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## What influences home delivery among women who live in urban areas in Ghana? Analysis of 2014 Ghana Demographic and Health Survey data --Manuscript Draft--

<b>Manuscript Number:</b>	PONE-D-20-23864
<b>Article Type:</b>	Research Article
<b>Full Title:</b>	What influences home delivery among women who live in urban areas in Ghana? Analysis of 2014 Ghana Demographic and Health Survey data
<b>Short Title:</b>	What influences home delivery among women who live in urban areas in Ghana
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<b>Keywords:</b>	Home delivery; Maternal mortality; Ghana; Women's health; Public health; Global health
<b>Abstract:</b>	<p><b>Background</b></p> <p>The present study investigated factors associated with home delivery among urban women in Ghana. Data for this study were obtained from the 2014 Ghana Demographic and Health Survey.</p> <p><b>Materials and Methods</b></p> <p>We used data of 1,441 women aged 15-49 who had ever given birth and were dwelling in urban areas. By the use of STATA version 14.2, we conducted both descriptive and multivariable logistic regression analyses and tested the results at 95% confidence interval.</p> <p><b>Results</b></p> <p>The study revealed that, compared to women who lived in the Northern region, women who lived in the Brong Ahafo region [AOR=0.38, CI=0.17-0.84] were less likely to deliver at home. The likelihood of home delivery was high among women in the poorest wealth quintile [AOR=2.02, CI=1.06-3.86], women who professed other religions [AOR=3.45; 1.53-7.81], and those who had no ANC visits [AOR=7.17; 1.64-31.3]. Conversely, the likelihood of home delivery was low among women who had attained secondary/higher education [AOR=0.30; 0.17-0.53], compared to those with no formal education.</p> <p><b>Conclusion</b></p> <p>The study identified region of residence, wealth quintile, religion, ANC visits, and educational attainment as predictors of home delivery. Therefore, health promotion programs targeted at home delivery need to focus on these factors. We also recommend that a qualitative study be conducted to investigate the factors responsible for the differences in home delivery in terms of region, as the present study could not do so.</p>
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Additional data availability information:

# 1 What influences home delivery among women who live in 2 urban areas in Ghana? Analysis of 2014 Ghana Demographic 3 and Health Survey data

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45 **Abstract**

46 **Background**

47 The present study investigated factors associated with home delivery among urban women in  
48 Ghana. Data for this study were obtained from the 2014 Ghana Demographic and Health Survey.

49 **Materials and Methods**

50 We used data of 1,441 women aged 15-49 who had ever given birth and were dwelling in urban  
51 areas. By the use of STATA version 14.2, we conducted both descriptive and multivariable logistic  
52 regression analyses and tested the results at 95% confidence interval.

53 **Results**

54 The study revealed that, compared to women who lived in the Northern region, women who lived  
55 in the Brong Ahafo region [AOR=0.38, CI=0.17-0.84] were less likely to deliver at home. The  
56 likelihood of home delivery was high among women in the poorest wealth quintile [AOR=2.02,  
57 CI=1.06-3.86], women who professed other religions [AOR=3.45; 1.53-7.81], and those who had  
58 no ANC visits [AOR=7.17; 1.64-31.3]. Conversely, the likelihood of home delivery was low  
59 among women who had attained secondary/higher education [AOR=0.30; 0.17-0.53], compared  
60 to those with no formal education.

61 **Conclusion**

62 The study identified region of residence, wealth quintile, religion, ANC visits, and educational  
63 attainment as predictors of home delivery. Therefore, health promotion programs targeted at home  
64 delivery need to focus on these factors. We also recommend that a qualitative study be conducted  
65 to investigate the factors responsible for the differences in home delivery in terms of region, as the  
66 present study could not do so.

