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Original Research Article

Prevalence and indications for caesarean section in Enugu state, Nigeria

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ABSTRACT

Background: Caesarean section (C/S) is one of the commonly performed surgical procedures in obstetrics. This procedure has been on the increase in the past decade, creating a public health concern. The objective of this study was to determine the prevalence and predictors of C/S delivery in a tertiary health facility in Nigeria.

Methods: A prospective cohort study conducted at a tertiary health facility in Nigeria. Data was retrieved from the delivery cards of the mothers. Data was analysed using SPSS version 25 and variables were presented as frequencies, percentages, means, and standard deviation. Chi-square test was performed with the level of significance set at $p \leq 0.05$. Binary logistic regression was used to determine factors that predicted C/S delivery.

Results: The prevalence of C/S was 48.3%. Commonest indication for C/S was 2 or more previous C/S. Mothers aged >30 years, employed, higher educational level, higher parity and delivered preterm predicted C/S delivery on logistic regression.

Conclusions: The prevalence of C/S was high. Higher maternal age, employment, higher educational level, higher parity and preterm delivery were positively associated with C/S delivery.

Keywords: Caesarean section, Enugu State, Nigeria, Prevalence, Tertiary health facility

INTRODUCTION

Caesarean section (C/S) is one of the oldest operations in surgery and also one of the commonly performed surgical procedures in obstetrics.¹ Globally, the number of C/S has been on the rise over the last decade and this has been a source of major concern to healthcare providers in many developing and developed countries. This is so because C/S is associated with increased risk of maternal/neonatal morbidity and mortality.² It is estimated that about 20 million C/S deliveries occur each year and this is increasing continuously in low, middle and high-income countries.³ A study conducted between 2002 and 2012 showed that the rate of C/S increased from 18.2% in 2002 to 30.3% in 2012, with the most common reason being the absence of a clear indication.⁴

In 1985, the World Health Organization (WHO) declared in Fortaleza, Brazil, that “There is no justification for any

region to have a C/S rate higher than 10-15%”.⁵ This position has been contested because the data on which the recommendation was based were limited and drawn primarily from northern European countries.⁶ In middle/low-income countries, the optimal C/S rate is influenced by preferences regarding delivery, available medical services, family income, and the health care professionals’ qualifications, as well as parents’ educational level.⁷ In a more recent position statement, the WHO maintains that population-based C/S rates >10% are not associated with a reduction in maternal and neonatal mortality rates.^{1,8} Nonetheless, the world health body emphasises the need of C/S service provision to every woman in need of it regardless of the prevailing population-based rates.^{1,8} When medically indicated, C/S has the potential for reducing maternal/neonatal mortalities and morbidities including delivery complications such as obstetric fistula.^{1,8,9} However, a non-medically indicated C/S has no associated additional

benefits for mothers and new-borns, rather like any other surgery, it carries both short-term and/or long-term health risks.^{1,8,9}

Some studies have been conducted on C/S utilisation in Nigeria including a survey which examined the views of pregnant women and found that a high proportion of the study participants were averse to caesarean delivery.¹⁰ Thus, increase in C/S is likely to be influenced by multiple additional factors, such as the financial status, underlying diseases, level of education, family/social environment, reproductive knowledge, media reports, feedback from social circles and medical staff, as well as the previous delivery experience.¹¹ Despite the greater number of complications and risks of C/S as compared to vaginal delivery, some women still tend to choose C/S. A report concluded that these women focused on a perceived benefit for their child, and overlooked the risk to themselves of going through a C/S.¹²

In Africa, C/S is still performed in unfavourable conditions for saving the mother and foetus with 5 to 10 times higher maternal morbidity and mortality compared with vaginal delivery due to limited resources and far distance to a health facility for people living in rural areas.¹³ This escalating C/S rate is a major public health problem because it increases the health risk for mothers and babies as well as the cost of health care compared with normal deliveries.¹⁴ While this increase has been attributed to the fear of litigation, more liberal use of C/S for breech presentation, the detection of foetal distress by continuous electronic foetal monitoring, abdominal delivery of growth retarded infant, and improved safety of C/S in developed countries; the reasons are less clear in developing countries.¹⁵ In Nigeria, for example, in spite of the high incidence of C/S and increasing rate noted in many studies, there is paucity of literature with regard to the reason for such findings.^{15,16}

Some of the reasons being adduced include, the specialist and referral nature of some of the hospitals, un-booked status of most of the patients, increasing use of foetal heart rate abnormalities alone as a measure of diagnosis of foetal distress in labour, over diagnosis of cephalo-pelvic disproportion by junior doctors, and use of repeat C/S for patients with a previous C/S.¹⁴ Perinatal mortality rate shows no significant diminution despite the increasing C/S rate.¹⁵ This increasing trend of C/S might be stopped and even reversed without detriment to a continuing improvement in maternal and foetal health.¹⁶ This is particularly important in developing countries like Nigeria where large family size is a norm. Women also have great dislike for C/S especially when there is no living child to show for it and would often try vaginal delivery at home or religious houses after a section thus predisposing themselves to uterine rupture with its resultant morbidity and mortality. It is proposed that careful probing of the trend and indications for the use of caesarean delivery may identify pathway to lower the C/S rate.¹⁷ The objective of

this study was to determine the prevalence and predictors of C/S delivery in a tertiary health facility in Nigeria.

