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Understanding the Utilization of Caesarean Sections in Ghana: A Comprehensive Study of Demographic and Socioeconomic Variables from the 2022 Mini DHS

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Abstract

A caesarean birth, or C-section, is an essential surgical technique that can avert difficulties during pregnancy or labor and save lives by safeguarding the health of the mother and child in cases when vaginal delivery may be risky. This study aims to determine factors (demographic, socioeconomic, and cultural) contributing to the development of DCS in Ghana. The data for this investigation were obtained from the 2022 Ghana Mini Demographic and Health Survey (2022 GMDHS). To assess the impact of demographic, socioeconomic, and cultural factors on DCS, this study analyzed 3,329 respondents who received care at health facilities. The non-parametric Chi-square test and the binary logistic regression model were employed to identify the factors that significantly influence Ghana's cesarean section delivery rate. 16.8% of participants underwent a caesarean section. Regional differences have a significant impact on C-section deliveries in Ghana. When comparing the Volta area to the Western region, women are 1.55 times more likely to give birth via C-section and 1.36 times more likely overall (odds = 1.36, p-value < 0.05). C-section deliveries are 1.69 times more common among women aged 36-49 (odds = 1.688, p-value < 0.05). Moreover, Women with secondary or higher education had a 1.31-fold (odds = 1.314, p-value < 0.05) increase in the risk of C-section delivery compared to those without education. Furthermore, Women with three to four children are 1.84 times (odds = 1.839, p-value < 0.05) more likely to require C-sections than those with one to two children. By improving healthcare infrastructure, guaranteeing fair access, promote early medical intervention and raising public knowledge, the study recommends that Ghana may improve mother and newborn outcomes in cesarean sections.

Keywords: Caesarean section, Demographic, Socioeconomic, Cultural factors, Mini DHS, and Ghana.

1. Introduction

Caesarean section (C-section) perceptions, which involve the separation of the mother's abdomen and uterus, are prevalent among women who are experiencing labor obstruction. C-section deliveries are a life-saving procedure involving the expectant mother and the unborn child. In recent years, caesarean births have grown significantly more pre-

valent on a global scale(Tsegaye H, Desalegne B, Wassihun B, Bante A, Fikadu K, Debalkie M, 2019). As per the World Health Organization known as the WHO, a caesarean delivery incidence of a child that exceeds 15% is indicative of misuse. A range of 5 to 15% is considered optimal (Nahid M, Zahirul M, Chowdhury R, 2019; Zahangir *et al.,* 2024). A study anticipated that the percentage of infants, who undergo caesarean sections worldwide would continue to rise, compared from 7% in 1990 to 21%. If current trends continue, the highest rates are anticipated to be seen in Eastern Asia (63%), Latin America and the Caribbean (54%), the western part of Asia (50%), the northern part of Africa (48%), Southern Europe (47%), Australia, and New Zealand (45%) by 2030, according to a World Health Organization study. The survey anticipates this ratio will rise over the following decade, using almost one-third (29%) of all newborns anticipated to be produced via a cesarean section by 2030 (Organization., 2021; Sultan *et al.,* 2025).

A study suggested that the increase in CS rates also affects the economy. The World Health Organization known as (WHO) has determined that the global economy incurs a $2.3 billion expense due to "excess" computer science(Gibbons L, Belizán JM, Lauer JA, Betrán AP, Merialdi M, 2010; Islam *et al.,* 2025). Recent data highlighting the significant differences in computer science rates between and within countries exacerbate this concern. In 2010, the prevalence of computer science varied threefold for 31 European nations, with the lowest rate at 14% and the highest at 52% (Macfarlane *et al.,* 2015). In addition, a study conducted in the United States demonstrated that the prevalence of computerized surgery (CS) varied from 7% to 70% in 573 hospitals nationwide. The disparity was fifteen times greater (2% to 36%) for low-risk women, who were additionally anticipated to have a comparable baseline risk (Dey *et al.,* 2024a; Kozhimannil KB, Law MR, 2013). Even though CS often proves life-saving for the newborn mother and the fetus during circumstances such as a premature placenta and uterine rupture, this growing incidence is concerning. The probability of maternal morbidity and mortality with CS is approximately three times greater than that of vaginal birth (Chowdhury *et al.,* 2007). This is due to the worldwide pattern of an increasing C-section rate in Ghana.

