DOI: 10.7860/JCDR/2021/45050.14596

Original Article

Obstetrics and Gynaecology Section

Association and Determinants of Decision Delivery Interval of Emergency Caesarean Sections and Perinatal Outcome in a Tertiary Institution

PEACE CHINYERE IGWE[1], JOHN OKAFOR EGEDE[2], EMEKA ONWE OGAH[3], CHIDEBE CHRISTIAN ANIKWE[4], MATTHEW IGWE NWALI[5], LUCKY OSAHENI LAWANI[6]

ABSTRACT

Introduction: A Decision to Delivery Interval (DDI) of 30 minutes for emergency caesarean section has been widely recommended but there is little evidence to support it. This target may not be practicable in a busy maternity unity and therefore, the anticipated beneficial effect on neonatal outcome requires re-evaluation.

Aim: To determine the association between decision-delivery interval and perinatal outcome of emergency caesarean section at Alex Ekwueme Federal University Teaching Hospital, Abakaliki (AEFUTHA) over a period of four years.

Materials and Methods: This was a retrospective observational study of the cases in emergency caesarean sections performed at the Department of Obstetrics and Gynaecology, AEFUTHA from 1st January 2012 to 1st January 2016. Hospital records of the women with singleton pregnancy at term who delivered through emergency caesarean sections were retrieved. Data extracted include socio-demographic and obstetric characteristics, duration between decision for caesarean section and intervention, indications for the caesarean section, reasons for delay in DDI, association between booking status and DDI and association of DDI and foetal outcome, APGAR score at 1st and 5th minutes and admission to NICU. Data were analysed with IBM statistics version 20. The p-value <0.05 were regarded as statistically significant.

Results: A total of 638 emergency caesarean sections involving singleton pregnancies at term, 522 (81.8%) of which had complete records and were analysed. The mean age of participants was 27.8±5.1 years, 89.3% were para 1-4 and 55.0% were unbooked. Only 6 (1.1%) of the emergency caesarean sections were performed within the recommended 30 minutes of DDI. The mean DDI was 189±124 minutes with range of 25 minutes to 1220 minutes. Two cases performed within 25 minutes were cases of foetal distress and cord prolapse while only a case of reduced foetal movement was delayed to 1220 minutes. The most common indications for emergency caesarean section were cephalopelvic disproportion 129 (24.7%) and foetal distress 65 (12.5%). The major cause of delay was delay in cross-matching of blood for surgery 136 (26.1%) while delay in giving informed consent contributed 67 (12.8%). There was no correlation between DDI of 75 minutes or above and the 1st minute APGAR score (AOR=2.48, CI=0.86-7.16, p-value=0.09), 5th minute APGAR score (AOR=3.08, CI=1.55-6.11, p-value=0.09), foetal outcome (AOR=0.82, CI=017-3.79, p-value=0.08) and admission to Newborn Intensive Care Unit (NICU) (AOR=2.08, CI=0.77-5.56, p-value=0.14).

Conclusion: This study showed that there was no correlation between DDI>75 minutes and poor perinatal outcome. Efforts should be made to strengthen the health system and improve the quality of care in order to keep DDI within this time limit for improved perinatal health outcome and indices.

Keywords: Cephalopelvic disproportion, Delays, Newborn intensive care unit, Singleton pregnancy

INTRODUCTION

Caesarean section is one of the most commonly performed obstetric procedures worldwide [1]. It constitutes about 16.4% of all deliveries at Alex Ekwueme Federal University Teaching Hospital (formerly known as Federal Teaching Hospital), Abakaliki [2]. Since, the dawn of caesarean births, operative deliveries have been performed in extreme clinical situations when vaginal delivery is either impossible or risk of vaginal delivery outweighs the benefit to either the mother or her unborn baby or both [3-5]. In modern obstetrics, routine caesarean deliveries are offered electively to women for variety of indications or performed in emergency for foetal or maternal indications or both [6].

A common reason for caesarean section is to prevent adverse effects of perinatal asphyxia, an important contributor to new born morbidities and mortality. Prompt decision-making and appropriate surgical intervention could prevent those morbidities and mortality associated with asphyxia [7]. Expeditious delivery is dependent on decision to perform caesarean delivery and the timelines achieved but beyond this, the outcome of this procedure is very important [2].

