Cesarean section and associated factors among women who gave birth at Jimma University Specialized Hospital, Jimma, south west Ethiopia 2016

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ABSTRACT

Background: -Cesarean section is an emergency obstetric care that is designed to reduce maternal and newborn morbidity and mortality. However, there are still complications associated with this procedure. Maternal morbidity associated with Caesarean sections is five to ten times greater than that associated with vaginal delivery.

Objective: The aim of this study is to assess the prevalence of cesarean section and associated factors among women who gave birth at Jimma University Specialized Hospital, South West Ethiopia.

Method: Institution based cross-sectional study design was employed from March 25 to April 08, 2016. The consecutive-sampling technique was used to select 250 subjects. Data was collected by face to face interview and client chart review. The data analyzed using simple and multivariable logistic regression and statistical associations measured using odd ratio and 95% Confidence Interval.

Result: The prevalence of cesarean section was 45.2%. According to this finding, factors significantly associated with cesarean section were malpresentation (Adjusted Odd Ratio: 11.332, 95% Confidence Interval: 2.090, 61.460), fetal distress (Adjusted Odd Ratio: 10.978, 95% Confidence Interval: 2.434, 49.506), obstructed labor (Adjusted Odd Ratio: 13.495, 95% Confidence Interval: 1.929, 94.422). Coming from a distance of >1 hour from the health facility (Adjusted Odd Ratio: 6.018, 95% Confidence Interval: 1.225, 29.561) and being getting an income of 4000Ethiopian Birr and above monthly income (Adjusted Odd Ratio: 19.826, 95% Confidence Interval: 2.898, 135.651)

Conclusions: Prevalence of caesarean sections at Jimma University Specialized Hospital is too higher than World Health Organization recommendations. Policymakers should develop a Guideline to control a cesarean section. Jimma University Specialized Hospital obstetrics and gynecology department should act according to World Health Organization to recommendations to reduce current cesarean section rate.

Keywords: Cesarean sections, associated factors, Jimma University Specialized Hospital

SOMMARIO

Sfondo: il taglio cesareo è un'assistenza ostetrica di emergenza progettata per ridurre la morbilità e la mortalità materna e neonatale. Tuttavia, ci sono ancora complicazioni associate a questa procedura. La morbilità materna associata a taglio cesareo è da cinque a dieci volte maggiore di quella associata al parto vaginale.

Obiettivo: lo scopo di questo studio è valutare la prevalenza del taglio cesareo e i fattori associati tra le donne che hanno partorito all'ospedale specializzato dell'Università Jimma, nel sud-ovest dell'Etiopia.

Metodo: dal 25 marzo all'8 aprile 2016 è stato utilizzato il disegno dello studio trasversale basato sulle istituzioni. La tecnica di campionamento consecutivo è stata utilizzata per selezionare 250 soggetti. I dati sono stati raccolti mediante interviste faccia a faccia e revisione della carta dei clienti. I dati analizzati utilizzando la regressione logistica semplice e multivariabile e le associazioni statistiche misurate utilizzando il rapporto dispari e l'intervallo di confidenza al 95%.

Risultato: la prevalenza del taglio cesareo è stata del 45,2%. Secondo questo risultato, i fattori significativamente associati al taglio cesareo erano malpresentazione (rapporto dispari aggiustato: 11,332, intervallo di confidenza al 95%: 2,090, 61,460), distress fetale (rapporto dispari aggiustato: 10,978, intervallo di confidenza al 95%: 2,434, 49,506), ostruito travaglio (rapporto dispari modificato: 13.495, intervallo di confidenza al 95%: 1.929, 94.422). Provenendo da una distanza> 1 ora dalla struttura sanitaria (Rapporto dispari aggiustato: 6,018, intervallo di confidenza al 95%: 1,225, 29,561) e ottenendo un reddito di 4000 Birr etiope e sopra il reddito mensile (rapporto dispari aggiustato: 19,826, confidenza al 95% Intervallo: 2.898, 135.651)

