The Rate and Costs of Caesarean Section among Women in Ado-Ekiti, Nigeria

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Abstract

Background: There has been an increase in the rate of caesarean section (CS) which raiseconcern about the costs and risk associated with it. The emphasis is to reduce the rising rate of CS so as to reduce the risk and costs associated with it. The aim of this study was to examine the rate of CS and identify the cost associated with it relative to the costs of virginal delivery.

Methods: Data were obtained from the cross-section of 166 women receiving postnatal care at both public and private hospitals that provide maternity service using structured questionnaire. Convenience sampling technique was used for the selection of women from the postnatal ward.

The descriptive statistics was used to examine the prevalence rate of caesarean section among women in Ado-Ekiti, while the simple arithmetic and descriptive analysis were used to measure the Economic costs of caesarean section and virginal delivery.

Results: The study revealed that the rate of caesarean section among women in Ado-Ekiti was 19.9%. The rate of CS was 39.4% among the women within the age group of 32-38 years, 42.4% and 45.5% among the educated and wage employed women respectively. The cost of CS in both the public and private healthcare facilities was found to be higher than the cost of Virginal delivery.

Conclusion: On this note, this study concluded that there is increase in the household health expenditure and increase in maternal mortality rate, especially in the case of women who cannot afford the cost when the risk of virginal delivery (VD) is too high.

Keywords: Caesarean Section • Public and Private Hospitals • Women • Virginal delivery • Direct costs

Introduction

The growing rate of medical intervention in child delivery has increased over the years which has combated the problems of maternal and child death. This has led to increasing numbers of child birth that have taken place through surgical procedures. Through the inventions of medical technologies, a lot of maternal and child deaths have been prevented. The major problem lies in the fact that these technologies are used at a higher rate in making more profit rather than in preventing risks in child birth. According to [1] child birth has become too medicalized and the higher rate of obstetrical intervention causes concern for household health expenditure. The obstetrical interventions with the aid of medical technologies have resulted into what is medically known as Caesarean Section (CS). Caesarean section is an alternative to virginal delivery (VD) and it is a surgical procedure. A Caesarean section refers to the delivery of a foetus, placenta, and membranes through an abdominal and uterine incision after viability [2].

The Caesarean section was introduced in clinical practice as a life-saving procedure both for the mother and the baby. The importance not placed on the financial cost of caesarean section is based on the maternal risk than the discomfort and risk accrued to the mother during prolonged virginal delivery [3]. Report that about 69 countries out of 137 countries have more than 15% rates of Caesarean with about 13,479 annual caesareans. This report indicated that more than half of the countries are considered to show overuse or unnecessary use of caesarean section. The World Health Organization (WHO) has recommended that a caesarean section rate of 15% should be taken as a threshold that should not be exceeded [4]. However, many countries across the globe have exceeded this threshold. As presented by [5] globally, the caesarean section rate has grown from 12.1% to 21.1%, it increased from 32.3% to 44.3% in the Latin America and Caribbean region from the year 2000 to 2015, making this region to have the highest caesarean section rate. The African region also witness about 1.1% increases from 2000 to 2015. Between the year 2000 and 2015, in the United States the rate was 25% and England, Wales and Northern Ireland, it was 20% [6].

Across Nigeria, the caesarean section rate ranges 20.8% - 35.5% [7]. Specifically, from the South-East, [2] conducted A-five-year survey of caesarean delivery in a teaching hospital in Nigeria, and 27.6% was obtained from the results as the rate of caesarean section. This rate was more than what was obtained from the evidence provided by [8] from the same hospital [7]. Put the rate at 35.5% in the South West, Nigeria. Both medical and socioeconomic factors have been attributed to this growth rate. The medical factor responsible for caesarean delivery is complications during child birth, while the socio-economic factors which are responsible for caesarean delivery are factors such as, age, educational level and household socioeconomic status among others. [9] The socio-economic factor of caesarean delivery explains the fact that the chances of caesarean delivery are increased by the level of education and age of the mother. Women usually above the age of 30 have more chances of undergoing caesarean child birth than those in the lower age category. Although there is remarkable improvement in the safety of surgical procedures used for the caesareans section, there is still higher risks of maternal death compare to virginal delivery. Apart from the medical risks associated with the caesarean section, it is more expensive than virginal delivery method [10,11].

