PREVALENCE AND DETERMINANTS OF CAESAREAN DELIVERY IN GHANA: A SYSTEMATIC REVIEW

Authors: Stephen Henry Afakorzi[1*], Onyinye Ginika Mba[1] and Stephen Manortey[2]

Affiliations: [1]University of Port Harcourt School of Public Health, Rivers State, Nigeria.
[2]Ensign Global College, Kpong, Eastern Region, Ghana.

*Corresponding Author: Afakorzi Henry Stephen, University of Port Harcourt, P.O. Box 359, East West Road, Choba Park, Nigeria. **Email**: afakorzi_stephen@uniport.edu.ng

ABSTRACT

Background: Caesarean section (CS) rates in Ghana have risen significantly, exceeding the World Health Organization's (WHO) recommended threshold of 10–15% in certain regions. This increasing trend is a public health concern due to potential maternal and neonatal complications when performed without medical indication. Socioeconomic, demographic, and clinical factors, such as maternal age, education, wealth, and previous CS history, drive these rates, with urban areas experiencing higher prevalence compared to rural settings.

The study seeks to explore the prevalence and determinants of caesarean deliveries in Ghana, highlighting regional disparities, as well as socio-economic, demographic, and clinical factors influencing its rising trend.

Methods: A critical review of peer-reviewed literature was conducted on PubMed, Scopus, and Web of Science databases. Studies focusing on the prevalence and determinants of CS in Ghana published within the last decade were included. Data were synthesized thematically, emphasizing socio-demographic and clinical factors influencing caesarean delivery rates.

Results: Fifteen studies (15) including case-control, cross-sectional, and retrospective cohort studies were reviewed. The review identified significant regional, socioeconomic, and clinical disparities in CD prevalence, ranging from 6.59% in rural areas to 40.6% in urban health facilities. Key determinants included advanced maternal age, urban residence, higher education levels, and previous CD history. Facility type (private vs. public) also influenced CD rates, with private facilities reporting higher rates. Factors such as parity, breech presentation, and NICU referrals were strong predictors of CD.

Conclusions: The study highlights the need for policy reforms to regulate CD use, improve resource allocation, and address socioeconomic inequalities. Further research is needed to explore effective strategies for reducing unnecessary CS rates while ensuring safe obstetric care in Ghana.

Keywords: caesarean section, prevalence, determinants, Ghana, maternal health, socio-demographic factors, public health

INTRODUCTION

In Ghana, deliveries through caesarean section have been increasing within various regions over recent years; hence, becoming a great public health concern. Though surgical methods are intended for complications during childbirth, CS may be lifesaving for mother and baby, but when performed without indications, it could lead to complications. WHO recommends that the rates of CS should remain below 10–15% of births, but studies indicate that certain areas in Ghana have surpassed the benchmark and reached as high as 40.6% (Kondor *et al.*, 2023). This upward trend in CS prevalence is influenced by a variety of socio-economic, demographic, and clinical factors. Factors such as maternal age, educational attainment, and wealth status, along with clinical histories like previous CS and pregnancy complications, play pivotal roles in the rising rates of caesarean deliveries *(Gyaase et al., 2023; Zethof et al., 2023).* Additionally, regional disparities between rural and urban areas exacerbate the issue, with urban centres often reporting significantly higher rates of CS compared to rural settings (Sackeya *et al.,* 2023).
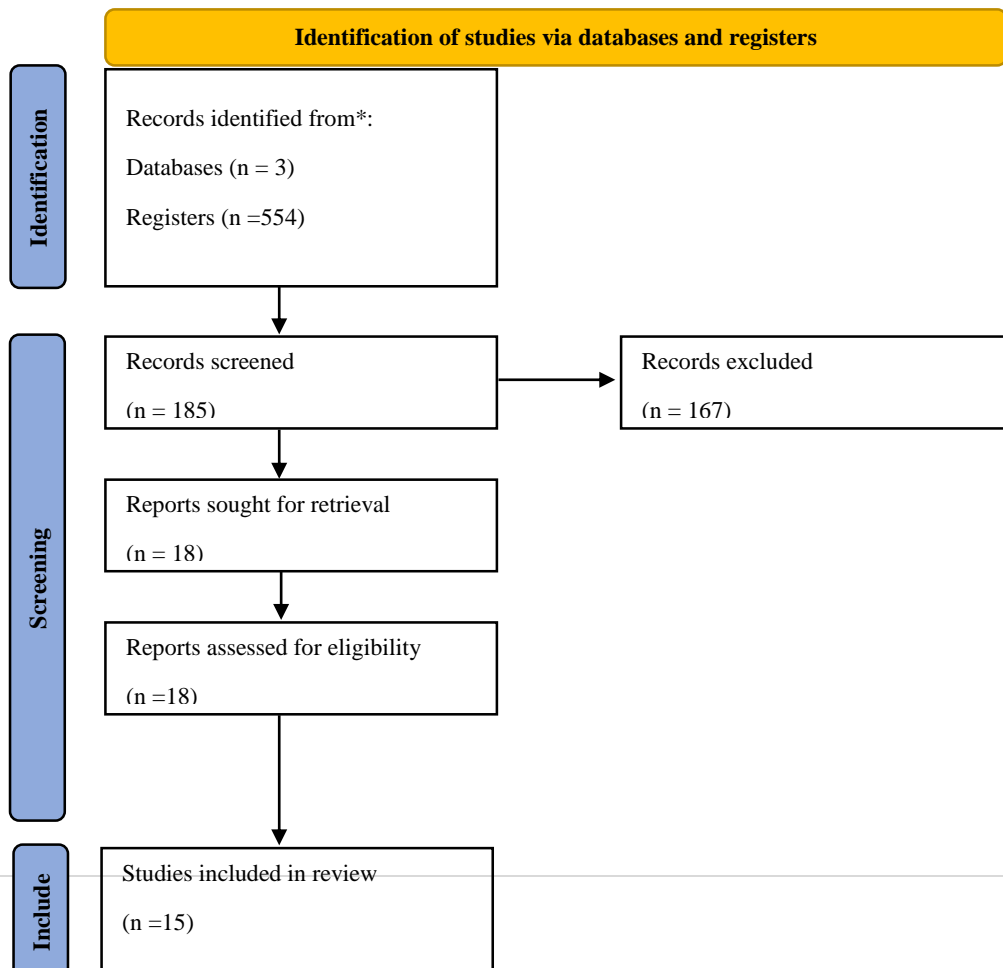
Although CS is an important tool in modern obstetric care, its growing trend for overuse in Ghana calls for critical evaluation. In many instances, the appropriateness of CS is under scrutiny because an unjustified surgical intervention may be predisposed to increased health care costs, prolonged convalescence, and risks to maternal and neonatal health. The study will therefore explore the prevalence and determinants of caesarean delivery in Ghana, with discussions on the regional variations and underlying socioeconomic and clinical factors driving the rising trend in CS rates. This study identifies such determinants to contribute to improvement in maternal and neonatal health outcomes within the country.

