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Research Article

Factors Associated with Cesarean Section in Primiparous Women at the Bernard Kouchner Communal Medical Centre in Coronthie, Conakry, Guinea

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Abstract

Objective: to analyse the factors associated with Caesarean section in primiparous women. *Methods*: This was a 12-month (1 January to 31 December 2022) retrospective case-control study conducted at the Bernard Kouchner Communal Medical Centre (CMC) in Coronthie. Correctly completed records of primiparous women with a singleton pregnancy were included, with a live foetus in cephalic presentation having been delivered (by Caesarean section or vaginal delivery) from 28 weeks' gestation with a weight ≥ 1000 g. The "cases" consisted of records from primiparous women who had undergone caesarean section. The "controls" were composed by matching each "case" with the record of a patient who had undergone vaginal delivery, according to the order in the delivery register. Socio-demographic, clinical and obstetric characteristics were analysed and compared. A univariate analysis comparing cases to controls and a multivariate analysis looking for an association between maternal determinants were performed. *Results*: The prevalence of caesarean section in primiparous women was 31%. The average age of primiparous women was 24 ±5 years. The 20-24 age group was the most represented in both groups, with 35% of caesareans and 42% of vaginal deliveries. The factors significantly associated with caesarean section in primiparous women were advanced maternal age (OR=1.13 CI=1.07-1.20), prolonged pregnancy (OR=25.1 CI =3.23 - 5.40), arterial hypertension (OR=4.98 CI= 2.24 -11.6), premature rupture of membranes (OR= 4.25 CI: 2.27 - 8.05), haemorrhagic complications (OR=8.56 CI=3.05 - 26.6), foetal distress (OR=68.4 CI=18.3 - 45.1) and macrosomia (OR=12.7 CI= 4.83 - 38.6). *Conclusion*: correct antenatal care and delivery by qualified personnel could help prevent some of these factors and thus reduce the caesarean section rate among primiparous women in our health facility.

Keywords

Associated Factors, Caesarean Section, Primipara, Coronthie, Conakry

1. Introduction

According to the WHO, caesarean section is a surgical intervention aimed at reducing maternal and foetal mortality when it is used for a medically justified reason [1]. It is a method of delivery that obstetricians use whenever natural childbirth carries a greater maternal and/or foetal risk than the risk inherent in the procedure [2]. Obstetric risk factors play a major role in predicting the mode of delivery. The risk of caesarean section is increased in the presence of at least one of these factors: foetal distress, malpresentation of the foetus, preterm delivery, gestational diabetes, premature rupture of membranes, multiple pregnancies, arterial hypertension and elderly primiparous women [3]. However, one of the biggest risk factors for Caesarean section is the previous Caesarean section itself. The first caesarean section plays a vital role in a patient's obstetrical prognosis [4]. This underlines the importance of the indication for caesarean section in primiparous women. Studies show that the first delivery, which is often associated with maternal and/or foetal complications, is therefore considered to be high-risk [5, 6]. According to recent WHO estimates covering 150 countries, 21% of all births were by caesarean section in 2018, with averages ranging from 1% to 58% depending on the country [7]. The caesarean section rate among primiparous women also contributes to the increase in the overall number of caesarean sections. In France, Zelli et al. reported in 2016 a caesarean section rate of 38.15% in primiparous women [8]. In the Democratic Republic of Congo, a 2017 study reported a 13.3% caesarean section rate among primiparous women [5]. In Guinea, Keita and al. reported in 2014 a caesarean section rate of 30.5% in primiparous women [9]. The decision to order a caesarean section for the first birth is a major issue in obstetrics due to the associated maternal and perinatal complications [10]. The aim of this study was to analyse the factors associated with the practice of Caesarean section in primiparous women at the Bernard Kouchner Communal Medical Centre in Coronthie.

2. Methods

2.1. Study Setting

this was a retrospective case-control study lasting one year (1 January to 31 December 2022), carried out at the maternity unit of the Bernard Kouchner Communal Medical Centre in Coronthie, Conakry. This is a level II maternity unit in the Guinean health pyramid, with almost 4,000 deliveries per year, 35% of which are caesarean sections.

2.2. Study Population

Our study population consisted of all the records of primiparous patients who had given birth by caesarean section or vaginal delivery at the Bernard Kouchner Communal Medical Centre in Coronthie during the study period.

2.3. Selection Criteria

We included in this study the complete records of primiparous women with a single foetal pregnancy, foetus living in cephalic presentation having given birth (caesarean section or vaginal delivery) from the 28th WA with a weight ≥1000 g at the Communal Medical Centre Bernard Kouchner in Coronthie. Multiple pregnancies, foetal death in utero, other foetal presentations (breech, oblique, transverse, etc.), incomplete records and patients who gave birth outside the Communal Medical Centre Bernard Kouchner were not included.