The decision to intervention interval is the interval in minutes from the date and time of decision to carry out caesarean section to the date and time of delivery of the baby [2]. This interval between the decision to operate and delivery affects foetal outcome and this may be influenced by different factors. Some of these factors include undue patient and hospital delays. These delays may present in the form of delay in getting informed consent, lack of money for out of pocket purchase of hospital consumables, lack of coordination between the health teams involved in patient care, increased patient load with resultant long waiting list for surgery, delay in cross matching blood and stabilising unfit patients, delays due to malfunctioning equipment, shortage of instruments, absence of sutures, drapes and other consumables, poor theatre technical staffing, power outage and limited number of operating theatres have been identified as contributory factors in resource poor settings like Nigeria [8-11].

Obstetric emergencies that may demand emergency caesarean section may occur at any time in any setting. It is important that obstetricians prepare themselves to assess and intervene without undue delays to prevent maternal and perinatal morbidity and mortality.

Data on the effect of decision to intervention interval on neonatal outcome is limited; with data from developing countries even more sparse [12-13]. The practicability of this target and its anticipated benefit on neonatal outcome has been questioned by recent evidence [14]. Failure to meet the recommendations does not seemed to increase neonatal morbidity [15]. In developing countries, the maternity units are often busy and congested making it difficult to meet the recommended 30 minutes for emergency caesarean section like in developing countries with modern maternity units. However, current standard of care focuses on the effect on decision-delivery interval on the neonatal outcome. Optimal decision-intervention interval depends on proper collaboration of numerous personnel who have responsibility in the management of patients.

Previous studies [1,2,8,11] from Nigeria showed that the 30 minutes standard is not always achievable. These studies showed conflicting results on the factors responsible for the delays and outcome of the deliveries suggesting institutional variations in response to emergencies. The American College of Obstetricians and Gynecologists (ACOG) has suggested that 30 minutes should not be a rule but based on resources available and geographic location, each institution should develop requisite personnel [16]. Also, American Society for Health Care Risk Management suggested that emergency caesarean section should be done as quickly as possible in keeping with capabilities of the institution [15].

This study aimed to evaluate the DDI for emergency caesarean section in the local context and determine the impact of foetal outcomes. It is hoped that, this study will help hospital management and policy makers in formulating guidelines to overcome some of challenges noted in this study and improve standard of care in emergency caesarean section.

MATERIALS AND METHODS

This was a retrospective observational study of the emergency caesarean sections carried out at the Department of Obstetrics and Gynaecology, AEFUTHA over a period of four years. The **inclusion criteria** were those who had singleton babies at term (between 37 and 42 weeks). The **exclusion criteria** were preterm deliveries, congenital anomalies, confirmed intrauterine foetal death before decision to deliver and parturients on opioids. Ethical approval was obtained from the Institution's Review and Ethics Committee with approval number 23/08/2016-29/08/2016.

The case files of the women who delivered through emergency caesarean sections and met the inclusion criteria at AEFUTHA from 1st January, 2012 to 1st January, 2016 were retrieved from the medical records department, gynaecological emergency, labour ward, operating theatre.

The data extracted focused on socio-demographic and obstetric characteristics including age, parity, booking status, duration between decision for caesarean section and intervention, indications for the caesarean section, reasons for delay in DDI, association between booking status and DDI and association of 75, 90 and 240 minutes DDI and foetal outcome, APGAR score at 1st and 5th minutes and admission to NICU.

STATISTICAL ANALYSIS

Data collection was done by trained research assistants who were registrars in the department. The data was collected using a pre-designed proforma. The collected data is immediately entered into the computer after verification by the researcher. Data analysis was done using Statistical Package for Social Sciences, IBM SPSS statistics version 20.0 (IBM Corp., Armonk, NY, USA). The results were expressed as frequency tables, percentages, mean and standard deviation. Multivariate analysis was performed to determine association between DDI at 75, 90 and 240 minutes. A p-value of 0.05 was considered statistically significant.

RESULTS

Over the study period, there were 8643 deliveries of which 1968 (22.7%) deliveries were through caesarean sections. Of the 1968 cases of caesarean sections, 1161 (58.9%) were emergency caesarean sections. Only 638 met the inclusion criteria of which 522 (81.8%) had complete record and were analysed. The hospital records of the remaining 116 could not be traced or have incomplete records and were excluded from the analysis. As shown in [Table/Fig-1], parturients between the age 21-30 years had the highest number (65.9%) of caesarean sections, while the least rate was among women above 41 years of age 3 (0.6%). Majority of the women 466 (89.3%) were para 1-4. Majority 497 (95.1%) of the women who had emergency caesarean section were married. About 235 (45%) parturient were booked, while 287 (55%) were unbooked. Majority 235 (45%) had secondary education as the highest level of education.