2. METHODS

A critical review was undertaken of existing peer-reviewed literature on prevalence and determinants of caesarean delivery in Ghana. This study searched several established databases, including Web of Science, PubMed and Scopus. The search was guided by a combination of keywords, phrases and MeSH terms such as (((prevalence) OR incidence) OR frequency) OR occurrence))) AND (((determinants) OR factors) OR drivers) OR influences))) AND (((caesarean delivery) OR c-section) OR surgical birth) OR caesarean section))) AND Ghana. This approach has thus ensured a comprehensive review of the literature. Specific inclusion criteria for the articles considered in this study were that they had to deal specifically with the prevalence, determinants, and general impact of caesarean delivery in Ghana. Irrelevant articles, or those older publications, or not based on Ghana and non-peer-reviewed, or of low quality, such as those whose methodology was incomplete, were excluded. Besides, only articles published in the last decade were considered to make sure of the timeliness of the data. Data collection involved the process of initial title and abstract screening against eligibility criteria for obtaining articles likely to be relevant. This was followed by full-text screening of the selected studies for relevance and applicability to the review question-inclusion criteria. Data were extracted from the selected full-text articles into a structured data collection form, which is systematic, organized, and easy to analyze. Data analysis was informed by identification of themes from the literature that were consistent with the study objectives. Such themes were then compared and merged narratively across the studies in order to come up with summarized statements of findings. The included studies were further appraised with the view of minimizing the risk of bias and hence improving the overall quality of evidence presented in the study.

3. RESULTS

Type of studies included in this review comprised 2 case control studies, 7 cross-sectional studies, 1 retrospective cohort study, and 5 retrospective cross-sectional studies.

Identification of studies via databases and registers

Identification

Records identified from*:

Databases (n = 3)

Registers (n =554)

Screening

Records screened (n = 185) → Records excluded (n = 167)

Reports sought for retrieval (n = 18)

Reports assessed for eligibility (n =18)

Include

Studies included in review (n =15)

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
Mireku-Gyima (2022)	Sociodemographic and Obstetric Predictors of Caesarean Section in Ghana	• Identify sociodemographic predictors influencing caesarean section rates in Ghana. • Determine obstetric factors associated with caesarean section performance in Accra	• Multivariable logistic regression analysis for data analysis. • Bivariate analysis of sociodemographic and obstetric factors. • Utilized secondary data from a major referral health facility	Case control study	Higher odds of CS with increasing maternal age, low income. Lower odds among women with secondary education and ANC non-attendants	• Maternal age, income, previous CS, and low foetal weight predict CS. • Secondary education and antenatal care nonattendance reduce CS likelihood. • Increasing maternal age correlates with higher odds of undergoing CS
Gyaase *et al.,* (2023)	Prevalence and determinants of caesarean section deliveries in the Kintampo Districts of Ghana	Determine CS delivery prevalence and influencing factors in Kintampo Districts, Ghana. Identify socio-demographic and obstetric factors contributing to CS deliveries. Assess the association between CS delivery and maternal age	Univariable and multivariable logistic regression models used for analysis. Automated stepwise approach for adding variables to the regression model. Data analyzed using STATA version 16.0	Cross sectional study	• CS delivery prevalence was 14.6% in Kintampo Districts of Ghana. • Women with secondary education had 2.6 times more CS deliveries. • Unmarried women were 2.5 times more likely to deliver by CS. • Women with 4-7 ANC visits had 1.95 times more CS deliveries. • History of pregnancy loss increased CD	CS delivery linked to socio-demographic factors and obstetric characteristics. Women with secondary education more likely to deliver by CS. Prevalence of CS delivery in study area was 14.6%
Seidu *et al.,* (2020)	Not just numbers: beyond	• Assess prevalence and determinants of caesarean deliveries	Binary logistic regression used to assess CD determinants.	Cross sectional study	• 18.5% of women delivered through	Women aged 45-49 had higher odds of caesarean deliveries.