According to the 2014 Government of Ghana Demographics and Health Survey (GDHS), Ghana's C-section rate climbed from 4.5 to 6.4% from 1990 to 2005(Tuncalp O, Stanton C, Castro A, Adanu R, Heymann M, 2013). In 2014, the GDHS reported that 13% of newborns were delivered via C-section, a substantial increase from 7% in 2008(GSS, 2014). Delivery by cesarean section is most prevalent among women who were 35–49 (17%), first-parity newborns (18%), births for which women had over three years of Antenatal Care (ANC) engagement (15%), deliveries in cities (19%) and in the area around Greater Accra (23%), births to women with a secondary and a higher degree (27%), and women with the most wealthy socioeconomic status (28%) (GSS, 2014). The primary C-section of a woman typically determines the following obstetric procedure (Hafeez *et al.,* 2014; Mustary and Haque, 2021; Riyadh Hossain *et al.,* 2025).

In 2017, the estimated caesarean section rate in Ghana was 16% (*Ghana Statistical Service, (GSS), Ghana Health Service, (GHS), & DHS-Program-ICF. (2018). Ghana Maternal Health Survey 2017. Accra, Ghana ;Rockville, Maryland, USA.*, 2017). However, there are substantial regional disparities, with the greater Accra area exhibiting the highest rate, 24.3%, and the upper east part of the country having the lowest rate, 7.2%(GHS, 2017; Rana *et al.,* 2021). The World Health Organization, also known as the WHO, has recently issued a warning regarding the negative short- and long-term consequences of Caesarean sections and has newly recommended that the average rate of Caesarean sections in a population or country not exceed 15% (WHO, 2015) (WHO, 2018). Consequently, it is essential to utilize population-based statistics to evaluate the frequency of C-sections and the factors that impact the delivery process in the national context of Ghana as well. The Health and Demographics Monitoring System offered a distinctive opportunity to investigate the variables associated with population-level C-section deliveries. Considering the variables that affect a population's choice of cesarean deliveries is one way to influence the decision to have a cesarean section. As a result, this study aimed to investigate the prevalence of C-section deliveries and the variables that affect DCS in women in Ghana.

2. Methodology

Study area and data collection

This study aimed to determine the factors contributing to the development of DCS in Ghana, which is situated in the West African region between the Ivory Coast and Togo (*Alphabetical List of All African Countries with Capitals*, n.d.; *Ghana Country Profile - National Geographic Kids*, 2014). The country is situated wholly within tropical latitudes and relatively compact, with north-south and east-west dimensions. Accra is the name of the capital city in the nation's central region. It is the fourteenth nation by population and the largest country in Africa (*How Many Countries in Africa?*, n.d.; Mohammad Salim Zahangir *et al.,* 2025). The data for this investigation were obtained from the children's records of the 2022 Ghana Mini Demographic and Health Survey (2022 GMDHS) (Service (GSS) & Program, 2024). Ghana Statistical Systems (GSS) conducted the 2022 Ghana Demographics and Health Surveys (GDHS). GDHS was funded by the World Health Organization (WHO), the Foreign, the Commonwealth, and the Growth Office, the United Kingdom AID, the U.S. Agency for International Development, known as USAID, the Presidential Malaria Initiative (PMI), the UNFPA, the UNICEF, the World Bank, the Global Fund for Development, and the Korean International Cooperative Agency (KOICA), as well as the Government of Ghana. Using the DHS Programs, a USAID-funded program that offers professional assistance and funding for the execution of demographic information and health surveys in countries worldwide, ICF provided technical assistance(Service (GSS) & Program, 2024).

Dependent Variables

The binary variable "delivery by caesarian section" (No, Yes) was the dependent variable in this study. Mothers who delivered at least one child with CS were classified as "Yes," while those who did not obtain a CS were designated as "No."

Explanatory Variables

This study has considered a total of 15 independent variables. Three distinct categories of explanatory variables were used: socioeconomic, demographic, and cultural characteristics. Socioeconomic variables encompass educational levels (No education, Primary,

Secondary, and Higher), place of residence (Urban, Rural), and socioeconomic status (Poor, Middle, and Rich). The demographic group is comprised of the following: the age of the mothers (16-25, 26-30, 31-35, 36-49), the sex of the child (Male, Female), the number of children ever born (1-2, 3-4, >4), the number of sons who have died (No, Yes), the age of the mothers at the first birth (11-18, 19-24, >24), the use of contraceptive methods (Not using, Using), the number of living children and the current pregnancy (0-2, 3-4, >4), and previous monthly pregnancy interval (9-25, 26-36, >36). Finally, cultural features were the religion (Christian, Muslim, and others) and region (Western Region, Volta Region, Upper East, and Upper West). At first, the mother's current age, previous monthly pregnancy interval, total number of children ever born, age of mothers at first birth, living children, and present pregnancy were discrete numeric variables. However, as previously mentioned, they were converted to categorical features to improve the interpretation of the study's dependent variable, which is a binary categorical variable.