Conclusioni: la prevalenza dei tagli cesarei all'ospedale specializzato dell'Università Jimma è troppo elevata rispetto alle raccomandazioni dell'Organizzazione mondiale della sanità. I responsabili politici dovrebbero sviluppare una linea guida per controllare un taglio cesareo. Il dipartimento di ostetricia e ginecologia dell'ospedale specializzato Jimma University dovrebbe agire secondo l'Organizzazione mondiale della sanità in base alle raccomandazioni per ridurre l'attuale tasso di taglio cesareo.

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BACKGROUND

The rates of delivery by cesarean sections show a wide variation globally ranging from 0.1 to 40%. The World Health Organization (WHO) has stated that there is no justification for any region to have cesarean sections rates higher than 10 to 15 percent. However, the rate is frequently increasing in many developed and some developing countries[1]. According to 2008 WHO statements, approximately 18.5 million cesarean sections are conducted yearly worldwide 6.2 million Caesarean sections (CS) in excess is yearly performed[2].

Caesarean sections rates have risen globally in the past decade, causing concern among clinicians, due to decreased training for clinicians in instrumental vaginal and vaginal breech births, medico-legal issues, the increased use of electronic fetal heart rate monitoring in labor and maternal request. Repeat CS after a previous CS birth is a significant contributor to overall increased CS rates. The challenge then is to reduce those CS that are unnecessary, while retaining those that are needed to save lives and decrease morbidity[3].

Compared to vaginal delivery, C-sections pose the greater risk of cardiac arrest, hysterectomy, infection, fever, pneumonia, blood vessel clotting, high cost, the risk for subsequent pregnancy, Dehiscence, Stress response, less satisfactory childbirth experience, bonding difficulties and unsuccessful breastfeeding, bleeding as well as risks for the fetal death. While this increase has been attributed to known reason and risk factors of cesarean sections in developed countries, it is less clear in developing countries [4-5-6]

The most effective approach to reducing overall morbidities related to cesarean delivery is to avoid the first cesarean delivery; because women with initial cesarean delivery more than 90% will have a subsequent repeat cesarean delivery[7]. Management approaches that may reduce cesarean deliveries in the second stage of labor are the active management of the second stage, operative vaginal delivery, the trial of labor and manual rotation of the fetal occiput for malposition[8].

In Ethiopia, large proportion of the population lacks access to essential obstetric care including CS. Ethiopian Demographic and Health Survey (EDHS) 2014 reported exceptionally low national CS rates of 2%. Furthermore, WHO estimated that in 2008 the total number of additional CS needed in Ethiopia in order to reach the minimum 5% rate was 278,370 and the figure was the third highest in the world. However, the situation in most teaching hospitals in the country is the opposite. The retrospective prevalence study conducted before two years showed a CS rate of 28.1%[9]. Therefore, this hospital-based study was conducted to identify factors associated with cesarean section rate.

METHODS

An institution-based cross-sectional study was conducted at Jimma University Specialized Hospital from March 25 to April 08, 2016. Jimma University Specialized Hospital (JUSH) is one of the oldest public hospitals in the country. The hospital was established in 1938 by Italian invaders for the service of their soldiers. Geographically, it is located in Jimma town 352 km southwest of Addis Ababa. It is a teaching and training center for health workers (Medical Doctors, Nurses, Pharmacy Technicians, Laboratory Technicians &Environmental Health Experts) without infrastructure change or major renovation.

Currently it is the only teaching and referral hospital in the southwestern part of the country, providing services for about15, 000 inpatients, 160,000 outpatient attendants, 11,000 emergency cases and around 6000 deliveries conducted in 2015 coming to the hospital from the catchment area. Currently, JUSH has about 21 units and 503 beds. The maternity ward is one that has around 65 beds &provides delivery service for the community around the area. The ward has around 119 health professional and support staffs, namely: Seven[7] Senior Obstetricians and Gynecologists,6 BSc Nurses, 6 BSc Midwives, 5 Diploma Nurses, 32 Diploma midwives,38 Residents, 16 Cleaners, 6 Porters and 3 Runners.