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
	counting caesarean deliveries to understanding their determinants in Ghana using a population based cross-sectional study	among women in Ghana. • Identify factors influencing the likelihood of caesarean section births in Ghana	Multivariable logistic regression employed to analyse associations with CD. Adjusted odds ratios calculated to determine CD risk factors		caesarean section in Ghana. • Factors influencing CD include maternal age, region of residence, and parity. • Women with female babies had lower odds of CD. • Mothers with female babies may avoid CD due to cultural beliefs. • CD rates in Ghana do not necessarily indicate quality care	Mothers from Upper East and Upper West regions had lower odds. Women with parity 4 or more had lower odds. Mothers with female babies had lower odds of caesarean deliveries
Manyeh *et al*., (2018)	Socioeconomic and demographic factors associated with caesarean section delivery in Southern Ghana: evidence from INDEPTH	• Identify C-section rate and associated factors in rural southern Ghana. • Explore factors influencing C-section delivery for appropriate interventions	• Descriptive analysis of participant characteristics. • Logistic regression model for associations between variables	Retrospective cohort study	C-section rate was 6.59% in rural southern Ghana. Maternal age, education, and socioeconomic status influenced C-section rates Factors like parity and district of residence affected C-section deliveries	C-section rate was 6.59% in rural southern Ghana. Maternal age, education, and socioeconomic status influenced C-section delivery. Further qualitative research is recommended to understand C-section factors

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
	Network member site					
Kondor *et al.*, (2023)	The Demographic and Clinical History as Predictors Contributing to the Prevalence of Caesarean Sections in Ghana: A Facility-Based Study	Determine CS prevalence and its association with demographic and clinical history. Analyse predictors for CS prevalence using logistic regression	Retrospective study design with logistic regression analysis. Data analysis using IBM-SPSS version 25 for statistical evaluation.	Retrospective cross-sectional study	Prevalence: 59.4% SVD, 40.6% CS. Employment: 83.1% SVD, 81.7% CS. Term deliveries: 51.3% SVD, 62.1% CS.	Prevalence of CS was 40.6%, above WHO's recommended rate. Age above 36 increased CS likelihood, parity of 1-2 influenced CS. Clinical history and demographic factors impacted CS prevalence at LEKMA hospital.
(Alhassan, 2023)	Prevalence of Caesarean Section Among Nurses: Predictors and Effect on Exclusive Breastfeeding	Determine CS prevalence among nurses and its impact on breastfeeding. Identify predictors of CS delivery and exclusive breastfeeding practices among nurses. Assess the effect of CS delivery on exclusive breastfeeding among nurses.	Quantitative technique and analytical cross-sectional design used for study analysis. Statistical Package for the Social Sciences employed for data analysis	Cross sectional study	Prevalence of CS delivery among nurses in Tamale, Ghana was 21.1%. Community health nurses/RGN had higher odds of CS delivery. CS delivery negatively impacted exclusive breastfeeding practices among nurses.	• CS delivery prevalence among nurses was 21.1%. • CS delivery negatively impacted exclusive breastfeeding practices among nurses. • Nurses with vaginal delivery were more likely to practice exclusive breastfeeding. • Educational attainment and nursing specialty predicted CS delivery among nurses
Agyemang &	Prevalence and predictors of	• Identify socio-demographic factors influencing CS	• Descriptive analysis and logistic regression models were used for analysis.	Retrospective cross-	• Maternal age above 30, rural settlement, twin	• CS prevalence in Tamale Metropolis was 8.8%,

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
Appiah, (2024	Caesarean Section deliveries at the Tamale Teaching Hospital in Northern Ghana	deliveries in Tamale Metropolis. • Explore predictors of CS deliveries to improve maternal healthcare services. • Investigate inequalities in CS prevalence due to medical and non-medical factors. Examine obstetric and socio-demographic predictors of caesarean deliveries	• Data was collected using a pretested questionnaire and data extraction sheet. • Socioeconomic status was determined using various indicator variables. • The Kobo Collect app was used for data entry	sectional study	delivery, obstetric complication influenced CS. • Majority preferred vaginal delivery over CS, with 55 elective CS. • Factors predicting CS: maternal age, parity, education, wealth, gestational age. • Women with normal haemoglobin levels were less likely to undergo CS	below WHO's recommended rate • Factors influencing CS: maternal age, rural settlement, twin delivery, obstetric complications • Women with higher parity, education, wealth, and pregnancy loss undergo CS.
Amoah *et al.*, (2024)	Caesarean section delivery rates and associated factors in a faith-based referral hospital in Ghana: A retrospective analysis	• Investigate CS prevalence, indications, outcomes, and determinants in private health facilities. • Examine CS rates and factors in a faith-based hospital in Ghana. • Identify risk factors and associations with CS deliveries in private facilities	• Data extraction tool developed for maternal demographics and obstetric history. • Descriptive and inferential statistics used for data analysis	Retrospective cross-sectional study	• CS prevalence was 28.70%, with primary indications including previous CS. • Significant associations found between CS and breech presentation, previous CS history. • Neonates referred to NICU had increased likelihood of CS.	• CS prevalence was 28.70%, higher than WHO-recommended threshold. • Major CS indications: previous CS, foetal distress, failed induction. • Risk factors for CS: previous CS, breech presentation, NICU referrals. • Study aimed to guide policymakers in improving maternal healthcare services.