2.4. Sample Constitution

In order to carry out a case-control comparison, we set up two groups of patients: the "cases" group, made up of records of patients who had undergone a caesarean section meeting the inclusion criteria, and the "controls" group, made up of records of patients who had undergone a vaginal delivery without an instrumental extraction meeting the inclusion criteria. We recorded 1 case for every 1 control.

2.5. Recruitment Method

We carried out systematic random recruitment, taking into account the records of primiparous patients. After calculating the sampling step, which is (sample size/target population size). Our recruitment consisted of skipping 2 files and taking the third file if it met our inclusion criteria. If the file did not meet our inclusion criteria, we automatically moved on to the next one.

2.6. Study Variables and Data Collection

The variables were qualitative (level of education, occupation, marital status, mode of admission, history, state of membranes, state of pelvis) and quantitative (maternal age, age of pregnancy, number of pregnancies, number of antenatal visits, number of ultrasounds and uterine height). The data collection technique consisted of reading the medical records and recording them on a survey form pre-established on Kobocollect. Other data media were used whenever necessary to clarify or supplement the data collected from the medical records.

2.7. Data Analysis

The data was collected from a smartphone using the Kobocollect application and analysed using R software. 4.3.2. The statistical analyses were carried out in two stages: a descriptive stage in which we presented the qualitative variables in the form of numbers and percentages, expressed the quanti-

tative variables in the form of mean and standard deviation; an analytical stage in order to identify the factors potentially associated with the practice of caesarean section in primiparous women using the Chi-square test and Fisher's test for bivariate comparisons. The Chi-squared test was used when the calculated theoretical numbers were ≥ 5, and the Fisher test was used when the calculated theoretical numbers were < 5. All variables with a p-value ≤ 0.20 were included in a multivariate regression model. For each variable retained in the final model, the odds ratio (OR) and confidence interval (CI) were calculated. An OR equal to 1 indicates no effect, when it is less than 1 it indicates a protective effect, and when it is greater than 1 it indicates a risk effect. We considered a p-value < 0.05 as indicative of a statistically significant association.

2.8. Ethical Considerations

The data was collected anonymously and the information obtained was used for purely scientific purposes.

2.9. Limitations

The main limitations of this study were that it was retrospective and uni-centric.

3. Results

3.1. Frequency of Caesarean Section in Primiparous Women

During the study period, 3800 deliveries were carried out, of which 1394 were by caesarean section. Of those who underwent caesarean section, 432 were primiparous, representing a frequency of 31%.

3.2. Socio-demographic Profile of Patients

Table 1. Socio-demographic profile of women seen for childbirth (caesarean section and vaginal delivery) at the Bernard Kouchner CMC in Coronthie from 1 January to 31 December 2022.

Socio-demographic profile of patients	Cases		Controls	
	N=261	%	N=261	%
Age range				
≤ 19 years	39	15	79	30
20-24 years old	91	35	110	42
25-29 years old	83	32	52	20
30-34 years old	34	13	20	7.7
≥ 35 years	14	5.4	0	0
	24 ±5 years (11 to 41 years old)		22 ±4 years (14 to 34 years old)	
Level of education				
No schooling	48	18	31	12
Primary	18	6.9	32	12
Secondary	90	34	106	41
Higher	105	40	92	35
Marital status				
Single	42	16	64	25
Married	219	84	197	75
Profession				
Self-employed	79	30	77	30
Student	62	24	112	43
Employed	80	31	44	17

Socio-demographic profile of patients	Cases		Controls	
	N=261	%	N=261	%
Housewife	40	15	28	11

Analysis of Table 1 shows that the age group most represented was 20 to 24 years (35%) among women who had undergone caesarean section and 42% among those who had vaginal deliveries. Of those who had undergone caesarean section, 84% were married, compared with 75% of those who had vaginal deliveries. Patients with a higher level of education were more numerous (40%) among those who had undergone caesarean section. On the other hand, 41% of vaginal deliveries were by women with secondary education.

3.3. Clinical Characteristics of Patients Received for Delivery at the Bernard Kouchner CMC in Coronthie

Table 2. Clinical characteristics of patients.

