

MULTI VARIATE ANALYSIS OF RISK FACTORS FOR CAESAREAN SECTION IN THE UNIVERSITY COLLEGE HOSPITAL IBADAN

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ABSTRACT

Objective: To determine the effect of maternal age, parity and booking status, and fetal weight and presentation on Caesarean section rate at a teaching hospital.

Method: Retrospective analysis of the mode of delivery within a 5 year period as contained in patients' medical records using frequency distribution and cross tabulations of the risk factor. Logistic regression analysis was used to determine the predictors of Caesarean section.

Result: Caesarean section rate was 22%. The highest rates were found among women aged 40 years and above, nulliparous and unbooked. Fetal macrosomia and abnormal presentation were also associated with high caesarean section rate. Predictors of Caesarean section were maternal age, parity, booking status and fetal presentation while fetal sex and birth weights were not.

Conclusion: Caesarean section rate has remained constant over the last 3 decades and the risk factors still play the same role despite an increase in health personnel, facilities and general public educational level. There is a need to focus on the predictors of caesarean section, improve public health education, provide adequate prenatal and intrapartum care, encourage external cephalic version for breech presentation and increase contraceptive usage in order to reduce the caesarean section rate.

KEY WORDS: Caesarean section, Risk factors.

INTRODUCTION

Majority of women in Nigeria have strong aversions for caesarean section unlike in the developed countries yet evidences indicates that the procedure is being performed at the same rate or more frequently than in most hospitals in developed countries^{1,4}.

Increasing safety procedure such as the use of antibiotics and improved anaesthetics encourage recourse to caesarean section by its proponents. The procedure certainly has attendant risks despite the proclaimed safety and it should be chosen with extreme caution^{5,9}. Although proponents of caesarean section point out that the procedure is undertaken in the interest of the mother and her child, the relationship between rising caesarean section and maternal or child health is inconsistent^{10,11}. Since the lowest perinatal mortality rates are seen in regions with caesarean section rate less than 10%, the World Health Organization advised that caesarean births for all geographic regions should not be more than 10%-15%². When caesarean section rates become unacceptably high, the risk factors should be identified and minimized. This forms the basis for this study aimed at determining the effect of various factors on the risk of Caesarean section rate at University College Hospital Ibadan.

MATERIALS AND METHODS

We carried out a retrospective analysis of data on all deliveries that took place at the University College Hospital, Ibadan, Nigeria between January 1, 1992 and December 31, 1996. We extracted maternal age, parity, booking status, fetal sex, fetal

presentation and birth weight as well as mode of delivery from the birth register. The hospital is a tertiary centre to which complicated cases are referred from other centres. There were a total of 3,759 deliveries, 22.1% of which were by Caesarean section and 4.3% were by operative vaginal delivery. The annual delivery rate was 752. Decision to deliver a patient operatively was taken by either a consultant or an attending senior registrar. We analysed the coded data in a computer using Statpac Gold Statistical analysis software. Records of 217 women (5.8%) with incomplete data were removed from the analysis. Results are presented with descriptive statistics using frequency distributions and cross tabulations of maternal and fetal variables along with modes of deliver. Chi square test was used to testy got statistical significance. Multiple regression analysis was used to study the predictors of delivery by caesarean section among all variables.

RESULTS

About 88% of the deliveries during the period studied were live births. The caesarean section rate was 22.1%. Table 1 shows the distribution of the maternal age with the mode of delivery. The largest age specific Caesarean section rate was found among women who were 40 years and above (35.7%) while the least was among those between 25-29 years of age (18.0%). The adolescents had a Caesarean section rate of 25.5% and the highest operative vaginal delivery rate (15%). Nulliparae were more likely to be delivered by Caesarean section (Table 2). More than on quarter of the patients were unbooked and they had a caesarean section rate of 34.4% compared to 17.5% of the booked patients (Table 2). Macrosomic babies (birth weight greater than or equal to 4.5 kg) had Caesarean section rate of 40% while those with birth

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weight between 1.5kg and 4.49kg had a rate of 22.2%. Babies with very low birth weight (≤ 1.49 kg) had a caesarean rate of 17.7% (Table 3). The least Caesarean section while 19.3% of those with vertex presentation had caesarean section. Other abnormal presentations such as brow, compound and shoulder presentations were associated with the highest caesarean section rate (82.3%). Among this group 9 cases (17.6%) of compound presentation had normal vaginal delivery (Table 4). The sex ratio 1.09. The mode of delivery was comparable in both sexes (Table 4).