The study population was comprised of all mothers who came for delivery service at Jimma University Specialized Hospital during the time of data collection.

The consecutive sampling method was used to select study participants and the data was collected by face-to-face interview using structured questionnaires and chart review. The sample size was determined by using a single population proportion formula considering the following assumptions: proportion of cesarean section in Jimma University Specialized Hospital (p = 0.281), 5% level of significance (α = 0.05). The annual delivery report at JUSH during the same study period in 2015 is 848 that is used as a source population for this study, since 848 is (<10,000), correction formula was used and, the final sample size was adjusted for none response rate of 10% and the total sample was 250.

Three Bachelor of Science (BSc) Midwives were data collectors and two Masters of Sciences (MSc) in Nursing were supervisors. Data was analyzed using SPSS version 20.0 software package. Variables with (p-value ≤ 0.25) on bivariate analysis were included in the multivariable logistic regression analysis. The results were presented in the form of tables, figures, and text using frequency and summary statistics such as mean, standard deviation, and percentage. The degree of association between the independent and dependent variables was analyzed using the odds ratio with 95% confidence interval.

RESULTS

A total of 250 women participated in the study with a response rate of 100%. The result showed that majority of respondent 108(43.2%) were between the age group of 25-29 followed by 20-24 years which accounted 74(29.6%). The mean age of the respondent was 26.54 with SD of 5.12. **(Table 1)**.

Regarding Gestational Age (GA) of current pregnancy, 199(79.6%) of them were between 38-42 weeks followed by those less than 37 full weeks and others were post terms (≥43 weeks). Majority 223(89.2%) of the respondents had a history of Antenatal Care (ANC) visit for current pregnancy. Concerning the previous history of pregnancy, 96(38.4%) of the respondent became pregnant for 2 to 3 times, 85(34%) were prim gravida and 69(27.6%) were multigravida. Among those who had previous live birth history, 24(15.68%) had the history of previous caesarean delivery. Of all respondents 43(17.2%) had the history of stillbirth. Only 16(6.4%) had medical complications during current pregnancy. Hypertension 6 (37.5%), anemia 5 (31.3%), HIV/AIDS 3 (18.8%) and DM and Malaria 1 (6.3%) each were the health problem encountered.

Among women who gave birth during this study period, 149 (59.6%) developed obstetric complications. Fetal distress, malpresentation, malposition, Cephalopelvic disproportion (CPD), Antepartum hemorrhage (APH), hypertensive disorder of pregnancy and prolonged labor were among the frequently occurred complications **(Table 2)**.

From 250 delivery cases, 113 of them were cesarean giving the prevalence of CS at JUSH 45.2%. Majority 104(41.6%) of respondents came from the distance of greater than one hour and above followed by those who traveled less than 30 minutes 92(36.8%) and 30 minutes to one hour 54(21.6%). Regarding means of transport to the

Table 1. Distributions of women delivered at JUSH with their sociodemographic characteristics from March 25 to April 08, 2016