METHODS

Study design, area and population

This was a prospective cohort study conducted at the Obstetrics and Gynecology (O and G) Department of Enugu State University Teaching Hospital (ESUTH) Park Lane Enugu. ESUTH is one of the tertiary health institutions in Enugu State, Nigeria that provides tertiary services to the inhabitants of the State and its neighbouring state. It also serves as a referral center for both the government and privately owned health facilities within and outside the state. All the women that delivered at the (O and G) Department of ESUTH Park Lane Enugu within the period of data collection were used for the study.

Data collection methods

Data was collected for a period of 12 months (June 2020-May 2021). The socio-demographic characteristics and modes of delivery including indications for C/S were retrieved from the ante natal and delivery cards and entered into a pro forma. Two research assistants (clinical medical students) were used for data collection. They were trained on the data to be retrieved and how to retrieve them from the clients' cards. Each morning they retrieve the folders of the women that delivered the previous day and fill in the data in a structured pro forma. This was done before the folders were taken to the central card room to avoid loss of information or missing cards.

Data analysis

All the data were imputed into IBM Statistical Package for Social Sciences (SPSS) version 25 and edited for errors by generating frequencies. Categorical variables were summarized using frequencies and percentages. Chi-squared test was used to test for associations between variables with significant level placed at $p \leq 0.05$. Binary logistic regression was used to determine the predictors of C/S delivery. Odds ratio together with their corresponding p values and confidence intervals were computed at a 5% error rate.

RESULTS

There were 758 C/S out of the 1568 deliveries within the 12 months that was studied giving a C/S rate of 48.3%. About 15.1% were elective while 33.2% were emergency C/S.

Table 1 shows the socio-demographic and obstetric characteristic of the studied mothers. Most of them were aged 21-30 years 878 (56.0%). Almost all of them were married 1519 (96.9%), Igbos 1554 (99.2%) and Christians 1560 (99.5%). Most of them were civil servants 869 (55.4%), had tertiary education 984 (62.8%) and of low

parity 1082 (69.0%). Majority delivered at term 1251 (79.8%) and were booked 1266 (80.7%).

Table 2 shows the modes of delivery. About half of the women delivered through SVD 810 (51.7%) while about one third 522 (33.2%) delivered through emergency C/S.

Figure 1 shows the indications for C/S delivery. Two or more previous C/S was the commonest indication for C/S.

Table 3 shows factors that affected C/S delivery. Maternal age, occupation, educational level, gestational age at delivery and booking status significantly affected C/S delivery.

Table 1: Socio-demographic and obstetrics characteristics of the mothers.

Variables	Frequency N=1568	Percentage
Age (years)		
Mean±SD	29.78±4.70	
Age in groups (years)		
≤20	30	1.9
21-30	878	56.0
31-40	646	41.2
41-50	14	0.9
Marital status		
Married	1519	96.9
Single	49	3.1
Ethnicity		
Igbo	1554	99.2
Yoruba	2	0.1
Hausa	10	0.6
Others	2	0.1
Religion		
Christianity	1560	99.5
Islam	8	0.5
Occupation		

Variables	Frequency N=1568	Percentage
Civil servants	869	55.4
Agricultural workers	12	0.8
Crafts and related trades	171	10.9
Unskilled workers	24	1.5
Unemployed	492	31.4
Educational level		
Tertiary	984	62.8
Secondary completed	574	36.6
Primary completed	10	0.6
Parity		
1-2	1082	69.0
3-4	400	25.5
Above 4	86	5.5
GA at delivery		
Term	1251	79.8
Preterm	195	12.4
Post date	122	7.8
Booking status		
Booked	1266	80.7
Un-booked	302	19.3

GA- gestational age

Table 2: Mode of delivery.

Mode of delivery	Frequency	Percentage
SVD	810	51.7
Elective C/S	236	15.1
Emergency C/S	522	33.2

SVD- Spontaneous vertex delivery

Table 4 shows the predictors of C/S delivery. Maternal age, employment status, educational level and gestational age at delivery predicted C/S delivery. Delivery at <37 weeks gestational age had about 2 times odd of C/S delivery when compared to delivery at ≥37 weeks gestational age.

