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Research Article

Does Antenatal Care Translate into Skilled Birth Attendance? Analysis of 2014 Ghana Demographic and Health Survey

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Background. Despite the high antenatal care attendance rate in Ghana, skilled birth attendance is relatively low. There is limited evidence on whether antenatal care attendance translates into skilled birth attendance in the Ghanaian research discourse. This study investigates whether antenatal care attendance translates into skilled birth. *Methods*. We extracted data from the 2014 Ghana Demographic and Health Survey. Data were analysed using descriptive and binary logistic regression analyses at 5% confidence interval. *Results*. The descriptive findings indicated a vast variation between antenatal care attendance and skilled birth attendance. Skilled birth attendance was consistently low across almost all sociodemographic characteristics as compared to antenatal care attendance. The binary logistic regression analysis however indicated higher inclination toward skilled birth attendance among women who had at least four antenatal care visits [OR=5.87, CI=4.86-7.08]. The category of women noted to have higher tendencies of skilled birth attendance was those with higher/tertiary education [OR=9.13, CI=2.19-37.93], the rich [OR=4.27, CI=3.02-6.06], urban residents [OR=2.35, CI=1.88-2.93], women with maximum of four children [OR=1.36, CI=1.08-1.72], and those using modern contraceptives [OR=1.24, CI=1.03-1.50]. *Conclusion*. We recommend that interventions to enhance skilled birth attendance must target women who do not achieve at least four antenatal visits, those with low wealth standing, those not using contraceptives, and women without formal education. Again, an in-depth qualitative study is envisaged to deepen the understanding of these dynamics in the rural setting.

1. Introduction

Globally, significant progress has been made in the quest to improve maternal and child health [1]. This is evidenced by the 45 percent decline in maternal mortality from 380 to 210 per 100,000 between 1990 and 2013. In spite of this progress, variations exist between developed and the developing world. That is, despite the general reduction, maternal mortality ratio among developing countries was about fourteen times higher than developed countries as of 2013 [2]. This variation further widened to 239 for developing countries and 12 for developed countries indicating twenty times wider variation. As of 2015, developing countries accounted for 99 percent (302,000) of the estimated global maternal mortality out of which sub-Saharan Africa alone accounted for 66 percent (201,000) [3].

Despite the high prevalence of maternal mortality in the developing world, most maternal deaths are preventable. This is because attending antenatal care (ANC) and delivering with the assistance of a skilled professional have the tendency of subsiding pregnancy related complications [4, 5]. Empirical evidence suggests that health facility-based delivery at primary level augmented by access to referral-level facilities constitutes a prime strategy for combating maternal mortality [6]. In an effort to reduce maternal mortality, key indicators include maternal mortality ratio and proportion of births

attended by skilled attendants [7]. It has been reported that Maternal Mortality Rate is below 200 per 100,000 live births in almost all countries where skilled professionals attend to at least 80 percent of deliveries [8]. Regular ANC attendances followed by skilled attendance have the tendency to reduce the estimated 16 to 33 percent of deaths emerging from obstructed labor, sepsis, haemorrhage, and eclampsia [9].

Delivering in health facilities where women's health and that of the expected children are guaranteed constitutes a prime concern to public health discourse [10]. As such a couple of studies have been carried out about determinants of skilled birth attendance within the sub-Saharan Africa and have revealed both consistent and varied results. For instance, a study in Ethiopia found that only 23.5% of respondents were assisted by Skilled Personnel. They also reported rural urban disparity skewing in toward the direction of urban dwellers [11]. Similar findings were realised in Kenya [10, 12].

In the Ghanaian context, although some studies have assessed various dimensions of ANC and place of delivery independently [13, 14] just as other sub-Saharan countries, how these two factors interrelate has not received the needed attention in literature. For instance, although Amoakoh-Coleman et al. [15] targeted ANC attendance in investigating predictors of skilled birth attendance, they did not explore how ANC translates into skilled birth delivery. They considered how other predictors such as wealth, residence, and history of previous birth complications determined skilled birth attendance. Again, although Ghana was considered in the investigation by Adjiwanou and LeGrand [16] on whether ANC attendance induces skilled birth, they focused only on rural dwellers; what then is the situation among urban Ghanaians and for that matter all Ghanaian women in the reproductive age group.

