

Impact of Covid-19 on Maternal Health Seeking in Ghana

Patrick Opoku Asuming¹  | Deborah Aba Gaisie¹  |
Caesar Agula² | Ayaga Agula Bawah²

¹Department of Finance, University of Ghana Business School, Accra, Ghana

²Regional Institute of Population Studies, Accra, Ghana

Correspondence

Deborah Aba Gaisie, Department of Finance, University of Ghana Business School, P. O Box 78, Legon, Accra, Ghana.
Email: abagaisie09@gmail.com

Funding information

Doris Duke Charitable Foundation

Abstract

The Covid-19 pandemic is widely speculated to have disrupted the delivery of primary health care in low-income countries. Yet, there is little rigorous empirical research identifying this effect. This paper estimates the impact of Covid-19 on facility and skilled delivery and utilisation of antenatal care (ANC) services by comparing these outcomes for women who were pregnant/delivered before and during the Covid-19 period. The results show that Covid-19 led to 23% and 25% reductions, respectively, in the likelihood of facility delivery and four or more ANC visits during pregnancy. These findings highlight the need to build more resilient health systems in low-income settings.

KEYWORDS

antenatal care, Covid-19, facility delivery, Ghana, skilled delivery

1 | INTRODUCTION

The Covid-19 pandemic has posed a huge economic and humanitarian challenge to nations worldwide (UNICEF, 2021). Efforts to contain the virus and halt its spread has led to significant disruptions in economic activity, social life and healthcare delivery in many nations. Low- and middle-income countries with limited health system capacities have been particularly hit hard by the pandemic (Menendez et al., 2020; World Health Organisation, 2020). In the early stages of the pandemic, the primary focus of health systems was on managing the disease and providing care to affected persons (Ali & Feroz, 2020). This subsequently led to interruptions in routine and primary healthcare delivery, especially maternal and child healthcare services as resources had to be diverted to other critical areas.

Fear of contracting the disease, movement restrictions and transport challenges served as barriers to seeking treatment. This was even more pronounced for pregnant women who were faced with a choice of staying at home and avoiding exposure to the virus or risk contracting the virus in order to prevent complications associated with

pregnancy and delivery (Graham et al., 2020). This has potential negative consequences for health behaviour and outcomes. For instance, evidence from past health emergencies shows that in 2014/2015, the Ebola outbreak in West Africa led to about 80% drop in maternal and delivery care (Delamou et al., 2017; Elston et al., 2017). A recent analysis by the United Nations Population Fund forecasts a 20% decline in the use of sexual and reproductive health services by women in the Asia-Pacific region (De Benie & Maurizio, 2020).

On 12 March 2020, Ghana confirmed its first two cases of Covid-19. As part of the efforts to curb the spread of the virus, the government of Ghana banned public gatherings and closed the country's borders. On account of the detection of additional cases, a partial lockdown was imposed in two major cities in the country with a greater number of infections, Accra and Kumasi, from 30 March 2021. This restricted the movement of many people, but exemptions were made for members of the Executive, Legislature and the Judiciary and persons involved in the production, distribution and marketing of food, pharmaceuticals, medicine, media and telecommunications. As of 18 August 2021, there had been 112 021 confirmed cases of Covid-19 with 968 deaths. Table 1 below presents the total population and the confirmed number of cases as at December 2020 and August 2021 per region.¹ The table shows wide disparity in the number of infections by region. Moreover, it is worthy of note that the five regions from which the data for this paper were collected have the lowest number of infections and deaths in the country (the regions are as follows: Oti region, North East region, Northern region, Savannah region and Volta region).

Understanding the extent of impact of the pandemic on health care delivery is therefore essential for governments and development agencies to reassess health priorities and restructure health systems to promote better health for all, especially for vulnerable groups like pregnant women and children. This paper, therefore, delivers an assessment of the impact of Covid-19 on maternal health behaviour (specifically, facility and skilled delivery and antenatal care [ANC] attendance) within a developing country context like Ghana using data collected from September 2020 to November 2020. Using a sample of about 535 observations, our analysis measures the impact of the pandemic by comparing the outcomes of delivery for the same woman who has had children during Covid-19 and some pre-Covid-19.

Our results show that deliveries in the Covid-19 era were 15 percentage points less likely to be in health facilities compared with deliveries by the same women that occurred prior to the Covid-19 pandemic. Our results show a similar negative impact on the likelihood of ANC attendance. The magnitudes of the effects are large: They represent a 23% and 25% reduction in the average values of facility delivery and attendance of four or more ANC visits during pregnancy, respectively. These effects are high considering that our samples show rising levels of facility delivery from 2016 to 2019. Moreover, given that our sample is largely rural and the cases in Ghana are largely concentrated in urban areas, the impact in the country as a whole is likely to be larger than the estimates presented in this paper. Additionally, considering that the pandemic is still ongoing, its effects on health outcomes are likely to be much higher when it eventually subsides. Our results show that the pandemic has had no significant impact on the probability of deliveries with skilled attendants present. Even though the coefficient on our Covid-19 exposure variable in the skilled delivery regressions is negative, it is not statistically significant.