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
					• Study highlights high CS rates in private health facilities.	• Factors influencing CS rate: advanced maternal age, urban residence, education
Boateng *et al.*, 2019)	Non-Medical Determinants of Caesarean Deliveries in Ghana: A Logistic Regression Approach	• Determine non-medical predictors of caesarean deliveries using logistic regression model. • Assess significant factors influencing expectant mothers' choice for caesarean deliveries	• Logistic regression model used to determine non-medical predictors of caesarean deliveries. • Data collected from 395 expectant mothers across Ghana's regions	Cross sectional study	• Hold-out sample validated model with 92.5% classification accuracy. • Maternal age, birth weight, and parity significantly affect caesarean delivery. • Logistic regression identified non-medical predictors of caesarean deliveries in Ghana.	• Non-medical factors influencing caesarean deliveries in Ghana were identified. • Maternal age and insurance were significant predictors of caesarean delivery. • Logistic regression model validated with statistical measures showed significant predictors.
Prah *et al.*, 2017	Caesarean section in a primary health facility in Ghana: Clinical indications and feto-maternal outcomes	• Ascertain CS prevalence and outcomes in a primary health facility. • Compare elective and emergency CS outcomes among delivering women	• Retrospective study with 645 women who underwent caesarean section. • Data analysis using SPSS version 20 for statistical significance. • Logistic regression analysis to predict associations within the group.	Retrospective cohort study	• 26.9% of deliveries were caesarean sections, with 51.9% being emergency. • Leading indications: previous CS, big baby, failure in progress. • Adverse maternal outcomes: blood transfusion, bladder injury, postpartum haemorrhage.	• Emergency CS had higher adverse foetal outcomes than elective CS. • Older nulliparas tend to undergo more CS due to difficult labours. • High CS rate due to referral centre status and rare instrumental delivery. • Dominant CS indications: previous CS, big baby, failure in progress. • VBAC challenges in low-resource settings due to

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
					• Adverse foetal outcomes: higher in emergency CS, fresh stillbirth rate. • Maternal characteristics: mean age, occupation, education.	monitoring and preparedness
Konlan *et al.*, 2019)	Reasons for Women's Choice of Elective Caesarean Section in Duayaw Nkwanta Hospital	• Identify factors influencing women's choice of elective caesarean sections. • Explore reasons for choosing caesarean section over vaginal delivery	• Descriptive cross-sectional survey method used for data collection. • Data analyzed using descriptive statistics and Pearson correlation test. • Questionnaire administered to post-caesarean section women above 18 years. • Data coded, double-entered into Excel, and analyzed using SPSS	Cross sectional studies	• 37.2% chose CS for pain-free birth, 57.1% for safety. • Positive correlation between income and CS births. • Fear of complications, episiotomy, and baby's health influenced CS choice. • Majority aged 28-35, 83.3% educated, 89.7% NHIS beneficiaries. • High parity linked to increased CS rates.	• Post-CS women chose CS due to pain-free and safety reasons. • Positive correlation between income and number of CS births. • Women chose CS due to fear of complications and episiotomy. • High elective CS rate in Duayaw Nkwanta compared to WHO standards.

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
(Manyeh & Ofosu, 2024)	Assessing a five-year trend and socio-demographic determinants of caesarean section delivery in Ghana	• Assess trends in C-section deliveries in Ghana. • Identify factors associated with C-section deliveries. • Inform policy for reducing unnecessary C-sections and improving maternal health	• Cross-sectional study design with DHIMS-2 database for analysis. • Descriptive and inferential analysis of socio-demographic factors for associations. • Data extraction from public and private health facilities in Ghana	Cross sectional study	• Majority of C-sections in hospitals, government-owned facilities. • High C-section rates linked to advanced maternal age, education, employment. • Need for patient-centred maternal healthcare, natural childbirth promotion.	• Majority of C-sections in hospitals, government-owned facilities. • Higher C-section rates in 2019 and 2020. • Factors: advanced maternal age, education, formal employment linked to C-sections. • Need for comprehensive maternal healthcare approach in Ghana.
(Adu-Bonsaffoh et al., 2022)	Preferred mode of childbirth among women attending antenatal clinic at a tertiary hospital in Ghana: a cross-sectional study	• Determine pregnant women's preferred mode of childbirth and associated factors. • Explore factors influencing preference for caesarean section among pregnant women. • Analyse determinants affecting women's choice of childbirth method	• Descriptive analysis and multivariate logistic regression were performed. • Data analysis involved SPSS version 20 for statistical analysis.	Cross sectional studies	• Majority preferred vaginal delivery, attributing it to natural childbirth. • Urban settlement increased odds for CS preference among pregnant women. • Previous childbirth and caesarean influenced preference for mode of delivery	• 86% preferred vaginal delivery, 14% preferred caesarean section. • Factors influencing CS preference: previous childbirth, previous CS, urban settlement. • Urban settlement linked to higher CS preference due to education and finances

