

Factors Affecting Pregnancy Complications in Ghana

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ABSTRACT

Introduction: The prevalence of maternal mortality continues to be a significant health concern across the world. In Ghana, pregnancy-related complications in the previous 5 years account for 12% of all deaths among women 15 to 49 years. More than half of these deaths were avoidable if early assessment had been done. However, assessment of the pooled prevalence of pregnancy-related complications among pregnant women to inform policy is limited. This study sought to determine the factors contributing to pregnancy complications in Ghana. **Methods:** Using a systematic sampling technique, a facility-based cross-sectional study was conducted among 415 pregnant women who attended antenatal care (ANC) services at Mamprobi Hospital. Bivariate and multiple logistics regression analyses were conducted to test significant factors determining pregnancy complications. The results of regression analysis are reported in odds ratio. Statistical significance was set at $p < 0.05$. **Results:** The mean age of the participants was 31.6 ± 6.6 years. The incidence of pregnancy complications among the pregnant women was 51.8% (95% CI, 0.47–0.56). The incidence of pregnancy complications among the women was significantly determined by age (adjusted odds ratio [AOR], 6.1; CI, 1.19–30.76), record of pregnancy complication (AOR, 2.5; CI, 1.35–4.49), ANC visit (AOR, 6.1; CI, 2.14–17.70), and family history of pregnancy complication (AOR, 3.6; CI, 1.25–10.40). Other significant factors included a record of abortion (AOR, 7.8; CI, 4.21–14.32), knowledge about obstetric danger signs (AOR, 2.4; CI, 1.21–4.88), and experiencing at least one obstetric danger sign during pregnancy (AOR, 6.6; CI, 3.30–13.29). **Conclusion:** The incidence of pregnancy complications was comparatively high among the women who used ANC services at Mamprobi Hospital. Early initiation of ANC services for pregnant women is an essential tool for addressing some of the challenges of early onset of some pregnancy complications, including anemia in pregnancy and preeclampsia. Midwives and other health workers who engage pregnant women should encourage their clients to initiate ANC visits at an early stage.

Keywords: pregnancy, complication, danger signs, obstetric

INTRODUCTION

Almost all maternal and child-related deaths (95%) occur in low-income and lower-middle-income nations, with nearly two-thirds (65%) occurring in the region of Africa, which includes Ghana.^[1] Women who live in poverty or rural areas, as well as women who belong to ethnic minorities and indigenous peoples are especially vulnerable.^[1] In middle-income countries like Ghana, pregnancy and abortion complications are the leading cause of death for 15–19-year-olds.^[2] An assessment of all maternal mortality in Ghana over 5 years revealed that approximately 12% of all deaths among 15 to 49-year-olds were related to pregnancy complications. Furthermore, more than half of pregnancy-related deaths were a result of complications that occurred during pregnancy. The 2017 Maternal Health Survey estimated Ghana's pregnancy-related mortality ratio

at 343 deaths per 100,000 live births.^[3] The survey further indicated that most (62%) of these deaths were a result of complications that were not identified at an early stage or were poorly managed when identified.^[3]

The 2017 Ghana Maternal Health Survey classified maternal deaths into three groups: direct maternal death, non-obstetric maternal death, and unspecified maternal deaths.^[3] The survey found that natural maternal deaths accounted for two-thirds of all deaths. In contrast, indirect maternal deaths accounted for more than a quarter of all deaths (27%), and unspecified maternal causes accounted for 6%.^[3]

The Government of Ghana, in the quest to reduce the rate of maternal mortality and limit the rates of pregnancy-related deaths, introduced the Free Maternal Healthcare Policy in 2008 across the country.^[4] The focus of this policy was to increase access to maternal health care as a means to address all maternal health-related problems and reduce

the number of maternal-related deaths among pregnant women.^[5] Although the policy seeks to reduce the barriers to financial and geographical access to maternal care services, it also aims to increase skilled personnel at all levels (prenatal, intranatal, and postnatal) to identify complications and address them accordingly and efficiently. However, with more than a decade of implementation of the policy, the rate of pregnancy-related deaths remains relatively higher and lags behind the Sustainable Development Goals (SDGs).^[1,5]

