm function. Robust standard errors were applied to account for potential heteroscedasticity and non-normality of residuals, ensuring more accurate significance testing. The results were interpreted in terms of adjusted odds ratios (aOR), reflecting the likelihood of outcomes for the overall population. Results with P-values less than 0.05 were deemed statistically significant

Propensity score diagnostics and balance assessment

We evaluated the distribution of propensity scores for each group to confirm overlap and verify the weight assignment across the treatment and control groups. A kernel density estimation was applied to plot (Figure 1) the distrib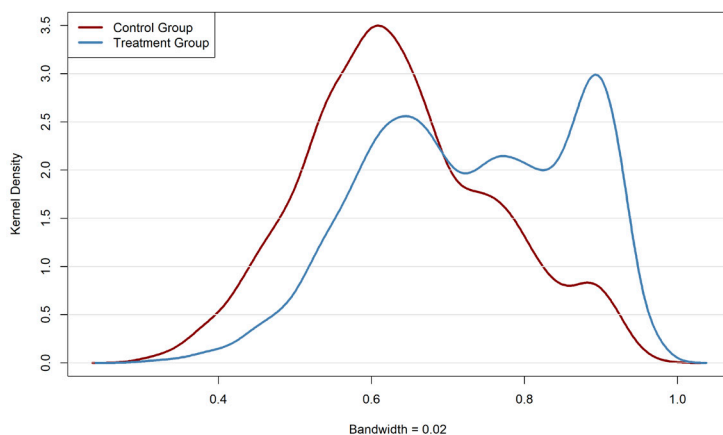ution of propensity scores using a bandwidth of 0.02 to check for a diagnosis of propensity score. We summarised the covariates balance using the bal.tab function from the cobalt package. Covariate balance was evaluated using standardised mean differences (SMDs) before and after weighting, with an SMD threshold of <0.1 considered indicative of adequate balance. We also utilised a love plot (Figure S2 in the **Online Supplementary Document**) to visualise the individual SMDs for each covariate and a box plot (Figure S3 in the **Online Supplementary Document**) to view the summary of covariate balance before and after weighting.

Figure 1. Kernel plot of propensity score by group.

RESULTS

Descriptive statistics

Table 1 shows the baseline characteristics of the survey-weighted study population. The mean maternal age was approximately 30.7±7.3 years for the control group of uninsured women and 30.1±6.8 for the treatment group comprising of insured women. The mean parity of the women surveyed in this study was 3.3±2.1 for uninsured women and 3.0±1.9 for insured. The majority of respondents were in unions, either married or cohabiting, and most of the study population had attained secondary education as their highest level of education. Among the unweighted study population, 70.2% were insured with the NHIS and formed the treatment cohort, while 29.8% comprised the control group. The data are presented in Table S2 in the **Online Supplementary Document**.