In estimating the costs of the caesarean delivery, employed a standardized [3] approach, which requires information on the quantities of physical inputs needed on their unit cost and only the marginal resources directly associated with the C-section procedure were included [3]. In the study of [10], only the direct costs made during the stay of mother and child in the hospital were taken into account. There is variation in costs between caesarean section and virginal delivery, the cost also differs between the public and private hospitals. Owing to the risk and the costs involved in the caesarean section, the emphasis is to reduce the rising rate ofcaesarean section to as much as possible so as to reduce the risk and costs associated with it. On this note, the aim of this study is to examine the rate of CS and identify the cost associated with both caesarean section and virginal delivery in relation to the ownership structure (Public and Private) of hospitals in Ado-Ekiti, Nigeria.

Literature Review

Several studies have reported different rates of caesarean section and most of the rates reported exceeded the15% threshold rate suggested by the WHO, thus clamouring for policy measures to ensure reduction of overuse caesarean section. [3] Revealed that out of 137 countries observed, a total of 54 countries had caesarean section rates below 10%, whereas 69 showed rates above 15%. 14 countries had rates between 10 and 15%. In Nigeria, [2] determined the caesarean section rate, as well as indications

and complications of caesarean section. A five year retrospective analysis of clinical data from the ward admissions and discharge books, patients' folders and the operating theatre record books at the University of Nigeria Teaching Hospital, Enugu from year 2005 to 2009 were used. The study obtained 27.6% rate of caesarean section among women with the age range between 16-48years. In a six-year audit study of [7], caesarean section rate was 35.5% with an upward trend.From the North-West in Nigeria, the evidence provided by [12] put the rate of caesarean section at 11.3% and this was 1.4% higher than the evidence provided by [13] from this same hospital.

Moreover, significant differences have been observed in the cost of caesarean section and virginal delivery and the huge estimated costs of caesarean section have also been reported. [3] estimated the extra number of needed caesarean section that would be necessary in countries with lower than recommended national rates, and the number of excess caesarean section in countries in which the procedure is arguably overused and to know the implications of the needed and excess caesarean section in term of the resources that must be expended. The findings show that about U$S 2.32 billion was the cost of the global excess caesarean section, this shows a huge resource that would have been saved if not spent on unnecessary caesarean section.[10] compared the immediate costs of Caesarean section and vaginal delivery, identifying their main determinants in the health system milieu of a higher-middle-income Balkan country. Data were obtained from the cross-section of 943 pregnant patients at term from Serbian hospital within a six month periods and direct costs expend by the mother and child during the hospitalization were estimated. The average total direct costs per Caesarean section delivery (96,992.84 ± 67,842.82 RSD), as compared with those who had a vaginal delivery (41,869.60 ± 42,843.16 RSD). This analysis established that the costs of CS are higher than that of virginal delivery. In Nigeria, [11] also revealed that the costs of virginal delivery is between N6,000- N 35,000,while CS ranges between N60,000- N 135,000. As shown by [10] these are direct costs expended by the mother and child during the hospitalization.

Theoretical Issues on Economic Costs of Caesarean Section

Upsurges in caesarean section rates globally have raised inquiries about the economic costs of caesarean section and virginal delivery. The economic cost in this context is the value of resources incurred by the caesarean section. This involves considering the virginal delivery foregone by selecting caesarean section, in order word, this is the opportunity costs. Economic costs take into account the amount of money the patient could have saved having alternative delivery method, it compares the delivery method chosen and rejected. The Economic costs of caesarean section can be divided into direct and indirect costs. Direct costs are easily identifiable and traceable; they include the costs of hospital days, services, materials and drugs used for the procedure [10]. Indirect costs are not easily identifiable or observable; they include relative/friends caregiver's time cost and informal payments such as money given to the hospital staff [14].