This paper contributes to the rapidly emerging literature on the health impacts of Covid-19. Much of the earlier evidence seeks to model the effects of the pandemic on maternal and neonatal mortality using simulations (Riley et al., 2020; Robertson et al., 2020; Stein et al., 2020). Riley et al. (2020), for instance, estimate that a 10% decline in essential pregnancy and newborn care service provision could result in 28 000 additional maternal deaths and 168 000 neonatal deaths using data from 132 Low - and Middle Income Countries (LMICs). Robertson et al. (2020) modelled three different scenarios where maternal and child health interventions were reduced by 9.8%–51.9% for 118 countries using the Lives Saved Tool. For their least severe scenario (9.8%–18.5% coverage reduction), their results showed that child deaths and maternal deaths increased by 1 157 000 and 56 700, respectively, as a result of the pandemic. In as much as these simulations seek to reflect real-world situations, the precision of their forecasts is limited since it requires making assumptions about the nature of the disease.

With the progress of the pandemic, direct evidence on its impact on maternal health behaviour is evolving from survey data. This literature has shown severe effects of the pandemic in the form of reductions in facility deliveries,

TABLE 1 Population and confirmed Covid-19 cases by region

December 2020				August 2021			
Region	Total cases	Total population	Cases per 100 000 population	Region	Total cases	Total population	Cases per 100 000 population
Greater Accra Region	30 140	5 055 883	596	Greater Accra Region	61 436	5 055 883	1215
Ashanti Region	11 170	5 924 498	189	Ashanti Region	19 745	5 924 498	333
Western Region	3095	2 214 660	140	Western Region	6533	2 214 660	295
Bono East Region	788	594 712	133	Eastern Region	5527	3 318 853	167
Central Region	2108	2 605 492	81	Central Region	4216	2 605 492	162
Eastern Region	2624	3 318 853	79	Volta Region	3781	1 907 679	198
Western North Region	665	1 168 235	57	Bono East Region	2201	594 712	370
Ahafo Region	530	927 960	57	Bono Region	1992	1 168 807	170
Bono Region	635	1 168 807	54	Northern Region	1693	1 948 913	87
Volta Region	761	1 907 679	40	Upper East Region	1339	1 302 718	103
Oti Region	244	759 799	32	Ahafo Region	1001	927 960	108
Northern Region	566	1 948 913	29	Western North Region	947	1 168 235	81
Upper East Region	384	1 302 718	29	Oti Region	687	759 799	90
Upper West Region	91	868 479	10	Upper West Region	523	868 479	60
Savannah Region	62	1 133 768	5	North East Region	236	588 800	40
North East Region	22	588 800	4	Savannah Region	164	1 133 768	14
Total	53 885	31 489 256	171	Total	112 021	31 489 256	356

Note: Table 1 shows the total number of confirmed cases and the number of cases per 100 000 population as at December 2020 and August 2021.

Sources: Ghana Statistical Service and Ghana Health Service website (<https://www.statsghana.gov.gh/regionalpopulation.php?population=MTgyMTAwODAwNS45Nzg1&&Savannah®id=14>) (<https://ghs.gov.gh/covid19/dashboardm.php>).

ANC attendance, family planning sessions and immunisations (Ahmed et al., 2021; Daskalakis et al., 2020; Goyal et al., 2021; Temesgen et al., 2021). To measure the effect of the pandemic, these studies compare information on maternal health service utilisation postpandemic with prepandemic levels. Ahmed et al. (2021), for example, investigated the impact of Covid-19 on maternal newborn and child health services (MNCHs) using data from three LMICs. By comparing MNCHs utilisation levels in April/May 2020 with the same months in 2019, they observed a reduction in the utilisation of basic MNCH services. Similarly, Goyal et al. (2021) assessed the effect of the pandemic on obstetric care and outcomes. Their data consisted of women who were admitted from April 2020 to August 2020 compared with data from October 2019 to February 2020. Their findings showed a drop in facility delivery by about 45% with significant reductions in ANC visits.

The main limitation of these studies is that they employ before and after comparisons which makes it difficult to appreciate the effect of the pandemic. The empirical strategy employed by this paper—comparing birth and ANC outcomes for the same women on either side of the pandemic—provides more robust evidence of the impact of the pandemic. To the best of our knowledge, this paper is the first to compare prepandemic maternal health behaviour with postpandemic information among the same women using data from 2018 to 2020. Since the data are based on women from mostly rural settings in Ghana, our paper is also able to provide much needed evidence of Covid-19's impact on a very vulnerable group of women who are already at a greater risk due to insufficient access to quality health care.