Table 3: Factors that affect CS delivery.

Variable	SVD	C/S	χ ²	P value
Age in group (years)				
≤20	13 (43.3)	17 (56.7)	24.424	<0.001*
21-30	498 (56.7)	380 (43.3)		
31-40	289 (44.7)	357 (55.3)		
41-50	10 (71.4)	4 (28.6)		
Marital status				
Married	791 (52.1)	728 (47.9)	3.361	0.067
Single	19 (38.7)	30 (61.2)		
Ethnicity				
Igbo	802 (51.6)	752 (48.4)	4.289	0.232
Yoruba	2 (100.0)	0 (100.0)		
Hausa	6 (60.0)	4 (40.0)		
Others	0 (0.0)	2 (100.0)		

Continued.

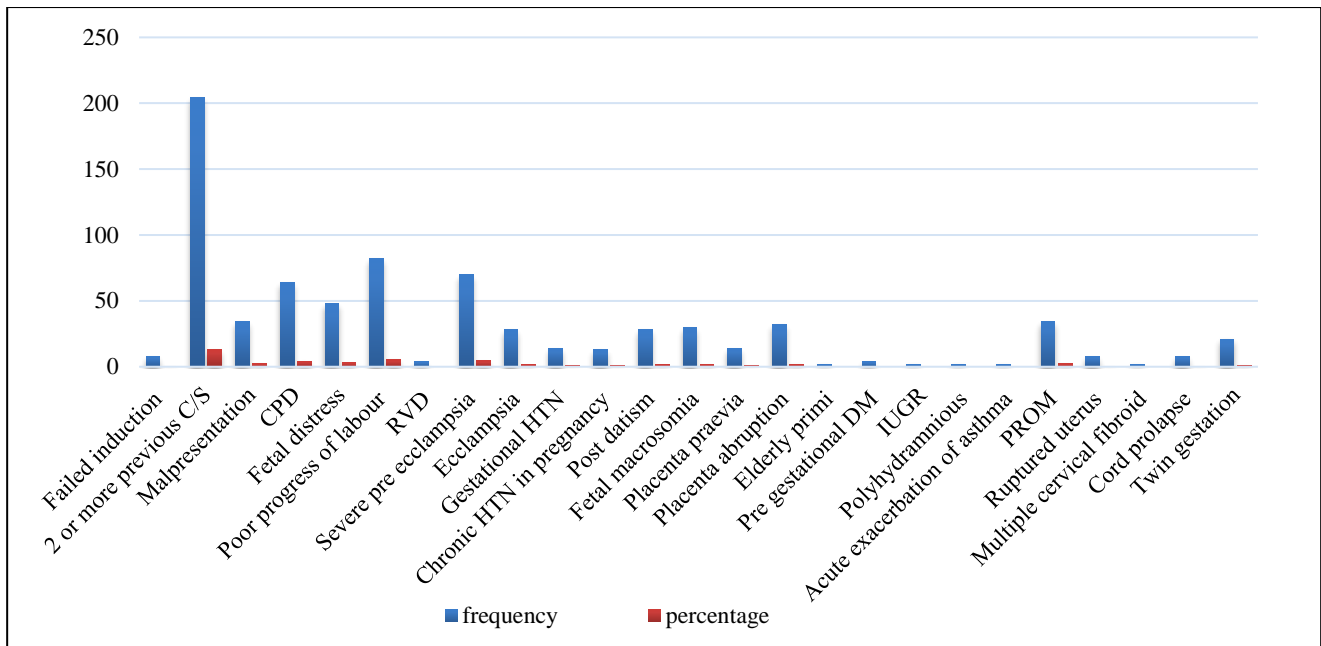
Variable	SVD	C/S	χ^2	P value
Religion				
Christianity	804 (51.5)	756 (48.5)	1.754	0.185
Islam	6 (75.0)	2 (25.0)		
Occupation				
Civil servants	427 (48.9)	446 (51.1)	11.077	0.026*
Agricultural workers	6 (50.0)	6 (50.0)		
Crafts and related trades	93 (54.4)	78 (45.6)		
Unskilled workers	8 (33.3)	16 (66.7)		
Unemployed	276 (56.6)	212 (43.4)		
Educational level				
Tertiary	532 (54.1)	452 (45.9)	6.755	0.034*
Secondary completed	272 (47.4)	302 (52.6)		
Primary completed	6 (60.0)	4 (40.0)		
Parity				
1-2	555 (51.3)	527 (48.7)	1.671	0.434
3-4	215 (53.8)	185 (46.3)		
Above 4	40 (46.5)	46 (53.5)		
GA at delivery				
Term	675 (54.0)	576 (46.0)	23.617	<0.001*
Preterm	69 (35.4)	126 (64.6)		
Post date	66 (54.1)	56 (45.9)		
Booking status				
Un-booked	127 (42.1)	175 (57.9)	13.819	<0.001*
Booked	683 (53.9)	583 (46.1)		

*Significant values

Table 4: Binary logistic regression showing predictors of C/S delivery.