The estimation of economic costs of caesarean section can encompass a variety of process of varying measures. First, in theory, large hospitals or public hospital should be able to provide health care services more cheaply than smaller or private because of economies of scale. This also brings variation in the costs. Some studies [15-17] provided evidence in support of this, while others indicated otherwise (Sari, (2003); [18] Most often the private hospitals are the targets of criticism for enhanced caesarean section as financial motives are inherent in the private medical system. Second Insurance coverage is another factor which facilitate rise in caesarean delivery [14] stated that the cost of caesarean delivery is relatively high on the average than the cost of a normal delivery but when there is insurance coverage the cost of caesarean delivery is relatively small because only part of the costs are incurred by the individual concerned. Third, where there are general systems of billing and fee-for-service payment, providers often cite charges for caesarean section and virginal delivery rather than costs. In Nigeria, there are fixed hospital charges for caesarean section and virginal delivery, especially in the public hospitals, while the private hospitals often collect transaction costs which give rooms for price bargaining. As noted by [19-22] health care charges may include elements arising from corporate financial decisions, which may be poor proxies for the costs of providing child delivery care.

Methods

This study was designed as a hospital based cross-sectional research that was carried out between January 31st to March 31st, 2019 to assess the rate and costs of caesarean delivery among women in, Ado-Ekiti, Nigeria. The target population was women in the postnatal wards of a public hospital and two private hospitals. The hospitals were selected because they provide maternity services to women. Data were obtained from the cross-section of 166 women receiving postnatal care. Convenience sampling technique was used for selection of respondents (women) from the ward as there was a high likelihood of not acquiring the required sample within the limited period of the study [14]. The study excluded women not paying out-of-pocket or with health insurance because, they claim not to have adequate knowledge of the overall cost paid by their Health Management Organization (HMO). The major instrument used for this study was a pre-tested-self-structured questionnaire containing questions, regarding reasons for undertaking caesarean delivery, the cost of caesarean section, benefit of caesarean delivery and the socioeconomic features. For adequate understanding of the questionnaire and proper filling, translation was done to translate the content of the questionnaire in native dialect to the uneducated respondent and a respondent that failed to fill the questionnaire during the first day visit was revisited. For ethical consideration, the participants were assured of their right to decline participation in the study. Also, they were required to sign the informed consent form after the objectives and procedures of the study had been explained to them. The consent form was attached to the questionnaire. The major method of analysis employed in this study is the descriptive statistics to describe the socioeconomic data of the respondents. Simple Arithmetic was employed to estimate the caesarean rate and the costs. SPSS statistical software was employed for the analysis. The direct costs of caesarean section with all relevant expenses from the hospital were accounted for. The total costs are expressed in Nigerian official currency, the Naira (₦); the average exchange rate in June 2019 was 1|$ = 306₦ (CBN, 2019).For content validity about 2% of the questionnaires was first distributed in a pilot study in order to clear errors before the final administration of the questionnaire.

Model Specification

To estimate the prevalence (p) of caesarean delivery in the study area. The incidence based approach is employed and the procedure is presented below as;

$$\hat{INR}_{cs} = \sum_i \frac{cs_i}{n} X100$$

Where

$\sum cs_i$ = Total number of all cases of caesarean delivery in the study area

n= Total number of people who were sampled

$\hat{INR}_{cs}$ = incidence rate

To examine the Costs of Caesarean and Virginal Delivery in Public and Private Health Facilities

$$TC_s = f(CSF, MADM, CHADM, DRUG, REGF, INF)$$

$$TC_s = CSF + MADM + CHADM + DRUG + REGF + INF$$

$$TC_{VD} = f(VDF, MADM, CHADM, DRUG, REGF, INF)$$

$$TC_{VD} = VGF + MADM + CHADM + DRUG + REGF + INF$$

Where;

