

**Title:** Factors influencing choice of women's delivery venue in predominantly rural communities across the three ecological zones in Ghana: a cross-sectional study

**Background:** Maternal and neonatal mortality indicators remain high in Ghana and other sub-Saharan African countries. Both maternal and neonatal health outcomes improve when skilled personnel provide delivery services within health facilities, as they are most likely to provide necessary emergency obstetric and neonatal care. Determinants of delivery location are therefore crucial, but little has been studied about them in rural Ghana. This study explored factors influencing delivery location in predominantly rural communities in Ghana.

**Methods:** Data were collected from 1,500 women aged 15–49 years with live or stillbirths that occurred between July and September 2013. This was done within the catchment area of the Health and Demographic Surveillance Systems of the Dodowa (Greater Accra Region), Kintampo (Brong Ahafo Region), and Navrongo (Upper-East Region) Health Research Centres in Ghana. For data analysis, we used multivariable logistic regression to adjust for covariates that were statistically significant from univariable regression models.

**Results:** When compared to Dodowa, multivariable logistic regression showed that deliveries were more likely to happen within health facilities in Navrongo (adjusted odds ratio [AOR] = 13.42 [95% confidence interval (CI): 2.46, 73.11 P = 0.003]), while Kintampo showed no significant associations. Women who were advised/counselled by healthcare providers were more likely to deliver within health facilities (AOR = 17.74 [95% CI: 6.63, 47.47 P < 0.001]). Women with valid health insurance (AOR = 1.89 [95% CI: 1.18, 2.94 P = 0.007]) were more likely to deliver in health facilities than were those without it. Wealthier women belonging to the highest wealth quintile (AOR = 11.41 [95% CI: 3.99, 32.70 P < 0.001]), the fourth quintile (AOR =

6.20 [95% CI: 2.76, 13.93 P < 0.001]), and the middle quintile (AOR = 3.35 [95% CI: 1.68, 6.69 P = 0.001]) respectively were more likely to deliver in health facilities than the poorest, i.e. those of the lowest wealth quintile.

**Conclusion:** Delivery location was influenced by the healthcare providers' advising/counselling women on the importance of delivery in health facilities and women's possession of valid health insurance coverage. These factors should be leveraged to improve the rates of health facility delivery in rural communities.

**Table 1: Background characteristics of study participants**

Place of delivery	Outside health facility		Within health facility		Total n (%)
	Frequency [n]	Percent [%]	Frequency [n]	Percent [%]	
<b>Age of mother</b>					
10–19	30	2.0	100	6.8	130 (8.8)
20–29	176	11.9	570	38.5	746 (50.4)
30–39	129	8.7	377	25.5	506 (34.2)
40–49	21	1.4	76	5.1	97 (6.6)
Total	356	24.1	1123	75.9	1479 (100.0)
<b>Age of partner</b>					
< 29	60	5.7	242	23.1	302 (28.8)
30–39	86	8.2	387	36.9	473 (45.1)
40–49	43	4.1	167	15.9	210 (20.0)
> 50	12	1.1	51	4.9	63 (6.0)
Total	201	19.2	847	80.8	1048 (100.0)
<b>Marital status</b>					
Married	191	12.8	719	48.1	910 (60.8)
Cohabiting	122	8.2	272	18.2	394 (26.3)
Divorced/separated/widowed	11	0.7	37	2.5	48 (3.2)
Never married	41	2.7	103	6.9	144 (9.6)
Total	365	24.4	1131	75.6	1496 (100.0)
<b>Ethnicity</b>					
Northern tribes	140	9.9	503	35.4	643 (45.2)
Akan	100	7.0	253	17.8	353 (24.8)
Ga/Adangbe/Ewe	41	2.9	195	13.7	236 (16.6)
Others	69	4.9	120	8.4	189 (13.3)
Total	350	24.6	1071	75.4	1421 (100.0)
<b>Religion</b>					
Christian	191	13.4	598	42.0	789 (55.4)
Islam	77	5.4	132	9.3	209 (14.7)
Traditional	66	4.6	286	20.1	352 (24.7)
Other	17	1.2	58	4.1	75 (5.3)

Total	351	24.6	1074	75.4	1425 (100.0)
<b>Educational attainment of mother</b>					
None	199	13.3	385	25.7	584 (39.0)
Primary	90	6.0	254	17.0	344 (23.0)
Middle/JSS/JHS	67	4.5	356	23.8	423 (28.3)
Secondary/SSS/SHS/Tech/Voc	8	0.5	103	6.9	111 (7.4)
Tertiary and above	1	0.1	33	2.2	34 (2.3)
Total	365	24.4	1131	75.6	1496 (100.0)
<b>Educational attainment of partner</b>					
None	142	10.4	290	21.2	432 (31.6)
Primary	54	3.9	140	10.2	194 (14.2)
Middle/JSS/JHS	93	6.8	326	23.8	419 (30.6)
Secondary/SSS/SHS/Tech/Voc	32	2.3	189	13.8	221 (16.1)
Tertiary and above	8	0.6	95	6.9	103 (7.5)
Total	329	24.0	1040	76.0	1369 (100.0)
JSS: Junior Secondary School; JHS: Junior High School; SSS: Senior Secondary School; SHS: Senior High School; Tech: Technical School; Voc: Vocational School					