Author	Study Title	Objective(s)	Methodology	Type of Study	Results	Findings
(Okyere et al., 2022)	Inequalities in prevalence of birth by caesarean section in Ghana from 1998-2014	• Analyse trends in birth by CS in Ghana from 1998-2014. • Assess inequalities in CS prevalence using WHO's HEAT software	• Analyzed GDHS data using WHO's Health Equity Assessment Toolkit software. • Disaggregated CS births by wealth, education, residence, and region. • Measured inequality with simple and complex weighted measures. • Constructed 95% confidence interval for statistical significance	Retrospective/Cross sectional trend analysis	• Analyzed GDHS data using WHO's Health Equity Assessment Toolkit software. • Disaggregated CS births by wealth, education, residence, and region. • Measured inequality with simple and complex weighted measures. • Constructed 95% confidence interval for statistical significance.	• Proportion of CS increased significantly from 4.0% to 12.8% from 1998-2014. • Disparities skewed towards wealth, education, urban areas, and regional differences. • Greater Accra Region had advantages in CS prevalence over the years. • More work needed to ensure access to necessary CS for all. • Complications with CS should be considered for medically indicated cases
(Apanga & Awoonor-Williams, 2018)	Predictors of caesarean section in Northern Ghana: a case-control study	• Determine predictors of caesarean section for prenatal counselling in Ghana. • Investigate obstetric and socio-demographic factors associated with caesarean section.	• Case-control study design with retrospective data collection. • Data analyzed using SPSS version 22 for univariate and multivariate analysis. • Sample size calculated using Epi info 7 with 95% confidence interval. • Records reviewed from delivery registers, postpartum, and postnatal registers	Case Control study	• Women with ANC visits ≥ 4 times had higher odds of CS. • Referral from other facilities increased odds of caesarean section. • Foetal weight ≥ 4000g associated with increased likelihood of CS.	• Women with ANC visits ≥ 4 times had higher odds of C-section. • Referral from other facilities increased likelihood of C-section. • Foetal weight ≥ 4000g associated with higher C-section odds. • Gestational age > 40 weeks slightly increased C-section odds

Grouped Recurring Themes and Sub-Themes in the Studies

i. Disparities in the Prevalence of Delivery by Caesarean Deliveries in Ghana
    The percentage of CDs in Ghana increased significantly from 4.0% in 1998 to 12.8% in 2024. This increase in CDs tended to be highly concentrated among women from the wealthier sections of the population, with a higher level of educational attainment and living in urban areas, particularly in certain areas within the country. The Greater Accra Region showed sustained advantages at all times in CD prevalence; thus, improved access to necessary CD procedures beyond this population is indicated.

ii. Socio-demographic Factors of Caesarean Section Rates in Ghana
    Some socio-demographic factors were associated with the likelihood of CDs as noted in the studies. With increased maternal age and usually higher income, the odds of CDs were higher, though the odds were lower for women with secondary education and women who did not attend ANC. The main predictors of CD included maternal age, income status, history of previous CD, and low weight of the baby, while secondary education and not attending ANC were associated with lower odds of CDs.

iii. CD Rates and Associated Factors in Faith-Based Referral Hospital in Ghana.
    The prevalence of CD in a faith-based referral hospital in Ghana accounted for 28.7% and the primary indications were reported as previous CDs. The studies found that there was a strong association of CD with factors like breech presentation and prior history of CD. The neonates referred to the neonatal intensive care unit were also more likely to be delivered via CS. The findings place in perspective the high rate of CS in private health facilities and perhaps depict a trend that may differ from public health institutions.

Table 2: Themed Summary of Prevalence and Determinants of Caesarean Deliveries

Theme	Contributions
Prevalence of Caesarean Deliveries	Consistent highlight of the prevalence of caesarean deliveries in Ghana, with rates ranging from 8.8% to 28.70%. Maternal age, previous CS history, breech presentation were commonest cited factors.
Determinants of Caesarean Deliveries	Urban settlement, education, wealth, and previous childbirth experiences were identified as key influencing determinants
Impact of CD on Maternal and Child Health	CD was associated with increased risks of complications, childhood obesity, and reduced rates of exclusive breastfeeding
Policy Implications	The studies aimed to inform policymakers on strategies to reduce unnecessary CS deliveries, improve maternal healthcare services, and promote natural childbirth practices. Recommendations included the need for patient-centred care and comprehensive maternal healthcare approaches.

4. DISCUSSIONS

A caesarean section, also known as a C-section, is a surgical procedure that involves making an incision on the abdominal walls and the uterus to safely deliver the baby (Konlan *et al*., 2019; Seidu *et al*., 2020). This surgical intervention is widely performed across the globe and is primarily undertaken when there is a substantial risk to the health of either the mother or the baby if a vaginal delivery is attempted (WHO, 2015). According to the recommendations of the World Health Organization (WHO), the ideal caesarean

delivery rates should range between 10% and 15% of all births (WHO, 2015). This guideline is supported by various studies that have indicated a significant decrease in maternal and perinatal morbidity and mortality within this range (Althabe *et al*., 2006; Betran *et al*., 2015). However, when the rates surpass this threshold, the advantages associated with caesarean deliveries diminish, and similar to other surgical procedures, it exposes both the mother and the baby to considerable short-term and long-term risks and complications (Organization, 2018; Ye *et al*., 2014).

Normally, according to the International Classification of Diseases, C-Section is only indicated in situations where the following cases are present: hypertensive disorders, malpresentation, disorders of amniotic fluid, antepartum haemorrhage (APH) which includes placenta previa, post-dated pregnancy, prolonged and obstructed labour, foetal distress, previous caesarean delivery, maternal disorders related to pregnancy, and general diseases complicating pregnancy. The foetal distress group encompasses both non-specified foetal distress and foetal distress caused by meconium-stained liquor. Hypertensive disorders cover gestational hypertension, pre-eclamptic toxaemia (PET), and eclampsia. The category of amniotic fluid disorders includes both oligohydramnios and polyhydramnios. However, cephalo-pelvic disproportion (CPD) and failed induction of labour are classified under the prolonged or obstructed labour category. Additionally, C-section indications documented as maternal distress, Rh negative mothers, and retention of urine are grouped under the classification of 'pregnancy-related maternal disorders', while thalassemia, anaemia, and asthma fall under the category of 'general diseases complicating pregnancy'.