The 2014 Ghana Demographic and Health Survey revealed that women who had ANC with skilled providers in 2003 stood at 92%, 95% in 2008, and 97% in 2014. During the same period, the percentages of skilled delivery were 47%, 59%, and 73% [17–19]. This clearly indicates that there is a gap between ANC attendance and SBA which needs to be explored. The debate in the Ghanaian literature has predominantly been whether having no education, being in lower wealth quintile, being older, having higher parity, staying far away from the health facility, and not attending ANC are allied with low utilisation of skilled birth attendance (SBA) [20–22]. Predominantly, studies in Ghana have been silence on whether SBA commensurates ANC attendance in the country. To fill this vacuum, the current study intends to investigate whether ANC utilisation translates into skilled birth attendance in the Ghanaian context. A study of this kind is important because outcome of the study is expected to make useful contributions to information, education, and communication strategies for enhancing SBA in order to safeguard the safety of birthing women and their newborns.

2. Materials and Methods

We made use of the women's file from the 2014 Ghana Demographic and Health Survey [19]. This is a nationally representative survey carried out on five-year interval. The survey is conducted by the Ghana Statistical Service and Ghana Health Service with technical assistance from the ICF International. It covers data on several health indicators of public health interest among developing countries by considering issues pertaining to ANC, SBA, fertility, and child health among other factors. The 2014 edition interviewed 9,396 women aged 15-49 years from 11,835 households evolving from 427 clusters nationwide; however 5,884 had birth histories within the last five years preceding the survey [19]. The survey was conducted with an updated frame developed from the 2010 Population and Housing Census (PHC) and had a response rate of 97 percent. The dataset for the study was requested from Measure DHS website and access to the dataset was granted following approval of the purpose for which the request was made.

Skilled Birth Attendance (SBA) was the outcome variable for the study. SBA constitutes any birth assisted by a health provider who has at least minimum knowledge and skills to manage normal child birth and basic emergency obstetric care. The 2014 GHDS investigated who assisted women during delivery and consequently any delivery assisted by someone who fits the definition of SBA was considered skilled birth in this study. In our conceptualisation of SBA, a woman who was assisted by a health provider was considered as someone who sought SBA (coded as 1) whilst someone who was not assisted by a health care provider was considered not to have had SBA (coded as 0). Antenatal care (ANC) was the principal explanatory variable for the study and this is because inconsistent reports have been reported on whether women accessing ANC ultimately seek SBA [23–25]. Following the recommendation of WHO that ideally a woman in a developing country like Ghana is expected to have at least four ANC visits, ANC was recoded into "Less than four" =0 and "At least four" =1.

In addition, it was imperative to investigate if some sociodemographic factors induce SBA among Ghanaian women to better understand the nexus surrounding the phenomenon. The sociodemographic factors that we considered were age, education, religious affiliation, wealth, occupation, marital status, residential status, National Health Insurance Scheme (NHIS) subscription, parity, and contraceptive use. In order for all these variables to be meaningful and more significant to the study some of them were recoded. Religion was recoded into Christianity=1, Islam=2, Traditionalist=3, and No Religion=4; wealth was recoded into Poor=1, Middle=2, and Rich=3; occupation was recoded into Not Working=0 and Working=1; marital status was recoded into Not Married=0 and Married=1; parity was recoded into Four and below=0 and More than four=1. Finally contraceptive use was recoded into No modern contraceptive=0 and Uses modern contraceptive=1.

3. Analysis

We made use of both descriptive and inferential analyses in examining whether ANC culminates in SBA in Ghana. With regard to the descriptive analysis, distribution of ANC and SBA together with the selected sociodemographic characteristics of research participants was analysed in frequencies and

Table 1: Distribution of ANC and skilled birth attendance in Ghana (N=5,884).