Sociodemographic variable		Mode of delivery		frequency	Percent (100%)
		Vaginal (13)	Caesarean (113)		
Maternal age	≤19	8(3.2%)	1(0.4%)	9	3.6
	20-24	42(16.8%)	32(12.8%)	74	29.6
	25-29	57(22.8%)	51(20.4%)	108	43.2
	30-34	16(6.4%)	13(5.2%)	29	11.6
	≥35	14(5.6%)	16(6.4%)	30	12
	Total	137(54.8%)	113(45.2%)	250	100
Marital status	Married	133(53.2%)	112(44.8%)	245	98
	Divorced	1(0.4%)	0(0.0%)	1	.4
	Widowed	2(0.8%)	0(0.0%)	2	.8
	Separated	1(0.4%)	1(0.4%)	2	.8
	Total	137(54.8%)	113(45.2%)	250	100
Educational status of the respondent	Cannot read and write	32(12.8%)	23(9.2%)	55	22
	Informal education	10(4%)	8(3.2%)	18	7.2
	Primary school (1 to 8)	52(20.8%)	36(14.4%)	88	35.2
	Secondary school (9 to 12)	27(10.8%)	21(8.4%)	48	19.2
	College and above	16(6.4%)	25(10%)	41	16.4
	Total	137(54.8%)	113(45.2%)	250	100
Educational status of spouse	Cannot read and write	26(10.4%)	17(6.8%)	43	17.2
	Informal education	13(5.2%)	9(3.6%)	22	8.8
	Primary school 1to 8)	40(16%)	24(9.6%)	64	25.6
	Secondary school (9 to 12)	28(11.2%)	26(10.4%)	54	21.6
	College and above	30(12%)	37(14.8%)	67	26.8
	Total	137(54.8%)	113(45.2%)	250	100
Occupation of respondent	House wife	29(11.6%)	25(10%)	43	17.2
	Private employee	5(2%)	6(2.4%)	11	4.4
	Gov't employee	25(10%)	18(7.2)	43	17.2
	Farmer	50(20%)	40(16%)	90	36
	Merchant	17(6.8%)	21(8.4%)	38	15.2
	Daily laborer	11(4.4%)	3(1.2%)	14	5.6
	Total	137(54.8%)	113(45.2%)	250	100
Religion	Orthodox	33(13.2%)	29(11.6%)	62	24.8
	Muslim	98(39.2%)	71(28.4%)	169	67.6
	Protestant	6(2.4%)	13(5.2%)	19	7.6
	Total	137(54.8%)	113(45.2%)	250	100
Residence	Urban	79(31.6%)	58(23.2%)	137	54.8
	Rural	58(23.2%)	55(22%)	113	45.2
	Total	137(54.8%)	113(45.2%)	250	100
Average monthly income	≤1000	71(28.4%)	58(23.2%)	129	51.6
	1001-2500	33(13.2%)	15(6%)	48	19.2
	2501-4000	11(4.4%)	17(6.8%)	28	11.2
	≥4001	22(8.8%)	23(9.2%)	45	18
	Total	137(54.8%)	113(45.2%)	250	100

hospital, majority 184(73.6%) of the respondents traveled by ambulance and 52(20.8%) used other vehicles. The rest came to the hospital on foot (5.6%). All the delivering women were not followed by partograph during labor and delivery. However, all of them were checked by ultrasound for feto maternal condition monitoring. Majority of cesarean conducted were emergency 99(87.6%) and 14(12.4%) were elective. Even if not successful, Vaginal birth after caesarean (VBAC)) was tried for 24 women with the previous scar. Most 108 (95.6%) of CS were conducted by Residents and 4.4% were conducted by senior obstetrician and gynecologists. Of all newborn, 223(89.2%) were alive with Apgar score of ≥7 170 (76.2%) and others had Apgar score of less than seven 53 (23.8%) at fifth minutes . Twenty-seven (10.8%) of fetal death was recorded during the study period.