Variables	Frequency (n)	Percentage (%)
Age (years)		
<20	43	8.2
21-30	344	65.9
31-40	132	25.3
>41	3	0.6
Parity		
Para 1-4	466	89.3
Para ≥5	56	10.8
Marital status		
Married	497	95.1
Single	23	4.5
Widow	2	0.4
Booking status		
Booked	235	45
Unbooked	287	55
Educational level		
Primary	116	22.2
Secondary	235	45.0
Tertiary	159	30.5
None	12	2.3

[Table/Fig-1]: Socio-demographic characteristics of participants.

[Table/Fig-2] shows the indications for emergency caesarean sections. The most common indications for emergency caesarean section in this study were cephalopelvic disproportion 129 (24.7%), foetal distress 65 (12.5%) and antepartum haemorrhage 59 (11.3%). The least indication was cord prolapse 6 (1.1%). The mean decision deliver interval in this study was 189±124 minutes [Table/Fig-3].

Variables	Frequency (n)	Percentage (%)
Failed induction/failed augmentation	46	8.8
Severe pre-eclampsia/eclampsia with Unfavourable cervix	46	8.8
CPD/Obstructed labour	129	24.7
APH	59	11.3
Foetal distress	65	12.5
Failed VBAC	26	5.0
Footling breech presentation	53	10.2
Two previous caesarean sections	23	4.4
Cord prolapse	6	1.1
Others	69	13.2
Total	522	100

[Table/Fig-2]: Indication for emergency lower segment caesarean section.
CPD: Cephalopelvic disproportion; APH: Antepartum haemorrhage; VBAC: Vaginal birth after caesarean section

Majority of the surgeries were performed within 121-180 minutes (mean 148.9±18.3 minutes), only 6 (1.1%) of the cases were performed within 30 minutes and 25 (4.7%) cases were performed within 60 minutes. About a fifth of cases 118 (22.6%) were performed beyond 240 minutes [Table/Fig-3].

DDI (minutes)	Frequency (n)	Percentage (%)	Mean±SD (minutes)
<30	6	1.1	26.0±7.6
31-60	19	3.6	50.2±8.5
61-120	126	24.1	95.5±17.1
121-180	159	30.5	148.9±18.3
181-240	94	18.0	209.0±17.4
>240	118	22.6	360.1±147.8
Mean			189±124

[Table/Fig-3]: Decision-delivery interval of emergency caesarean section.
DDI: Decision-delivery interval; SD: Standard deviation

[Table/Fig-4] depicts the reasons for delays indicating that delay in obtaining and cross-matching of blood for surgery accounted for 136 (26.1%). Others were delay in giving consent for surgery 67 (12.8%), stabilisation of patients 36 (6.9%), busy theatre suits 29 (5.6%), delay in carrying out laboratory investigation 82 (15.7%) and others 74 (14.2%).

Reasons for delay	Frequency (n)	Percentage (%)	Mean DDI (±SD)
Lack of sterile packs and scrubs	98	18.7	168.3±93.6
Delay in obtaining blood for surgery	136	26.1	304.1±233.0
Time for stabilising the patient	36	6.9	293.4±136.8
Busy theatre suits	29	5.6	287.3±155.1
Delay in giving consent for operation	67	12.8	279.9±168.9
Delay in doing lab investigation	82	15.7	351.2±297.8
Others	74	14.2	240.2±131.8
Total	522	100	

[Table/Fig-4]: Reasons for delay in performing emergency caesarean sections. Others- power failure in the theatre 17 (3.3%), delay in getting laboratory result 23 (4.4%), lack of O-Rhesus negative blood in the blood bank 6 (1.1%) and due to financial constraint 28 (5.4%).

[Table/Fig-5] indicates that of the 235 women who were booked, 27 delivered within 75 minutes and of the 287 unbooked participants only 18 delivered within 75 minutes (OR=1.65, CI=1.02-2.66, p-value=0.04).