TC_s =Total Cost of Caesarean Section

TC_{VD} =Total Cost of Virginal Delivery

VGF= Virginal Delivery fee

CSF= Caesarean Section fee

MADM= Mother's admission fee

CHADM= Admission fee for the Child

DRUG= Drugs

REFR= Registration fee

INF= Informal fee

Results and Discussion of Findings

The highest age category of the respondents which were selected

for this study fall within the age bracket of 24-31 years, validated by 64 respondents with 38.6%. This is followed by age bracket of 32-38 years with 56 respondents, which represent 33.7% of the total respondents. Also, 34 (20.5%) respondents are within the age bracket of 39-46 years, while 12 participants which represent 7.2% fell within the age bracket of 47 years. Thus, the selected respondents, in terms of age were expected to understand issues relating child delivery. It can be seen from Table 1 that about lowest percentage of the respondents, which represent 3(1.8%) had no formal education, while the majority of the respondents 84(50.6%) had post-secondary education. Also, 67(40.4%) of the total respondents had secondary education, while the remaining 12(7.2%) respondents had primary education. Thus, the problem of low education of the respondents is not believed to affect the respondents on issue relating to caesarean delivery. Also, the occupational distribution of respondents presented in table 3 shows that 66 respondents which represent 39.8% of the total respondents were in the category of wage employed. Also, 75 (45.2%) respondents were Self-employed, while 21 and 4 with (12.7%) and (2.4%) were under the categories of those who were unemployed and not available for employment as presented in Table 1. By implication, majority of the respondents were employed and thus financially empowered to access caesarean delivery (Table 1).

Source: Author's computation from field survey (2020)

The Incidence of Caesarean Section among Women

To examine the incidence of caesarean delivery among women in Ado-Ekiti, the number of women that experience caesarean section relative to the number of women that deliver through virginal during the period of study was calculated. The incidence was observed in relation to age, educational status and type of occupation and the results are presented in Tables 2-4. (Table 2)

Source: Author's computation from field survey (2020)

From Table 2, out of the 166 respondents that were survey, 33 respondents, which represent 19.9% of the total respondents, had caesarean section. This gives rise to incidence rate of 19.9%, while those who had their children through virginal delivery were 133, which represents 80.1% (Table 3).

Source: Author's computation from field survey (2020)

Table 3 shows that the highest percentage of the respondents that experience caesarean section selected for this study fall within the age bracket of 32-38 years with 13(39.4%) respondents, while the highest percentage of the respondents that had virginal delivery fall within the age group of 24-31 years. This result implies the incidence of caesarean section is higher among the respondents in the age group of 32-38. Table 3, also shows that the highest percentage of the respondents that experienced CS selected for this study fall within the group of respondent with post-secondary education with 15(45.5%) respondents, while the lowest percentage of the respondents that had CS fall within the those with no formal education. This result implies the incidence of caesarean section is higher among the respondents with higher level of education.

Table 1: Age, Educational and occupational distribution of the respondents.

Age	Freq	Percent	Education	Freq	Percent	Occupation	Freq	Percent
24-31	64	38.6	None	3	1.8	Wage employed	66	39.8
32-38	56	33.7	primary education	12	7.2	Self-employed	75	45.2
39-46	34	20.5	secondary education	67	40.4	Unemployed	21	12.7
47 above	12	7.2	Post – secondary	84	50.6	Not available for employment	4	2.4
Total	166	100.0	Total	166	100.0	Total	166	100.0

Table 2: The incidence of caesarean delivery.

Methods of Child Delivery	Frequency	Percent
Virginal delivery	133	80.1
Caesarean Section	33	19.9
Total	166	100.0

Table 3: The incidence of caesarean delivery in relation to age, education and occupation.