The remainder of the paper is structured as follows. Section 2 presents the study's methodology. Section 3 presents the findings. Section 4 discusses the findings and concludes the paper.

2 | METHODOLOGY

2.1 | Data source

The data used for the analysis of this paper come from a survey of women in their reproductive age (15–49 years) in 14 districts in five regions in Ghana. The regions are Oti region, North East region, Northern region, Savannah region and Volta region. The data were collected for the evaluation of the CHPS (Community-based Health Planning and Services) project which was implemented in these regions. The CHPS project is a health systems strengthening initiative that was implemented in rural areas in Ghana. The data were collected from September to November 2020, during the pandemic. The sample for the survey was designed to obtain a representative sample of women in their reproductive age in each district and employed a two-stage cluster random sampling strategy. In the first stage, 275 census enumeration areas (EAs) were randomly sampled. The total number of EAs was distributed to the various districts based on the district's contribution to the total population of the 14 districts. A complete listing of all households in each of the sampled EAs was conducted to obtain information on all households with eligible women (i.e., women aged 15–19 years) in each EA. This formed the sampling frame for the second stage sampling. In the second stage, an average of 55 eligible women was sampled from each EA. This gave a total sample of 15 044 women.

The survey collected information on the household characteristics, assets, dwelling characteristics, socio-demographic information of women, marriage history, a complete birth history of each woman, and for all pregnancies occurring the last 5 years before the survey, detailed information on ANC attendance, delivery information and immunisation information.

For the purposes of this analysis, the sample was restricted to women who have more than one child, with at least one of the births (or at least part of the most recent pregnancy, in the case of our ANC attendance analysis) occurring during the Covid-19 period. Applying this restriction limited our analysis sample to 535 pregnancies from 288 women. Although the study design limits the analysis to a small sample size, to the best of our knowledge, this is the first household survey data of its kind that can be used for this analysis. National-level household survey data with pregnancy history are not yet available.

2.2 | Empirical strategy and estimation

The goal of this paper is to estimate the impact of Covid-19 on delivery of maternal health services using ANC attendance and delivery at health facilities as outcomes. The ideal identification strategy will randomly assign some pregnant women to Covid-19 and some to pre-Covid-19 and compare the ANC attendance and delivery at health facilities between the two groups. However, this is neither possible nor desirable under the circumstances of Covid-19. In the absence of this ideal, the thrust of the empirical strategy of this paper is to restrict the sample to

women who have had multiple children, some before the occurrence of Covid-19 and some during Covid-19 and compare the outcomes of deliveries of the same woman, comparing deliveries that occurred in Covid-19 and with the woman's most recent delivery prior to the Covid-19 period. Our general estimation equations are of the following form:

$$facilitydelivery_{iwt} = \alpha_1 + \alpha_2 Covid1_{iwt} + \alpha_3 age_{iwt} + \alpha_4 agesquare_{iwt} + \alpha_5 parity_{iwt} + \alpha_6 ANC_{iwt} + \alpha_7 month_{iwt} + w_t + \varepsilon_{iwt} \quad (1)$$

$$ANC4_{pwt} = \beta_1 + \beta_2 Covid2_{pwt} + \beta_3 age_{pwt} + \beta_4 agesquare_{pwt} + \beta_5 parity_{pwt} + \beta_6 pregdur_{pwt} + w_t + \mu_{pwt} \quad (2)$$

where iwt denotes child i born to woman w at time t and pwt denote pregnancy p of woman w at time t . $facilitydelivery$ is an indicator variable that takes a value of one if the child was delivered in a health facility and zero otherwise, and $ANC4$ is an indicator variable that takes a value of one if woman had four or more ANC visits during pregnancy p . w_t represents woman fixed effects and ε_{iwt} and μ_{pwt} denote errors terms for the $facilitydelivery$ and $ANC4$ outcomes, respectively. Equation 1 is used to estimate the impact of Covid-19 on delivery in health facilities, while Equation 2 is used to estimate the effect of Covid-19 on ANC attendance. We also estimate Equation 1 using $skilleddelivery$ as an outcome variable. $skilleddelivery$ is an indicator that takes a value of 1 if delivery was attended by a skilled birth attendant (a doctor, midwife, nurse or community health officer) and zero otherwise.

