Predictors of Cesarean Section among Women Delivered at Durame General Hospital, Southern Ethiopia

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ABSTRACT

Background: Cesarean section is a lifesaving surgical procedure for both the mother and the fetus when vaginal delivery is impossible. However, avoidable cesarean section leads to increased risks. This study aimed to assess the prevalence and predictors of cesarean section among women delivered at Durame General Hospital, Southern Ethiopia.

Methods: A facility-based cross-sectional study was conducted on 300 women from April 1st to April 30th, 2019. Data were collected using a pretested and structured questionnaire through face to face interview and reviewing of medical records. Data were entered by Epi-data version 3.1 and analysed by SPSS version 23. A bivariate and multivariate logistic regression with their odds ratio was calculated at 95% confidence interval and p-value < 0.05 was considered as statistically significant.

Result: The overall prevalence of cesarean delivery in the study area was 24.7%. Previous cesarean section [AOR=7.3, 95% CI (2.02, 26.65)], post term pregnancy [AOR=3.3, 95% CI (1.26, 8.67)] and mothers age 35 years and above, [AOR=3.21, 95% CI (1.19, 8.67)] were predictors of cesarean section.

Conclusion: The prevalence of cesarean section in the study area was high as compared to WHO recommendation. To keep a standard cesarean section rate due attention should be given for possibility of vaginal delivery by providing cautious assessment to every woman who had previous cesarean delivery and the appropriateness of the indications of cesarean section must be continually monitored.

Keywords: Cesarean Section; Predictors; Southern Ethiopia

Abbreviations: ANC: Antenatal Care; AOR: Adjusted Odds Ratio; APGAR: Appearance, pulse, grimace, activity, respiration; CI: Confidence Interval; COR: Crude Odds Ratio; CI: Confidence interval; CS: Cesarean Section, ETB: Ethiopian birr; USD: United State Dollar; WHO: World Health Organization

INTRODUCTION

Cesarean Section (CS) is defined as the delivery of a fetus, placenta, and membranes through an abdominal and uterine incision. It is used in cases where vaginal delivery either not possible or would cause excessive risks either to the mother or the baby [1,2]. Worldwide CS is one of the commonest types of surgical procedures [3,4].

Cesarean section is one of the signal functions of comprehensive emergency obstetrics care and it is also a marker of availability and utilization of such services which used to treat direct obstetric complications. Currently, CS has become a main concern in agenda setting to reduce maternal morbidity and mortality. Nevertheless, when CS rates are very high, it may also denote discrepancy between evidence and practice [5,6].

Though the appropriate range of CS was arguable, World Health Organization (WHO) recommends that the regional CS rate should not exceed 10 to 15%. Despite of this, the proportion of CS is considerably elevated. Internationally 15% of births were delivered by CS. From this, 21.1%, 14.3% and 2% was took place in most developed, less developed and least developed countries

respectively. Yearly, in United States only more than 1 million CS were performed which accounts 32.3% of deliveries [7,8]. In developing countries like Ethiopia, the rates of CS were also high which ranges between 21.1-34.3% [9-13].

The causes of remarkable increase in CS rates are not clear. However, some of the familiar indications of CS were: cephalopelvic disproportion, previous uterine surgery, prior uterine rupture, failed induction of labor, placenta praevia, placental abruption, fetal distress, cord prolapse, maternal disease like (preeclampsia and diabetes mellitus), cord presentation and prolapse during labor, macrosomia, fetal malpresentation and maternal request [14-16].

The International Federation of Gynaecology and Obstetrics (FIGO) suggest that CS should be only performed for medically indicated reasons to improve the health of mothers and babies. However, the provision of safe and well-timed CS remains as a major challenge in countries with high maternal mortality rate [17-19].

CS is associated with various types of short and long term complications concerning to anesthesia, hemorrhage and injury to the bladder, aspiration pneumonia, cardiac arrest, drug-related complications, post-operative infections and thrombophlebitis are among the well-known forms of short term complications, whereas scar dehiscence and high proportion of repeat CS are the common long term complications. It also causes very massive cost and delayed hospital stay when compared to vaginal delivery [20].

