An Analysis Of Delivery Methods And Outcome Of Child Birth: Case Of South-Western Nigeria

Alatise Olufemi Ebenezer

Abstract: This research work studied the trend of the methods involved in child delivery, where methods involved in child delivery are: normal delivery, elective caesarean section and emergency caesarean section. Data about delivery from University College Hospital Ibadan in Nigeria were used for all the analysis involved, data based on these three methods and their outcomes was sourced from the record units of the hospital under consideration. The data used for the analysis spread through 2012 and 2013, where 1000 units of delivery records was randomly taken and the trend at which women request delivery through elective method was obtained. The comparison of the outcomes of the three methods was carried out, in other to see their contributions to the risk at birth. The major risk at birth considered is "Death", both the perinatal and maternal mortality. The dependency of the outcomes of the methods with variables: mother's age and methods of delivery, was determined and also discover which of these variables having highest contribution to death during child delivery. The analyses were carried out using chi square, multinomial logistic regression and simple percentages, while Statistical package for social sciences was used for the analysis. Through analysis, other women age groups has 99.9% less contribution to death than age group <=17. Normal delivery has highest number of delivery likewise age-group 30 and above, elective caesarean section is more likely to contribute to death than emergency caesarean section when compare to the normal delivery.

Keywords: Elective caesarean section; Emergency caesarean section; Normal deliver

1.0 INTRODUCTION

Caesarean section is a surgical operation to deliver a baby or babies by means of an incision through the abdomen and uterus (Mutihir et al., 2005). In current obstetric practice, caesarean section is the commonest operation apart from episiotomies. The operation dates from antiquity and was usually performed to save the living fetus in dead and near miss pregnant women (Ijaiya and Aboyeji, 2001).It can be performed as an emergency or elective procedure. The elective ('planned') caesarean section is not urgent and may be scheduled well in advance, at a time when it is convenient for the obstetrician, neonatologist, anaesthetist and the patient. The decision is taken before or during pregnancy and planned for a term or as close to term as is possible, (Mutihir et al., 2005), (Adinma, 1993). Emergency caesarean section is that in which the decision to do so is taken during labour or delivery, when there is imminent danger to the mother, fetus or both. Caesarean Section can also be categorized based on the timing of CS at the time of decision making into four (4) categories. Category 1 or emergency CS when there is an immediate threat to the mother or the fetus and ideally the CS should be done within the next 30 min. Category 2 or urgent CS when there is maternal or fetal compromise but was not immediately life threatening. The delivery should be completed within 60–75 min. Category 3 or scheduled CS when there is no maternal or fetal compromise but early delivery is needed due to concerns that continuation of the pregnancy is likely to affect the mother or fetus in hours or days to come and then Category 4 or elective CS where there is an indication for the Caesarean Section but there is no urgency as such the delivery is timed to suit the mother and staff (Arulkumaran, 2012). The indications for elective caesarean section are many, and varied. Documented indications for the elective procedure include contracted pelvis, major degree placenta praevia, malpresentations, previous caesarean section for recurrent causes, hypertensive disorders of pregnancy, intrauterine growth restriction, precious baby, elderly primigravidae and bad obstetric history (Mutihir et al., 2005; Anya et al.(2005),). A small number of CS is contributed by maternal request for non-medical reasons (Arulkumaran, 2012). In 1985, the World Health Organization (WHO) held a Joint International Conference on Appropriate Technology for Birth in Fortaleza, Brazil. The conference resulted in several recommendations for proper prenatal and birth care, among which was stated that since the countries with the lowest perinatal mortality rates had Caesarean-section delivery rates below 10%, there would be "no justification in any specific geographic region to have more than 10%–15% Caesarean section births"Notwithstanding,Caesarean rates have risen considerably in the last 25 years, all over the world, for a number of suppose. Mukherjee (2004). In underdeveloped countries, the low incidence of Caesarean births is considered as an indicator of poor access to birth care. Thus, its increase would be desirable, and hypothetically, would be accompanied by decreasing perinatal morbidity/mortality. However, in Nigeria and some other developed countries, the reasons for this rise do not seem linked to increased access to birth care, but rather related to an increase in elective and subjective use of Caesareans, possibly reflecting patient and/or doctor preference (Chalmers et al 1993). With these above discussions and considerations, this study looked into the trend of elective caesarean section, and its contribution to death at the process of delivering child.

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2.0 Objectives of the Study

The objectives of the study are to:

- evaluate the trend of the three methods involved in child delivery
- determine which of these methods contributes most to death at delivery based on their outcomes
- evaluate the dependency of the outcomes of these methods on: Age of the mother, methods of delivery
- examine if Elective Caesarean section can be adopted in south-western Nigeria, through its contribution to death during child delivery

3.0 Methodology

Introduction

Risk at birth mostly occur as a result of complications that come up during delivery process, actually most of the studies on Risk at birth had not adept investigation through the context of child delivery process. Birth risk most times claims the life of either the mother or the child (ren), while at times both might be involved. As earlier discussed, this study looked into methods of child delivery in relation to birth risk, while mortality was the factor in consideration.