Study population

A total of 5189 women were included in the 2022 GMDHS children recorded data, with 833 of them giving birth at home and 4356 delivering their infant in a health facility. The research population of this study consisted of 3329 women born in a clinical setting in Ghana. These women were questioned regarding DCS, and 16.8% (n = 670) of them were discovered to have delivered by a cesarean section (**Table 1**). All women who delivered in a domestic environment were excluded from this study.

Statistical analysis

The data for this investigation were obtained from the 2022 Ghana Mini Demographic and Health Survey (2022 GMDHS). The survey received a total of 5189 responses. To evaluate the influence of demographic, socioeconomic, and cultural variables on DCS, this investigation examined 3329 respondents who delivered at health facilities. It has been noted that 3311 respondents (83.20%) conventionally carried their child, while 670 respondents (16.8%) delivered their child through a caesarean section. Initially, this investigation examined 15 explanatory variables that

had the potential to impact the dependent variable "delivery by caesarean section".

Table 1: Distribution of the participants by background characteristics of the caesarian section in Ghana expressed as a percentage.

Variables	Categories	Frequency	percent
Region	Western Region	1049	26.40
	Volta Region	1069	26.90
	Upper East	1074	27.00
	Upper west	789	19.80
Mothers' current age	16-25	740	18.60
	26-30	1104	27.70
	31-35	1026	25.80
	36-49	1111	27.90
Type of place of residence	Urban	1606	40.30
	Rural	2375	59.70
Highest educational level	No education	1348	33.90
	Primary	662	16.60
	Secondary and Higher	1971	49.50
Religion	Christian	2429	61.00
	Muslim	1315	33.00
	Others	237	6.00
Socio economic status	Poor	2157	54.20
	Middle	752	18.90
	Rich	1072	26.90
Total children ever born	1-2	1245	31.27
	3-4	1530	38.43
	>4	1206	30.29
Sons who have died	No	3559	89.40
	Yes	422	10.60
Use of contraceptive method	Not using	2535	63.70
	Using	1446	36.30
Currently breastfeeding	No	1363	34.20
	Yes	2618	65.80
Sex of child	Male	2076	52.10
	Female	1905	47.90
Preceding pregnancy interval (months)	9-25	926	23.26
	26-36	1021	25.65
	>36	2034	51.09
Age of mother at 1st birth	11-18	1241	31.17
	19-24	2078	52.20
	>24	662	16.63
Living children + current pregnancy	0-2	1258	31.60
	3-4	1603	40.27
	>4	1120	28.13
Place of delivery	Home	642	16.10
	Clinic	3339	83.90
Delivery by caesarean section	No	3311	83.20
	Yes	670	16.80

Initially, the frequency transmission of all the independent and dependent variables was prepared to ascertain the background features of the respondents. The non-parametric statistical method was applied throughout the investigation concerning the outcome variables' unconditional character. The proposed non-parametric Chi-square ($\chi2$) test was employed to ascertain a significant relationship between the delivery by C-section and a variety of independent variables. The explanatory variables identified as necessary in the bivariate assessment were also considered in the multivariate analysis. To ascertain

the variables that significantly influence the cesarean section delivery rate in Ghana, the binary logistic regression approach was employed as a multivariate analysis, as the study variable in the current study is binary. Both bivariate and multivariate studies are identified using a significance level of 5% (0.05). The Hosmer-Lemeshow (HL) goodness of fit evaluation was employed to assess the model's validity in this analysis. The HL examination (chi-square = 9.857, P-value = 0.275) indicates that the model used in this study is more appropriate for the research data. Every statistical analysis in the study was conducted using SPSS version 25.

Ethical Consideration

The data for this investigation were obtained from the 2022 Ghana Mini Demographic and Health Survey (2022 GMDHS) children's records (*2022 Demographic and Health Survey Summary Report*, n.d.). Ghana Statistical Systems (GSS) was responsible for conducting the 2022 Ghana Demographic and Health Surveys (GDHS). The World Health Organization (WHO), the Foreign, Common-wealth, and Growth Office, the United Kingdom AID, the U.S. Agency for International Development (USAID), the President's Malaria Initiative (the PMI), the United Nations Population Authority (UNFPA), the UNICEF's, World Bank, the Worldwide Fund, and the Korean Inter-

national Cooperative Agency (KOICA), and the authorities of Ghana, provided funding for the GDHS Project. ICF provided technical assistance through the DHS Programs, a USAID-funded initia-tive that provides professional assistance and financing for conducting health surveys and demographic infor-mation in countries nationwide (2022 Demogra-phic and Health Survey Summary Report, n.d.).