Socio-demographic Characteristics	Frequency	Percentage (%)	≥ 4 Visits	Skilled Delivery
Age				
15-19	190	4.4	79.2	73.8
20-24	729	16.9	84.2	73.8
25-29	1,039	24.2	87.9	73.9
30-34	1,005	23.4	87.7	71.9
35-39	809	18.8	88.3	74.1
40-44	396	9.2	85.4	67.8
45-49	125	2.9	82.3	56.2
Highest level of Education				
No formal education	1,118	26.0	80.3	53.8
Primary	842	19.6	83.9	69.2
Secondary	2,135	49.7	91.4	85.5
Higher/Tertiary	198	4.6	98.8	98.8
Religious Affiliation				
Christianity	3,284	76.5	87.3	76.0
Traditionalist	126	2.9	64.9	26.0
Islam	721	16.8	90.4	72.8
No Religion	163	3.8	71.0	44.1
Wealth Quintile				
Poor	1,772	41.2	80.6	57.2
Middle	858	20.0	87.5	78.1
Rich	1,664	38.8	96.5	95.6
Occupation				
Not working	749	17.5	82.5	74.7
Working	3,537	82.5	87.3	71.7
Marital Status				
Not Married	1,646	38.3	82.0	71.8
Married	2,648	61.7	88.9	72.5
Residential Status				
Rural	2,310	53.8	82.4	59.9
Urban	1,984	46.2	92.3	89.7
NHIS Subscription				
Not subscribed	1,426	33.2	79.4	63.6
Subscribed	2,867	66.8	89.6	76.1
Parity				
Four and below	3,212	74.8	88.6	77.4
More than four	1,082	25.2	81.0	58.8
Contraceptive use				
No modern contraceptive	3,208	74.7	84.9	70.5
Uses modern contraceptive	1,085	25.3	91.3	77.7

Source: 2014 GDHS.

percentages. These were presented in Table 1. On inferential analysis, we employed binary logistic regression in our investigation. Binary Logistic Regression was employed because the outcome variable assumed a dichotomous nature. All analyses were conducted with the aid of STATA version 13 and the data was weighted with the sample weight factor inherent in the dataset in order to offset the effects of sampling biases.

4. Results

It was realised from the analysis that a significant proportion of Ghanaian women in the reproductive age period are aged 25-29 years (24.2%). As indicated in Table 1, ANC attendance exceeds SBA across all age categories with the widest disparity occurring among 45-49 year aged women where 82.3 percent attained at least four ANC visits whilst SBA stood at 56.2 percent. The study revealed that half of the research participants had attained secondary education (49.7%) whilst only 4.6 percent had attained higher/tertiary education. Except women with higher/tertiary education where the same proportion of those who had at least four ANC visits (98.8%) also had SBA (98.8%), relatively low SBA was recorded across all levels of educational attainment as compared with their ANC visits. It is worthy of note that even though 80.3 percent of uneducated women had at least four ANC visits, SBA among them stood at 53.8 percent.

Table 2: ANC attendance and skilled birth attendance in Ghana.

Independent Variables	Model I	95% CI	Model II	95% CI
ANC				
Less than four	1	[1, 1]	1	[1, 1]
At least four	5.87∗ ∗ ∗	[4.86-7.08]	3.64∗ ∗ ∗	[2.95-4.50]
Age				
15-19			1	[1, 1]
20-24			0.83	[0.55-1.25]
25-29			0.70	[0.46-1.06]
30-34			0.67	[0.44-1.03]
35-39			0.98	[0.63-1.56]
40-44			1.02	[0.62-1.69]
45-49			0.83	[0.46-1.47]
Highest level of Education				
No formal education			1	[1, 1]
Primary			1.53 ∗ ∗∗	[1.24-1.89]
Secondary			2.37 ∗ ∗∗	[1.92-2.94]
Higher/Tertiary			9.13 ∗ ∗	[2.19-37.93]
Religious Affiliation				
Christianity			1	[1, 1]
Traditionalist			0.30 ∗ ∗∗	[0.19-0.46]
Islam			0.96	[0.78-1.18]
No Religion			0.50 ∗ ∗∗	[0.35-0.71]
Wealth Quintile				
Poor			1	[1, 1]
Middle			1.41 ∗ ∗	[1.13-1.75]
Rich			4.27 ∗ ∗∗	[3.02-6.06]
Occupation				
Not working			1	[1, 1]
Working			1.05	[0.84-1.30]
Marital Status				
Not Married			1	[1, 1]
Married			1.14	[0.95-1.37]
Residential Status				
Rural			1	[1, 1]
Urban			2.35 ∗ ∗∗	[1.88-2.93]
NHIS Subscription				
Not subscribed			1	[1, 1]
Subscribed			1.56 ∗ ∗∗	[1.32-1.85]
Parity				
More than four			1	[1, 1]
Four and below			1.36∗	[1.08-1.72]
Contraceptive use				
No modern contraceptive			1	[1, 1]
Uses modern contraceptive			1.24∗	[1.03-1.50]

Exponentiated coefficients; 95% confidence intervals in square brackets; ∗P<0.05; ∗∗ p<0.01; ∗ ∗ ∗ p<0.001.