In addition to the medical reasons for performing caesarean sections, there has been a rise in the number of C-sections requested by mothers due to other various factors. These factors include anxiety and fear of the pain associated with vaginal birth, previous negative experiences during labour, worries about potential harm or death to the baby during a vaginal birth, concerns about damage to the pelvic floor, the convenience of scheduling the birth, and positive attitudes towards C-sections in terms of the ease and speed of delivery without experiencing labour pain (Sorrentino *et al*., 2022).

Data indicates that there has been a rise in the number of C-sections, particularly in developed countries and Asian countries (Betran *et al.*, 2021). However, Africa has reported relatively low rates (9.2%) of C-section deliveries. Nevertheless, projections suggest that by 2030, the rates of C-sections in Africa will increase (Betran *et al*., 2021). Since the study considered data published between 1990 and 2018, there may have been some missing data from Africa due to issues related to data reporting and in addition to this, there has been some additional studies that have been published between 2018 and 2024 in Africa that can contribute to estimating the prevalence of C-Section, indications, and outcomes. Considering the advancements in healthcare delivery in Africa, the increase in privately owned health facilities, and the rise in socioeconomic status, it is possible that the rate of C-sections in Africa has increased since 2018. Furthermore, there are certain gaps in evidence such as incidence of C-sections, the types of C-sections (emergency, elective, and C-Section by maternal request), and appropriate indications for this intervention. There is also a gap in the evidence regarding where C-Sections occur both between public and private facilities, and socioeconomic profiles of women who undergo surgeries.

High rates of CS present associated risks to mother and child including increased complications during and after birth. Long- and short-term health effects have been noted to be associated with this life-saving intervention. There has been a record high prevalence of maternal morbidity and mortality in women who had deliveries through CS compared to those who had vaginal births. Emerging facts also indicate difference in hormonal and physiological integrity between babies born via CS and those who were delivered vaginally (The Lancet, 2018). Exploring the factors contributing to the prevalence in CS rates will inform strategies to make this all-important procedure safer. There are also issues of undue pressure on hospital or healthcare systems due to increased CS cases and longer hospital stays after surgery. Findings from this review can guide healthcare policies to optimize resource usage to increase cost effectiveness in healthcare. In addition, varying disparities in different demographic populations may indicate a probable health disparities and spotting the determinants could shed some light on the contributing variables that underlie these differences, thus creating the need for tailored interventions unique to each demographic group in dealing with their respective health concerns (Negrini *et al*., 2021; Yaya *et al*., 2018).

Identifying factors that influence pregnancy-associated surgery including determinants, facilitators, and barriers can be potentially critical in the context of Africa to minimize the unnecessary practice of such C-Section and increase its access as well as secure conduct to

those who need it the most (Betran *et al*., 2018). It is worth noting that CS may result into unwelcome outcomes such as feto-maternal deaths, maternal DVT, postpartum hemorrhage, respiratory complications, and infections, among others. Searches conducted on this subject in Africa indicates that most of the available reviews focused on specific countries rather than the entire continent, making it difficult to generalize the findings. For instance, one review examined studies from Ethiopia to determine the prevalence of C-Section and the resulting complications (Gedefaw et al., 2020). The overall pooled prevalence of Caesarean section was found to be 29.55% (95% CI: 25.46–33.65) (Gedefaw *et al.*, 2020). It is important to note that Caesarean section is associated with various complications for both the mother and the newborn. The most common indication for Caesarean section was cephalopelvic disproportion (18.13%, 95% CI: 12.72–23.53), followed by non-reassuring fetal heart rate pattern (19.57%, 95% CI: 16.06–23.08) (Gedefaw *et al*., 2020). Among the newborns, common complications included low APGAR score, perinatal asphyxia, neonatal sepsis, meconium aspiration syndrome, early neonatal death, stillbirth, and prematurity. On the other hand, maternal complications following Caesarean section included febrile morbidity, surgical site infection, maternal mortality, severe anemia, and postpartum hemorrhage (Gedefaw *et al.*, 2020).

A different systematic review conducted in Cameroon aimed to identify the causes and outcomes of C-sections. The study found that the overall prevalence of caesarean deliveries was estimated to be 9.9% (95% CI: 7.4, 12.8%, I2 = 99.68%, χ2 = 315.9, p < 0.001) *(Njim et al.,* 2020). The prevalence of caesarean deliveries showed a progressive increase over time, starting from 3.4% (95% CI: 2.2, 4.8%) before the year 2000, rising to 9.8% (95% CI: 7.4, 12.8%) between 2000 and 2009, and reaching 14.7% (95% CI: 8.8, 21.7%) from 2010 to 2019. The three most common indications for caesarean deliveries were cephalopelvic disproportion (27.5%; 95% CI: 17.5, 38.7%), previous caesarean deliveries (13.2%; 95% CI: 7.4, 20.3%), and foetal distress (11.2%; 95% CI: 4.8, 19.5%). Furthermore, neonates born via caesarean delivery had a higher likelihood of experiencing neonatal asphyxia compared to those born through vaginal deliveries (OR: 6.5; 95% CI: 2.5, 16.5) (Njim *et al.*, 2020). In Sub-Saharan Africa, a comprehensive review of 68 studies revealed varying frequencies of caesarean section (CS) across four main themes (Dikete *et al*., 2019). The range of CS frequency was found to be between 2% and 51%. The primary indications for CS in this region include dystocia, foetal distress, scarred uterus, breech presentation, antenatal hemorrhage, and hypertensive disorders. CS poses several maternal risks, such as surgical site infections, obstetric fistulae, anaesthetic complications, pulmonary embolism, postpartum hemorrhage, haemostatic hysterectomy, and maternal death. Additionally, perinatal risks associated with CS include respiratory distress, prematurity, and perinatal death (Dikete *et al*., 2019).