3. Results

Fig. 1 illustrates the geographical variations in Ghana's Caesarean section (C-section) deliveries. Greater Accra (42.18%) and Volta (35%) exhibit the most excellent rates due to the access to skilled professionals and improved healthcare infrastructure in urban areas. On the other hand, rural regions such as Savannah (10.80%) and Upper East (8.33%) exhibit significantly lower rates. This is likely due to the scarcity of skilled professionals and the limited availability of healthcare facilities, leading to dependence on traditional deliveries. From **Fig. 2** it is observed that urban and rural region in Ghana exhibit disparities in the delivery of Caesarean sections (C-sections). Compared to rural areas, urban areas, such as Greater Accra (44% urban vs. 10% rural) and Ashanti (37% urban vs. 25% rural), exhibit signi-ficantly higher C-section rates.
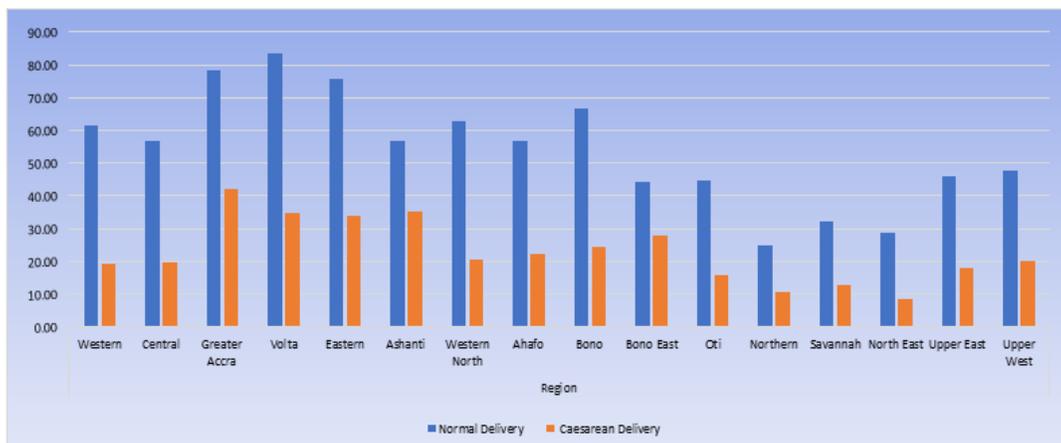

Fig. 1: The percentage of DCS in various demographic regions of Ghana.

This is because urban areas have more readily accessible healthcare infrastructure and experienced professionals, which promotes increased surgical delivery rates. On the other hand, a few regions, such as the Upper East (11% urban vs. 28% rural), show higher C-section rates in rural areas. This is likely due

to specific healthcare interventions or an increased need for C-sections. In contrast, rural regions have lower rates of cesarean sections due to inadequate healthcare services, a scarcity of competent personnel, and transportation obstacles.
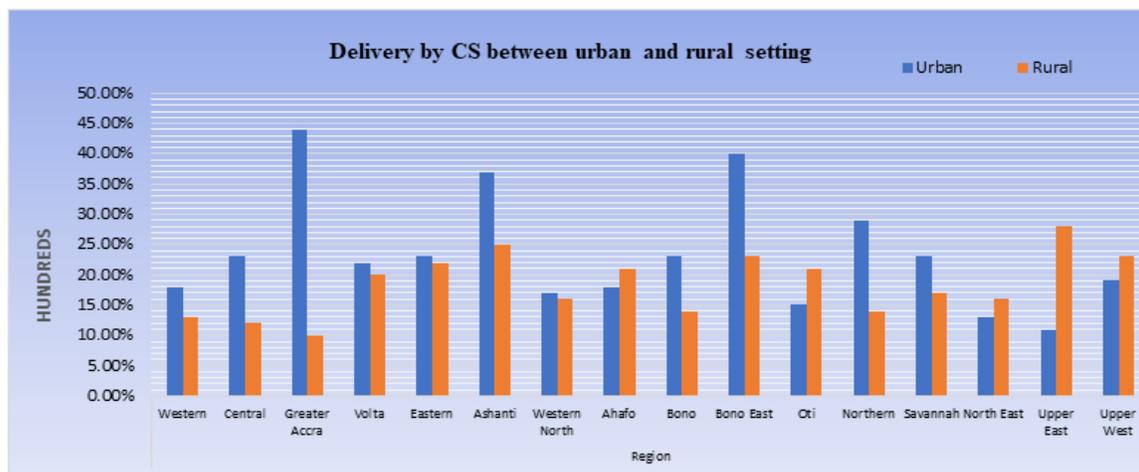
Fig. 2: The ratio of CS in urban and rural contexts across various regions of Ghana.