In consonance with the observation made by the 2010 Population and Housing Census that Christianity is the leading religion in the country, it was noted in the present study that 76.5 percent of the women were Christians with only 2.9 percent being Traditionalists. Generally, ANC was high across all religions. Only 26 percent Traditionalists sought SBA as compared to 64.9 percent who sought at least four ANC visits. Disparity between ANC and SBA occurred among women of all wealth categories with the widest variation occurring among the poor whereby attainment of at least four ANC visits stood at 80.6 percent whereas SBA was 57.2 percent. Analysis of occupation indicated that most of the research participants were working (82.5%). Among these working women, at least four ANC visits (87.3%) exceeded SBA (71.7%). Upon considering the phenomenon across residence, the gap between having at least four ANC visits (82.4%) and SBA (59.9%) was wide. It is worthy of note that ANC visit (81.0%) was high whilst SBA was low (58.8%) among women with more than four children. It was again realised that women using modern contraceptive and had at least four ANC visits (91.3%) were more as compared with SBA (77.7%) occurring among them.

Table 2 presents results of the logistic regression analysis on whether ANC attendance translates into SBA. The results revealed that women having at least four ANC visits were almost six times more likely to seek skilled birth [OR=5.87,

CI=4.86-7.08] as compared to women who had less than four ANC visits. Upon controlling for the effect of sociodemographic characteristics, women who had at least four ANC visits still had higher likelihood of SBA [OR=3.64, CI=2.95-4.50]. When considered across various age categories, it was observed that, apart from women aged 40-44 who were slightly more probable to access SBA [OR=1.02, CI=0.62-1.69], all other women were less probable to seek SBA as compared to those aged 15-19. It was observed that as one's level of education rises, her likelihood of having SBA rises with the highest likelihood been recorded among those with higher/tertiary education [OR=9.13, CI=2.19-37.93]. As compared to Christians, affiliates of all other religions were less probable to have skilled birth, meanwhile, rich women were four times more probable to seek skilled birth as compared to poor women [OR=4.27, CI=3.02-6.06].

Women in the working category were noted to be slightly more likely to have skilled birth as compared to their nonworking counterparts [OR=1.05, CI=0.84-1.30]. Analysis of marital status and SBA also revealed that married women were more probable to have skilled birth as compared to the unmarried [OR=1.14, CI=0.95-1.37]. At the same time, urban residents were about two times more probable to have skilled birth as compared to rural residents [OR=2.35, CI=1.88-2.93]. Women who were subscribed to the NHIS were more probable to seek skilled birth as compared to those not subscribed to the scheme [OR=1.56, CI=1.32-1.85]. The results further indicated that women having maximum of four children were more probable to seek skilled birth as compared to women with more than four children [OR=1.36, CI=1.08-1.72]. It is worthy of note that high tendency of SBA is associated with women using modern contraceptives as compared to those not using modern contraceptives [OR=1.24, CI=1.03-1.50].

5. Discussion

As to whether all women who attain the minimum recommended ANC visits seek SBA has been silent in the Ghanaian literature and as such there was the need for such a study to fill the gap in literature. It was realised that there were high ANC visits as compared to SBA and this was observed across all sociodemographic characteristics with only few instances where SBA equated ANC. This raises several critical questions about why some women would be more concerned about their wellbeing during pregnancy (ANC) but deliver without seeking assistance from qualified healthcare providers (SBA) and why they would prioritise ANC over SBA. This could partly be due to poor personal relationships and unwelcome attitude of health care providers toward clients [26]. Possibly, the women do not enjoy the interactions they had with the care providers during the ANC visits or they prioritise ANC over SBA. In any case, due to the free maternal care policy, delivery services are free and as such cost cannot be a major deterrent unless transportation and other plausible social costs. This observation can possibly be interpreted as limited knowledge of women about the consequences of delivery induced complications.