Variable	Odds ratio	P value	95% CI for odds ratio	
			Lower	Upper
Age (years)				
≤30	0.608	<0.001*	0.488	0.756
>30	1			
Marital status				
Married	0.763	0.403	0.404	1.439
Single	1			
Employment status				
Employed	1.276	0.046*	1.004	1.622
Unemployed	1			
Educational level				
Secondary and above	1.280	0.032*	1.022	1.603
<Secondary	1			
Parity				
1-2	0.777	0.042*	0.610	0.991
Above 2	1			
GA at delivery				
<37 weeks	1.942	<0.001*	1.393	2.708
≥37 weeks	1			
Booking status				
Un booked	1.255	0.125	0.939	1.677
Booked	1			

*Significant values



CPD- Cephalo-pelvic disproportion; RVD- retroviral disease; HTN- hypertension; DM- diabetes; PROM- premature rupture of membrane.

Figure 1: Indications for C/S delivery.

DISCUSSION

The prevalence of C/S in this study was 48.3% and is far much higher than the 10-15% recommended by the WHO for developing countries.¹⁸ This may suggest an overuse of the procedure in the studied population. Some reports have also supported this indicating that there is overuse of this procedure in many parts of the world.^{19,20} It may also be due to proximity of the hospital as a referral centre for both private and other government owned facilities within and outside the state. Additionally there may be a dilution effect as majority of the mothers with low risk pregnancies deliver at the primary or secondary health facilities. Similar studies in Nigeria, Pakistan and Greece reported similar higher findings.^{14,15,21,22} The frequency of C/S may depend on the socio-demographic and obstetrics characteristics of the population, referral role of the hospital, departmental policies regarding management of such cases as dystocia, breech, foetal distress and previous C/S, physician factor, medico-legal aspects, and consideration of maternal choice.¹⁴

About 68.7% of the C/S were through emergency C/S. Similar findings have been reported in other parts of Nigeria.²³ This may be due to the strong aversion to C/S in our environment due to religious, cultural, or socio-economic factors and superstitious beliefs.²³ It could also be attributed to the fact that this is a referral centre where complicated cases from both primary and secondary health facilities are managed. The commonest indications for C/S was 2 or more previous C/S (13.0%). This is similar to the 12% reported from Sagamu Nigeria but lower than the 16% reported from Ethiopia.^{15,24} Previous C/S has been reported as the highest single indication for repeat section

because obstetricians regard vaginal birth after previous C/S as a high-risk option. However, trial of labour under close monitoring in carefully selected patient is now increasingly being advocated. Additionally, it is reported that 64.8-86.0% of patients with a C/S who were allowed for trial of labour delivered without any complication.²⁵

On logistic regression mothers aged above 30 years are more likely to deliver through C/S than those younger. Older women have more chance of a prior C/S, which leads them to high chance of another C/S. This finding agrees with studies conducted in India, Vietnam and Ethiopia where those aged 30 years and above are at least two times more likely to have C/S delivery.²⁶⁻²⁸ Women that are employed and with higher educational level have higher odds of having C/S. Other studies corroborated this.^{26,27} These factors are associated with financial independence and better decision making. They are also more likely to use health facilities. A study in India showed that economic status and woman's financial autonomy are associated with institutional delivery.²⁹ Mothers with lower parity (1-2) are less likely to have a C/S when compared to those with higher parity. Women with higher parity may have had previous C/S predisposing them to another C/S as previous C/S was the commonest indication for C/S delivery in this study.

Preterm delivery had about 2 times odd of C/S. This was not surprising as vaginal delivery have been noted to worsen perinatal outcome and even predispose to brain injury in premature babies.³⁰ Another study also reported positive association between preterm birth and C/S delivery.³¹ Un-booked mothers have higher odds of C/S delivery when compared to booked mothers. This may be

because most un-booked cases present as complicated cases that need immediate delivery of the baby leading to increased C/S delivery. Conversely, a similar study reported that ANC attendance and booked cases were more likely to have a C/S delivery.²⁸ Maternal choice and physician factor may explain the difference.

CONCLUSION

The prevalence of C/S is high in Enugu State. The study demonstrated that higher maternal age, employment, higher educational level, higher parity and preterm delivery predicted C/S delivery. Efforts should be intensified to address these risk factors.

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