Booking status	<75 min	>75 min	Total	AOR (CI)	p-value
Booked	27	208	235	1.65 (1.02-2.66)	0.04*
Unbooked	18	269	287		
Total	45	477	522		

[Table/Fig-5]: Association between booking status and DDI.
Logistic regression; *statistically significant; AOR: Adjusted odd ratio

The association between decision delivery intervals at cut-off points of 75, 90 and 240 minutes and foetal outcomes is shown in [Table/Fig-6]. The foetal outcome measures examined first and fifth minutes APGAR scores, admission into newborn special baby care unit as well as survival of the baby (live birth or stillbirth). Forty-five babies were delivered within 75 minutes, 79 babies within 90 minutes while 404 were delivered within 240 minutes. Among these, the odds of having APGAR score of 7-10 at the first minute were consistently lower with increase in time (AOR=2.48, CI=0.86-7.16) vs (AOR=1.09, CI=0.48-2.44) vs (AOR=0.78, CI=0.39-1.54). This was not statistically significant. Similar trend was also noted at the 5th minute APGAR score (AOR= 2.24, CI=0.87-5.78) vs (AOR=2.1, CI=0.95-4.69) vs (AOR=1.048, CI=0.49-2.20). This was not statistically significant [Table/Fig-6].

A total of 198 babies were admitted in the NICU. Of these, 18 were delivered within 75 minutes, 31 within 90 minutes and 155 within 240 minutes. The odds of having a baby that will not be admitted into NICU decreased with increase in the cut-off time (AOR=2.08, CI=0.77-5.56) vs (AOR=1.21, CI=0.59-2.48) vs (AOR=0.78, CI=0.42-1.43). This was not found to be statistically significant [Table/Fig-7].

There were 18 perinatal deaths, four of which were delivered within 90 minutes, 15 were delivered within 240 minutes while only 3 were delivered beyond 240 minutes. The odds of having a live baby at 75, 90 and 240 minutes were (AOR=0.82, CI=0.17-3.79), (AOR=0.82, CI=0.21-3.24) and (AOR=1.76, CI=0.42-7.38), respectively. These were not found to be statistically significant [Table/Fig-7]. The indications for the caesarean section among babies that died were as shown in [Table/Fig-8]. Majority were due to prolonged obstructed labour and occurred between 90 minutes and 240 minutes of DDI. Early delivery within 75 minutes may have contributed in saving the lives of the death babies.

DISCUSSION

Most emergency caesarean sections that were performed in the current study were conducted after a decision delivery interval of more than 75 minutes. DDI >75 minutes was not significantly associated with higher APGAR scores (7-10) at both 1st and 5th minutes, with no significant risk of perinatal deaths and NICU admissions-indicating less adverse perinatal outcome. This could have been due to the close feto-maternal intra partum surveillance and optimum resuscitation for foetal heart rate abnormalities that were instituted during labour and decision delivery interval, when preparation for emergency delivery via caesarean section was being made.

There were only 1.1% emergency caesarean sections performed within 30 minutes and 4.7% performed within one hour. This result is similar to 0.86% performed within 30 minutes in Ogbomosho and 0.7% in Uganda [11,17] but lower than 5.7% and 12.3% performed within 30 minutes in Benin and Tanzania, respectively [8,18]. A study in Enugu, Nigeria showed that there was no emergency caesarean section performed with DDI of 30 minutes

	1st minute APGAR score					5th minute APGAR score				
DDI (min)	0-6	7-10	COR (CI)	AOR (CI)	p-value	0-6	7-10	COR (CI)	AOR (CI)	p-value
75										
<75	23	22	2.21 (1.10-4.09)	2.48 (0.86-7.16)	0.09	14	31	3.08 (1.55-6.11)	2.24 (0.87-5.78)	0.09
>75	153	324				61	416			
90										
<90	31	48	1.33 (0.81-2.17)	1.09 (0.48-2.44)	0.83	18	61	1.99 (1.10-3.62)	2.11 (0.95-4.69)	0.06
>90	145	298				31	386			
240										
<240	136	268	0.99 (0.64-1.53)	0.78 (0.39-1.54)	0.48	59	345	1.09 (0.60-1.98)	1.048 (0.49-2.20)	0.90
>240	40	78				16	102			

[Table/Fig-6]: Association between perinatal outcome and DDI.
Logistic regression; COR: Crude odd ratio; AOR: Adjusted odd ratio; CI: 95% Confidence interval

