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Magnitude of Caesarean Section Delivery and its Associated Factors among Immediate Postnatal Women in Public Hospitals of Addis Ababa, 2022

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Abstract

Background: Caesarean section is the commonest obstetric operative procedure worldwide. Including Ethiopia, that can improve infant and maternal outcomes.

Objective: The objective of this study is to compute the magnitude of cesarean section delivery rate and its associated factors among immediate postnatal women in public hospitals of Addis Ababa, Ethiopia 2022.

Methods: An institution-based cross-sectional study design was conducted. A total of 550 study participants were chosen using multi-stage sampling. A self-administered structured questionnaire was used for data collection; the collected data was cleared and entered into Epi Data version 3.1. Then it was exported to SPSS version 20 for analysis. Then, the result will be presented by table frequency, percentage, and charts. By using binary logistic regression, bivariate analysis and multivariate analysis were computed to see the association between each independent variable and the outcome variable. Adjusted odds ratios with their 95% confidence intervals and a p-value of less than 0.05 will be used to declare a result as statistically significant.

Results: According to these results (n=550), the prevalence of cesarean sections was 45.8%, with a 95%CI of 42%–50.2%). Previous caesarean section (AOR=15.32, 95% CI: (7.07-33.17)), eclampsia/pre-eclampsia (AOR 10.69, 95% CI: (4.99-22.87) Fetal distress CS (AOR=6.28, 95% CI: (2.98-13.24), APH (AOR=3.13, 95% CI: (1.33-9.65), and mal presentation (AOR=2.96, 95% CI: 14.2-6.18) were all significantly associated with caesarean section birth.

Conclusion: In this study the rate of Caesarean delivery is unacceptably high Previous Cesarean section deliveries and Pre-eclampsia /eclampsia are the most significant factors for cesarean delivery. CS utilizations higher than WHO recommendation was not associated with a reduction in maternal and newborn mortality rates, Empowering and educating women, increasing co-services targeting mothers' awareness might be very vital to deal with current problem.

Keywords: cesarean section; public hospitals; addis ababa

Introduction

Caesarean section is a comprehensive obstetric life-saving procedure of women and newborn performed during pregnancy and childbirth-related complications [1]. Appropriate and timely use of CS can reduce maternal and perinatal morbidity and mortality. However, inappropriate use of caesarean section increased the risk of short-term and long-term maternal complications that can negatively affect infant health, women health, and future pregnancies. The World Health Organization (WHO) has recommended a maximum CS rate of 10-15% rates have been significantly debated during the last years due to rising figures, significant variations, and the general focus on quality of care and patient safety. Despite the fact that CS rates above 15 % seem to do more harm than good [2]. Currently, caesarean section is rising at an alarming rate, often for non-medical indications, has become a major public health concern globally [3].

The practice of caesarean section in developing countries is different from what pertains in the developed world. Many problems seen in developing areas no longer exist in developed ones [4]. An increase in the primary CS delivery with no specified indication was faster than in the overall population and appears to be the result of changes in obstetrics practice rather than changes in the medical risk profile or increases in maternal request. The risk of women dying after caesarean sections in developing countries was a hundred times higher than in developed countries. This has been a source of major

concern to health care providers in many developed and developing countries [5]. The concern stems from the fact that caesarean section is significantly associated with higher risk of maternal morbidity and mortality compared to The burden was higher in Sub-Saharan Africa indicated that 1 out of 100 women died after CS, 82.5 stillbirths, and 100.4 perinatal deaths per 1000 caesarean sections have occurred [6]. In Ethiopia the most frequently cited factors of performing caesarean section were Obstructed Labor, cephalic pelvic disproportion ,Mal presentation, Previous Cesarean section, Fetal distress, Antepartum hemorrhage ,Multiple gestation ,Pre- eclampsia / eclampsia ,fetal microsomal were reported indications of performing caesarean section [7].