67  
68 **Keywords:** Home delivery; Maternal mortality; Ghana; Women's health; Public health;  
69 Global health

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72 **Background**

73 One issue that has always been of public health concern is high maternal mortality. Because of  
74 this, the international community has always placed premium on reducing maternal mortality. For  
75 example, the then Millennium Development Goals (MDGs) aimed at reducing maternal mortality  
76 by 75% by the year 2015 [1,2]. While this aim saw a significant decline in maternal mortality rates  
77 in countries all over the world, Ghana could not achieve this target, as maternal mortality reduced  
78 only by 45% by the end of 2015 [3]. After the MDGs came the Sustainable Development Goals  
79 (SDGs), which also targets improvements in women's health, including reduction of maternal  
80 mortality. Specifically, target 3.1 of the SDGs aims at reducing the global maternal mortality ratio  
81 to less than 70 per 100,000 live births by the year 2030 [4,5]. Despite this, the world still struggles  
82 with maternal mortality, with sub-Saharan African countries disproportionately affected [5], with  
83 351 per 100,000 live births [6]. In the context of Ghana, as of 2017, the maternal mortality ratio  
84 stood at 310 deaths per 100,000 births [7]

85 A larger percentage of maternal mortalities in Ghana is caused by pregnancy-related issues  
86 such as obstetric complications, which result in death during pregnancy, childbirth, or within 42  
87 days after delivery [5]. This implies that maternal mortality can be reduced by ensuring that women



88 have better maternal healthcare services, including skilled birth delivery [5]. Over the years, the  
89 government of Ghana has attempted to improve access to maternal healthcare services. In 2003,  
90 the government, for example, introduced the waiver of delivery fees, and by 2005, fees on delivery  
91 care were abolished in all the then 10 regions of the country [8]. This was followed by the  
92 introduction of the National Health Insurance Scheme (NHIS) in 2005. The NHIS allows all  
93 pregnant women under the scheme to have free access to maternal healthcare services, including  
94 antenatal care, delivery services, postnatal care, and neonatal care [9]. This program saw a decrease  
95 in home delivery from 45% in 2007 to 20% in 2017 [7]. However, there are rural-urban  
96 differentials in terms of home delivery, with the prevalence of home delivery in rural areas being  
97 40%, as compared to 10.2% in urban areas [10]. Besides, 9% of women in urban areas are likely  
98 to deliver without a skilled provider [11].

99 While the prevalence of home delivery appears to be relatively low in Ghana, there are still  
100 some barriers that obstruct women from using skilled birth attendants, despite the waiver of  
101 delivery fees, and this consequently puts women at increased risk of infections and maternal  
102 mortality [12, 13]. In view of this, more efforts are needed to significantly reduce maternal  
103 mortality in Ghana, if the country is to achieve the objectives of SDG 3.1. To this end, it is needful  
104 to reveal factors associated with home delivery, as such factors will provide useful information to  
105 interventions aimed at reducing maternal mortality in Ghana. In Ghana, a few studies have been  
106 conducted in this regard. Studies by Ganle et al. [14] and Boah et al. [15] in Northern Ghana and  
107 the Builsa South District of the Upper West region, respectively, identified fewer antenatal care  
108 visits, lack of health insurance, living in a male-headed household, being unexposed to media,  
109 parity, poor attitude of nurses, lack of transportation, cost of delivery kits, and traditional beliefs  
110 and practices as predictors of home delivery. However, these studies focused more on rural areas,  
111 ignoring the fact that a considerable number of women in urban areas still use home delivery  
112 services. The present study departs from previous ones by assessing the factors associated with  
113 home delivery in urban Ghana.