At Mamprobi Hospital in Accra, Ghana, prior studies have shown that more than 35% of all pregnant women initiate their antenatal care (ANC) attendance in the second to third trimester.^[6] When ANC commences, it helps identify early complications, which helps to manage them earlier. In all, 5962 antenatal visits were done at least once in 2018 and 2019 and later increased to 7111 in 2020. In 2018, 61.3% of the women who attended ANC services had at least four antenatal visits.^[6] However, this decreased from 61.3% in 2018 to 38.4% in 2019 and 21.3% in 2020.^[6] The annual report further noted that most women who attended fewer than four visits also initiated ANC relatively late. In 2019, approximately 5.2% of pregnant women began ANC very late compared with the previous year.

Further, the institutional maternal mortality ratio was 112 deaths per 100,000 live births in 2018, all of which were because of pregnancy-related complications.^[6] The factors associated with pregnancy-related complications are not clearly understood. Therefore, this study sought to address this known gap, which may help determine appropriate interventions.

METHODS

Ethical clearance was obtained from the Ghana Health Service Ethics Review Committee, and consent for the study participation was sought from each participant.

Study Setting

This study was conducted at the Mamprobi Hospital in the Ablekuma South Municipality of the Greater Accra Region. Established in the early 1960s, the hospital was a polyclinic providing primary services until 2019. The hospital is now a referral point for direct maternal health care services in the region.

Study Design

We conducted a facility-based, cross-sectional design. A questionnaire was used to determine the incidence of pregnancy complications.

Study Population

The study population was pregnant women who attended ANC services at Mamprobi Hospital between July and September, 2021, irrespective of their gestation period. Pregnant women who did not have a hospital card to

receive ANC services, as well as those who were indisposed due to ill health, were excluded.

Sample Size and Sampling Method

The minimum sample size for this study was determined by the Cochran formula^[7] using the single population proportion formula. The sample size was determined based on the following assumptions: 95% confidence level at the standard value of 1.96, 5% margin of error, and 43.1% proportion of pregnant women presenting with pregnancy complications at ANC service.^[8] After adjusting for a 10% nonresponse rate, the desired sample size for the study was 415. We used a simple random sampling method to select participants.

Data Analysis

Data were analyzed using Stata/IC 17.0 and reported using descriptive statistics. Household wealth was estimated using principal component analysis. The household wealth index was categorized into five quantiles, ranging from 1–5, where 1 represented extremely poor and 5 the least poor. The incidence of pregnancy complications was estimated as per the proportion of the women who were diagnosed with at least one of the pregnancy complications. The factors associated with the incidence of pregnancy complications were analyzed at two levels. At the first level, inferential statistics using bivariate analysis was done, and the results were reported in chi-square and *p*-values. At the second level, all significant variables were further adjusted, and the results of the multiple regression analysis were reported in odds ratios. All analysis of the test of association was done at a 95% confidence interval with a significance level of ≤ 0.05 .

RESULTS

Sociodemographic Characteristics

A total of 415 participants were included in the study (100% response rate). Table 1 presents their sociodemographic characteristics. The participants' mean (\pm SD) age was 31.6 (\pm 6.6). Of the study participants, 66 (15.9%) were aged 40+, 322 (77.6%) were Christians, 162 (39.0%) had attained tertiary education, 271 (65.3%) were self-employed, and 385 (92.8%) lived in urban areas. In addition, 234 (56.4%) of the pregnant women were married, with 10 (4.3%) of the married women in polygamous marriages. A total of 171 (41.2%) were of the Ga ethnic group, 406 (97.8%) used insurance for accessing maternal healthcare services, 135 (30.0%) had a monthly income below the minimum wage, 96 (23.1%) had partners who completed tertiary education, and 270 (65.1%) had partners who were self-employed.