AGE						
		24-31	32-38	39-46	47 above	Total
VD	Count	58	43	23	9	133
	% within VD	43.6%	32.3%	17.3%	6.8%	100.0%
CS	Count	6	13	11	3	33
	% within CS	18.2%	39.4%	33.3%	9.1%	100.0%
Total	Count	64	56	34	12	166
	% within Total	38.6%	33.7%	20.5%	7.2%	100.0%
Education						
		None	primary education	secondary education	Post – secondary	Total
VD	Count	2	7	55	69	133
	%within VD	1.5%	5.3%	41.4%	51.9%	100.0%
CS	Count	1	5	12	15	33
	%within CS	3.0%	15.2%	36.4%	45.5%	100.0%
	Count	3	12	67	84	166
	% within Total	1.8%	7.2%	40.4%	50.6%	100.0%
Occupation						
		Wage employed	Self-employed	Unemployed	Not available for employment	Total
VD	Count	52	62	15	4	133
	% within VD	39.1%	46.6%	11.3%	3.0%	100.0%
CS	Count	14	13	6	0	33
	% within CS	42.4%	39.4%	18.2%	0.0%	100.0%
	Count	66	75	21	4	166
	% within Total	39.8%	45.2%	12.7%	2.4%	100.0%

Table 4. The Costs of Delivery in the Public and Private Hospitals.

	Public Hospital (VD)				Private Hospital (VD)			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Cost of VD	20212.3	1893.5	15000	22500	32963.0	3736.3	25000	35000
Mother's admission fee	14919.8	2702.0	9000	20000	29963.0	5969.4	12000	32500
Child's admission fee	8349.5	478.6	4000	9000	14687.0	5872.1	7000	30500
Drug fee	5859.9	621.9	3250	7250	10601.9	2002.7	6250	15000
Registration fee	1370.3	218.8	1000	1500	4342.6	1005.2	3250	7500
total Direct Costs	50711.8	4343.7	39000	57500	92557.4	10566.8	60500	111500
Indirect Costs	1764.2	731.0	500	5000	2666.7	679.4	2000	5000
Total Costs of VD	52475.9	4425.7	41000	59500	95224.1	10653.4	63500	114500
No of Observ.	106				27			
	Public Hospital (CS)				Private Hospital (CS)			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Cost of CS	68000.0	8101.6	60000	95000	160000	19720.3	120000	175000
Mother's admission fee	6039.1	857.4	4500	7500	14550	2650.5	12000	18000
Child's admission fee	6934.8	2399.4	3500	10000	9350	1776.4	8000	12500
Drug fee	6565.2	2101.4	6000	16000	14450	4769.4	7500	20000
Registration fee	1504.3	590.1	1000	3000	4665	1222.5	3500	7500
Total Direct Costs	89043.48	9076.384	76500	116000	203015	17504.9	167400	225000
Indirect Costs	1630.4	919.7	1000	5000	2750	634.6	2000	4000
Total costs of CS	90673.9	9199.5	77500	119000	205765	17339.7	170400	228000
Variable	23				10			

Furthermore, table 4 shows that the highest percentage of the respondents that experience caesarean section selected for this study fall within the categories of wage employed with 11(47.8%) respondents, while the lowest percentage of the respondents that had CS fall within the category of those that were unemployed. This result implies the incidence of CS is higher among the respondents that are financially stable.

The Costs of Child Delivery in Public and Private Hospitals

To estimate the costs of caesarean section and virginal delivery in the public and private healthcare facility, the information about the cost of surgery for delivery, mother's admission fee, drugs and other fees were obtained and the results obtained from the estimates of costs for caesarean and virginal delivery are presented in Table 4.

Source: Author's computation from field survey (2020)

Note: Costs are presented in Naira

Table 4 presents the estimated cost of caesarean section and virginal delivery in the public and private hospitals. The average cost of caesarean section in the public hospital is ₦68000.0with a standard deviation of ₦ 8101.6. The minimum and maximum costs of caesarean section are ₦60, 000 and ₦90, 000respectively. Also, in the public hospital, the average total direct and indirect costs of CS are ₦89, 043.5 and ₦1630.4 respectively, while the overall cost is ₦90, 673.9. However, the average cost of caesarean section in the private hospital is ₦160, 000with a standard deviation of ₦19, 720.3. The minimum and maximum costs of caesarean delivery are ₦120, 000 and ₦ 175,000 respectively. The respective direct and indirect costs of CS in the private hospital stand at ₦203, 015 and ₦2750, are yielding overall costs of ₦205, 765.