## 114 **Materials and Methods**

### 115 **Data source**

116 The study used data from the 2014 Demographic and Health Survey (DHS) of Ghana. DHS is a  
117 nationwide survey collected every five-year period across low- and middle-income countries.  
118 Women's file was used for this study and contains the responses by women aged 15 and 49. The  
119 survey targets core maternal and child health indicators such as unintended pregnancy,  
120 contraceptive use, skilled birth attendance, immunisation among under-fives, and intimate partner  
121 violence. Stratified dual-stage sampling approach was employed and the same questions were  
122 posed to all women. Selection of clusters (i.e. enumeration areas [EAs]) is the first step in the  
123 sampling process, followed by systematic household sampling within the selected EAs. The  
124 second step involves the selection of households from the predefined clusters. For the purpose of  
125 this study, only women in the urban areas who had ever given birth and had complete cases on all  
126 the variables considered for the study were included (N=1,441). Details of the methodology  
127 employed by the GDHS can be found in the final report [16]. We relied on the Strengthening the  
128 "Reporting of Observational Studies in Epidemiology" (STROBE) statement in writing the  
129 manuscript.

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## 133 **Study variables definition**

### 134 **Outcome variable**

135 The outcome variable employed for this study was “home delivery” which was obtained from the  
136 question, “Where did you deliver?” Responses to this question were coded respondent’s home,  
137 other home, government hospital, government health centre/clinic, government health post/CHPS,  
138 other public, private hospital/clinic, **maternity homes** and others. It was then dichotomised into  
139 facility delivery= 0 and home delivery=1, where respondent’s home and other home were group  
140 as “home delivery” and all the other categories were grouped as “facility delivery.”

### 141 **Explanatory variables**

142 The study considered twelve explanatory variables. These are age, region, religion, ethnicity,  
143 educational level, marital status, wealth status, employment, parity, sex of household head,  
144 antenatal visits, and decision-making for healthcare. These variables were not determined a priori;  
145 instead, they were determined based on parsimony, theoretical relevance, and practical  
146 significance with place of delivery [17, 18,19]. The categorization of the variables can be found in  
147 Table 1.

### 148 **Statistical analysis**

149 The statistical software STATA version 14.0 was used to process the data. Both bivariate and  
150 multivariate analyses were employed in this study and results were tested at 95% confidence  
151 interval. Bivariate analysis was conducted to show the proportion of home deliveries across socio-  
152 demographic characteristics with their significance levels and chi-square values ( $\chi^2$ ). Multivariate  
153 analysis (binary logistic regression) was further conducted. Only the variables that showed  
154 statistical significance in the bivariate analysis were used for the regression analysis. Before the  
155 binary logistic regression analysis, we conducted a multicollinearity test of all the statistically  
156 significant variables using the variance inflation factor (VIF), and it showed no evidence of  
157 collinearity among the explanatory variables (Mean VIF=1.32, Max VIF=1.57, Minimum=1.02).  
158 The results were presented as adjusted odds ratios, with their corresponding 95% confidence  
159 intervals signifying their level of precision. Statistical significance was declared at  $p < 0.05$ . Sample  
160 weight was applied and the survey command (svy) was used to account for the complex sampling  
161 design of the survey.

### 162 **Ethical Approval**

163 The survey reported that ethical approval was granted by the Institutional Review Board of ICF  
164 International and Ethical Review Committee of Ghana Health Service (Ghana Statistical Service,  
165 Ghana Health Service & ICF Macro, 2015). We further obtained permission from the DHS  
166 Program for use of this data for the study. Data is available on [https://](https://dhsprogram.com/data/dataset)  
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168

## 169 **Results**

### 170 **Distribution of the prevalence of home deliveries among women in the urban** 171 **areas**

172 Table 1 presents results on the distribution of the prevalence of home deliveries among women in  
173 the urban areas of Ghana across socio-demographic characteristics. The prevalence of home  
174 deliveries in the country was 7.9%, with variations across the various socio-demographic  
175 characteristics of the respondents. The results of the chi-square test showed that region, ethnicity,

176 educational level, wealth index, parity, religion, and ANC visits had significant associations with  
177 home delivery ( $p < 0.001$ ).