Table 1. Weight-adjusted baseline characteristics of the sample population

Variables	Control, n (%)	Treatment, n (%)	P-value
Survey year			<0.001
2008	77.2 (1.4)	706.4 (5.8)	
2014	338.8 (6.0)	2376.7 (19.5)	
2017	4176.1 (73.8)	5679.9 (46.7)	
2022	1066.9 (18.9)	3412.1 (28.0)	
Age, x̄±SD	30.7±7.26	30.1±6.82	<0.001
Parity, x̄±SD	3.3±2.07	3.0±1.92	<0.001
Marital status			<0.001
Single	997.6 (17.6)	1688.0 (13.9)	
Married	2884.5 (51.0)	7621.6 (62.6)	
Cohabitation	1776.8 (31.4)	2865.5 (23.5)	
Education			<0.001
No education	1319.0 (23.3)	2697.8 (22.2)	
Primary	1132.5 (20.0)	1942.7 (16.0)	
Secondary	3003.9 (53.1)	6476.1 (53.2)	
Higher	203.6 (3.6)	1058.6 (8.7)	
Residence			0.705
Urban	2770.9 (49.0)	6008.2 (49.3)	
Rural	2888.1 (51.0)	6167.0 (50.7)	
Religion			
No religion	147.6 (2.6)	216.7 (1.8)	
Christianity	4388.3 (77.5)	9151.5 (75.2)	
Islam	967.5 (17.1)	2579.6 (21.2)	
Traditional	155.6 (2.7)	227.4 (1.9)	
Wealth index			<0.001
Poorest	1223.7 (21.6)	2346.7 (19.3)	
Poorer	1274.8 (22.5)	2378.7 (19.5)	
Middle	1152.5 (20.4)	2404.7 (19.8)	
Rich	1087.0 (19.2)	2569.5 (21.1)	
Richest	921.1 (16.3)	2475.7 (20.3)	
Media exposure (radio)			0.030
Not at all	1497.6 (26.5)	2947.2 (24.2)	
Less than once a week	1394.6 (24.6)	3141.5 (25.8)	
Every week	2766.8 (48.9)	6086.5 (50.0)	
Media exposure (TV)			0.527
Not at all	1462.2 (25.8)	3153.4 (25.9)	
Less than once a week	948.5 (16.8)	2137.3 (17.6)	
Every week	3248.2 (57.4)	6884.5 (56.5)	
Region			<0.001
Western*	660.5 (11.7)	1345.5 (11.1)	
Central	570.4 (10.1)	1030.4 (8.5)	
Greater Accra	962.5 (17.0)	1557.0 (12.8)	
Volta†	388.8 (6.9)	914.2 (7.5)	
Eastern	410.2 (7.2)	1268.1 (10.4)	
Ashanti	1152.5 (20.4)	2094.9 (17.2)	
Brong Ahafo‡	547.5 (9.7)	1441.7 (11.8)	
Northern§	584.7 (10.3)	1509.9 (12.4)	
Upper East	222.3 (3.9)	614.4 (5.0)	
Upper West	159.6 (2.8)	399.0 (3.3)	

SD – standard deviation, x̄ – mean
*Western, Western-North.
†Volta, Oti.
‡Bono, Bono-East, Ahafo.
§Northern, Savanna, North-East.

Association of health insurance enrolment and maternal health service utilisation

Pregnant women insured with NHIS, who were beneficiaries of the fee exemption policy were more likely to deliver in a health facility aOR=1.21 (95% CI=1.11–1.33, $P<0.05$). Women who were in unions, either married aOR=1.48 (95% CI=1.33–1.64, $P<0.05$) or cohabiting aOR=1.25 (95% CI=1.11–1.40, $P<0.05$) were more likely to initiate ANC visits within the first trimester. Education level was associated with an increasing likelihood of facility-based delivery (Table 2). Primary school education aOR=1.27 (95% CI=1.13–1.43, $P<0.05$), secondary school education aOR=1.82 (95% CI=1.62–2.04, $P<0.05$), and higher education aOR=4.94 (95% CI=2.94–8.30, $P<0.05$) all showed significant association with facility-based delivery.

Women in lower wealth indexes were less likely to initiate ANC within the first trimester of pregnancy, complete four or more ANC visits during pregnancy, or deliver in a health facility. Women in the richest wealth index showed the highest odds for the timing of ANC visits aOR=1.78 (95% CI=1.07–1.36, $P<0.05$), completing four or more ANC visits aOR=4.14 (95% CI=2.84–6.03, $P<0.05$) and facility-based delivery aOR=5.96 (95% CI=4.43–8.02, $P<0.05$). Media exposure showed no significant association with the likelihood of maternal health service utilisation. Women residing in the Upper East aOR=1.19 (95% CI=1.03–1.38, $P<0.05$), Upper West aOR=1.23 (95% CI=1.06–1.42, $P<0.05$), and Volta aOR=1.29 (95% CI=1.11–1.50, $P<0.05$) regions were more likely to initiate ANC visit within the first trimester of pregnancy. Also, women in the Upper East region were more likely to complete the recommended number of ANC visits aOR=1.99 (95% CI=1.46–2.70, $P<0.05$) and deliver in a health facility aOR=5.08 (95% CI=4.04–6.38, $P<0.05$).