The independent variables of interest are $Covid1$ and $Covid2$, our main variable of Covid-19 exposure. $Covid1$ is the variable that identifies the impact of Covid-19 on delivery in health facility and is defined as an indicator variable that takes a value of 1 if the delivery took place on or after 1 April 2020 and zero otherwise. The first case of Covid-19 in Ghana was reported on 12 March 2020. However, it was the imposition of the 21-day lockdown in some parts of the country starting from 30 March 2020 that really brought nationwide attention to the pandemic in Ghana. Therefore, in this paper, we classify any delivery from 1 April 2020 as Covid-era delivery. $Covid 2$ is the indicator for identifying the effect of Covid-19 on ANC coverage, and it is defined as an indicator variable that takes a value of 1 if 5 or more months of pregnancy p was spent in the Covid-19 period (i.e., from 1 April 2020).

In each equation, the variable age denotes the age of the women at the end of the pregnancy, while $agesquare$ is the square of the age of the women at the end of the pregnancy. In Equation 1, we control for an indicator for whether the women attended ANC during the pregnancy (ANC). Previous works have found that ANC is a strong predictor of delivery in health facilities (Boah et al., 2018; Shahabuddin et al., 2016). We also control for month of delivery (variable $month$) to account for possible impact of seasonality on place of delivery. Equation 2 controls for duration of pregnancy ($pregdur$) because the pregnancies have varied durations and the duration can affect the number of ANC visits. In both equations, we control for parity ($parity$) to account for the effects of prior births on facility delivery and ANC attendance. All covariates are time varying. In all estimations, standard errors were clustered at the EA level.

Equations 1 and 2 identify the impact of Covid-19 on the two outcomes under the assumption that w_t controls for time-invariant characteristics of the mother that affect the outcomes. Two potential challenges with the above identification strategy are circular trends improvements in ANC attendance and delivery at health facilities over time, and there could be other time-invariant characteristics of the household that could affect the outcomes. The first challenge is likely to introduce downward bias, and thus, our estimates are likely to represent lower bounds of the impact of Covid-19. The second challenge could affect the consistency of our estimates. For instance, factors like education of the women, proximity to health facilities and wealth status could affect the outcomes. We believe that limiting the sample to each woman's two most recent births reduces the possibility of observed time-varying characteristics affecting our results. In our sample, the births of each woman occurred within a 36-month period. We believe that woman's time-varying characteristics are likely to remain constant for this relatively short period of time.

3 | RESULTS

3.1 | Descriptive statistics

Table 2 presents the descriptive statistics from the data used for the analysis. Information is presented separately for women with pregnancies that occurred before the onset of Covid, after the onset of Covid and for the full sample. The sample consists of 535 pregnancies for 288 women with 312 pregnancies occurring before Covid and 223 pregnancies occurring after Covid. Generally, the information is similar across the two categories. Women in our sample are quite young with the average age being 28 years. Almost all (95%) of the women in our sample are married or living together with a partner. In terms of wealth, the proportion of the sample coming from the various wealth quintiles is almost the same, except the richest quintile which contributes about 17% to our sample. This proportion is even smaller for our post-Covid sample (15%).

As expected in this largely rural setting, farming is the largest occupation, followed by trading. Educational attainment is quite low: About 46% of the women have no formal education and less than 10% had secondary education or higher. Health facilities are generally accessible as 43% of the women in our sample live within 1 km of a health facility even though almost a third (32%) live more than 3 km from the nearest health facility. As expected, given the nature of our sample, the average parity of the birth and pregnancies analysis was higher than 1 and higher for the post-Covid group compared with the pre-Covid group (1.9 versus 1.3).

In terms of our outcome variables, 66% of deliveries took place in a health facility with 65% of deliveries supervised by a skilled birth attendant. The proportion of pregnancies that had four or more ANC visits is 79%.

In terms of our main independent variable, 42% of all these pregnancies took place during the Covid-19 period and for 61% of pregnancies, five or more months coincided with the Covid-19 period.

3.2 | Impact of Covid-19 on facility delivery and skilled delivery

Table 3 presents the results of the fixed-effects estimation of the impact of Covid-19 on facility and skilled delivery. The table reports regression results from the fixed-effects models together with the standard errors. All regressions control for month of delivery. The outcome variable for the results in Panel A is an indicator for delivery in health facility, while the outcome variable for the results in Panel B is an indicator that takes a value of 1 for the presence of skilled health personnel at delivery and zero otherwise.

From Panel A, the results show that Covid-19 had a significant negative impact on facility delivery and this is statistically significant at 5%. Specifically, deliveries occurring during the Covid-19 era were 15 percentage points less likely to take place in a health facility compared with other deliveries by the same women prior to the Covid-19 pandemic. The coefficients on the other covariates are quite consistent with expectation. Age of woman at time of delivery has an effect on facility delivery. Delivery in health facility is decreasing in the age of the woman. The likelihood of delivering in a health facility reduces by 21 percentage points if the age of the woman increases by 1. Consistent with expectation, pregnancies in which the woman attended four or more ANC visits are more likely to be delivered in a health facility. The results show that having four or more ANC visits increases the likelihood of a woman delivering at a health facility by 20 percentage points.