178 **\*\*\*Table 1\*\*\***

179  
180 **Predictors of home delivery among women in the urban areas of**  
181 **Ghana**

182 Table 2 shows results on the predictors of home delivery among women in the urban areas of  
183 Ghana. Compared to women who lived in the Northern region, women who lived in the Brong  
184 Ahafo region [AOR=0.38, CI=0.17-0.84] were less **likely to deliver at home**. Women with poorest  
185 wealth quintile were more likely to deliver at home, compared to those with middle wealth quintile  
186 [AOR=2.02, CI=1.06-3.86]. The likelihood of home delivery was high among women who  
187 professed other religions, compared to Christians [AOR=3.45; 1.53-7.81]. Home delivery was  
188 found to be high among women who had no ANC visits, compared to those who had at least one  
189 ANC visit [AOR=7.17; 1.64-31.3]. Conversely, the likelihood of home delivery was low among  
190 women who had attained secondary/higher education [AOR=0.30; 0.17-0.53], compared to those  
191 with no formal education.

192 **\*\*\*Table 2\*\*\***

193 **Discussion**

194 Home delivery presents an array of negative health complications to the mother and the child;  
195 hence, ensuring health facility delivery has the potential to avert such risks [5]. Therefore, the  
196 primary focus of our study was to assess the factors associated with home delivery in urban Ghana.  
197 Our study revealed that, compared to all the regions, women who lived in the Northern region  
198 were more likely to deliver at home. Debatably, health facilities in Ghana are not equally  
199 distributed, and disfavours some regions. Typically, the northern part of the country is less  
200 endowed with health facilities [20, 21].

201 Several studies have further remarked that accessibility and availability of quality maternal  
202 health services influence the use of an institution for delivery [22, 23,24,25,26]. Shahabuddin et  
203 al. [27] similarly noted that young women from mountain region Nepal were less likely to choose  
204 institutional delivery, compared with women in the Terai region. This implies that, without  
205 equitable distribution of health facilities and elimination of accessibility barriers including  
206 provision of efficient and effective referral services, health facility delivery will be cumbersome  
207 for most women in Ghana who are in the disadvantaged regions.

208 We found that women with poorest wealth quintile had higher odds to deliver at home,  
209 compared to those with middle wealth quintile. Our results is in line with previous studies in other  
210 low- and middle-income countries such as Nepal [27], Malawi [28] and Guinea-Bissau [29]. It is  
211 increasingly known that wealthier women are more likely to deliver in healthcare facilities than  
212 their poorer counterparts [30, 31, 32]. What might have caused this disparity in institutional  
213 delivery among the rich and the poor could possibly be attributed to financial stands. Poor women  
214 might be challenged financially when there is the need to deliver in a health facility, including the  
215 cost of transport and buying other items needed for delivery.

216 Our study also revealed that those who professed other religions had higher propensity to  
217 home delivery, compared to Christians. Religious affiliation was responsible for the disparity in  
218 institutional delivery in other studies. For instance, in Nepal, Shahabuddin et al. [27] observed that  
219 young Muslim women were 1.82 times more likely to deliver at an institution, compared with  
220 young Hindu women. We must acknowledge that religious affiliation comes with specific beliefs

221 and practices, which may influence women's general practices including opting health facility  
222 delivery [14,15]. Our study fails to unravel why women from other religious backgrounds were  
223 more likely to deliver at home, compared to Christians. We, therefore, suggest that a qualitative  
224 study be done between religion and place of delivery to understand the phenomenon better.

225 It is common knowledge that ANC utilisation has a spilt over effect on mothers' choice of  
226 place of delivery, whereby women who utilize ANC mostly prefer institutional delivery supervised  
227 by health professionals [33,34]. As such, it was not surprising that home delivery was found to be  
228 high among women who had no ANC visits, as compared to those who had at least one ANC visit  
229 in our current study. A systematic review in assessing factors influencing utilisation of maternal  
230 health services by adolescent mothers in low- and middle-income countries concluded that the use  
231 of antenatal care predicted use of skilled birth attendance, and use of both predicted use of postnatal  
232 care [35]. Practically, it is suggestive that sufficient ANC utilisation is likely to increase pregnant  
233 women's awareness of possible complications and safe delivery practices, which consequently  
234 urges them to deliver in a health facility [36, 37, 38, 39]. It has also been argued that women who  
235 visit health facilities for healthcare services including ANC check-ups might be exposed to  
236 counselling and guidance from health professionals [40]. Both scenarios enlighten them about the  
237 dangers associated with home deliveries. Theoretically, following the proposition raised by the  
238 protection motivation theory (PMT), women, having been exposed to vital information during  
239 ANC, will opt for delivering at a health facility to serve as a protection against unforeseen  
240 predicaments associated with home delivery [41, 42, 43].