Materials and Methods

Study Area and period

The study was carried out in Addis Ababa, the capital city of Ethiopia, which has a total size of 527 km2 and is situated in the country's central region. Estimated population density for this settlement is 5,535.8 persons per square kilometer. According to 2007 CSA, Addis Ababa is expected to have a total population of 5,227,794 million by the year 2022.The city has 121woredas and 11 sub cities. The Addis Ababa City Administration Health Bureau owns 6 hospitals, the Federal Ministry of Health owns 4, Addis Ababa University owns 1, a non-governmental organization owns 3, and the Defense Force and Police hold 3, and 34 private owners own their facilities. Ten of them are hospitals that provide MCH services. There are over 700 private clinics and 98 health canters together. 75 of these clinics are higher ones. There are 10 government hospitals in Addis Ababa that perform caesarean sections and report to the Addis Ababa City Administration Health Bureau, according to DHIS report data of the AA health bureau. From July 5 to August 29, 2022, this study will be conducted among moms who gave birth at the three public hospitals that have been chosen, namely Tirunesh Beijing Hospital, Yekatit 12 Medical College General Hospital, and Ras Desta Damtew Memorial General Hospital.

Study design

Institution based cross sectional study was conducted

Source population

All immediate postnatal women in public hospital of Addis Ababa, Ethiopia

Study population

All immediate postnatal women in selected public hospital of Addis Ababa, Ethiopia

Study units

Mothers or cards

Inclusion criteria:

All immediate postnatal women and who gave informed consent will be included in the study
All charts of the women who gave birth after the fetus are viable.

Exclusion criteria:

Mothers, who was critically ill, develop a childbirth complication, and unable to respond during data collection period will be excluded.
Incomplete charts.

Sample Size Determination

To assess Magnitude of cesarean section delivery rate among immediate postnatal women in selected public hospitals of Addis Ababa; the required sample size is determined by using a single population proportion sample determination formula for objective one and double population proportion sample determination is used for objective two by considering the following assumptions. Proportion of among women who gave birth in Southwest Ethiopia with cesarean section 32.5 [3].
The formula for calculating the sample size is n =D ($z\alpha/2^2$. p (1-p))/d^2
Where, Level of significance = 95%, Margin of error = 5%, non-response rate = 5%, D is the design effect = 1.5, P = 32.5 %, the proportion of mothers who gave birth in South west Ethiopia with cesarean section, q = (1-p), n- Sample size, Z- Standard normal distribution curve value for 95% CI Which is 1.96, d- Tolerable margin of error = 5% (0.05), n = 1.5(1.96)2 × 0.32.5 × (1 − 0.32.5)/ (0.05)2=505
Hence, the calculated sample size was 550. Adding a 10% Nonresponse rate gave the required minimum sample size (n) = 550 As per the formula above,

Sampling Technique and Procedure

The study was conducted in three randomly selected public hospitals of Addis Ababa, Ethiopia, from March 2022–April 2022. Total sample sizes of 550 clients who had birthing services provided was selected from three health institutions. The numbers of mother operated surveyed from each health institution were allocated proportionally based on the expected number of deliveries in the study period,

which was estimated using the number of last one month in each health institution.

Data collection procedure

The data was collected from immediate postnatal women by using a structured and pretested self-administered questionnaire and by reviewing client MRN. The questionnaire was adapted through the review of different kinds of literature and previous similar studies. The questionnaire was developed in English and then translated into Amharic and back to English. A review was conducted for consistency of the translation of the language. The tool consists of two sections: socio-demographic characteristics and obstetric characteristics. One midwife, two nurses, and one MPH health professional were recruited and took a training on the objective of the study and techniques of data collection for one day, participating in the data collection and supervision respectively.

Operational definitions

Caesarea section: Is a comprehensive obstetric surgical incision in a women's abdomen and uterus for delivery of the fetus, membrane, and placenta after viability of the fetus [3].

Incompletes chart: is the patient card that has not contained all components filled according to the chart needed [21].

Previous cesarean section: It is widely assumed that having had one cesarean section makes it impossible to have a vaginal delivery in subsequent pregnancies [22].