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Table 2. Distributions of maternal and fetal complications among all women who gave birth at JUSH from March 25 to April 08, 2016

Obstetric complications		Frequency of cases	Percentage (100%)
Malpresentation	No	94	63.1
	Yes	55	36.9
	Total	149	100
Malposition	No	103	69.1
	Yes	46	30.9
	Total	149	100
Prolonged labor	No	123	82.6
	Yes	26	17.4
	Total	149	100
Hypertensive disorders of pregnancy	No	126	84.6
	Yes	23	15.4
	Total	149	100
Ruptured uterus	No	139	93.3
	Yes	10	6.7
	Total	149	100
APH	No	120	80.5
	Yes	29	19.5
	Total	149	100
Obstructed labor	No	119	80
	Yes	30	20
	Total	149	100
Fetal distress	No	98	65.8
	Yes	51	34.2
	Total	149	100
Cervical arrest	No	136	91.3
	Yes	13	8.7
	Total	149	100
	Total	149	100
CPD	No	114	76.5
	Yes	35	23.5
	Total	149	100

Table 3. Multivariable logistic regression model with their corresponding p-values for the associations between the cesarean section and independent predictor variables in JUSH from March 25 to April 08, 2016

Model		Frequency (%)	COR	AOR	CI		P-value
					Lower	Upper	
Fetal distress	No	98(65.8%)		1			
	yes	51(34.2%)	5.697	10.978	2.434	49.506	.002
Obstructed labor	No	119(79.9%)		1			
	Yes	30(20.1%)	5.600	13.495	1.929	94.422	.009
Mal presentation	No	94(63.1%)		1			
	yes	55(36.9%)	9.377	11.332	2.090	61.460	.005
Distance from Hospital in a minute	≤29	92(36.8%)		1			
	30-59	54(21.6%)	.984	1.440	.260	7.984	.677
	≥60	104(41.6%)	3.148	6.018	1.225	29.561	.027
Income in ETB	≤1000	129(51.6%)		1			
	1001-2500	48(19.2%)	.556	2.404	.345	16.735	.376
	2501-3999	28(11.2%)	1.892	3.064	.502	18.694	.225
	≥4000	45(18%)	1.280	19.826	2.898	135.651	.002

After giving birth, one maternal death occurred due to uterine atony.

Multivariable Logistic regression analysis was done to identify the independent variables on cesarean sections. The study showed that women whose fetus developed fetal distress were 10.978 times more likely to deliver by cesarean (Adjusted Odd Ratio (AOR)): 10.978, 95% Confidence Interval (CI): 2.434, 49.506) than those free of fetal distress. Women with obstructed labor were 13.495 times more likely to deliver by cesarean (AOR: 13.495, 95%CI: 1.929, 94.422) than those did not have obstructed labor. The study also revealed that women with fetal malpresentation were 11.332 times more likely to give birth by cesarean (AOR: 11.332, 95%CI: 2.090, 61.460). The study revealed that distance to health facility they gave birth in had the positive significant association with cesarean delivery. Accordingly, women who came traveling from the distance of one hour and above were 6.018 times more likely to give birth by cesarean (AOR:6.018, 95%CI: 1.225, 29.561) than those who came from distance of less than 30 minutes. Average monthly incomes had positive significant association with cesarean delivery. Women earning monthly income of 4000 Ethiopian Birr (ETB) and above were 19.826 times more likely to deliver by cesarean (AOR: 19.826, 95%CI: 2.898, 135.651) when compared with those who earn ≤1000 (ETB) **(Table 3)**.

DISCUSSION

This study showed that the prevalence of cesarean sections was 45.2 % in the study area. It is very high compared with reports from Adigrat 14.23% (10), Felegehiwot 25.4%[11], Harar 34.3%[12], Addis Ababa 24.3%[13], Gurage zone 27.6%[14], Mizan Aman 21.1[15] and Jimma 28.1%[9].

It's also higher than what has been observed in Nigeria 40.1%[16] and other study from Brazil 40%[17], two Egypt Hospital 37.8%&36.5%[18] and Tirani 32.3%[19]. This gap might be due to type of health facilities: that it's teaching hospital whose professionalism most of the cases are students who might encourage cesarean sections for their educational purposes, time variation due to currently increased emergency obstetric care services, increased referral cases and absence of health facility that give similar service with current study area.