From Panel B, the results do not show a significant impact of Covid-19 on skilled delivery. Although the coefficient of our Covid variable is negative and quite high, it is not statistically significant. The coefficients on the other covariates are also largely consistent with the results in Panel A. Skilled delivery is decreasing in age. Also, pregnancies with four or more ANC visits are 21 percentage points more likely to be delivered under the supervision of skilled health personnel.

TABLE 2 Descriptive statistics

Variables	Pre-Covid	Post-Covid	Full sample
Number of pregnancies	312	223	535
Number of women	228	228	288
Average age of woman at birth: Mean (sd)	27.82 (6.40)	28.95 (6.84)	28.29 (6.60)
Marital status			
Never married	15 (4.81%)	6 (2.69%)	21 (3.93%)
Married/living together	292 (93.59%)	214 (95.96%)	506 (94.58%)
Separated/divorce/widowed	5 (1.60%)	3 (1.35%)	8 (1.49%)
Wealth quintile			
Poorest	70 (22.58%)	49 (22.58%)	119 (22.58%)
Poorer	54 (17.42%)	46 (21.20%)	100 (18.98%)
Middle	69 (22.26%)	38 (17.51%)	107 (20.30%)
Richer	61 (19.68%)	52 (23.96%)	113 (21.44%)
Richest	56 (18.06%)	32 (14.75%)	88 (16.70%)
Occupation			
No occupation	47 (15.06%)	48 (21.52%)	95 (17.76%)
Student	-	2 (0.90%)	2 (0.37%)
Farming	140 (44.87%)	88 (39.46%)	228 (42.62%)
Trading/selling	76 (24.36%)	44 (19.73%)	120 (22.43%)
Hairdressing/dressmaking	23 (7.37%)	15 (6.73%)	38 (7.10%)
Housewife	14 (4.49%)	17 (7.62%)	31 (5.79%)
Other occupation	12 (3.85%)	9 (4.04%)	21 (3.93%)
Education			
None	145 (46.47%)	99 (44.39%)	244 (45.61%)
Primary	59 (18.91%)	48 (21.52%)	107 (20.00%)
Middle school/JHS/JSS	80 (25.64%)	56 (25.11%)	136 (25.42%)
Secondary +	28 (8.97%)	20 (8.97%)	48 (8.97%)
Distance to nearest health facility			
Less than 1 km	136 (43.59%)	95 (42.60%)	231 (43.18%)
Between 1 and 2 km	50 (16.03%)	32 (14.35%)	82 (15.33%)
Between 2 and 3 km	29 (9.29%)	23 (10.31%)	52 (9.72%)
More than 3 km	97 (31.09%)	73 (32.74%)	170 (31.78%)
Duration of pregnancy: mean (sd)			
Duration of pregnancy: mean (sd)	9.10 (0.53)	9.04 (0.42)	9.08 (0.49)
Parity: mean (sd)			
Parity: mean (sd)	1.25 (0.44)	1.90 (0.39)	1.52 (0.53)
Delivered at facility			
Delivered at facility	200 (64.10%)	144 (64.57%)	344 (64.30%)
Had skilled delivery			
Had skilled delivery	205 (65.71%)	147 (65.92%)	352 (65.79%)
Had four or more ANC visits			
Had four or more ANC visits	251 (80.45%)	172 (77.13%)	423 (79.07%)
Delivered during Covid period			
Delivered during Covid period		223 (41.68%)	
More than 5 months of pregnancy spent during Covid			
More than 5 months of pregnancy spent during Covid		322 (60.87%)	

Note: This table presents the descriptive characteristics of the respondents in the study. The figures are calculated at the pregnancy level, and separate columns are presented for pre-Covid and post-Covid pregnancies together with the full sample. Abbreviation: ANC, antenatal care.

TABLE 3 Impact of Covid-19 on facility delivery and skilled delivery

Variables	Margins
Panel A: facility delivery	
Delivery during Covid	-0.149** (0.073)
Age of woman at delivery	-0.209*** (0.079)
Age squared	0.004*** (0.002)
Parity	0.040 (0.024)
Had four or more ANC visits	0.203** (0.084)
Constant	2.658*** (0.998)
Observations	527
R-squared	0.134
Number of women	288
Panel B: skilled delivery	
Delivery during Covid	-0.111 (0.072)
Age of woman at delivery	-0.211*** (0.077)
Age squared	0.004*** (0.002)
Parity	0.011 (0.018)
Had 4 or more ANC visits	0.205** (0.083)
Constant	2.745*** (0.965)
Observations	527
R-squared	0.136
Number of women	288

Note: The table presents results from a fixed-effects (FE) model. The outcome variable for results in Panel A is an indicator that takes a value of 1 if a woman delivered in a facility. The outcome variable for results in Panel B is an indicator that takes a value of 1 if a woman had skilled delivery. All the covariates included in the FE model are time-varying and all regressions controlled for month of delivery. Standard errors are reported in parentheses. Standard errors are clustered at the enumeration area level.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.10$.