DDI (min)	Foetal outcome					NICU admission				
	Dead	Alive	COR (CI)	AOR (CI)	p-value	No	Yes	COR (CI)	AOR (CI)	p-value
75										
<75	4	41	3.22 (1.01-10.25)	0.82 (0.17-3.79)	0.80	27	18	0.90 (0.48-1.69)	2.08 (0.77-5.56)	0.14
>75	14	463				297	180			
90										
<90	4	75	1.63 (0.52-5.12)	0.82 (0.21-3.24)	0.78	48	31	0.93 (0.57-1.53)	1.21 (0.59-2.48)	0.59
>90	14	427				276	167			
240										
<240	15	389	1.48 (0.42-5.19)	1.76 (0.42-7.38)	0.43	249	155	0.92 (0.60-1.40)	0.78 (0.42-1.43)	0.44
>240	3	115				75	43			

[Table/Fig-7]: Association between perinatal outcome and DDI.
Logistic regression; COR: Crude odd ratio; AOR: Adjusted odd ratio; CI: 95% Confidence interval

Variable	<75 min	>75-90 min	>90-240 min	>240 min
Type of still birth				
Fresh still birth	4	0	11	3
Macerated still birth	0	0	0	0
Indication for EMCS in case of still birth				
Abruptio placentae	0	0	2	0
CPD/Obstructed labour	3	0	5	3
Cord prolapse	1	0	0	0
Foetal distress	0	0	4	0
Total	4	0	11	3

[Table/Fig-8]: Perinatal deaths and indications for Emergency caesarean section.
CPD: Cephalopelvic disproportion

[7]. These findings compared to those of the present study suggest that some progress is being made in shortening DDI for emergency operative delivery in Nigeria. However, safe DDI is determined by each facility according to available resources. Resource constraint has made the recommended 30 minutes DDI difficult to implement in low resource setting.

The mean decision delivery interval of 189 minutes from this study is higher than the recommended 30 minutes [18]. The mean DDI is similar to the results obtained from other centres [5,15,19] where mean DDI of 200, 252 and 204 minutes, respectively were reported. It was higher than mean DDI of 39.5 minutes, 52.4 minutes and 42.5 minutes reported by other researcher from other studies [20-22]. The difference in the results obtained from centres in Nigeria and high income countries is an indication of the difference in advanced emergency service delivery and quality of health care services in western countries, hence emphasising the need for health system strengthening in Nigeria.

The practicability and implication on poor neonatal outcome was questioned because there was no strong evidence to support a 30 minute DDI in all cases. There was no correlation between DDI exceeding 75 minutes and adverse perinatal neonates.

The major causes of delays in this study were delay in procuring blood (26.1%), sorting out laboratory investigations (15.7%) and getting informed consent (12.8%). These are attributes of a weak health system and poor health seeking behaviour of the participants.

About 55% of the participants were unbooked and clinicians are often unsure of their baseline blood parameters. Owonikoko KM et al., recommended that it is safer in resource poor settings to ensure that blood is made available before commencing surgery especially for patients who are at risk of bleeding, as cross-matching of blood and securing rare blood group types may take time and increase DDI and the risk the mother and baby are likely to face from this delays [11]. Occasionally, laboratory staff may not understand the dire emergency in some clinical scenario and the need to urgently group and cross-match blood and blood products, sometimes resulting in delays which prolongs DDI. In Benin the main cause of delay was anaesthetic delay and busy theatre suits [8]. Owonikoko KM et al., observed that the major cause of delay in their study was due to lack of funds and non provision of surgical materials but also noted non-availability of blood and blood products contributed to the delays reported [11]. They also reported that patients' relatives usually pay surgical fees and also buy materials before the operation could be performed, making out of pocket financing a contributor to the delay. Studies have shown that, out of pocket financing of health care is associated with poor maternal and perinatal outcomes [23]. Onah HE et al., in Enugu, Nigeria, identified delay in assembly of personnel for surgery and non-readiness of the operating theatre which may be attributed to dearth of appropriate staff in their centre at that time [7].

Antenatal attendance was also a factor, as unbooked women were almost twice more likely to be delivered beyond 75 minutes. Unbooked status is an identified risk factor for increased maternal and perinatal morbidity and mortality in obstetrics. Furthermore, they often present to the hospital unprepared, with no money to purchase consumables and pay for investigations in a health system without universal health insurance. They are also unwilling to donate or procure blood, this constitute a major contributors to delay in decision to surgical delivery.