Although limited studies are conducted in Ethiopia regarding to cesarean section but there is still scarcity of evidences on the scope and predictors of cesarean section in study area which is very essential to identify and avert reasons of the dramatic growing of cesarean delivery rate. Therefore, this study aimed to assess the prevalence and predictors of cesarean section among women who delivered at Durame General Hospital, Southern Ethiopia.

MATERIALS AND METHODS

Study design and period

A facility-based cross-sectional study was conducted from April 1st to April 30th, 2019 at Durame General Hospital. The hospital is found at Durame town which is the capital of Kembata zone and it serves as referral hospital for all seven woredas of Kambata Tembaro Zone which has 46638 people. In the town there are three public health centres, one hospital and four private clinics. The town is located 372 kilometres south of Addis Ababa and 139 kilometres far from Hawassa. The hospital has four wards (surgical, obstetrics and gynaecology, pediatrics and medical) it gives service of antenatal care, family planning, outpatient and inpatient.

Study population

Women who delivered at Durame general hospital during the study period were included in the study.

Sample size determination and sampling procedure

The sample size was determined by using single population proportion formula with the following assumptions; 34.3% proportion of cesarean section which is taken from a previous study conducted in Eastern Ethiopia [13], with 95% confidence interval, 5% margin of error and 10% non-response rate. The final sample size was found to be 300. A consecutive sampling technique was used to select the study participants.

Operational definition

Elective cesarean delivery: A type of planned cesarean section that is done before the onset of labor.

Emergency cesarean delivery: A type of cesarean section done after the onset of labor or for immediate threat to the life of the woman or the fetus.

Data collection procedure and tool

Data was collected through face to face interview using a pre-tested and structured questionnaire as well as by reviewing medical records. The questionnaire had four sections; socio-demographic data, obstetric history, an indication of cesarean section and maternal and fetal outcome. The questionnaire was developed in English based on the purpose to be addressed after evaluation of related published articles [10-12]. Trained four diplomas and two bachelors of degree midwives were collected and supervised the data. To ensure the quality of data; training was given for data collectors and supervisors; the questionnaire was pre-tested and its completeness and consistency was checked by the principal investigator and supervisors.

Data processing and analysis

The collected data were cleaned and entered to Epi-data version 3.1 and analysed using Statistical Package for Social Sciences (SPSS) 23 version. Descriptive statistics, frequency and proportions were computed to summarize the data. The dependent variable was cesarean section (No=0; Yes=1). Initially bivariate logistic regression was done to identify candidate variables for multivariable logistic regression. Those variables which have p-value <0.25 at bivariate logistic regression were entered in to multivariable logistic regression. Multivariable logistic regression was done to see independent predictors of the outcome variable and to control possible confounders. Odds ratio (OR) with 95% confidence interval (CI) was computed to identify the strength of association. The p-value <0.05 was considered as statistically significant. The Hosmer-Lemeshow had p-value of 0.75 which illustrates that it is not statistically significant which confirmed the model was a good fit.

RESULTS

Sociodemographic characteristics

The mean age of the mothers were 38.6 (standard deviations ±1.7). Almost half of the mothers 147 (49%) were found between age group of 25-29 years. Majority 290(96.7%) were married, 155 (51.7%) were Kambata, 169(56.3%) were residing in urban, 209(69.4%) were housewives and 220 (73.3%) were followers of protestant. Regards to the educational status of mothers, 127(42.3%) were having no formal education at all and 105(35%) of them had primary education. Regarding to income, half of the mothers 151(50.3%) earned a monthly income of <73.42 USD (Table 1).

Obstetric characteristics of women

Out of 300 study participants, 200(66.7%) of women were multiparous. Two hundred fifty four (84.7%) women had ANC follow up during their last pregnancy. The majority of women 204(68%) had a gestational age between 37 and 42 weeks. There were a total of 300 deliveries, and 74(24.7%) of them were *via* cesarean section. Of the total cesarean section cases, 4(5.4%) were by elective cesarean section while 70(94.6%) were by emergency

cesarean section. The majority of the women 238(79.3%) had duration of labor less than 12 hours (Table 2).

Fetal and maternal outcome

Out of 300 newborns, 255(855%) were born alive. Out of those alive newborns most of them 278(92.7%) has an Apgar score of greater than seven. The majority of newborns 273(91%) weighed between 2500 and 400 grams. Of all mothers only 2(0.6%) of them were dying (Table 3).