Areas such as Volta (22% urban vs. 20% rural) and Eastern (23% urban vs. 22% rural) exhibit less pronounced disparities between urban and rural C-section rates, suggesting that healthcare access is more equitable. The results of **Table 1** present the primary factors influencing Caesarean section (C-section) births in Ghana. The rates of C-sections vary significantly by region, with the Upper East (27%), Volta (26.9%) reporting the highest rates, and the Upper West (19.8%) reporting lower rates. From **Table 1** it is implies that discrepancies in the availability of surgical facilities and the quality of healthcare infrastructure, with certain regions needing to be more well-equipped to perform C-sections than others.

In comparison to younger women aged 16-25 (18.6%), older women, particularly those who were aged 36-49 (27.9%), are more likely to undergo C-sections. This is likely due to the increased risk of difficulties, such as protracted labour or diabetes during pregnancy, among older women, which has resulted in a greater prevalence of surgical intervention that shown in **Table 1**.

Wealthier women are more likely to undergo cesarean sections (26.1%), which is indicative of their improved access to medical facilities and prenatal care, which aid in the identification of complications necessitating surgical intervention. In the same vein, women who have completed secondary or higher education are more likely to undergo cesarean sections (49.5%) than those who have not completed any education (33.9%). This indicates that education enhances awareness and

access to medical services. The rate of cesarean sections is higher among urban women (40.3%) than in rural regions (59.7%). The availability of healthcare facilities and skilled physicians is more difficult for rural women, resulting in a decreased number of C-sections and a greater reliance on natural births.

The bivariate analysis was conducted along with the univariate analysis to investigate the relationship between the delivery by the caesarian section and the various explanatory variables among the women in Ghana. The chi-square test was implemented to evaluate these associations, and the results are summarized in **Table 2**. The Upper East area, with its notably low C-section rate of 10.3%, stands in stark contrast to the Volta Region, where the rate is significantly higher at 22.5%.

These regional disparities are not just statistics but urgent issues that must be addressed. The chi-square test result (chi-square = 61.962, p-value < 0.05) underlines the significance of geography, likely due to variations in healthcare access. From **Table 2**, it is observed that the likelihood of a C-section is influenced by maternal age, with a higher rate (19.9%) among women aged 31-35 than those aged 16-25 (11.5%) (chi-square = 26.753, p-value < 0.05). There is also a substantial disparity between urban and rural residences, as urban women are more likely to undergo C-sections (23.3%) than rural women (12.4%) (chi-square = 81.756, p-value < 0.05). This disparity is indicative of the superior healthcare access that cities provide.

Table 2: Cross-tabulation with associated summary information for caesarean section deliveries in Ghana.

Variables	Categories	Delivery by CS		Chi-square	P-value
		No (%)	Yes (%)		
Region	Western Region	849(80.90)	200(19.10)		
	Volta Region	829(77.50)	240(22.50)		
	Upper East	963(89.70)	111(10.30)	61.962	0.000
	Upper west	670(84.90)	119(15.10)		
Mothers' current age	16-25	655(88.50)	85(11.50)		
	26-30	933(84.50)	171(15.50)		
	31-35	822(80.10)	204(19.90)	26.753	0.000
	36-49	901(81.10)	210(18.90)		
Type of place of residence	Urban	1231(76.70)	375(23.30)		
	Rural	2080(87.60)	295(12.40)	81.756	0.000
Highest educational level	No education	1222(90.70)	126(9.30)		
	Primary	560(84.60)	102(15.40)	98.961	0.000
	Secondary and Higher	1529(77.60)	442(22.40)		
Religion	Christian	1949(80.20)	480(19.80)		
	Muslim	1135(86.30)	180(13.70)	51.109	0.000
	Others	227(95.80)	10(4.20)		
Socio economic status	Poor	1901(88.10)	256(11.90)		
	Middle	623(82.80)	129(17.20)	110.884	0.000
	Rich	787(73.40)	285(26.60)		
Total children ever born	1-2	1006(80.80)	239(19.20)		
	3-4	1244(81.30)	286(18.70)	28.682	0.000
	>4	1061(88)	145(12)		
Sons who have died	No	2968(83.40)	591(16.60)		
	Yes	343(81.30)	79(18.70)	1.205	0.272
Living children + current pregnancy	0-2	1003(79.70)	255(20.30)		
	3-4	1316(82.10)	287(17.90)	35.302	0.000
	>4	992(88.60)	128(11.40)		
Use of contraceptive method	Not using	2153(84.90)	382(15.10)		
	Using	1158(80.10)	288(19.90)	15.461	0.000
Currently breastfeeding	No	1099(80.60)	264(19.40)		
	Yes	2212(84.50)	406(15.50)	9.546	0.002
Sex of child	Male	1730(83.30)	346(16.70)		
	Female	1581(83)	324(17)	0.083	0.774
Preceding pregnancy interval (months)	9-25	763(82.40)	163(17.60)		
	26-36	882(86.40)	139(13.60)	10.254	0.006
	>36	1666(81.90)	368(18.10)		
Age of mother at 1st birth	11-18	1085(87.40)	156(12.60)		
	19-24	1761(84.70)	317(15.30)	98.816	0.000
	>24	465(70.20)	197(29.80)		
Place of delivery	Home	642(100)	0(0.00)		
	Clinic	2669(79.90)	670(20.10)	154.891	0.000