Data entry and analysis

The collected data was cleared and entered into Epi Info version 7.0, then exported to SPSS version 20 for analysis. The outcome was then displayed using a table, narrative statements, and charts. Binary logistic regression was used to run bivariate and multivariate analyses to determine the relationship between each independent variable and the result variable. After verifying the binary logistic regression's presumptions, values from the bivariate analysis that fall below 0.25 will be looked at as potential candidates for multivariate logistic regression. Utilizing VIF, a multi-collinearity test was performed. Since all included variables had VIF values greater than 10, the results of the multi- collinearity test revealed that there is no indication of collinearity among the independent variables. In order to assess the model's fitness, Hosmer-Lemeshow goodness tests were performed (65.4). For a result to be deemed statistically significant, adjusted odds ratios with their 95% confidence intervals and a p-value of less than 0.05 were employed.

Results

Socio-demographic characteristics

This study included the participation of 550 immediate postnatal mothers. Participants' ages ranged from 16 to 43, with a mean of 29. The majority of participants, 464 (84%), were between the ages of 19 and 34, while 513 (93%) of the women were married.163 participants in the study, or 40%, were housewives. Regarding the educational level, 421 people (76%) had at least a secondary education (Table 2).

Table 1: Socio-Demographic Characteristics of Among Immediate Postnatal Women in Public Hospitals of Addis Ababa, 2022.

Variable	Category	Mode of delivery	
		VD (%)	CS (%)
Age	<19	13(2)	5(1)
	20-34	249(45)	215(39)
	.≥35	36(7)	32(6)
Marital Status	Single	10(2)	4(1)
	Married	276(50)	237(43)
	divorced/widowed	12(2)	11(2)
Educational status	Illiterate	12(2)	7(1)
	Primary (1-8)	66(12)	44(8)
	Secondary (9-12)	166(30)	97(18)
	College and above	54(10)	104(19)
Occupation	Housewife	90(16)	91(17)
	Merchant	38(7)	40(7)
	Governmental/NGO employee	159(29)	111(20)
	Daily Laborer	11(2)	10(2)
Monthly income	<1000 birr	64(12)	59(11)
	1000-4000birr	46(8)	39(7)
	4001-7000 birr	135(55)	108(17)
	>7000 birr	53(10)	46(8)

Table 2: Medical and obstetric related factors of among immediate postnatal women in public hospitals of Addis Ababa, 2022.

Variable	Category	Mode of delivery	
		VD (%)	CS (%)
Respondent 's Gravidity	Primigravida	95(17)	58(11)
	Multigravida	172(31)	164(30)
	Grand multigravida	31(6)	30(5)
Respondent 's Parity	Primiparaous	71(13)	67(12)
	Multiparaous	192(35)	150(28)
	Grand multiparous	36(7)	34(5)
Number of ANC visits	1	67(12)	39(7)
	2	121(22)	100(18)
	3	27(5)	20(4)
	>4	83(15)	70(13)
	Unknown status	14(3)	23(4)
Gestational age	Term (37–42 week)	222(40)	265(1)
	Preterm (< 37 week)	16(3)	13(2)
	Post term (> 42 week)	14(3)	20(4)
Newborn birth weight	Normal birth (2500-4000gm)	217(39)	267(49)
	Low birth (< 2500gm)	16(3)	13(2)
	Macrosomal(>4000gm)	19(3)	18(31)
Types of CS	Emergency	127(50.3)	-
	Elective	125(49.7)	-
Obstructed Labor	Yes	42(8)	20(4)
	No	210(38)	278(51)
CPD	Yes	7(1)	5(1)
	No	245(44)	293(54)
Multiple gestation	Yes	8(1.5)	3(0.5)
	No	244(45)	295(53)

Medical and obstetric related characteristics

According to this study, 336 (61%) and 352 (63%) of moms were Multigravida. 516 people (93%) had at least one ANC follow-up throughout their current pregnancy. 487 (88%) of the mothers had gestations that were full-term, whereas 34 (6%) were post-term and 29 (5%) were preterm. 484 (88%) of the moms had babies with a normal birth weight (2500-400gm). Only 28 (5%) and 12 (2%), respectively, of the moms

The magnitude of caesarean section

The magnitude of the caesarean section of Addis Ababa city public hospitals was found at 45.8%, 95%CI (42%-50.2%) (n=550) Elective caesarean sections were performed on 22.7% and 24.1% of mothers, respectively, while vaginal deliveries were performed on 54.2%.