The present study shows that babies delivered beyond 75 minutes of decision to deliver have lower odd of having good APGAR scores of 7-10 at the first and fifth minutes. This was not found to be statistically significant. Similarly, the chances of admission into NICU increase beyond 75 minutes of DDI. This was also not statistically significant. Although not statistically significant, the overall perinatal outcome of the babies does not appear to worsen over time suggesting that other factors may contribute to the survival of the babies. Hirani BA et al., showed that babies born after 75 minutes have higher odd of having APGAR score of less than 7 in the first and fifth minutes though this was not found to be statistically significant [20]. The implication is that the duration of DDI <75 minutes did not confer better or improved perinatal outcome. This is similar to the finding in Ogbomosho, Southwest, Nigeria, were 5 minutes APGAR scores, admission to NICU and perinatal mortality were not related to DDI [10]. A similar study in Uganda reported that DDI did not affect maternal and perinatal outcomes [15]. However, caution must be applied in patient care, despite the lack of correlation between DDI and poor perinatal outcome, as unnecessarily prolonged DDI may be unjustified and may results in morbidity and mortality.

Limitation(s)

The medical records were intact and complete, however, due to the retrospective nature of the study; it was not possible to evaluate on individual basis some of the causes of delay specific to staff challenges and anaesthetic difficulties. Prospective studies should be done to identify specific causes of the delay and study in details the DDI in relation to different clinical scenario.

CONCLUSION(S)

There was no association between DDI >75 minutes and poor perinatal outcome. Efforts should be made to strengthen the health system and improve the quality of care in order to keep DDI within this time limit for improved perinatal and maternal health and indices.