The influence of education and prosperity on C-section rates is profound. Women who have completed secondary or higher education have a C-section rate of 22.4%, significantly higher than those who have not completed any education (9.3%). This suggests a clear correlation between educational level and higher C-section rates. Similarly, the rate of wealthier women (26.6%) was notably higher than that of impoverished women (11.9%). These findings underscore the need for targeted interventions to bridge these disparities. The place of delivery is significant, as women who deliver in clinics have a 20.1% C-section rate, while

home deliveries have a 0% rate (chi-square = 154.891, p-value < 0.05). Finally, factors like age, education, prosperity, and location significantly impact the prevalence of cesarean sections in Ghana. Urban, educated, and affluent women are more likely to have cesarean sections, whereas rural and impoverished women encounter substantial obstacles to obtaining surgical care.

Factors influencing delivery by a caesarean section
Binary logistic regression is employed as a multi-variate analysis to identify the factors that substantially impact the DCS in Ghana, as illustrated in **Table 3**. C-section deliveries exhibit substantial regional disparities. Compared to the Western Region, women in the region of Volta are 1.36 times more likely to deliver by C-section (odds = 1.36, p-value < 0.05). In contrast, the Upper East Region has a 25% lower incidence of C-sections among women, despite the difference being not statistically significant (Odds = 0.751, p-value = 0.054). From **Table 3**, It is observed that the regional disparities in healthcare access, with certain regions are possessing more advanced facilities and more proficient healthcare professionals.

The maternal age significantly influences C-sections. **Table 3** revealed that in comparison to women aged 16–25, those aged 31–35 are 1.55 times more likely to have a C-section (odds = 1.55, p-value < 0.05). The probability of delivering by C-section increases for women aged 36-49, who are 1.69 times more likely to do so (odds = 1.688, p-value < 0.05). This is consistent with global research, which indicates that aged mothers are at a higher risk of pregnancy compli-cations, which frequently necessitate surgical inter-ventions. The probability of a C-section is significantly diminished when one resides in rural areas. In comparison to urban women, rural women are 30% less likely to undergo C-sections (Odds = 0.707, p-value < 0.05). The disparity is indicative of the prevalent obstacles to accessing surgical inter-ventions such as C-sections in rural areas, which include a scarcity of healthcare facilities and qualified professionals. Education serves as an additional substantial factor in the determination of C-section rates. There is a 1.31-fold increase in the likelihood of C-section delivery among women with secondary or

higher education compared to those with no education (Odds = 1.314, p-value < 0.05). Educated women are more likely to comprehend and choose surgical interventions when necessary, and they have greater access to healthcare. In the same vein, socioeconomic status is of paramount importance. In comparison to women from impoverished households, those from wealthy families are 1.54 times more likely to deliver by cesarean section (Odds = 1.539, p-value < 0.05). Wealthier women frequently reside in urban areas with improved healthcare access. They can cover the expenses associated with C-sections, in contrast to impoverished women who encounter financial obs-tacles.

Women who have three to four children are 1.84 times more likely to undergo C-sections than those who have one to two children (Odds = 1.839, p-value < 0.05). Women who had their first child after the age of 24 are 1.6 times more likely to undergo a cesarean section (Odds = 1.604, p-value < 0.05). The older maternal age and higher birth order exacerbate the risks of labor, leading to a significant increase in C-sections. Factors like maternal age, education, wealth, place of residence, and birth order substan-tially influence the likelihood of C-sections in Ghana. Urban women, who possess higher levels of education and wealth, are more likely to undertake cesarean sections, whereas rural and impoverished women encounter obstacles to surgical care.

4. Discussion
The primary objective of this study was to determine the determinants of DCS among women in Ghana. The results indicate that the age of the mothers con-siderably influences the DCS, with a greater possibility of DCS in the age groups of 31–35 and 36–49. This is due to the potential for a variety of diseases to grow within the body of older women, which can result in a variety of health complications and ultimately lead to the decision to undergo a caesarean section. Due to physiological and anatomical changes brought on by aging, older mothers are more vulnerable to high-risk pregnancy complications after giving birth. These ladies believe that, in terms of fetal protection, cesarean sections are safer than vaginal births (Dankwah *et al.,* 2019).