3.3 | Impact of Covid-19 on having four or more ANC visits

Table 4 presents results of the fixed-effects estimation of the impact of Covid-19 on having four or more ANC visits. Overall, the results show that Covid-19 had a negative effect on ANC attendance. Women with more than 5 months of pregnancy spent during Covid were 20 percentage points less likely to attend ANC. The results did not show a significant effect of the age of woman, parity and duration of pregnancy on having four or more ANC visits.

4 | DISCUSSION

This paper sought to estimate the impact of Covid-19 on maternal health seeking with specific focus on facility and skilled delivery and ANC attendance. We provide evidence to establish an impact of the pandemic on maternal health. We do this by comparing outcomes of ANC attendance, facility delivery and skilled attendant at delivery for pregnancies during the Covid-19 pandemic with pregnancies by the same women before the pandemic. Our results

TABLE 4 Impact of Covid-19 on having four or more ANC visits

Variables	Margins
More than 5 months of pregnancy spent during Covid	-0.196* (0.113)
Age of woman at delivery	0.089 (0.093)
Age squared	-0.000 (0.001)
Parity	0.023 (0.040)
Pregnancy duration	
6 months (ref)	
7 months	-0.262 (0.175)
8 months	-0.471 (0.346)
9 months	-0.055 (0.050)
10 months	-0.162 (0.120)
Constant	-1.271 (1.787)
Observations	521
Number of women	295
R-squared	0.036

Note: The table presents results from a fixed-effects model. The outcome variable is an indicator that takes a value of 1 if a woman spent more than 5 months of her pregnancy during Covid. All the covariates included in the FE model are time-varying, and all standard errors are clustered at the enumeration area level.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.10$.

show that the pandemic has had significant negative impact on the likelihood of women delivering in health facilities and ANC attendance but no significant effect on deliveries supervised by skilled health personnel.

Although our findings are consistent with expectation and existing literature, the magnitude of the negative effects found is quite large. The 15 percentage points and 20 percentage points reduction in facility delivery and ANC attendance represents 23% and 25% reduction from the average values of both outcomes. Even though not statistically significant, our results also show a 16% reduction in deliveries supervised by a skilled birth attendant. The impacts are also large in the context of the rising levels of facility delivery both nationally and within our sample. Our samples show that facility delivery has risen every year in the past 5 years, from 53% in 2016 to 64% in 2019.

Although Ebola cases have not been confirmed in Ghana, our findings are consistent with the negative effects of the Ebola outbreak in West Africa on maternal health outcomes documented by a number of studies (Gizelis et al., 2017; Quaglio et al., 2019; Ribacke et al., 2016; Sochas et al., 2017). Sochas et al. (2017), for instance, analysed the indirect effects of the Ebola epidemic on maternal and neonatal health in Sierra Leone. They estimated significant decreases in ANC coverage and facility delivery. Gizelis et al. (2017) also found a decline in deliveries in public health facilities.

While our sample may not be representative of the overall impact for even Ghana, our findings suggest that the overall impact of Covid-19 in primary health care delivery may be higher in other parts of country. This is because as data in Table 1 show, the five regions from where our sample was taken have among the lowest number of infections from Covid-19 in the country. Moreover, our sample is predominantly rural while the Covid-19 cases and deaths have been concentrated mainly in the urban areas of the country. Additionally, given that our data cover only the first 8 months of the pandemic which is still ongoing, our results may only be capturing the short-run effects. It is likely that these effects may be much larger when Covid-19 eventually ends.

The study is not without limitations. One of the main limitations is the relatively small sample size. This was the result of the need to impose restrictions on the sample to enable an identification of impact. We believe this is an acceptable trade-off because many of the existing studies are based solely on trend analysis from which it is difficult to identify impact. Another limitation of the paper is our inability to identify the potential channels through which Covid-19's impact affects the delivery of maternal and child health outcomes. Existing literature has identified resource diversion toward dealing with the pandemic and fear of contracting the virus as possible channels through which the pandemic has affected health care utilisation. Our data do not allow us to identify which of these factors are more prominent in explaining the negative impacts found.