Household wealth index results (Table 2) show that 89 (21.4%) of the women were extremely poor (mean score of 1), and 143 (34.5%) were less poor (mean score of 4). Overall, the mean household wealth score was 2.8 ± 1.25 .

Table 1. Sociodemographic characteristics of respondents (N = 415)

Variables	Number	Percent
Age, y (mean \pm SD)	31.6 \pm 6.6	
15–19	20	4.8
20–24	50	12.1
25–29	92	22.2
30–34	88	21.2
35–39	99	23.8
40+	66	15.9
Religion		
Christianity	322	77.6
Islam	93	22.4
Education level		
No education	54	13.0
Basic	27	6.5
Secondary	172	41.5
Tertiary	162	39.0
Employment		
Housewife	7	1.7
Employee/Salary worker	95	22.9
Self-employed	271	65.3
No work	17	4.1
Others	25	6.0
Residence		
Rural (reside in coastal communities in Ga East)	30	7.2
Urban	385	92.8
Marital status		
Single	82	19.8
Married	234	56.4
Cohabiting	99	23.8
Type of marriage		
Monogamous	224	95.7
Polygamous	10	4.3
Ethnicity		
Akan	115	27.7
Ewe	64	15.4
Ga	171	41.2
Northern origin	65	15.7
Insurance users		
Use insurance	406	97.8
Does not use insurance	9	2.2
Income levels		
<GHS 340 (minimum wage)	135	30.0
GHS 340–GHS 999	228	50.7
GHS 1000+	87	19.3
Partner's education		
No education	3	0.7
Basic	67	16.2
Secondary	249	60.0
Tertiary	96	23.1
Partner's employment		
Employee	120	28.9
Self-employed	270	65.1
Casual worker	17	4.1
Other	8	1.9

out of 5. Most women were within the lowest quantile of the household wealth index.

Obstetric Characteristics

The obstetric characteristics of the women are presented in Table 3, including age of first sex and number of

Table 2. Household wealth index

Wealth Quantiles	Number (%)
Extreme poor	89 (21.4)
Very poor	77 (18.5)
Poor	85 (20.5)
Less poor	143 (34.5)
Least poor	21 (5.1)

pregnancies. A total of 147 (37.5%) women had a history of pregnancy complications, and 94 (22.6%) had fewer than four ANC visits; however, 314 (75.7%) initiated ANC visits after the first trimester. In addition, 371 (89.4%) did not indicate any family history of pregnancy complications, and 214 (51.6%) had at least one abortion in the past.

During the study period, the incidence of pregnancy complications was 51.8% (215), and 38 (18.0%) of those had multiple complications. Common pregnancy complications included anemia (40.6%), preeclampsia (15.8%), hypertensive disorders (13.5%), gestational diabetes (6.0%), and frequent vaginal bleeding (4.5%). Most 302 (72.8%) women experienced at least one danger sign during their pregnancy.

Factors Associated With the Incidence of Pregnancy Complications

Results of bivariate and multiple regression analyses are presented in Table 4. After adjusting for 10 variables that were significant at the univariate level, the factors that had a significant association with pregnancy complications were age, personal or family history of pregnancy complications, timing of first ANC visit, history of abortion, and the presence of danger signs. Pregnant women over 40 years old were six times more likely to experience pregnancy complications compared with 15–19-year-old females (adjusted odds ratio [AOR] 6.1; CI 1.2–30.7). Women with a history of at least one pregnancy complication were approximately two times more likely to develop complications than women with no history of pregnancy complications (AOR 2.5; CI 1.3–4.5).

The odds of developing complications during pregnancy were approximately three and six times higher among women who began their ANC visits in the second and third trimester, respectively, compared with women who began in the first trimester (AOR 2.9, CI 1.4–5.9; AOR 6.1, CI 2.1–17.7). The odds of experiencing pregnancy complications were approximately four times higher among women who had a family history of pregnancy complications than women with no family history (AOR 3.6; CI 1.2–10.4). The odds of pregnancy complications were approximately eight times higher among women with a record of abortion compared with women with no record of abortion (AOR 7.8; CI 4.2–14.3). Women who were experiencing at least one obstetric danger sign were approximately seven times more likely to experience pregnancy complications than women with no obstetric danger sign (AOR 6.6; CI 3.3–3.3).