Impact of fee exemption policy on maternal health service utilisation

Table 3 shows the timing of ANC visits aOR=1.08 (95% CI=1.00–1.17, $P<0.05$) and completion of recommended ANC visits aOR=1.09 (95% CI=1.01–1.18, $P<0.05$) increased by 8% and 9%, respectively. Facility-based delivery aOR=1.21 (95% CI=1.11–1.32, $P<0.05$) from the observed exponentiated coefficient increased by 21%.

Table 2. Multivariate logistic regression between insurance enrolment and maternal health service utilisation

Variables	Timing of first ANC visit			Completing recommended ANC visits			Facility-based delivery		
	aOR	95% CI*	P-value	aOR	95% CI*	P-value	aOR	95% CI*	P-value
NHIS									
Control	Ref			Ref			Ref		
Treatment	1.03	(0.96–1.11)	0.349	1.10	(0.98–1.24)	0.118	1.21	(1.11–1.33)	<0.001
Age	1.02	(1.01–1.03)	<0.001	1.07	(1.05–1.08)	<0.001	1.03	(1.02–1.04)	<0.001
Parity	0.88	(0.86–0.90)	<0.001	0.81	(0.78–0.85)	<0.001	0.85	(0.82–0.87)	<0.001
Marital status									
Single	Ref			Ref			Ref		
Married	1.48	(1.33–1.64)	<0.001	1.89	(1.61–2.23)	<0.001	1.07	(0.93–1.24)	0.321
Cohabitation	1.25	(1.11–1.40)	<0.001	1.33	(1.12–1.58)	0.001	0.86	(0.74–0.99)	0.049
Education									
No education	Ref			Ref			Ref		
Primary	0.97	(0.88–1.07)	0.497	1.00	(0.86–1.17)	0.989	1.27	(1.13–1.43)	<0.001
Secondary	0.92	(0.84–1.00)	0.058	1.22	(1.04–1.42)	0.014	1.82	(1.62–2.04)	<0.001
Higher	1.21	(1.03–1.40)	0.017	2.05	(1.20–3.49)	0.009	4.94	(2.94–8.30)	<0.001
Residence									
Urban	Ref			Ref			Ref		
Rural	1.17	(1.08–1.27)	<0.001	1.00	(0.87–1.16)	0.978	0.53	(0.48–0.59)	<0.001
Religion									
No religion	Ref			Ref			Ref		
Christianity	1.18	(0.94–1.48)	0.151	1.12	(0.81–1.53)	0.501	1.43	(1.13–1.79)	0.003
Islam	1.13	(0.89–1.42)	0.316	1.03	(0.74–1.42)	0.880	1.35	(1.06–1.71)	0.014
Traditional	0.69	(0.50–0.94)	0.018	0.68	(0.46–0.99)	0.045	0.69	(0.52–0.93)	0.016
Wealth index									
Poorest	Ref			Ref			Ref		
Poorer	1.12	(1.01–1.23)	0.031	1.39	(1.20–1.62)	<0.001	1.48	(1.33–1.66)	<0.001
Middle	1.21	(1.07–1.36)	0.002	1.49	(1.23–1.82)	<0.001	2.27	(1.95–2.64)	<0.001
Rich	1.39	(1.21–1.59)	<0.001	2.67	(2.05–3.48)	<0.001	3.84	(3.13–4.69)	<0.001
Richest	1.78	(1.52–2.09)	<0.001	4.14	(2.84–6.03)	<0.001	5.96	(4.43–8.02)	<0.001
Media exposure (radio)									
Not at all	Ref			Ref			Ref		
Less than once a week	0.98	(0.90–1.07)	0.709	1.16	(1.00–1.34)	0.056	1.06	(0.94–1.19)	0.316
Every week	1.04	(0.96–1.12)	0.376	1.22	(1.07–1.39)	0.003	1.07	(0.97–1.18)	0.207
Media exposure (TV)									
Not at all	Ref			Ref			Ref		
Less than once a week	0.96	(0.87–1.07)	0.482	1.16	(0.98–1.37)	0.078	0.99	(0.87–1.12)	0.868
Every week	1.04	(0.95–1.14)	0.353	1.25	(1.08–1.44)	0.003	1.08	(0.97–1.21)	0.151
Region									
Western†	Ref			Ref			Ref		
Central	1.12	(0.95–1.31)	0.173	1.01	(0.73–1.39)	0.968	0.74	(0.59–0.92)	0.007
Greater Accra	0.76	(0.65–0.89)	0.001	0.71	(0.50–1.01)	0.054	1.09	(0.82–1.46)	0.533
Volta‡	1.29	(1.11–1.50)	0.001	0.65	(0.50–0.85)	0.002	0.71	(0.58–0.86)	0.001
Eastern	0.87	(0.75–1.01)	0.074	0.55	(0.42–0.72)	<0.001	0.85	(0.69–1.04)	0.111
Ashanti	1.00	(0.86–1.15)	0.949	0.94	(0.71–1.25)	0.666	1.16	(0.94–1.43)	0.163
Brong Ahafo§	0.90	(0.79–1.03)	0.129	0.93	(0.72–1.19)	0.552	1.34	(1.11–1.61)	0.002
Northern¶	0.78	(0.68–0.90)	0.001	0.82	(0.64–1.05)	0.118	0.77	(0.64–0.91)	0.003
Upper East	1.19	(1.03–1.38)	0.018	1.99	(1.46–2.70)	<0.001	5.08	(4.04–6.38)	<0.001
Upper West	1.23	(1.06–1.42)	0.006	1.10	(0.84–1.45)	0.493	2.20	(1.79–2.68)	<0.001