Nature of the Study

The study looked into past records of the delivery patients in the University College hospital Ibadan Nigeria, while patient's data, and outcomes of the delivery based on methods involve in delivery process becomes a group, from which descriptive and inferential result was generated to provide postulation for birth risk. Thus the study is a retrospective- cohort study. University College Hospital Ibadan, Nigeria was chosen as a case hospital, because it's most standard teaching hospital out of about five recognised teaching hospitals in the south-western Nigeria.

Data used for the analysis

The data used for the study covers a sample of delivering patient's records, spread for the year 2012-2013, all information concerning their delivery was sourced, where the following variables were majorly extracted: Mother's age, Obesity, Infant size, parity, Delivery status/outcome (i.e death or Alive for either mother/child or both), and method of delivery (i.e Normal, required Cs, elective Cs). The variables were categorized and coded based on the following definitions: For age group of the mother we define this into three categories but taken one of the categories (<=17) as the reference group. 1 implies age group <=17, 2 imply age group 18-29, and 3 implies age group >=30. For the methods involved in the process of child delivery, we have three a definition in which (normal delivery) is defined as the reference method. "1" implies normal delivery, "2" implies emergency caesarean section, and "3" implies elective caesarean section. The following dummy definitions were given to the variables:

Age group (18-29) =

$$\begin{cases} 1, if\ i^{th}\ age\ is\ of\ age\ group\ label2 \\ 0, otherwise \end{cases}$$

Age group (>=30) =

$$\begin{cases} 1, if\ i^{th}\ age\ is\ of\ age\ group\ label3 \\ 0, otherwise \end{cases}$$

While the reference group is age group <= 17. And it was taken because it has no contribution to the reference of respond variable (that is death record was zero)

For the methods of child delivery:

There exist three categories, those that delivered through normal delivery method (vaginal delivery), those that delivered through the process of elective caesarean section and those that delivered through the process of emergency caesarean section method

Emergency =

$$\begin{cases} 1, if\ i^{th}\ method\ is\ \ method\ label2 \\ 0, otherwise \end{cases}$$

Elective =

$$\begin{cases} 1, if\ i^{th}\ method\ is\ \ method\ label3 \\ 0, otherwise \end{cases}$$

While the reference method is the normal method of child delivery, and this was taken because it has highest occurrence.

For the respond variable, Y_i "1" implies outcomes of delivery (death of either mother or the child (ren) or death of both the mother and the child (ren) "0" implies outcomes of delivery (save delivery for both mother and child (ren))

Data analysis

Data analysis was carried out by descriptive method using percentages, frequencies, and graphs, also inferentially by the use of logistic regression and chi-square.

Multinomial logistic Model:

$$Y_i = \alpha + \beta_1(age\ of\ mother, 18-29;\ 30\&above) + \beta_2(\text{Elective}_{\text{CS}}, \text{Emergency}_{\text{CS}}) \quad (1)$$

The reference for the respond variable is death. While the mother's age and the methods of delivery are categorical data.

Hypothesis:

(a) To test if outcome-status of a delivery is dependent of the methods of child delivery:

H_o: Outcome-status of the delivery is independent of the methods of child delivery

H_1: Outcome-status of the delivery is dependent of the methods of child delivery

(b) To test if outcome-status of a delivery is dependent of the age-group

H_o: Outcome-status of the delivery is independent of the mother's age

H_1: Outcome-status of the delivery is dependent of the mother's age

Chi –square test statistics:

Test statistic: $X^2 = \sum_{i,j}^{r,c} \frac{(O_{ij}-E_{ij})^2}{E_{ij}} \backsim \chi^2_{(r-1)(c-1)}$ (2)

Where the degree of freedom is $(r-1)(c-1)$

Decision rule:
Reject the Null hypothesis and accept the alternative if P-value is less than 0.05.