Table 3: The factors influencing the delivery by the caesarian section in Ghana determined through binary logistic regression.

Variables	B	S.E.	Exp(B)	95 C.I. for Exp(B)		P-value
				Lower	Upper	
Region						
Western Region			1			0.000
Volta Region	0.307	0.115	1.36	1.086	1.703	0.007
Upper East	-0.286	0.148	0.751	0.562	1.005	0.054
Upper west	0.000	0.141	1	0.758	1.318	0.997
Mothers' current age						
16-25			1			0.043
26-30	0.154	0.162	1.166	0.85	1.601	0.341
31-35	0.436	0.185	1.546	1.075	2.223	0.019
36-49	0.523	0.217	1.688	1.104	2.58	0.016
Type of place of residence						
Urban			1			
Rural	-0.347	0.098	0.707	0.583	0.856	0.000
Highest educational level						
No education			1			0.129
Primary	0.233	0.156	1.262	0.93	1.713	0.136
Secondary and Higher	0.273	0.137	1.314	1.004	1.719	0.047
Religion						
Christian			1			0.068
Muslim	-0.122	0.113	0.885	0.709	1.105	0.28
Others	-0.744	0.345	0.475	0.242	0.935	0.031
Socio economic status						
Poor			1			0.001
Middle	0.125	0.126	1.133	0.885	1.45	0.321
Rich	0.431	0.116	1.539	1.226	1.931	0.000
Total children ever born						
1-2			1			0.028
3-4	0.609	0.228	1.839	1.175	2.878	0.008
>4	0.644	0.335	1.905	0.988	3.672	0.054
Use of contraceptive method						
Not using			1			
Using	0.107	0.093	1.113	0.928	1.335	0.247
Currently breastfeeding						
No			1			
Yes	-0.099	0.094	0.906	0.753	1.09	0.296
Preceding pregnancy interval (months)						
9-25			1			0.501
26-36	-0.051	0.134	0.95	0.73	1.237	0.705
>36	0.081	0.115	1.084	0.865	1.358	0.484
Age of mother at 1st birth						
11-18			1			0.005
19-24	0.062	0.116	1.064	0.848	1.336	0.591
>24	0.473	0.164	1.604	1.162	2.214	0.004
Living children + current pregnancy						
0-2			1			0.004
3-4	-0.66	0.22	0.517	0.336	0.795	0.003
>4	-0.988	0.323	0.372	0.198	0.701	0.002
Place of delivery						
Home			1			
Clinic	19.372	1541.862	2.59E+08	0.000	.	0.99
Constant	-21.28	1541.862	0.000			0.989
Hosmer and Lemeshow Test	Chi-square=9.857		P-value=0.275			

According to a study by G. Janoudi and colleagues carried out in Ontario, Canada, the prevalence of the cesarean section risk variables rose as mothers' ages increased (Janoudi *et al.,* 2015; Mohammad Omar Faruk *et al.,* 2025). Compared to women of younger ages, older women (over 34) are more likely to choose DCS ("American Journal of Obstetrics and Gynecology," 1944). Furthermore, a 1998–2015 Danish study found that, in comparison to moms under 30 years old, women 35–39 years old and over 40 years old had twice or even treble the risk of CS, respectively (Md. Rasel Hossain *et al.,* 2025; Rydahl *et al.,* 2019).

This study found that urban women are more likely to have cesarean sections than rural women. Rural women have less access to healthcare facilities and experienced physicians, which leads to fewer C-sections and a greater dependence on spontaneous births. Data from health and demographic surveys were analyzed retrospectively, and the results showed that Pakistan's urban areas had a higher CS tendency than the country's rural ones (Abdulla *et al.,* 2023; Sayeed *et al.,* 2021). In Vietnam's metropolitan areas, the CS rate has been rising steadily over time, a pattern that is comparable to that seen in low- to middle-income nations like Bangladesh (de Loenzien *et al.,* 2019; Saikat *et al.,* 2020). According to this study, there are less noticeable differences between the rates of C-sections in urban and rural areas in places like Eastern and Volta, which may indicate more fair access to healthcare. However, other localities - like the Upper East - have greater rates of C-sections in rural areas. This is most likely a result of specific healthcare policies or an increase in C-sections. Meanwhile, about half of all CSs still happen in rural regions, as they have for the past 20 years, despite rising urbanization levels (de Loenzien *et al.,* 2019; Parvej *et al.,* 2020).