Despite the observation made between ANC and SBA in the descriptive analysis, it was noted that women who had at least four ANC visits were more likely to seek SBA as compared with their counterparts who had less than four ANC visits during pregnancy. It can be argued that the low SBA could be enhanced by championing ANC because it is through the ANC that health providers educate women on the need for SBA. To seek SBA or otherwise is behavioural and as such might take some time before SBA can commensurate ANC. It is well founded that a greater proportion of maternal mortality cases are recorded either during or within some few hours after delivery. For instance, in 2013 alone, virtually one million newborns died around delivery [27], signifying the need for all women to prioritise SBA. An earlier study investigating the effects of ANC on SBA in rural settings within selected African countries (Ghana, Kenya, Uganda, and Tanzania) had reported that ANC attendance essentially increases the tendency for SBA and this is noted by other researchers as well [12, 28].

It was realised that highly educated women were much inclined toward SBA. Higher education is expected to endow women with basic knowledge of health and wellbeing comprising pregnancy precautions such as the need to seek SBA. With this, highly educated women are expected to, in addition to seeking ANC, have SBA for all their deliveries to guarantee their safety and that of their children. Similar observation was made in Kenya when Gitimu and colleagues [12] investigated determinants SBA. Also, Esena, and Sappor [13] noted that education enhances the tendency for an expectant mother to seek SBA. The findings indicated that wealthier women usually obtain SBA as compared to the poor. Wealth might therefore imply richness in knowledge in pregnancy among Ghanaian women. If so, then it gives a clue that one major way of enhancing SBA in Ghana is to target ways of improving the economic standing of Ghanaian women as wealth has proven to be a protective tool to SBA. Noticing that SBA rises with wealth quintile coincides with an Ethiopian study which investigated the phenomenon in South West Shoa Zone [29].

Rural women were noted to have less tendency of SBA as compared to women in urban Ghana. This is expected considering the dominance of health facilities and care providers in urban areas as compared to the scanty health facilities and limited health care providers in the rural areas. The poor road network linking rural settings to urban areas where professional care can be sought is also a recipe for rural residents to deliver without the assistance skilled professionals. This emphasises the claim by Hosseinpoor, Bergen, Koller, and Prasad et al. [30] that inequalities in access to health care play significant role in service utilisation among rural and urban residents.

It was also observed that owning NHIS has a positive reflection on SBA. NHIS as a pro-poor intervention offers cost free maternal health services and as such every woman registered is more likely to seek SBA bearing in mind that once subscribed to the scheme, maternal services are rendered at no cost. However, unregistered women would be less motivated to access skilled service for delivery upon weighing cost and benefits. This implies that NHIS remains

a cost cutting intervention as established by an earlier study [31]. The findings revealed that women having at most four children were more probable to have SBA than those with more than four children. As women with more than four children are more probable to dwell on their previous delivery experiences and thereby forego SBA, those with less than four children might still be afraid of the possible negativities aligned with delivery and thereby adhere to advice obtained through ANC visits and other sources.

6. Conclusion

The study has illustrated that skilled birth attendance (SBA) is low in Ghana as compared to antenatal care (ANC). Despite this, women having at least four ANC visits are more probable to seek SBA than their counterparts who are not able to attain at least four ANC visits. It was realised that SBA is high among young women, educated and urban women in Ghana. These findings prompt the need to reconsider some aspects of maternal health services in the country. Outcome of the study brings to light some key recommendations needed to enhance SBA in the country. First of all, there is the need for an in-depth qualitative study to explore from both expectant mothers and care providers' perspective about the motivation and deterrents of seeking SBA. In order to increase SBA, interventions need to target women who do not meet the recommended four ANC visits, poor women, those without education, and women who do not use modern contraceptives. An in-depth qualitative study is envisaged to deepen the understanding of these dynamics in the rural setting.

Abbreviations

ANC: Antenatal care
GDHS: Ghana Demographic and Health Survey
PHC: Population and Housing Census
SBA: Skilled birth attendance.

Data Availability

The dataset supporting the conclusions of this article is available in the Measure DHS repository http://www.measuredhs.com.

Ethical Approval

Since secondary data was used, no ethical approval was sought; however, permission was sought from Measure DHS for use of the data.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Linus Baatiema conceived the study, Edward Kwabena Ameyaw conducted the analysis, Aliu Moomin drafted the background, and Mukaila Mumuni Zankawah, Doris Koramah, and Linus Baatiema did the write-up of the methods, results, discussion, and conclusion. All authors proofread the manuscript for important intellectual content.

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