The logistic regression coefficient for predicting the mode of delivery showed that the maternal age, parity and U.C.H. booking status as well as fetal presentation were significant risk factors for abdominal delivery, with odd ratios

ranging from 0.16 to 1.15 (Table 5). The probability of change was 0.0000 in all the variables except the maternal age that has a probability of 0.0003.

DISCUSSION

The overall caesarean section rate of 22% in this study compares well with 25% in Adeleye's study² and 22% in the study by Aimakhu¹. These rates are however, higher than 15.8% and 16.1% for different Italian hospitals but comparable with the rates quoted for USA^{4,5}.

Reports in literature suggested that women older than 36 years of age had twice as many caesarean births as younger ones^{13,14}. This is in keeping with the findings in this

Table 1: Frequency distribution of maternal age by mode of delivery

Age groups in years	Spontaneous vertex delivery n (%)	Caesarean Section n (%)	Operative Vaginal delivery n(%)	Total
15-19	58 (59.2)	25 (25.5)	15 (15.3)	98
20 - 24	342 (63.4)	126 (24.6)	43 (8.4)	511
25 - 29	1002 (76.9)	235 (18.0)	66 (5.1)	1303
30-34	872 (76.4)	253 (22.2)	16 (1.4)	1141
35-39	319 (69.0)	131 (28.4)	12 (2.6)	462
> 40	14 (50)	10 (35.7)	4 (1.4)	28
Total	2607	780	155	3542

Table 2: Frequency distribution of the women's parity and hospital booking status by mode of delivery

Characteristic (N)	Spontaneous vertex delivery n (%)	Caesarean Section n (%)	Operative vaginal delivery n (%)*
Parity:			
0 (1189)	794 (66.8)	286 (24.1)	109 (9.2)
1 - 2 (1428)	1085 (76.0)	310 (21.7)	33 (2.4)
3 - 4 (661)	524 (79.3)	1130 (19.7)	7(1.1)
>5 (264)	204 (77.3)	54 (20.5)	6 (2.3)
Total (3542)	2607 (73.6)	780 (22.0)	155 (4.4)
Hospital booking status			
Booked (2594)	2067 (79.7)	454 (17.5)	73 (2.8)
Unbooked (948)	540 (57.0)	326 (34.4)	82 (8.6)
Total (3542)	2607 (73.6)	780 (22.0)	155 (4.4)
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Total (3542)	2607 (73.6)	780 (22.0)	155 (4.4)

* Characteristic specific percentages.

Table 3: Frequency distribution of fetal weight by mode of delivery

Fetal weight (N)	Spontaneous vertex delivery n (%)	Caesarean Section n (%)	Operative vaginal delivery n(%)
≤ 1.49 kg (158)	127 (80.4)	28(17.7)	3 (1.9)
1.50 - 2.49 kg (539)	354 (65.7)	133 (24.7)	26 (5.2)
2.50 - 3.49kg (612)	414 (67.6)	167 (27.3)	31 (5.1)
≥ 4.5 kg (10)	6 (60)	4 (40)	0 (0)

* Fetal weight specific percentages

Table 4: Frequency distribution of fetal sex and presentation by mode of delivery.

Characteristic (N)	Spontaneous vertex delivery n (%)	Caesarean Section n(%)	Operative vaginal delivery n(%)*
Fetal sex:			
Male (1846)	1338 (72.5)	425 (23.0)	83 (4.5)
Female (1696)	1269 (74.8)	355 (20.9)	72 (4.3)
Total (3542)	2607 (73.6)	780 (22.0)	155 (4.4)
Presentation:			
Vertex (3213)	2448 (76.2)	619 (19.3)	155 (4.8)
Breech (268)	0 (0)	119 (44.4)	149 (55.6)**
Others (52)	10 (19.2)	42 (80.8)	0 (0)
Total (3542)	2458 (69.4)	780 (22.0)	304 (8.6)

- * Characteristic specific percentages
- ** Assisted breech deliveries

Table 5: Logistic regression coefficient for predicting the mode of delivery.