5 | CONCLUSIONS AND POLICY RECOMMENDATIONS

The Covid-19 pandemic has posed significant challenges for the health systems of most countries in the world with a more profound impact on the fragile health systems of Low- and Middle-Income countries. This has the potential to erode the gains made in maternal and child health over the years. It is therefore imperative that governments develop the right policy responses to address the indirect effects of the pandemic on maternal health. An informed policy response requires adequate understanding of the extent of the pandemic on the delivery of primary health care.

The findings from our study show that the Covid-19 pandemic has had a significant impact on the delivery of primary health care services in Ghana. These findings have significant implications for policy making especially for developing countries. With Covid cases increasing in some countries, governments and development partners need to take into account the important role of maternal and child health services and establish a plan to prevent interruptions in routine and primary care. Resources must be allocated to ensure continued access to reproductive health services and community-based interventions (UNFPA, 2020). Additionally, the role of technology in delivering health solutions can be explored. Telemedicine and teleconsultations can be adopted to reach out to women who are likely to avoid hospital visitations due to anxieties about the pandemic. Finally, our results also bring into sharp focus the need for developing countries to build resilient health systems to deal better with the next pandemic.

ACKNOWLEDGEMENTS

This project was funded under the CHPS+ initiative. CHPS+ is a collaborative effort between Columbia University Mailman School of Health, The Regional Institute for Population Studies at the University of Ghana and the Ghana Health Service's Policy, Planning, Monitoring and Evaluation Division. It is funded by the African Health Initiative of the Doris Duke Charitable Foundation.

ENDNOTE

¹ It is important to note that these numbers are unlikely to be related to differences in testing capacity because Covid-19 testing is nationally coordinated by the Ghana Health Service.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available upon reasonable request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Patrick Opoku Asuming  <https://orcid.org/0000-0002-5010-3484>