Factors associated with caesarean section deliveries

In the bivariate analysis, any possible confounders were not controlled, and assessing the independent effects of the covariates was difficult. So, the entry method of the logistic regression technique was used to assess the independent effect of explanatory variables on CS. The result of the multi-collinearity test showed that there was no evidence of collinearity among the independent variables since all included variables had VIF< 10. A Hosmer-Lemeshow goodness test was carried out to check model fitness (65.4). After adjusting for confounders, the multivariate binary logistic regression model analysis revealed significant links between caesarean delivery and mal presentation, past cesarean section, fetal distress, antepartum hemorrhage, and pre-eclampsia/eclampsia (Table 3).

Table 3: Bivariate and multivariate logistic regression analysis to identify determinate factors of caesarean section delivery among immediate postnatal women in public hospitals of Addis Ababa, 2022.

Variable	category	Mode of delivery				P. value
		VD (%)	CS (%)	COR (95% CI)	AOR (95% CI)	
Educational status	Illiterate	12(2)	7(1)	1	1	0.16
	Primary (1-8)	66(12)	44(8)	0.67(0.14- 2.09)	0.67(0.14- 2.09)	
	Secondary (9-12)	166(30)	97(18)	0.55(0.04- 0.62)	0.55(0.04- 0.62)	
	College and above	54(10)	104(19)	0.16(0.48- 1.30)	0.16(0.48- 1.30)	
Respondent's Gravidity	Primi gravida	95(17)	58(11)	1	1	0.6
	Multigravida	172(31)	164(30)	0.79(0.48- 1.30)	0.79(0.48- 1.30)	
	Grand multigravida	31(6)	30(5)	0.73(0.34-1.54)	0.73(0.34-1.54)	
Mal presentation	1.yes	6(1)	25(5)	8.82(3.17- 24.52)	8.82(3.17- 24.52)	0
	2.No	292(53)	227(41)	1	1	
Previous CS	1.yes	9(2)	69(12)	15.32(7.07-33.17)	15.32(7.07-33.17)	0
	2.No	289(53)	183(33)	1	1	
APH	1.yes	8(1)	20(4)	3.13(1.33- 9.65)	3.13(1.33- 9.65)	0.01
	2.No	290(153)	232(42)	1	1	
Fetal distress	1.yes	18(3)	53(10)	6.28(2.98-13.24)	6.28(2.98-13.24)	0
	2.No	280(51)	199(36)	1	1	
Eclamp/Pre-ecl	1.yes 2.No	10(2) 288(52)	59(11)19 3(35)	10.69(4.99-22.87)	10.69(4.99-22.87)	

Eclampsia/pre-eclampsia was substantially linked with birth through caesarean section (AOR 10.69, 95%; CI (4.99-22.87)). Previous history of caesarean section was significantly associated with birth through caesarean section (AOR=15.32, 95%, CI (7.07-33.17). Ma presentations were strongly correlated with caesarean delivery (AOR = 2.96, 95% CI (1.42-6.18)).

Discussion

The magnitude of women undergoing CS delivery in this study was 45.8%, 95%CI; (42%-50.2%) (n=550) indicated that approximately three times the WHO recommendation of 10-15%; this suggests an increase in medically unnecessary and potentially dangerous procedures [14].

The result was also greater than studies done in Shire Tigray area, 20.2% [26];; Felegehiwot referral hospital, 25.4 %[19]; Harare, Eastern part of Ethiopia, 34 % [25]; and Mizan-Aman general hospital, 21%(3) [26]. Public hospitals in the North Wollo Zone, 30.9% [8]; Hawassa University referral hospital, 32.8% [24] and Nepal, 22.6% India '25, Vietnam's 26.2% [27] and South Africa's 42.4% [3]. But this finding was slightly lower than the study was done in was South Sudan 58.1%, Brazil 55.5% ; Egypt 55.5% in 2014; Turkey, 53.1%; and Venezuel 52.4% [3]. Study period differences, improved accessibility to good basic emergency obstetric and neonatal care, socioeconomic differences and cultural differences might all be contributing factors to the gap.