241 Finally, we noted that the probability to deliver at home was low among women who had  
242 attained secondary/higher level of education, compared to those with no formal education.  
243 Similarly, studies in Malawi observed that women who had no formal education were about four-  
244 fold probable to deliver at home, compared to women who had attained secondary or higher level  
245 [28]. In a related study, Yaya, Bishwajit, and Gunawardena [29] also found that, among residents  
246 in urban areas of Guinea-Bissau, compared those who had no education, those who had primary  
247 and secondary/higher level of education were 2.2 and 3.3 times more likely to deliver at a health  
248 facility. Level of education has been a determinant to home delivery in Zambia as well, and it was  
249 known that women who had four years of schooling or less were 63 percent more likely to deliver  
250 at home than a health facility, compared to those who had at least five years of schooling. A recent  
251 study also found that having education increases the likelihood that a woman would decide to  
252 deliver her baby in a hospital or maternity home than at home or in other places [44]. Oyedele [44]  
253 further explained that education increases individuals' awareness about health holistically and  
254 exposes them to benefits associated with complication prevention. Therefore, we can argue that  
255 the educated Ghanaians would be compelled to live a sanitary and hygienic life including opting  
256 institutional delivery.

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258

## 259 **Strengths and limitations**

260 Among the strengths of the study is the fact that it depended on a nationally representative data  
261 set. Also, the study adopted probability method in selecting survey respondents and used sound  
262 analytical procedure which enhances the robustness of the results. However, our results should be  
263 interpreted with caution since causality cannot be established.

264  
265

## 266 **Conclusion**

267 The major determinants of home delivery among urban residents observed in our study were region  
268 of residence, wealth quintile, religion of affiliation, ANC visits, and educational attainment. What  
269 might have compelled Northern residents to be inclined to home delivery calls for health education  
270 emphasising health facility delivery while prioritising health facility delivery on policy initiatives.  
271 Women should be empowered to utilise ANC, using sufficient counselling, guidance, and mass  
272 sensitisation through various mass media platforms. Disparity in health facility delivery masked  
273 by religion of affiliation calls for a qualitative study to interrogate the phenomenon.

274

## 275 **Abbreviations**

276 ANC: Antenatal Care; AOR: Adjusted Odds Ratio; CI: Confidence Interval; DHS: Demographic  
277 and Health Surveys; MMR: Maternal Mortality Ratio; WHO: World Health Organization; SDG:  
278 Sustainable Development Goal; SSA: sub-Saharan Africa; LMICs: Low and Middle-income  
279 countries ; PNG: Papua New Guinea  
280

## 281 **Acknowledgements**

282 We acknowledge Measure DHS for providing us with the data.  
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## 285 **Competing interests**

286 The authors declare that they have no competing interests.  
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**Table 1: Weighted distribution of the prevalence of home deliveries among women in the urban areas of Ghana across socio-demographic characteristics (N=1,441)**