Furthermore, in the public hospital, the minimum and maximum costs of virginal delivery are ₦15, 000 and ₦22, 500 correspondingly, while the average cost of virginal delivery is put at ₦20, 212.3 with a standard deviation of 1893.5. The estimated total costs of virginal delivery in the public hospital giving the direct and indirect costs of ₦50711.8 and ₦1764.2 is equal to ₦52475.9.In the private hospital, the minimum and maximum costs are ₦25,000 and ₦ 35, 000 correspondingly, while the average costs is put at ₦32963. Moreover, in the private hospital, the average total direct and indirect costs of VD are ₦92, 557.4 and ₦2666.7 respectively, while the overall cost is ₦95, 224.1.

Discussion

The result of the study revealed that 19.9% of the women in Ado-Ekiti undergo caesarean section which exceeded the 15% threshold suggested by the WHO. This analysis implies that out of every five women, one will give birth through caesarean delivery. As stated in Gibbin et al, (2010) the caesarean section rate in 2008 was 1.8 in Nigeria, however, the results of the studies conducted in different parts of the country have shown increase in the caesarean rates over time [2,7,12]. The findings of this study also confirmed that there is overuse or unnecessary use of caesarean section across the country. Moreover, high prevalence rate of caesarean section among women within the age category of 32-38 years was observed. The 39.4% caesarean section rate reported highest among the age group of 32-38 years in this study was almost the same rate with the findings in [11] and [2], but in different age group of 31-35 and 25-34 years.The highest count of virginal delivery was within the age category of 24-31 years, which implied that increase in age of the mother would increase the chances of caesarean section. Caesarean section was also found to be common among women who were employed and also had high level of education these findings were consistent with [7]

From the costs analysis, it was clear that the average costs of caesarean section was more than two times higher than the costs of virginal delivery, indicating that caesarean delivery increases the household health expenditure. As noted by [10] higher increase in the cost of caesarean section than that of vaginal delivery, made caesarean section an economically less favorable delivery option. Thus, the financial burden of caesarean section in the case of women who cannot afford the costs when the risk involves virginal delivery is too high, can increase maternal mortality rate. Also the costs of caesarean section are higher in private hospitals than in the public hospitals. By implication, women with the higher risk of having virginal delivery with financial constraint and without health insurance coverage may be demotivated in having more children and this could impact on the fertility rates. Furthermore, the results also show the cost of virginal delivery is significantly higher in the private hospital than in the public hospital. This finding suggests that it is only women that are financially buoyant that can have child delivery in the private hospitals. Overall, looking at the incidence of CS in the study area in relation to the costs of having CS, it shows that the economic burden of CS is higher than virginal delivery and for the women with high risk of having virginal delivery; the associated morbidity and fatality may be higher than the monetary value.

Conclusion

In conclusion, there is high prevalence rate of caesarean delivery among women, which shows overuse of caesarean section in child birth. Within the economically situations of Ado-Ekiti, Caesarean section has immediate higher costs than vaginal delivery, this condition may be due to some reasons that need to be investigated in further studies. Increase in unnecessary use of caesarean section therefore has an important negative financial implication for the poor and the unemployed. The incidence of

caesarean section being higher among the respondents that are financially enabled also has negative implications for health equity in Ado-Ekiti and across Nigeria. These findings suggest that caesarean section should be used exclusively in the case of obstetrical emergencies since high rate of caesarean section not only has health risk on the mother, but also has financial burden. Women who demand for caesarean delivery for other reasons aside obstetrical emergencies should also be sensitized about the health risk involved in undergoing caesarean section during prenatal care. This would reduce the number of women who undergo caesarean delivery in unnecessary situations. The cost of caesarean delivery is higher in the private hospitals than in the public hospital, this can increase the financial burden of the household in the case where public hospital is not easily accessible due to location. In order to reduce the cost differential between public and private hospital, health insurance should be encouraged for all and sundry, this would subsidize and reduce the immediate cost of accessing health care thereby making caesarean section more affordable for women that has health risks of virginal delivery.

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