Previous caesarean section history was significantly associated with caesarean section delivery (AOR = 15.32, 95% CI (7.07-33.17)). This conclusion was reinforced by research carried out in the public hospitals of the North Wollo Zone, the Amhara area [9.11], the Northeast of Ethiopia [8]. and the public hospitals of Addis Abeba (10.5) [22]. The probable explanation might be that women who have had previous caesarean sections are more likely to experience antepartum hemorrhage, have a poor obstetric history or have medical or surgical issues that would make it difficult or impossible to try vaginal delivery following a caesarean section.

Caesarean section deliveries were strongly associated with mal presentation (AOR=2.96, (95% CI (1.42-6.18)). The result was consistent with earlier studies carried out at North Wollo Zone public hospitals, Amhara area (2.56) [8], and Felegehiwot referral hospital, Amhara region (9.8) [19]. Mal presentation may result in prolonged labor, fetal distress, and cephalopelvic disproportion, which may impede the development of normal labor. As a result, doctors may Plan to perform a caesarean section to improve the chances of both the mother and the newborn surviving.

Antepartum hemorrhage was also substantially associated with caesarean section (AOR = 3.13, 95%CI :(1.33-9.65)). Another research done in northern Ethiopia supported the conclusion (8.65) [8]. The cause may be related to APH-related issues in mothers, such as abnormal presentation, early labor, postpartum hemorrhage, shock, and retained placenta.

Fetal distress and pre-eclampsia/eclampsia were likewise substantially associated to caesarean section [19]. This finding is congruent with another study that was carried out in another region of Ethiopia [17].

Strengths of the study

Referral cases out of study catchment that might overestimate the true magnitude were excluded.

Utilization of both primary and secondary source of data (Mothers and mothers' cards)

To obtain unregistered and limited information of mother's card regarding basic socio- demographic and others obstetric characteristics and to proper exploring of a factors.

Limitations of the study

The study did not address the views and practices of health care providers related to cesarean section delivery

Private health facilities were not included, which might undermine generalizing the result to the general population.

Conclusion

In this study the magnitude of women undergoing CS delivery is almost three fold of the WHO recommendation , Suggest increasing numbers of medically unnecessary, potentially harmful procedures [14].It is found to be affected by Mal presentation, Previous Cesarean section ,Fetal distress, Antepartum hemorrhage and Pre-eclampsia /eclampsia were significantly associated with caesarean section delivery. Empowering and educating women, increasing co-services targeting mothers' awareness might be very vital to deal with current problem.

Recommendations

According to this finding, to address the sustained rise in the use of caesarean section, the following recommendations are advised.

Federal ministry of health and Addis Ababa health bureau:

developing evidence-based clinical and programmatic guidance and providing technical support for hospitals regarding prevention of unnecessary C/S, in collaboration with stake holders

Hospitals, Health offices and stakeholder

Empowering and educating women, increasing co-services targeting mothers' awareness might be very vital to deal with current problem

Do educational interventions targeted at health-care professionals that aim to improve adherence to evidence-based clinical practice

Use of clinical guidelines and second opinion Use of evidence-based clinical practice guidelines combined with mandatory second opinion for caesarean section indication

Researchers

conducting further study including both Governmental and Private health facilities and focusing on views and practices of health care providers related to cesarean section delivery.

Declarations

Ethical approval and consent to participate: the ethical clearance was obtained from Institutional Review Board of KEA-MED University college and official letters was submitted to each respective health facility. After explaining the objectives of the study, informed written consent was obtained from all mothers, and anonymity and confidentiality of the data were kept. Respondents have the right not to participate or withdraw from the study at any stage, and all study methods were performed in accordance with the Declaration of Helsinki.

Consent for publication: Not applicable.

Availability of data and materials: The data used to support the findings of this study are available from the corresponding author upon request.

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Author contributions

C.G; Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Visualization, Writing – original draft.

A.L; Conceptualization, Formal analysis, Methodology, Resources, Software, Visualization, Writing and original draft.

M. Conceptualization, Formal analysis, Methodology, Software, Supervision, Writing, review & editing.

Y. Conceptualization, Formal analysis, Methodology, Software, Supervision, Writing, review & editing.

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