Variables	Cases (261)		Controls (261)	
	N	%	N	%
Age of pregnancy				
28-36 SA + 6 days	35	13	24	9.2
37-41 SA + 6 days	214	82	236	90
≥ 42 SA	12	4,6	1	0.4
	38.9 WA		39.4 WA	
	28-42 WA		30-42 WA	
Prenatal consultation				
None	46	18	24	9.2
1-3	41	16	77	30
≥4	174	67	160	61
Uterine height				
≤ 34 cm	150	57	136	52
> 34 cm	111	43	125	48
State of membranes				
Intact	128	49	218	84
Ruptured	133	51	43	16
High blood pressure on admission				
No	199	76	249	95
Yes	62	24	12	4.6
Bleeding complications				
No	230	88	254	97
Yes	31	12	7	2.7

3.4. Factors Associated with Caesarean Section in Primiparous Women

Table 3. Factors associated with the practice of caesarean section in primiparous women at the Bernard Kouchner CMC in Coronthie from 1 January to 31 December 2022.

Variables	Cases N=261	Controls N=261	p-value
Age range			<0.001
≤ 19 years	39 (33%)	79 (67%)	
20-24 years old	91 (45%)	110 (55%)	
25-29 years old	83 (61%)	52 (39%)	
30-34 years old	34 (63%)	20 (37%)	
≥ 35 years	14 (100%)	0 (0%)	
Level of education			0.022
No schooling	48 (61%)	31 (39%)	
Primary	18 (36%)	32 (64%)	
Secondary	90 (46%)	106 (54%)	
Higher	105 (53%)	92 (47%)	
Profession			<0.001
Self-employed	79 (51%)	77 (49%)	
Student	62 (36%)	112 (64%)	
Employed	80 (65%)	44 (35%)	
Age of pregnancy			0.002
28-36 WA + 6 days	35 (59%)	24 (41%)	
37-41 WA + 6 days	214 (48%)	236 (52%)	
≥ 42 WA	12 (92%)	1 (7.7%)	
High blood pressure on admission			<0.001
No	199 (44%)	249 (56%)	
Uterine height			0.2
≤ 34 cm	150 (52%)	136 (48%)	
> 34 cm	111 (47%)	125 (53%)	
State of membranes			<0.001
Intact	128 (37%)	218 (63%)	
Ruptured	133 (76%)	43 (24%)	

Table 4. Multivariate analysis of factors associated with Caesarean section in primiparous women at the Bernard Kouchner CMC in Coronthie from 1 January to 31 December 2022.

Variables	OR	IC 95%	P-value
Age	1.13	[1.07- 1.20]	<0.001

Variables	OR	IC 95%	P-value
Marital status			
Single	—	—	
Married	1.33	[0.67- 2.70]	0.4
Origin			
Conakry	—	—	
Outside Conakry	0.34	[0.09- 1.07]	0.086
Age of pregnancy			
28-36 WA + 6 days	—	—	
37-41 WA + 6 days	0.82	[0.33- 2.04]	0.7
≥ 42 WA	25.1	[3.23- 540]	0.007
Prenatal consultation			
0	—	—	
1-3	0.16	[0.07- 0.39]	<0.001
≥4	0.38	[0.18- 0.80]	0.011
High blood pressure on admission			
No	—	—	
Yes	4.98	[2.24-11.6]	<0.001
Uterine height			
≤ 34 cm	—	—	
> 34 cm	2.19	[1.27-3.84]	0.005
State of membranes			
Intact	—	—	
Ruptured	4.25	[2.27- 8.05]	<0.001
Bleeding complications			
No	—	—	
Yes	8.54	[3.05-26.6]	<0.001
Fetal distress			
No	—	—	
Yes	68.4	[18.3-45.1]	<0.001
Suspicion of macrosomia			
No	—	—	
Yes	12.7	[4.83-38.6]	<0.001

Multivariate analysis showed that as age increased, primiparous women were 1.13 times more likely to have a caesarean section. Pregnancy at 42 weeks' gestation was 25.1 times significantly associated with caesarean section in primiparous women. Primiparous women with hypertension on admission were 4.98 times more likely to have a caesarean section. Patients with excess uterine height >34 cm were 2.19 times more likely to have a caesarean section. Also, primiparous women with premature rupture of the membranes were 4.25 times more likely to undergo caesarean section. Patients with haemorrhagic complications were 8.56 times more likely to have a caesarean section. Fetal distress and suspected

macrosomia significantly increased the risk of Caesarean section in primiparous women by 68.4 times and 12.7 times respectively.

4. Discussion

We conducted a 12-month retrospective case-control study. The overall aim of our study was to contribute to the identification of factors associated with caesarean section in primiparous women.