**Table 2: Determinants of delivery venue across the three HDSS sites**

Characteristics	Univariate logistic regression			Multivariate logistic regression		
	OR	95% CI	P-value	AOR	95% CI	P-value
<b>Age of mothers (N = 1479)</b>						
10–19 years	1			-	-	-
20–29 years	0.97	0.63–1.51	0.898	-	-	-
30–39 years	0.88	0.56–1.38	0.570	-	-	-
40–49 years	1.09	0.58–2.04	0.799	-	-	-
<b>Age of partners (N = 1048)</b>						
< 29	1					
30–39	1.12	0.77–1.61	0.558	-	-	-
40–49	0.96	0.62–1.49	0.866	-	-	-
> 50	1.05	0.53–2.10	0.882	-	-	-
<b>Mother's educational attainment (N = 1496)</b>						
None	1			1		
Primary	1.46	1.09–1.96	0.012	0.65	0.36–1.20	0.167
Middle/JSS/JHS	2.75	2.01–3.75	< 0.001	1.35	0.71–2.58	0.367
Secondary/SSS/SHS/Tech/Vocation	6.66	3.12–13.94	< 0.001	1.12	0.34–3.74	0.855
Tertiary and above	17.06	2.32–125.63	0.005	0.93	0.08–11.08	0.955
<b>Partner's educational attainment (N = 1369)</b>						
None	1			1		
Primary	1.27	0.88–1.84	0.210	0.49	0.23–1.04	0.064
Middle/JSS/JHS	1.72	1.26–2.33	0.001	1.15	0.62–2.15	0.661
Secondary/SSS/SHS/Tech/Vocation	2.89	1.89–4.42	< 0.001	1.06	0.48–2.31	0.888
Tertiary and above	5.82	2.75–12.30	< 0.001	0.71	0.20–2.46	0.588
<b>Desire for pregnancy (N = 1496)</b>						
Wanted at time of conception	1			-	-	-
Wanted later	0.79	0.61–1.02	0.070	-	-	-
Did not want at all	0.73	0.49–1.09	0.122	-	-	-

<b>Number of births at last delivery (N = 1496)</b>						
≤ 4 children	1			1		
> 4 children	0.72	0.56–0.92	0.009	1.09	0.64–1.86	0.744
<b>Marital status (N = 1496)</b>						
Married	1			1		
Cohabiting	0.59	0.45–0.77	< 0.001	0.63	0.33–1.24	0.183
Divorced/separated/widowed	0.89	0.45–1.79	0.750	0.87	0.27–2.89	0.825
Never married	0.67	0.45–0.99	0.045	0.88	0.39–1.97	0.748
<b>Ethnicity (N = 1421)</b>						
Northern tribes	1			1		
Akan	0.70	0.52–0.95	0.021	0.45	0.12–1.71	0.240
Ga/Adangbe/Ewe	1.32	0.90–1.95	0.154	1.97	0.82–4.74	0.132
Others	0.48	0.34–0.69	< 0.001	0.98	0.49–1.94	0.945
<b>Religion (N = 1425)</b>						
Christian	1			1		
Islam	0.55	0.40–0.76	< 0.001	0.72	0.35–1.48	0.260
Traditional	1.38	1.01–1.89	0.042	0.43	0.15–1.22	0.113
Other	1.09	0.62–1.92	0.766	1.69	0.58–4.94	0.340
<b>Antenatal care attendance (N = 1496)</b>						
≤ 3 times	1			1		
> 3 times	3.28	2.42–4.45	< 0.001	1.59	0.83–3.05	0.162
<b>Education on danger signs of pregnancy during antenatal care (N = 1471)</b>						
No	1			1		
Yes	1.44	1.11–1.87	0.006	1.12	0.68–1.83	0.659
<b>HDSS sites (N = 1496)</b>						
Dodowa	1			1		
Kintampo	0.51	0.39–0.67	< 0.001	0.65	0.20–2.07	0.466
Navrongo	2.65	1.87–3.77	< 0.001	13.41	2.46–73.11	0.003
<b>Influence on woman's decision on delivery venue (N = 1496)</b>						
Non-healthcare provider	1			1		
Healthcare provider	21.52	10.56–43.85	< 0.001	17.74	6.63–47.47	< 0.001
<b>Possess valid health insurance and provided evidence of it (N = 1090)</b>						
No	1			1		
Yes	2.15	1.59–2.90	< 0.001	1.87	1.18–2.94	0.007
<b>Socioeconomic status/wealth quintiles (N = 1377)</b>						
Lowest	1			1		
Second	1.40	0.96–2.03	0.083	0.937	0.51–1.74	0.837
Middle	1.93	1.31–2.84	0.001	3.348	1.68–6.69	0.001
Fourth	3.97	2.59–6.06	< 0.001	6.197	2.76–13.93	< 0.001
Highest	9.37	5.28–16.62	< 0.001	11.415	3.99–32.70	< 0.001
HDSS: Health and Demographic Surveillance System; OR: odds ratio; AOR: adjusted odds ratio; CI: confidence interval; JSS: Junior Secondary School; JHS: Junior High School; SSS: Senior Secondary School; SHS: Senior High School; Tech: Technical School; Voc: Vocational School						