Variable	Frequency (N)	Percentage (%)	Home delivery (%)	$\chi^2$ (p-value)
<b>Age</b>				0.57 (0.75)
15-24	174	12.1	15.5	
25-34	787	55.6	53.5	
35 years or more	481	33.4	31.0	
<b>Region</b>				101.64 (p<0.001)
Western	109	7.5	4.9	
Central	107	7.4	11.3	
Greater Accra	437	30.4	5.6	
Volta	80	5.6	12.0	
Eastern	118	8.2	7.0	
Ashanti	333	23.1	7.8	
Brong Ahafo	116	8.1	9.1	
Northern	94	6.5	33.8	
Upper East	31	2.1	7.0	
Upper West	15	1.0	1.4	
<b>Occupation</b>				0.04 (0.840)
Working	238	16.5	18.3	
Not working	1203	83.5	81.7	



<b>Ethnicity</b>				16.32 (p<0.001)
Akan	748	51.9	29.6	
Ga/Dangme	131	9.1	4.2	
Mole Dagbani	235	16.1	39.4	
Other	359	22.8	26.8	
<b>Educational level</b>				130.98 (p<0.001)
No education	222	15.4	54.9	
Primary	212	14.7	23.2	
Secondary/Higher	1,007	69.9	21.8	
<b>Wealth index</b>				153.31 (p<0.001)
Poorest	67	4.7	26.1	
Poorer	80	5.5	23.2	
Middle	232	16.1	29.6	
Richer	443	30.7	15.5	
Richest	619	43.0	5.6	
<b>Parity</b>				30.30 (p<0.001)
One birth	292	20.3	8.5	
Two births	364	25.2	17.6	
Three births	299	20.8	21.1	
Four or more births	486	33.7	52.8	
<b>Religion</b>				88.46 (p<0.001)
Christianity	1151	79.9	45.8	
Islam	247	17.1	40.1	
Other	43	3.0	8.5	
<b>Marital status</b>				0.72 (0.397)
Married	1084	75.2	75.3	
Cohabiting	357	24.8	24.7	
<b>Sex of household head</b>				0.68 (0.411)
Male	1141	79.1	77.5	
Female	300	20.9	22.5	
<b>ANC visits</b>				50.48 (p<0.001)
No ANC visits	16	1.1	7.0	
Had ANC visit	1425	98.9	93.0	
<b>Healthcare decision-making</b>				0.18 (0.675)
Not alone	1035	71.8	76.1	
Respondent alone	406	28.2	23.9	
National (Total)	1,441	100	7.9	

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**Source: Computed from 2014 GDHS**

432 **Table 2: Logistic regression analysis on predictors of home delivery among women in the**  
 433 **urban areas of Ghana**

Variable	AOR	95% CI	
		Lower Bound	Upper Bound
<b>Region</b>			
Western	0.63	0.20	2.01
Central	0.74	0.29	1.87
Greater Accra	0.42	0.14	1.28
Volta	0.80	0.34	1.90
Eastern	0.54	0.21	1.38
Ashanti	0.59	0.23	1.49
Brong Ahafo	0.38*	0.17	0.84
Northern	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Upper East	0.26**	0.11	0.60
Upper West	0.15**	0.04	0.62
<b>Ethnicity</b>			
Akan	1.39	0.69	2.79
Ga/Dangme	1.71	0.55	3.36
Mole Dagbani	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Other	0.86	0.48	1.56
<b>Education</b>			
No education	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Primary	0.80	0.46	1.40
Secondary/Higher	0.30***	0.17	0.53
<b>Wealth</b>			
Poorest	2.02*	1.06	3.86
Poorer	1.84	0.99	3.41
Middle	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Richer	0.38***	0.21	0.68
Richest	0.18***	0.08	0.42
<b>Parity</b>			
One birth	0.52	0.26	1.02
Two births	0.96	0.54	1.69
Three births	1.36	0.80	2.31
Four or more births	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Religion</b>			
Christianity	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Islam	0.97	0.53	1.75
Other	3.45***	1.53	7.81
<b>ANC visits</b>			
No ANC visits	7.17**	1.64	31.3
Had ANC visit	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
N	1441		
Pseudo R <sup>2</sup>	0.259		

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435 Exponentiated coefficients; 95% confidence intervals in brackets, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p <$   
436 0.001, aOR=adjusted Odds Ratios  
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