During the study period, 432 primiparous women underwent caesarean section out of 1394 caesarean sections, i.e. 31%. Our rate is lower than that of Zelli et al [8], who reported a frequency of 74% in France in 2016. On the other hand, it is much higher than the rate of Munan et al [5] in the Democratic Republic of Congo, who reported a frequency of 13.3% in 2017.

The average age of primiparous women who underwent caesarean section was 24 +/- 5 years, with extremes ranging from 11 to 41 years. In controls, the average age of women giving birth was slightly lower, at 22 +/- 4 years, with a range of 14 to 34 years. The 20 to 24 age group was the largest in both groups, accounting for more than a third (35%) of primiparous women who underwent caesarean section and 42% of those who gave birth vaginally. In Canada, Acharya et al [11] reported in their study that the 24-29 age group was the most important. Other authors such as Zgheib et al [12] in Lebanon found that most caesarean sections were performed in women aged 18 to 35. Similarly, Mongbo et al [13] in Benin in 2016 reported that women undergoing caesarean section were aged between 15 and 35. Of the women who had a caesarean section, 84% were married, compared with 75% of those who had a vaginal delivery. This may suggest the influence of socio-economic and cultural factors limiting access to healthcare. The highest level of education was found among primiparous women (40%) who had undergone caesarean section. In contrast, 41% of women with vaginal deliveries had secondary education. Our result differs from that of Gamble et al [14] who found that women who underwent caesarean section had secondary education. Of the women who underwent caesarean section, 31% were in paid employment, whereas 43% of those who gave birth vaginally were students. Level of education is often correlated with better socio-economic status, which in turn may offer better access to expensive care, including the possibility of choosing a caesarean section, whereas greater financial constraints among students may make them less inclined to opt for a caesarean section, which is generally more expensive than vaginal delivery. Logistic regression showed that as maternal age increased, the risk of caesarean section in primiparous women also increased (OR=1.13; CI=1.07-1.20), making primiparous women 1.13 times more likely to have a caesarean section. Pregnancy at 42 days' gestation (OR=25.1; CI=3.23 - 54.0) was 25.1 times significantly associated with caesarean section. Patients with high blood pressure on ad-

mission (OR=4.98; CI= 2.24 - 11.6) were 4.98 times more likely to undergo caesarean section. Patients with uterine height > 34 cm (OR=2.19; CI=1.27 - 3.84) and RPM (OR=4.25; CI=2.27 - 8.05) were 2.19 times and 4.25 times significantly at risk of caesarean section. Patients with haemorrhagic complications (OR=8.56; CI=3.05 - 26.6) were 8.56 times more likely to have a caesarean section. Fetal distress (OR=68.4; CI=18.3 - 45.1) and suspected macrosomia (OR=12.7; CI=4.83 - 38.6) significantly increased patients' risk of caesarean section by 68.4 and 12.7 times respectively. Our results differ from those of Ochieng et al [15] in 2020, who, in Tanzania and Kenya, identified a statistically significant association between the practice of caesarean section and factors such as place of residence, maternal age, socio-economic level, level of education, number of antenatal visits and profession. As far as advanced maternal age is concerned, pregnancies in older primiparous women are often considered to be precious, and may present increased risks of obstetric complications, which is why some obstetricians avoid taking the risk of attempting a vaginal delivery. A pregnancy that exceeds the normal term of 40 WA increases the risks to foetal and maternal well-being, which could lead practitioners to decide on a caesarean section. The fact that uterine height influences Caesarean section in primiparous women could be explained by the fact that uterine height >34 cm, apart from hydramnios, presumes macrosomia. The risk of delivery by caesarean section increases when macrosomia is suspected in primiparous women. Delbrouque et al [4] in 2022 in France reported in their study that maternal age over 28 years, suspected macrosomia and uterine height on admission over 32 cm significantly increased the risk of caesarean section in primiparous women.

5. Conclusion

The prevalence of caesarean section among primiparous women in our study was high. The profile of primiparous women who underwent caesarean section was that of young, married women with a higher level of education. The factors found in our study to be significantly associated with caesarean section in primiparous women were advanced maternal age, late term, high blood pressure, excess uterine height, premature rupture of membranes, haemorrhagic complications, foetal distress and suspected macrosomia. Correct antenatal care and delivery by qualified personnel could help prevent some of these factors and thus reduce the caesarean section rate among primiparous women in our health facility.

Abbreviations

CI	Confidence Interval
Cm	Centimetre
CMC	Communal Medical Centre
g	Gramme

N	Number
WHO	World Health Organisation
OR	Odds Ratio
WA	Weeks of Amenorrhoea

Authors Contributions

All authors contributed to the finalisation of this manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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