A different study conducted on Sub-Saharan countries utilizing data from the DHS to investigate the prevalence and factors associated with cesarean delivery in SSA countries revealed varying rates of C-sections in public healthcare settings, ranging from 3% in Burkina Faso to 15.6% in Ghana. Conversely, in private healthcare settings, the rates ranged from 0% in Sao Tome and Principe to 64.2% in Rwanda. Overall, the study determined that C-section rates were 7.9% in public healthcare facilities and 12.3% in private healthcare facilities (Yaya *et al*., 2018). The study also employed an adjusted regression model, which indicated that women aged 35-49 had an increased likelihood of undergoing a C-section (Yaya *et al*., 2018). Further analysis of public healthcare settings revealed that women from richer or richest households, male infants, and larger-sized infants at birth had an increased likelihood of C-section. Conversely, women from affluent neighborhoods had a reduced likelihood of undergoing a C-section. In private healthcare settings, women with high decision-making power and those with multiple births had an increased odds of C-section, while women who attended ANC visits had a significant reduction in the odds of C-section (Yaya *et al*., 2018).

A different study conducted a review of synthesized studies from seven African countries, which examined women's preferences regarding C-sections and the prevalence of CS (Konlan *et al*., 2022). The findings revealed that the rate of CS ranged from 2.1% to 18.5% of all live births. Various socioeconomic and

demographic factors were identified as influencing the likelihood of CS, including higher socioeconomic status, education, and age. Additionally, factors such as place of birth, urban residence, and women-headed households were found to have an impact (Konlan *et al*., 2022). Maternal and obstetric-related factors, such as preceding birth interval, multiple pregnancies and parities, maternal overweight, and giving birth before the age of 18 or after 35, were also identified. Furthermore, specific labour-related factors, including malpresentation, antepartum hemorrhage, failed induction, prolonged labour, and non-reassuring foetal distress were found to contribute to the likelihood of CS.

Foetal factors such as cephalopelvic disproportion or having a large baby, as well as pregnancy for a male child, were also associated with an increased likelihood of CS (Konlan *et al*., 2022).

To summarize, previous systematic reviews have failed to distinguish the occurrence rates of C-Section in Africa based on medical and non-medical reasons. Furthermore, these reviews did not investigate the factors that contribute to non-medical C-Sections. The outcomes of both medical and non-medical C-Sections have not been thoroughly examined. Therefore, the objective of this current study is to assess whether women who choose to have a C-Section without any medical necessity achieve the desired maternal and neonatal outcomes. The available reviews were unable to establish the differences in patterns between elective and emergency C-Sections, as well as the factors that are likely to influence them, due to limitations in the data structure of the included studies. Additionally, while the reviews focused on socioeconomic factors, it did not explore the clinical and psychological factors that may determine the need for a C-Section. Furthermore, the impacts of both elective and emergency C-Sections were not addressed in this review. However, the study identified gaps in the understanding of the incidence rates of C-Section, rates for each type of surgery, clinical determinants of C-Section, and outcomes of the performed surgeries. Additionally, the reviews primarily relied on secondary data, potentially overlooking other data from health facilities that were not reported.

2.3.1 Caesarean Section Deliveries in Ghana

The prevalence of caesarean delivery has varied from many studies in Ghana due to demographic factors, geographical locations and health facilities. A prevalence of 14.4% CD was reported by Gyaase *et al*., (2023) in the Kintampo districts. Another study indicated that 18.5% of women delivered through caesarean section (Seidu *et al.,* 2020). Manyeh *et al*., (2018) estimated a CD prevalence of 40.6% in a facility-based study. Alhassan, (2023) found the prevalence of CS delivery among nurses in Tamale to be 21.1%. In addition to that, Agyemang & Appiah, (2024) reported the prevalence of CD at the Tamale Teaching Hospital as 8.8%. A retrospective analysis carried out by Amoah *et al*., (2024) in a faith-based referral hospital identified previous CS, breech presentation and referrals to the NICU significant. On another hand, Boateng *et al*., (2019) discussed wider trends without giving a clear prevalence rate. In a related study by (Prah *et al*., 2017) in the Central Region of the country, there was a 26.9% caesarean section. Konlan *et al*., (2019) documented that 37.2 % of the women would prefer an elective CS due to mainly painless delivery and safety concerns.

These findings highlight that the prevalence of CDs vary significantly across the regions and populations of Ghana and that targeted interventions may be needed depending on the prevailing factors contributing to caesarean delivery. The implications of these variations in CD prevalence suggest that healthcare access, socio-economic disparities and medical practices influence caesarean delivery rates. Higher prevalence rates in some areas may be indicative of better access to healthcare or increased elective CS, while lower rates may indicate barriers or bottlenecks to surgical delivery options available to women. Understanding the prevalence is essential for stakeholders such as policymakers and healthcare personnel in curbing unwanted caesarean delivery and its associated maternal and neonatal health outcomes.