Probability of type 1 error was set to a standard value of 0.05, while the P-value was taken under (2-sided)

4.0 Results and Discussions

Table (i): *Distribution of Child Delivery Based on Methods Involved*

Methods of Delivery	Frequency	Percentage (%)
Emergency Cs	333	33.3
Elective Cs	138	13.8
Normal Delivery	529	52.9
Total	1000	100.0

through table (i) above ,from the 1000 units of delivering data collected ,333 (33.3%) patients delivered by emergency caesarean section, 138(13.8%) patients delivered through elective caesarean section and 529(52.9%) delivered by the method of normal delivery

Table (ii): *Cross Distribution of Methods of Child Delivery and Status of the Outcomes*

Status	Methods of Child Delivery			Total
	Emergency Cs	Elective Cs	Normal Delivery	
Alive	310	130	475	915
Death	23(C, 9.9099 %)	8(C, 5.7971%)	54(C,10.2079 %)	85
Total	333	138	529	1000

Out of the 1000 delivery, 85 (8.5%) deaths were recorded, while 915 (91.5%) were alive. Based on the methods of the delivery , 23(9.9099%) out of 333 patients that delivered with emergency Cs were dead, 8(5.7971%) out of 138 patients that delivered through elective Cs were dead and 54 out of 529 that delivered through Normal delivery were dead. Further test of hypotheses was carried out using chi-square test of independent, testing if Outcome-status of the delivery is independent of the methods of child delivery and the result.

Table (iii) *chi-square test on methods of child delivery*

Chi-Square Tests	value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.990[a]	2	.224
Likelihood Ratio	3.554	2	.169
Linear-by-Linear Association	2.874	1	.090
No of Valid Cases	1000		

From table (iii) above shows that p-value (0.113) > 0.05, with this, the null hypothesis was accepted and alternative rejected, we therefore conclude that result or status of delivering of child is independent of method by which the delivering was taken.

Table (iv): *Cross Distribution of Delivery mother's age-group and Status of the Outcomes*

Status	Delivery Women age-group			Total
	<=17	18-29	>=30	
Alive	6	356	553	915
Death	0(C, 0%)	26(C, 7.9268%)	59(C, 9.6405%)	85
Total	6	382	612	1000

Table (iv) above shows the distribution of the mother's age group and outcome of the delivery in each age group, 6 deliveries were recorded in age group <= 17 and all these 6 were alive, 382 deliveries in age group 18-19, where 26 (7.9%) were dead out of this 382 deliveries, 612 deliveries in age group >= 30 ,where 59(9.6%) of this 612 were dead, in all age group 85 were dead and 915 were alive , and out of the 85 total death recorded age group >= 30 had the highest death recorded with 59(69%) , and age group 18-29 had death record of 26 (31%), while age group <=17 has no death record.

Table (v) *chi-square test on age-group*

Chi-Square Tests	value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.367[a]	2	.113
Likelihood Ratio	4.475	2	.107
Linear-by-Linear Association	3.207	1	.073
No of Valid Cases	1000		

Table (v) above shows that the p-value (0.224 > 0.05), with this, the null hypothesis was accepted and alternative rejected, we therefore conclude that outcome-status of delivery is independent of mother's age.

Table (vi) *multinomial Logistic Regression Variables and Parameters in the Equation*

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
EMERGENCYCS	.406	.260	2.439	1	.118	1.501
ELLECTIVECS	.627	.393	2.548	1	.110	1.872
agegroup18_29	-13.825	.246	3.157E3	1	.000	9.910E-7
Age group 30 and above 30	-14.212	.000	.000	1	.000	6.728E-7
Intercept	16.251	.163	9.896E3	1	.000	

Table (vi) above shows the variables in the equation of a multinomial logistic regression. While the model goes as follows:

y=16.251+0.406 Emergency CS+0.627ElectiveCS-13.825agegroug (18-29)-14.212agegroup (30and above) (3)

EmergencyCS has odds of 0.501, that is it's about 50% likely to contribute to death than Normal delivery, ElectiveCS has odds of 0.872 that is its 87.2% likely to contribute to death than Normal delivery, age-group(18-29), has odds of -0.999, that is, age-group(18-29) has 99.99 less likely contribution to death at delivery than age-group <= 17, while age-group(30 and above) also has odds of -0.999, that is, age-group(18-29) has 99.99 less likely contribution to death at delivery than age-group <= 17. The logistic model above is assumed to be adequate because the p-value of the goodness of fit test in table (vii) below gives, (0.394>0.05).

Table (vii) *Goodness of fit*

	Chi-square	df	Sig.
Pearson	4.088	4	.394
Deviance	5.794	4	.215

5.0 Conclusion

Analysis has shown that the highest delivery comes through the normal virginal method of child delivery with 52.9% of the whole delivery from the selected sample, death counts has highest frequency from the normal delivery, likewise age group 30 and above has highest death counts, with 59% of the whole delivery but since the number of delivery that was carried out through this process is much more compare to the other methods and age group, thus further analysis through chi-square test was carried out, which shows that both methods of delivery and the age-group of mother are independent of the birth outcome, the results of the chi-square seems unfair with real life view, thus further analysis was carried out using multinomial logistic regression to model birth outcome with age group and methods of delivery while the analysis shows that elective caesarean section is more likely to contribute to death at delivery than emergency delivery also age group 18-29 and 30 and above has 99.9% less likely contribution to death at delivery. With these observations, adoption of elective caesarean section in the south-western Nigeria might still be under investigation.

6.0 References

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