Indications of C-section

The three most frequent indications of cesarean section was obstructed labour 22(28.9%), fetal distress 13(17.06%), and pregnancy induced hypertension 8(10.8%) (Table 4).

Table 1: Socio demographic characteristics among women at Durame General Hospitals Southern Ethiopia, April 2019 (n=300).

Variables	Frequency	Percentage
Age group in years		
<20	23	7.7
20-34	256	85.3
≥35	21	7
Religion		
Protestant	220	73.3
Orthodox	55	18.3
Muslim	14	4.7
Catholic	11	3.7
Marital status		
Married	297	99
Single	3	1
Ethnicity		
Kambata	155	51.7
Hadiya	30	10
Halaba	46	8.3
Gurage	24	8
Amhara	22	7.3
Oromo	23	7.7
Residence		
Urban	169	56.3
Rural	131	-
Educational Status		
No formal education	127	42.3
Primary education	105	35
Secondary education	53	17.7
College and above	15	5
Occupation		
Housewife	209	69.4
Private employee	31	10.3
Government employee	14	4.7
Merchant	39	13
Student	7	2.7
Family monthly income in USD		
<73.42	151	50.3
73.42 -146.84	59	19.7
>146.84	90	30
Note: *1ETB=0.03671USD		

Table 2: Obstetric characteristics among women delivered at Durame General Hospital, Southern Ethiopia, April 2019.

Variables	Frequency (N=300)	Percent
Parity		
Primiparous	75	25
Multiparous	200	66.7
Grand multiparous	25	8.3
ANC visit in last pregnancy		
Yes	254	84.7
No	46	15.3
Gestational age at labor in weeks		
Preterm	74	24.7
Term	204	68
Post term	22	7.3
Labor duration in hours		
<12	238	79.3
Dec-24	60	20
≥ 24	2	0.7
Mode of delivery		
Vaginal delivery	226	75.3
Cesarean section	74	24.7
Type cesarean section		
Emergency	70	94.6
Elective	4	5.4
Previous cesarean section		
Yes	12	4
No	288	96

Table 3: Outcome of women and new-born among mothers delivered at Durame General Hospital, Southern Ethiopia, April 2019 (n=300).

Variables	Frequency	Percent
Fetal outcome		
Alive	255	85
Dead	45	15
APGAR Score		
≤ 7	22	7.3
>7	278	92.7
Weight of the baby in gram		
2500-4000	273	91
>4000	27	9
Maternal outcome		
Alive	298	99.3
Dead	2	0.7

Table 4: Indications of cesarean section among women delivered at Durame General Hospital, Southern Ethiopia, April 2019.

Indications	Frequency	Percentage
Obstructed labor	22	29.8
Fetal distress	13	17.6
Pregnancy induced hypertension	8	10.8
Failed induction	7	9.5
Prolonged prom	5	6.8
Antepartum haemorrhage	4	5.4
Multiple pregnancy	4	5.4
Failed instrumental delivery	3	4.1
Post date	2	2.7

Table 5: Predictors of cesarean Section among women delivered at Durame General Hospital, Southern Ethiopia, April 2019.

Variables	Cesarean Section		COR 95%CI	AOR 95%CI
	No	Yes		
Maternal age in year				
<15-19(ref.)	13	10	1	1
20-34	202	54	2.9(0.4,6.91)*	2.7(0.34,6.84)
≥35	10	11	4.1(1.66,10.19)*	3.2(1.19,8.67)**
Residence				
Urban(ref.)	138	31	1	1
Rural	87	44	2.3(1.32,3.83)*	1.7(0.95,2.99)
Gestational age				
Preterm	56	18	1.1(0.59,2.061)	1.05(0.53,2.05)
Term(ref.)	158	46	1	1
Post term	11	11	3.4(1.39,8.43)*	3.3(1.26,8.67)**
Previous cesarean section				
No(ref.)	221	67	1	1
Yes	4	8	6.6(1.92,22.59)*	7.3(2.02, 26.65)**
Parity				
Primiparous	157	43	0.8(0.43,.1.5)	0.9(0.47,1.86)
Multiparous(ref.)	56	19	1	1
Grandmultiparous	12	13	3.2(1.24,8.18)*	2.7(0.96,7.48)