Deborah Aba Gaisie  <https://orcid.org/0000-0002-6468-4101>

REFERENCES

- Ahmed, T., Rahman, A. E., Amole, T. G., Galadanci, H., Matjila, M., Soma-pillay, P., Gillespie, B. M., El, A. S., & Anumba, D. O. C. (2021). The effect of COVID-19 on maternal newborn and child health (MNCH) services in Bangladesh, Nigeria and South Africa: Call for a contextualised pandemic response in LMICs. *International Journal for Equity in Health*, 5, 1–6.
- Ali, N. A., & Feroz, S. A. (2020). Maternal mental health amidst the COVID-19 pandemic. *Asian Journal of Psychiatry*, 54(102261). <https://doi.org/10.1016/j.ajp.2020.102261>
- Boah, M., Mahama, A. B., & Ayanga, E. A. (2018). They receive antenatal care in health facilities, yet do not deliver there: Predictors of health facility delivery by women in rural Ghana. *BMC Pregnancy and Childbirth*, 18(125), 1–10. <https://doi.org/10.1186/s12884-018-1749-6>
- Daskalakis, G., Theodora, M., Koura, S., Loutradis, D., & Pergialiotis, V. (2020). The impact of proactive strategies on pregnancy healthcare during the COVID-19 epidemic. *HJoG*, 19(4), 153–155. <https://doi.org/10.33574/hjog.2092>
- De Benie, D., & Maurizio, F. (2020). Coronavirus is leaving pregnant women with tough choices and bleaker outcomes. In World Economic Forum (Cited 28 April 2021). Available at <https://www.weforum.org/agenda/2020/05/women-children-covid19-srh-mortality-rates/>
- Delamou, A., El Ayadi, A. M., Sidibe, S., Delvaux, T., Camara, B. S., Sandouno, S. D., & Beavogui, A. H. (2017). Effect of Ebola virus disease on maternal and child health services in Guinea: A retrospective observational cohort study. *The Lancet Glob Health*, 5, e448–e457. [https://doi.org/10.1016/S2214-109X\(17\)30078-5](https://doi.org/10.1016/S2214-109X(17)30078-5)
- Elston, J. W. T., Cartwright, C., Ndumbi, P., & Wright, J. (2017). The health impact of the 2014–15 Ebola outbreak. *Public Health*, 143, 60–70. <https://doi.org/10.1016/j.puhe.2016.10.020>
- Gizelis, T. I., Karim, S., Østby, G., & Urdal, H. (2017). Maternal health care in the time of Ebola: A mixed-method exploration of the impact of the epidemic on delivery services in Monrovia. *World Development*, 98(2014), 169–178. <https://doi.org/10.1016/j.worlddev.2017.04.027>
- Goyal, M., Singh, P., Singh, K., Shekhar, S., & Agrawal, N. (2021). The effect of the COVID-19 pandemic on maternal health due to delay in seeking health care: Experience from a tertiary center. *International Journal of Gynecology & Obstetrics*, 152, 231–235. <https://doi.org/10.1002/ijgo.13457>
- Graham, W. J., Afolabi, B., Benova, L., Maeve, O., Campbell, R., Filippi, V., Nakimuli, A., Penn-Kekana, L., Sharma, G., Okomo, U., Valongueiro, S., Waiswa, P., & Ronsmans, C. (2020). Protecting hard-won gains for mothers income and newborns in low-income countries in the face of COVID-19: call for a service safety net. *BMJ Global Health*, 5, e002754. <https://doi.org/10.1136/bmjgh-2020-002754>
- Menendez, C., Gonzalez, R., Donnay, F., & Leke, R. G. F. (2020). Avoiding indirect effects of COVID-19 on maternal and child health. *The Lancet Glob Health*, 8(7), e863–e864. [https://doi.org/10.1016/S2214-109X\(20\)30239-4](https://doi.org/10.1016/S2214-109X(20)30239-4)
- Quaglio, G., Tognon, F., Finos, L., Bome, D., Sesay, S., Kebbie, A., Di Gennaro, F., Camara, B. S., Marotta, C., Pisanì, V., Bangura, Z., Pizzolo, D., Saracino, A., Mazzucco, W., Jones, S., & Putoto, G. (2019). Impact of Ebola outbreak on reproductive health services in a rural district of Sierra Leone: A prospective observational study. *BMJ Open*, 9(9), 1–9. <https://doi.org/10.1136/bmjopen-2019-029093>
- Ribacke, K. J. B., Saulnier, D. D., Eriksson, A., & Von Schreeb, J. (2016). Effects of the West Africa Ebola virus disease on health-care utilization—A systematic review. *Frontiers in Public Health*, 4, 1–12. <https://doi.org/10.3389/FPUBH.2016.00222>
- Riley, T., Sully, E., Ahmed, Z., & Biddlecom, A. (2020). Estimates of the potential impact of the COVID-19 pandemic on sexual and reproductive health in low- and middle-income countries. *International Perspectives on Sexual and Reproductive Health*, 46, 73–76. <https://doi.org/10.33314/jnhrc.v18i2.2747>
- Roberton, T., Carter, E. D., Chou, V. B., Stegmuller, A. R., Jackson, B. D., Tam, Y., Sawadogo-lewis, T., & Walker, N. (2020). Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: A modelling study. *The Lancet Global Health*, 8(7), e901–e908. [https://doi.org/10.1016/S2214-109X\(20\)30229-1](https://doi.org/10.1016/S2214-109X(20)30229-1)
- Shahabuddin, A. S. M., Delvaux, T., Utz, B., Bardají, A., & De Brouwere, V. (2016). Determinants and trends in health facility-based deliveries and caesarean sections among married adolescent girls in Bangladesh. *BMJ Open*, 6(9), e012424. <https://doi.org/10.1136/bmjopen-2016-01242>
- Sochas, L., Channon, A. A., & Nam, S. (2017). Counting indirect crisis-related deaths in the context of a low-resilience health system: The case of maternal and neonatal health during the Ebola epidemic in Sierra Leone. *Health Policy and Planning*, 32, iii32–iii39. <https://doi.org/10.1093/heapol/czx108>
- Stein, D., Ward, K., & Cantelmo, C. (2020). Estimating the Potential Impact of COVID-19 on Mothers and Newborns in Low- and Middle-Income Countries. In Health Policy Plus (Cited 15 April 2021). Available at <http://www.healthpolicyplus.com/covid-mnh-impacts.cfm>

- Temesgen, K., Wakgari, N., Debelo, B. T., Tafa, B., Alemu, G., Wondimu, F., Gudisa, T., Gishile, T., Daba, G., Bulto, G. A., & Soboka, B. (2021). Maternal health care services utilization amidst COVID-19 pandemic in West Shoa zone, central Ethiopia. *PLoS ONE*, 16(3), e0249214. <https://doi.org/10.1371/journal.pone.0249214>
- UNFPA. (2020). *COVID-19 technical brief for antenatal care services*. UNFPA. <https://asiapacific.unfpa.org/en/publications/covid-19-technical-brief-antenatal-care-services>
- UNICEF. (2021). *Primary and Secondary Impacts of the COVID-19 Pandemic on Children in Ghana*. UNICEF.
- World Health Organisation. (2020). In WHO global pulse survey, 90% of countries report disruptions to essential health services since COVID-19 pandemic (Cited on 15 April 2021). Available at <https://www.who.int/news/item/31-08-2020-in-who-global-pulse-survey-90-of-countries-report-disruptions-to-essential-health-services-since-covid-19-pandemic>

How to cite this article: Asuming, P. O., Gaisie, D. A., Agula, C., & Bawah, A. A. (2022). Impact of Covid-19 on Maternal Health Seeking in Ghana. *Journal of International Development*, 34(4), 919–930. <https://doi.org/10.1002/jid.3627>