Table 3. Obstetric characteristics among pregnant women using ANC services

Variables	Number	Percent
Age range at first sex (mean \pm SD)	21.1 \pm 0.3	
15–19	88	21.2
20–24	232	55.9
25–29	83	20.0
30–34	12	2.9
Parity		
Nulliparous	83	20.0
Primiparous	79	19.0
Multiparous	236	57.4
Grand multiparous	15	3.6
Gravidity		
Primigravida	25	6.0
Multigravida	390	94.0
Personal history of pregnancy complication		
Yes	147	37.4
No	246	62.6
Number of ANC visits		
<4 visits	94	22.6
4–7 visits	317	76.4
8+ visits	4	1.0
First ANC visit		
First trimester	101	24.3
Second trimester	268	64.6
Third trimester	46	11.1
Family history of pregnancy complication		
Yes	215	51.8
No	200	48.2
History of abortion		
Yes	44	10.6
No	371	89.4
Currently diagnosed with a pregnancy complication		
Yes	214	51.6
No	201	48.4
Types of pregnancy complications		
Anemia	168	40.6
Preeclampsia	66	15.8
Hypertensive disorders	56	13.5
Gestational diabetes	25	6.0
Frequent vaginal bleeding	19	4.5
Multiple complications	66	15.8
Others	16	3.8
Number of pregnancy complication		
Single complication	177	82.0
Multiple complications	38	18.0
Experience any danger signs		
Yes, I experienced danger signs at least once	302	72.8
Never experienced danger sings	113	27.2

ANC: antenatal care.

DISCUSSION

The study observed a pregnancy complication incidence rate of 51.6%, with preeclampsia, anemia, and hypertensive disorders contributing mainly to the incidence of pregnancy complications among pregnant women. Other factors include age, history of pregnancy complication, timing of first ANC visit, and presence of obstetric danger signs.

The World Health Organization (WHO) explained that pregnancy complications have become a significant health

Table 4. Multivariate analysis of factors associated with pregnancy complications among pregnant women

Variables	Odds Ratio	CI (95%)	p-Value
Age range, y			
15–19	1	—	—
20–24	0.2	0.04–1.18	0.078
25–29	0.8	0.18–4.00	0.835
30–34	1.1	0.24–5.04	0.898
35–39	2.4	0.53–11.29	0.251
40+	6.1	1.19–30.76	0.030
Education level			
No education	1	—	—
Basic	1.3	0.28–5.60	0.756
Secondary	0.7	0.26–2.05	0.551
Tertiary	0.5	0.19–1.49	0.231
Residence			
Rural	1	—	—
Urban	0.9	0.30–2.96	0.922
Income levels			
<GHS 500	4.1	0.67–25.36	0.126
GHS 500–999	3.8	0.62–23.00	0.151
GHS 1000–1499	3.0	0.47–18.94	0.248
GHS 1500+	1	—	—
Gravidity			
Primigravida	—	—	—
Multigravida	1	—	—
Personal history of pregnancy complication			
Yes	2.5	1.35–4.49	0.003
No	1	—	—
First ANC visit			
First trimester	1	—	—
Second trimester	2.9	1.39–5.93	0.004
Third trimester	6.1	2.14–17.70	0.001
Family history of pregnancy complication			
Yes	3.6	1.25–10.40	0.018
No	1	—	—
History of abortion			
Yes	7.8	4.21–14.32	0.000
No	1	—	—
Ever experienced any danger sign			
Yes	6.6	3.30–13.29	0.000
No	1	—	—

concern in most developing countries, with rates exceeding 40% in most cases.^[1] The expectation of WHO in the 2020 maternal health updates was to limit the rate to below 25% globally.^[1] This study's finding of pregnancy complications is relatively higher than the expected WHO rate. Studies in other developing countries found lower rates of 17.4%, 43.1%, and 41.3%.^[8–10] A study in Tanzania among urban women observed an incidence of 17.4%, far lower than the observed result in our study.^[9] Other studies in Ghana have the estimated incidence of pregnancy complications to be 50.1% and 51.2%.^[11,12]