Note: Statistically Significant * ≤ 0.25 and ** <0.05

Predictors of cesarean section

The result of bivariate logistic regression analysis showed that, maternal age of 35 and above, being rural, previous cesarean delivery, parity, and post term pregnancy were predictors of cesarean section. However, on multivariable logistic regression analysis mothers aged 35 and above, previous cesarean section, and post term pregnancy were remained as predictors of cesarean section. Mothers who were aged 35 years and above were 3.2 more likely to deliver by cesarean section as compared with whose age between 15-19 years [AOR=3.2, 95% CI (1.19, 8.67)]. Similarly, mothers who have previous cesarean section were 7.3 times more likely to give birth by cesarean section as compared to those who have no previous cesarean section [AOR=7.3, 95% CI (2.02, 26.65)]. Furthermore, mothers with post term pregnancy were 3.3 times more likely to deliver by cesarean section as compared to those with term pregnancy [AOR = 3.3, 95% CI (1.26, 8.67)] (Table 5).

DISCUSSION

The overall prevalence of cesarean section at Durame general hospital was 24.7%. This proportion is lower than the prevalence reported from a study conducted in eastern Ethiopia were 34.3% [13] and studies done in Italy and Jordan were 36% and 29.1% respectively [21,22]. However, this prevalence is higher as compared with the prevalence of WHO recommendation which states that the upper limit of cesarean section should not to be more than 15% [7] and it is also higher than studies done in Morocco and Nigeria which reported the prevalence of cesarean section 17.8% and 21.4% respectively [23,24]. This discrepancy might be due to offerings of referrals from primary hospitals and the due attention given to maternal health, larger number of delivery cases, and more availability of trained obstetrics care providers.

Maternal age of 35 years and above have significant association with cesarean section. This finding is in line with studies conducted in Ethiopia [21], Jordan [25], and Bangladesh [26]. This could be due to the fact that higher maternal age is correlated with the risk of developing complications like placental abruption, placenta previa, pregnancy induced hypertension, multiple gestation, breech presentation, and fetal macrosomia.

Post term pregnancy is also associated with cesarean section. This finding is supported by studies conducted in Ethiopia [27], and India [28]. The reason could be pregnant women with post term pregnancy are more likely to have fetal macrosomia which is related with greater risk of having a cesarean section.

The finding of this study also showed mothers who have previous caesarean section were more likely to give birth by cesarean section. This finding is consistent with studies that were conducted eastern Ethiopia [13], and India [28]. This could be previous cesarean section raises the chance of various placental abnormalities like placenta previa, placental abruption, and adherent placentation in consequent pregnancies.

This study was limited to health facility in scope and utilized data from a cross-sectional study design. Also the study focused only on mothers but better to include health care providers and health institution delivering service to identify predictors of cesarean section.

CONCLUSION

The prevalence of cesarean section in the study area was 24.7%. This proportion is high as compared to the WHO recommendation. Maternal age of 35 and above, previous cesarean delivery, and post term pregnancy were predictors of cesarean section. To keep a standard cesarean section rate due attention should be given for possibility of vaginal delivery by providing of cautious assessment to every woman who had previous cesarean delivery and the appropriateness of the indications of cesarean section must be continually monitored. Additionally, to obtain reliable inference regarding to the extent and predictors of cesarean section

community based study should be conducted.

AUTHORS' CONTRIBUTIONS

Hassen Mosa Halil participated in conceptualization of the study design, data collection, data analysis, interpretation, and drafted the manuscript. Ritbano Ahmed Abdo conceived, designed, wrote the study, involved in data collection, and interpretation, and revised draft of the paper. Shamill Eanga Helill and Romedan Delil Kedir participated in conceptualization of the study design and data collection. All authors read and approved the final report of the manuscript.

ETHICAL APPROVAL

Ethical approval and clearance was obtained from the Ethical Review Committee of Wachemo University, College of Medicine and Health Science. An official permission letter was secured from the hospital authorities. After explaining the purpose of the study, informed written consent was obtained from each study participant. Study participants were told about their right to refuse or withdraw at any time during the interview. Confidentiality and anonymity of each participant were maintained throughout the study process.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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