aOR – adjusted odds ratio, CI – confidence interval, NHIS – National Health Insurance Scheme, TV – Television
*Lower-Upper.
†Western, Western-North.
‡Volta, Oti.
§Bono, Bono-East, Ahafo.
¶Northern, Savanna, North-East.

Table 3. Average treatment effect of fee exemption policy on maternal health service utilisation

Variables	aOR	95% CI*	P-value
Timing of first ANC Visit			
Intercept	0.49	(0.46–0.52)	<0.001
NHIS	1.08	(1.00–1.17)	0.043
Completing recommended ANC visits			
Intercept	10.57	(9.53–11.72)	<0.001
NHIS	1.09	(1.01–1.18)	0.003
Facility-based delivery			
Intercept	3.77	(3.50–4.07)	<0.001
NHIS	1.21	(1.11–1.32)	<0.001

ANC – antenatal care, aOR – adjusted odds ratio, CI – confidence interval, NHIS – National Health Insurance Scheme
*Lower-Upper.

DISCUSSION

The findings of our study show that the fee exemption policy implemented under the National health insurance scheme had a positive impact on maternal health service utilisation. Although the association analysis did not identify a statistically significant relationship between NHIS enrolment and the timing of recommended ANC visits, the average treatment effect analysis revealed a statistically significant 8% increase in initiating ANC within the recommended first trimester of pregnancy. Evidence from this study shows that the impact of the fee exemption policy was more pronounced in the facility-based delivery indicator. The difference in the impact between ANC uptake and facility-based delivery could be attributed to the implementation mechanism of the policy. First, pregnant women are required to register with the NHIS and hold a valid NHIS card at the point of service delivery to access the fee-exemption benefits of the policy. The NHIS cards, which are valid for five years, are subject to annual renewals either through payments of premiums or registration [17,26]. It has been reported elsewhere of weak administrative processes within the NHIS, which results in delays in the issuance of NHIS cards by the scheme for new registrations, and this could significantly affect the timing of women seeking their first ANC care and may also affect the completion of the recommended number of ANC visits [27]. Second, the scheme instituted a minimum thirty-day waiting period for newly registered cards to be activated and accepted at health facilities [28]. This added wait period could account for the lower impact of the fee exemption policy on early pregnancy maternal health service indicators, such as the timing of first ANC visit as compared to facility-based delivery. Based on the current findings, the null hypothesis is rejected, indicating that Ghana's fee exemption policy positively influences maternal health service utilisation.