Richer women are also more likely to have cesarean sections, according to this study. This suggests that they have better access to healthcare facilities and prenatal care, which helps identify problems that call for surgery. According to studies, the chance of CS delivery increasing with higher wealth quintiles is consistent with the results of this investigation (M.

Hossain *et al.,* 2025; M. R. Hossain *et al.,* 2020; Ronsmans *et al.,* 2006). Nowadays, the majority of women choose CS over vaginal delivery since they believe it to be painful instead of going through with it (Suwanrath *et al.,* 2021). According to a study, the average income in Bangladesh's urban and rural areas was rising at a faster rate for computer science services (CS) delivery in the former than the latter (Ahmmed *et al.,* 2021; Dey *et al.,* 2024b). Mothers from higher-class families typically have access to more luxuries and amenities; as a result, they may be more fearful of the pains associated with vaginal delivery and may choose to have a CS delivery. This result might be considered consistent and repeatable with the earlier discoveries (Gibbons *et al.,* 2010). Furthermore, more than 74% of educated women living in cities come from middle-class or rich homes and are qualified for CS style delivery (Gibbons *et al.,* 2010).

According to this study, A cesarean section is more likely to be performed on women who finished high school or higher than on women who didn't have any formal education. These findings indicate that education improves awareness and accessibility to healthcare. A meta-analysis conducted in Sub-Saharan Africa showed that mother education had a significant impact on c-section delivery, which is consistent with the results of this investigation. Furthermore, women who have accomplished a more substantial amount of education are more inclined to choose DCS (Demiessie *et al.,* 2021; Hsu *et al.,* 2008). A study that observed the development of this procedure shows that the rate of Caesarean births in Turkey increases as mothers' educational levels increase (Santas & Santas, 2018). Additionally, a study of the worldwide epidemiology of CS use and disparities revealed significant disparities in CS use throughout nations, particularly among women with higher levels of education (Boerma *et al.,* 2018). Nevertheless, conflicting results from numerous studies also indicated that women with lower levels of education are more inclined to elect a cesarean section (Boerma *et al.,* 2018).

In addition, this investigation demonstrated that women having multiple kids are considerably more susceptible to C-sections than those who have only

one or two. Women who are pregnant for the first time and are over the age of 24 are more likely to undergo cesarean sections. According to a study conducted in Bangladesh, the most essential variables for the cesarian section are the overall number of children and the age at first delivery. According to a survey, a considerable correlation was discovered between a decrease in CS and an increase in the number of children per unit in sub-Saharan African nations(Yaya *et al.,* 2018). Contrary to our findings, a study indicated that women with fewer than two children had a lower rate of cesarean sections (Hailegebreal *et al.,* 2021). According to a UK study, a young woman's age at her first delivery appeared to be protective against a later caesarian section (Essex *et al.,* 2013; Ogbede *et al*., 2024).

Furthermore, to the features examined in this study, additional factors could impact the DCS, such as the mother's physical conditions, public-private medical facility settings, and various environmental factors. These factors are not included in this study and are the limitations of the current investigation. This investigation recommends additional research to ascertain the significance of the feature above in DCS. Additionally, the study's strength lies in the fact that the data utilized represent the nation, and the statistically significant effect of diverse socio-economic, demographic, and cultural variables on DCS is accurately reported.

5. Conclusion

The objective of this investigation was to determine the factors that contribute to DCS in women in Ghana. According to the findings of this investigation, 16.8% of participants had cesarean births. Maternal age, education, affluence, place of residence, as well as birth order are all significant factors that significantly influence the frequency of C-sections in Ghana. Urban women, who are more educated and wealthier, are more likely to undergo cesarean sections, while rural and disadvantaged women face challenges in accessing surgical care. Women who have several children and are of advanced maternal years are more likely to undergo C-sections compared to those who possess only one or two children. Further research on other factors that influence C-section delivery, including maternal physical status, location of a public-private health care facility, and a variety of environmental factors, is necessary to develop an appropriate intervention.

6. Data Availability

The datasets used and analyzed during the current study are available from the corresponding author.

7. Author contributions

M.R.H.; I.I.; M.O.R.A.; and K.H.: conceptualized and designed the study, supervised, and framed the hypothesis, extracted data, conducted the statistical analysis, revised, and drafted the manuscript. M.R.H.; I.I.; R.H.; and K.H.: conducted a literature review, tabulated results, and drafted the manuscript. K.H.; M.O.R.A.; M.R.H.: revised and drafted the manuscript. M.R.H.: conceptualized the study, supervised the project, and critically reviewed the manuscript. All authors have read the manuscript and agreed with the Authorship order that the work is ready for submission to the Journal.

8. Acknowledgment

9. Conflicts of Interest

The authors declared that they have no conflict of interest regarding this paper.

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