The study also showed that this prevalence was less than reports from Iran[20] and South Africa[21] that were 52.3% and 60.4% respectively. This variation might be due to private hospital delivery and maternal request for caesarean delivery allowed at those countries.

From sociodemographic variables, higher family monthly income is observed to have the positive significant association with cesarean delivery. This finding is consistent with findings from Brazil[22,23], Mexico[24], Harar[12] and Addis Ababa[13]. In fact, many studies in developed and developing countries revealed that as income increases, the chance of cesarean delivery also increases. The assumption is that people with higher income most of the time do not want to go through labor pain and rather opt for CS. As labor pain is very severely exacerbated pain that may lead those peoples to any decision. Therefore, they

might decline vaginal delivery and Vaginal Birth After Caesarean sections (VBAC).

The study showed that maternal and fetal factors significantly associated with cesarean delivery were fetal distress, malpresentation, and obstructed labor. This study has found that fetal distress was significantly associated with cesarean delivery. This is consistent with findings in England[25] and Tirane[19]. Fetal distress is a clear indication for a cesarean section to save the life of a newborn during obstetric emergencies.

Obstructed labor significantly increases the chance of cesarean delivery. This finding is also consistent with the study conducted in Felegehiwot hospital Ethiopia, Brazil and Iran[11,17,20]. Obstructed labor is most common in developing countries. It's mismanaged and neglected lobar result from prolonged labor, malposition, and Cephalo pelvic disproportions and these complications are associated with fetal and maternal exhaustion and fetal distress that results in difficulty of vaginal delivery and a cesarean section may be the last option. So, the assumption is that because our services are poor in emergency and obstetric care mothers become the candidate for cesarean section even if she can deliver virginally with proper follow up.

There was also a strong relationship between malpresentation and cesarean section. Similar findings were reported in several studies in Felegehiwot hospital in Ethiopia, Iran and England[11,20,25] respectively. The reason behind is those non-cephalic presentations such as face, brow, shoulder, breech, compound presentations and cord prolapse in complicated case mostly managed by cesarean section in alive fetus. Therefore, any malpresentation should be identified early to prevent complications that may lead to a cesarean section.

From health facility-related factors, distance women travel to reach health facility to give birth was significantly associated with cesarean section. The assumption is that since this hospital is the only referral hospital in the area, laboring women come to health facility by traveling a long distance and this increases the chance of developing obstetric complications. With any of the complications and delayed basic obstetric care, vaginal delivery may be difficult and cesarean section would be a viable option. To overcome such problems, availing health facilities with trained healthcare providers at the community level can be an appropriate strategy. Women who were not followed by partograph during labor and delivery were more likely to deliver by cesarean section at Adigrat hospital in Ethiopia[10].

Conclusion and recommendation:

The study showed that the prevalence of cesarean section is 45.2%, which is too high when compared with the profound figure that was, reported in min EDHS 2014 and other studies in different countries. Malpresentation, fetal distress, obstructed labor, higher family monthly income and distance from health facility were found to be significantly associated with CS. Majority of these factors may be manageable by early detection of any obstetric complications during ANC service, labor, and delivery. We recommend the responsible authorities (JUSH obstetrics and gynecology departments, Jimma Zone health office, NGO working on this area), policymakers to discuss on this issue to develop the guideline to control cesarean section in line with WHO recommendation. Moreover, use of other techniques like Partograph correctly and consistently, practicing VBAC for all women with previous scar if fulfill criteria and facilitate referral system from remote areas, laboring mothers without developing major complications are also recommended.

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COMPETING INTERESTS

The authors declare that we don't have any competing interests

ACRONYM

ANC: Antenatal Care, APH: Antepartum Hemorrhage, CPD: Cephalo Pelvic Disproportion, CS: Caesarean Sections, EDHS: Ethiopian Demographic and Health Survey, SPSS: Statistical Package of Social Sciences, WHO: World Health Organization, VBAC: Vaginal Birth after Caesarean section., GA: Gestational Age.

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