2.3.2 Determinants of Caesarean Deliveries in Ghana

Most of the socio-demographic and obstetric factors contribute to prevailing rates of CS deliveries in Ghana. Maternal age is a key contributing factor to CS delivery. Studies have shown that older pregnant women have higher odds of having CS compared to younger women (Seidu *et al*., 2020). This could be due to increased pregnancy-related complications such as

hypertension, gestational diabetes and reduced uterine elasticity which would necessitate caesarean delivery. Consequently, Manyeh & Ofosu, (2024) also highlighted that those women aged at least 36 were more likely to give birth by CS.

Secondary education levels among pregnant women have been directly linked to higher CS delivery rates. Gyaase *et al*., (2023) and Mireku-Gyimah, (2022) found that women with secondary education were 2.6 times more likely to deliver through CS. This may be due to the fact that educated women have greater access to healthcare and information, have better health-seeking behaviours and may decide on CS due to perceived beneficial outcomes.

Women who were not married were found to have higher CS rates. Gyaase *et al*., (2023) reported that unmarried women were 2.5 times more likely to opt for CS delivery than their married counterparts. This is likely attributed to lower social support, increased stress or differences in antenatal care seeking behaviour among unmarried women as compared to married women.

It has also been highlighted that the number of antenatal visits is positively associated with CS rates, with women having 4-7 antenatal visits most likely to deliver through CS (Apanga & Awoonor-Williams, 2018). This the authors stated could be because women with a planned caesarean delivery often have their mode of delivery planned during ANC visits. More often than not, women with medical or obstetric indications for caesarean delivery have been advised by health providers to attend more ANC visits than those without the indications.

Residing in an urban area and having higher income levels are also associated with increased caesarean delivery rates (Manyeh & Ofosu, 2024). Women who are wealthy tend to have more access to healthcare and are more likely choose CS over vaginal birth. For instance, Boateng *et al*., (2019) indicated that women with insurance coverage have a higher likelihood of having CS delivery.

The probability of CS delivery is also enhanced by certain clinical conditions, such as breech presentation (Amoah *et al*., 2024). Previous CS, twin deliveries and emergency referrals are the other obstetric factors contributing clinically to CS rates (Prah *et al*., 2017).

The preference of mothers for pain-free delivery and perceived safety and fear of complications and episiotomy are other reasons contributing to increasing the rates of elective CS (Konlan *et al*., 2019).

These trends collectively highlight the rates and factors contributing in diverse ways to the choice of CS deliveries and outcomes.

2.4 Implications on Maternal and Neonatal Health Outcomes

The increasing trend in the rate of CS is particularly depicted in private health facilities and above the threshold recommended by the WHO, thus influencing maternal and neonatal health outcomes in both positive and negative ways. On the one hand, the 28.70% prevalence of CS is higher than recommended reliance on surgical delivery, which, in certain situations-for example, previous CS, foetal distress, failed induction, big baby, and breech presentation, can be medically indicated and may be beneficial for preventing adverse maternal and neonatal outcomes. In neonates, especially among admissions to the NICU, CS diminishes the risks associated with complicated vaginal births (Amoah *et al*., 2024).

However, the trend also gives rise to concerns about unnecessary medicalization of child delivery, with increased risks for mothers of postoperative complications, blood transfusions, bladder injuries, and postpartum haemorrhage which is noted in a recent WHO study to be the top contributing factor to adverse maternal outcomes (Cresswell *et al*., 2025). In addition, emergency CS is associated with a higher rate of adverse foetal outcomes, including fresh stillbirth rate, indicating that the urgency for such types of operations may not always culminate in the best neonatal outcomes. Further, wealth-skewed rates, skewed for education, urban areas, and regional differences are likely to indicate inequalities in access and quality of care. The risk of CS is higher among women from wealthy, better-educated urban backgrounds, which reflects possible inequality in access to health care and delivery decisions based on socio-economic status rather than on medical grounds (Prah *et al*., 2017).

Overall, although CS may be a lifesaving intervention in selected high-risk pregnancies and may result in wanted health outcomes when properly indicated, the implications of this trend do call for careful consideration. It is necessary to weigh the benefits against possible risks and underlying inequalities in

access to and quality of maternal health care. It is important that the rate of CS be closer to medical need than socioeconomic preference or health-care-provider-related variable rates.

CONCLUSION

These studies presented the rate of CS performed in Ghana to vary significantly, with some regions exceeding the recommended thresholds. Key predictors were older maternal age, higher education levels, previous CS deliveries, wealth, and antenatal care attendance. These results point to the necessity for targeted interventions aimed at encouraging natural childbirth and only medically necessary CDs, thus improving maternal health care services. To encourage safe and medically indicated childbirth, interventions need to aim at creating the capacity for antenatal education, reducing socioeconomic barriers, enhancing obstetric care, and promoting public health campaigns. Antenatal counselling programmes need to be instituted and promoted in order to inform pregnant women about the benefits and risks of CS and vaginal delivery, allowing for informed decision-making among birthing mothers. Low-cost maternal care policies and expanded insurance coverage must be instituted to make sure That CS is carried out under medically necessary and cost-effective conditions. Adequate investment in skilled birth attendance and midwifery education are needed to facilitate safe deliveries especially in low resourced settings and rural areas. Finally, public health interventions are needed to tackle cultural myths surrounding CS and vaginal delivery to ensure that delivery options are medically pursued rather than being socio-culturally driven. These will be effective interventions once implemented, enhancing and promoting optimal maternal health outcomes.

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