In the recent 2020 annual performance report, Ghana Health Service indicated that anemia in pregnancy remains one of the pregnancy complications that affects the overall performance of maternal indicators. Unsurprisingly, this study observed a high incidence of anemia (40.6%). Other

studies on anemia in pregnancy have reported similar rates. A survey in Sunyani observed a significantly higher rate of 50%, which is relatively higher than the result of our study, suggesting that pregnant women in Ghana have issues with blood count, culminating in anemia challenges.^[11] Although dietary intake plays a significant role in the blood count of pregnant women, we did not assess anemia-specific factors. Introducing folic acid for women who attend ANC services is expected to improve their hemoglobin levels. The impact of folic acid may be realized if women begin ANC services in the first trimester.^[12]

Preeclampsia was the second-highest pregnancy complication recorded in this study. Comparatively, incidence of preeclampsia was lower than two other studies in Ghana and higher than one study.^[13–15] Findings outside Ghana tend to report lower levels of preeclampsia compared with our study. Another significant pregnancy complication observed in this study was hypertensive disorder, with an incidence rate of 13.5%.^[16–18] In the past decade, hypertensive disorder has consistently remained one of the factors contributing to maternal mortalities in Ghana.^[3] Other studies have reported a higher incidence of hypertensive disorders than our study.^[13,19,20]

The Ministry of Health and the Ghana Health Service should be able to develop strategies to address the high risk of pregnancy complications among pregnant women in the municipality and the country. Early initiation of ANC services for pregnant women is an essential tool for addressing some of the challenges of early onset of some pregnancy complications, including anemia in pregnancy and preeclampsia. Midwives and other health workers who engage pregnant women should encourage their clients to initiate ANC visits early. Reducing anemia in pregnancy is a significant intervention that must be thought through and well-implemented. The provision of calcium and folic acid to pregnant women should be strengthened in the facility to ensure that women receive adequate supplements at an early stage of pregnancy to limit the risk of anemia. Also, early diagnosis of preeclampsia (gestation week 20) helps to provide appropriate intervention to prevent the occurrence of preeclampsia. Midwives are therefore encouraged to frequently conduct early screening for preeclampsia while delivering the necessary supplements that reduce the risk of blood pressure and proteinuria.

The age of the pregnant women was significantly associated with pregnancy complications. As the age of a woman increases, she is exposed to critical maternal health challenges because of reproductive health system and hormonal changes as well as increasing blood pressure.^[1,21–30] A survey in Hohoe observed that women with a family history of hypertension and a record of preterm delivery have higher odds of experiencing some major pregnancy complications.^[24] Other studies have reported higher odds of developing pre-eclampsia for women with a family predisposition for it and/or history of hypertension^[31–37]

The WHO recommends continuous attendance to ANC from the first trimester to the final delivery, with at least eight antenatal visits.^[38] Attendance at ANC has been described as pivotal for implementing comprehensive maternal health interventions. However, the utilization of ANC services in most developing countries has remained the same.^[39] One study noted that a substantial proportion of women begin ANC attendance in the third trimester, which is associated with a significantly greater risk of anemia in pregnancy.^[39] Other studies have reported similar results.^[12,15,29]

Limitations

This study was limited to a single center in Ghana, so we did not include pregnant women who reside in the district but did not attend ANC services in our facility. Similarly, without data on previous pregnancy complications, but the study was limited to studying only the incidence during the study period. Despite these limitations, the results were consistent with similar studies conducted in Ghana.

CONCLUSION

The results of this study provide a platform for addressing some root causes of pregnancy complications in Ghana. Critical interventions such as early initiation of ANC services and providing calcium and folic acid supplements to pregnant women should be strengthened in the country. Similarly, early diagnosis of preeclampsia at gestation week 20 helps to provide appropriate intervention to prevent the occurrence of preeclampsia.

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