REFERENCES

[1] Ugwu EOV, Obioha KCE, Okezie OA, Ugwu AO. A Five-year Survey of Caesarean Delivery at a Nigeria Tertiary Hospital. Ann Med Health Sci Res. 2011;1(1):77-83.
[2] Onoh RC, Eze JN, Ezeonu PO, Lawani LO, Iyoke CA, Nkwo PO. A 10-year appraisal of cesarean delivery and the associated fetal and maternal outcomes at a teaching hospital in southeast Nigeria. IJWH. 2015;7:531-38.
[3] Rashid N, Nalliah S. Understanding the decision-delivery interval in Caesarean births. JSME. 2007;1(2):61-68.
[4] Lagrew DC, Bush MC, McKeown AM, Lagrew NG. Emergent (Crash) Caesarean delivery: Indications & outcomes. Am J Obstet Gynecol. 2006;194(6):1638-43.
[5] Spencer MK, Maclennan AH. How long does it take to deliver a baby by emergency Caesarean section? Austratian & New Zealand J Obstet Gynaecol. 2001;41:07-11.
[6] ACOG Committee on Ethics. ACOG committee opinion. Surgery and patient choice: the ethics of decision making. Number 289, November 2003. Int J Gynaecol Obstet. 2004;84(2):188-93.
[7] Onah HE, Ibeziako N, Umezurike AC, Effetie ER, Ogbuokiri CM. Decision – delivery interval and perinatal outcome in emergency Caesarean sections. J Obstet Gynaecol. 2005;25(4):342-46.
[8] Chukwudi OE, Okonkwo CA. Decision delivering interval and perinatal outcome of emergency caesarean sections at a tertiary institution. Pak J Med Sci. 2014;30(5):946-50.
[9] Pearson GA, MacKenzie IZ. Factors that influence the incision-delivery interval at caesarean section and the impact on the neonate: A prospective cohort study. Eur J Obstet Gynecol Reprod Biol. 2013:169(2):197-201.
[10] Radhakrishnan G, Yadav G, Vaid NB, Ali H. Factors affecting "decision to delivery interval" in emergency caesarean sections in a tertiary care hospital: A cross sectional observational study. Int J Reprod Contracept Obstet Gynecol. 2013;2(4):651-56.
[11] Owonikoko KM, Olabinjo AO, Bello-Ajao HT, Adeniran MA, Ajibola TA. Determinants of Decision to Delivery Interval (DDI) in Emergency Caesarean Sections in Ladoke Akintola University Of Technology Teaching Hospital Ogbomosho, Nigeria. Ann Pregnancy Birth. 2018;1(1):1001.
[12] Maternal and Child Wealth Research consortium. Confidential Enquiring into stillbirths and Deaths in infancy. 7th Annual Report. 2000:41-51.
[13] Livermore LJ, Cothrane RM. Decision to delivery interval: A retrospective study of 1000 emergency Caesarean sections. Journals of Obstetrics and Gynaecology. 2006;26(4):307-10.
[14] ACOG Guidelines revamped as resource manual for women's health care, 2007.
[15] Helmy WH, Jolaoso AS, Ifaturoti OO, Afify SA, Jones MH. The decision-to-delivery interval for emergency caesarean section: Is 30 minutes a realistic target? BJOG: An International Journal of Obstetrics & Gynaecology. 2002;109(5):505-08.
[16] Guidelines for perinatal care. 5th ed. Elk Grove 111: American Academy of Paediatrics & American College of Obstetricians and Gynaecologists; 2002:23-27.
[17] Nakintu E, Murokora D. Emergency caesarean sections: Decision to delivery interval and obstetric outcomes in Nsambya Hospital, Uganda-A cross sectional study. J Gynecol. 2016;1(4):000122.
[18] Hirani BA, Mchome BL, Mazuguni NS, Mahande MJ. The decision delivery interval in emergency caesarean section and its associated maternal and fetal outcomes at a referral hospital in northern Tanzania: A cross sectional study. BMC Pregnancy and Childbirth. 2017;17:411.
[19] Kolas T, Hofos D, Olan P. Predictions for the decision to delivering interval for emergency caesarean section in Norway. Acta Obstetrics and Gynaecologica. 2006;85:561-66.
[20] Sayegh I, Dupuis O, Clement HJ, Rudigoz RC. Evaluating the decision to delivering interval in emergency caesarean sections. European Journal of Obstetrics and Gynaecology and Reproductive Biology. 2004;116(1):28-33.
[21] Adewunmi AA, Rabiu KA, Tayo TA, Ottun TA, Kehinde OA, Akinlusi FM, et al. Decision-delivery interval and perinatal outcome in emergency Caesarean section: A University Teaching Hospital experience. West Afr J Med. 201;33(4):252-57.
[22] Singh R, Deo S, Pradeep Y. The decision to delivery interval in emergency caesarean sections and perinatal outcome: Evidence from 204 deliveries in a developing country. Trop Doct. 2012;42(2):67-69.
[23] Lawani LO, Iyoke CA, Onoh RC, Nkwo PO, Ibrahim IA, Ekwedigwe KC, et al. Obstetric benefits of health insurance: A comparative analysis of obstetric indices and outcome of enrollees and non-enrollees in southeast Nigeria. J Obstet Gynaecol. 2016;36(7):946-49.

PARTICULARS OF CONTRIBUTORS:

1. Senior Registrar, Department of Obstetrics and Gynaecology, Alex Ekwueme Federal Teaching Hospital, Abakaliki Ebonyi, Nigeria.
2. Consultant, Department of Obstetrics and Gynaecology, Alex Ekwueme Federal Teaching Hospital, Abakaliki Ebonyi, Nigeria.
3. Consultant, Department of Paediatrics, Alex Ekwueme Federal Teaching Hospital, Abakaliki Ebonyi, Nigeria.
4. Consultant, Department of Obstetrics and Gynaecology, Alex Ekwueme Federal Teaching Hospital, Abakaliki Ebonyi, Nigeria.
5. Consultant, Department of Obstetrics and Gynaecology, Alex Ekwueme Federal Teaching Hospital, Abakaliki Ebonyi, Nigeria.
6. Consultant, Department of Obstetrics and Gynaecology, Alex Ekwueme Federal Teaching Hospital, Abakaliki Ebonyi, Nigeria.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
John Okafor Egede,
Consultant, Department of Obstetrics and Gynaecology, Alex Ekwueme Federal Teaching Hospital, Abakaliki, Ebonyi State, Nigeria.
E-mail: egedejohno@yahoo.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: May 19, 2020
- Manual Googling: Nov 19, 2020
- iThenticate Software: Jan 27, 2021 (14%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? NA
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **May 19, 2020**
Date of Peer Review: **Jul 02, 2020**
Date of Acceptance: **Nov 20, 2020**
Date of Publishing: **Mar 01, 2021**