The findings are consistent with studies from Ghana and other LMICs [29–33] where most studies have demonstrated a significant association between health insurance policy and increased utilisation of maternal health care services. Also, our findings are consistent with other studies in determining that facility-based delivery utilisation benefits more from the fee exemption policy [29].

Despite the positive impact of the fee exemption policy on maternal health service utilisation, our results also demonstrated a strong positive association between wealth index and utilisation of maternal health service. Our findings reveal that the wealth index shows a stepwise increase in odds ratio across all maternal health service indicators analysed and reflects a pronounced socioeconomic gradient. This marked disparity emphasises systemic inequalities, including affordability and accessibility of maternal health services. It may also reflect financial barriers to accessing health and differences in cultural practices, perceptions of health care quality, and geographical proximity to health care facilities in poorer communities. Systemic inequalities such as poor transportation systems, the non-comprehensive nature of the NHIS, and the poor attitude of health care providers that are pervasive among underprivileged communities have been found to underscore disparities in health service utilisation in Ghana [34]. Mistreatment of women in labour, especially women from lower-income communities at health facilities, has

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been widely reported, and this could account for the perceptions of health care quality [35–37]. Despite all these other factors, similar findings have been reported in studies conducted across other regions of sub-Saharan Africa on the impact of insurance and fee exemption policies on maternal health service utilisation [38,39]. Studies conducted in Kenya and Tanzania revealed the advent and increase in health insurance coverage was associated with increase in maternal health utilisation and health outcomes [40,41].

Similar to findings in other studies, our study shows that women residing in the Upper East Region were more likely to initiate ANC visits in the first trimester of pregnancy, complete the recommended four ANC visits, and deliver in a health facility [29,42]. The contributing factors to this finding could be explained by the initial piloting of the fee exemption policy in the Upper East Region. This may have led to policy localisation and acceptance among women in the region. Also, the Upper East region has benefitted from other maternal health improvement policy interventions such as the Community-based Health Planning Services (CHPS) project, a primary health accessibility improvement program that was aimed to relocate health centres and health posts from subdistricts to convenient community locations that realised rapid scale up in the region [43,44].

The findings of this study offer compelling evidence of the positive impact of Ghana's fee exemption policy on maternal health service utilisation and the null hypothesis is rejected. The study has implications for policy review in the implementation strategies for improving maternal health service utilisation and inadvertently improving on maternal health outcomes in Ghana. The mechanisms for registration and renewal of NHIS cards could be reviewed to improve accessibility to the fee exemption policy for pregnant women and further enhance maternal health utilisation.

Strengths and limitations

Our study utilises extensive and representative national data from three rounds of GDHS and one round of GMHS, enhancing the population-based generalisation of findings. By applying the inverse probability of treatment weighting technique, our analysis retains the entire sample data and hence preserves the statistical power and provides robust estimates. Despite these strengths, our study has several limitations. First, in this study, data on health care utilisation was self-reported, even though the GDHS and GMHS used well-validated and standardised questionnaires in their surveys, there could still exist recall bias. We explicitly acknowledge this limitation in our study and suggest that future research could use more objective measures of health care utilisation, such as electronic health records, to further validate our findings. Second, in this study, respondents with incomplete data were excluded from the analysis, which could introduce bias if the missingness is not random. However, to attenuate this limitation, we utilised pooled data, which increased the sample size and enhanced the robustness of our analysis.

CONCLUSIONS

This is the first study assessing the impact of Ghana's fee exemption policy on maternal health service utilisation by employing a robust analysis of the most recent nationally representative data. By employing IPTW, we enhance the validity of our causal inference, ensuring that our findings more accurately reflect the policy's impact. While IPTW provides robust support for causal inference, the findings are subject to the inherent limitations of the observational design of the study. The findings of this study suggest that government initiatives aimed at providing fair access to maternal health services through the current fee exemption policy under the NHIS positively impacted maternal health service utilisation. However, significant socioeconomic disparities exist in access to maternal health services, and enhanced efforts may be needed to bridge the gap in accessibility specifically for women within the lower wealth index. A review of the policy to exempt fees on NHIS registration and NHIS card renewal for low-income groups could further enhance access to service utilisation and reduce the disparity based on economic status.

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