Variables	B Coefficient	Odds ratio	Standard error	T value	P value
Constant	5.0378	1.15	0.3289	15.3134	0.0000
Hospital booking status	-1.00938	0.34	0.0861	-12.7067	0.0000
Age	-0.0325	0.90	0.0090	-3.6029	0.0003
Parity	0.1392	1.15	0.0280	4.9708	0.0000
Presentation	-1.8480	0.16	0.1361	-13.5760	0.0000

study. Social circumstances, reproductive history and medical disorders are suggested reasons for these difference^{1,5}. Women having their first delivery (nullipara) are mostly at risk of operative vaginal delivery or caesarean section rate when parity alone is considered^{1,4}. Nullipara are more likely to develop pre-eclampsia, cephalo-pelvic disproportion, prolonged labour and prolonged pregnancy than those delivering for the second or more times (multipara) at the two extremes of reproductive life^{1,6}.

The risk of caesarean section is further increased in elderly nullipara because of the age related medical conditions (e.g. diabetes, hypertension, uterine fibroid) that may complicate the pregnancies¹. Reports on adolescent obstetric performance is conflicting. Some studies showed favourable obstetric performances by adolescents, spontaneous vaginal being the rule rather than the exception while others have reported a high operative delivery rate^{1,8,9}. The regional differences in adolescent obstetric performances are related

more to the nutritional status, physical development and prenatal and prenatal care received by the adolescents. Medical complications like anaemia, severe pre-eclampsia and eclampsia increase the risk of caesarean sections in adolescents in underprivileged communities^{2,1}.

U.C.H. booking status is apparently a strong factor influencing the mode of delivery as seen in this study. A higher recourse to caesarean section occurs for unbooked patients many of who present in emergency situations with complications such as prolonged obstructed labour, antepartum haemorrhage and eclampsia, making operative delivery inevitable.

Forty percent of macrosomic babies had caesarean section on account of cephalo-pelvic disproportion in this study. Caesarean section is often performed in this situation to prevent a disaster^{2,2,3}. Similarly, breech delivery is performed for most breech presentations in order to reduce the perinatal morbidity and mortality associated with vaginal breech delivery. However, in order to reduce the rates of caesarean section most units practice selective vaginal delivery based on the estimated fetal weight, progress of labour and other conditions like previous uterine scar and accompanying medical complications. Reports from other regions have shown that external cephalic version reduced caesarean section rate for term breech^{2,4,5} but this requires expertise.

The sex ratio in this study is comparable to rations in other reports^{2,6,7}. The male fetus seems more vulnerable than the female counterpart and at a higher risk of death^{2,8,9}. Studies have shown that the male fetus is at risk of a higher caesarean delivery on account of antepartum and intrapartum fetal distress^{2,8} but the present study did not reflect such differences. It may be that inclusion of elective procedure and caesarean section for indications other than fetal distress in our analysis influenced the result.

The multiple regression analysis used to study the predictors of delivery by caesarean section among all selected variables allowed for elimination of multi-collinearity in the variables and showed that fetal sex and birth order were not significant predictors of caesarean section at University College Hospital, Ibadan while maternal age, parity, hospital booking status and fetal presentation were. Nothing seems to have changed since the study by Adeleye² despite improvement in health facilities and increase in health personnel. On the contrary, the country has seen an upsurge of bogus practitioners/ charlatans in religious houses and traditional facilities taking deliveries at community levels to the detriment of some pregnant women and their babies. Most women who deliver at such settings receive little or no prenatal care and only use hospital facilities in emergency situations. The increase in publicity, by means of personal paid advertisement, given to these charlatans by the public media in recent times have further increase the confusion. Therefore, more attention should be paid to public health activities at the community level since the significant predictors of caesarean section can be controlled through health education, adequate prenatal and intrapartum care, and contraception.

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