

THE MAGNITUDE AND PATTERN OF CESAREAN SECTION DELIVERIES IN PRIVATE HEALTH FACILITIES IN ADDIS ABABA

Dereje N. , MD, MPH¹, Mesfin E., MD, MPH¹, Asfawesen G/Y, MD¹, Denis J., MPH², Bonnie K., M.Ed, CPT², Ximena Z Mc.²,
Mesfin T., MD, MPH¹, Tilaye T., MPH¹

ABSTRACT

BACKGROUND: In Ethiopia, the national Cesareans Section (CS) rate stands at 3.79% nationally currently, which is significantly below the World Health Organization (WHO) recommended rate of 10-15%, signifying barriers in access. On the otherhand the prevalence of CS in hospitals in Addis Ababa was found to be 38.3% while private facilities performed more CSs than public health facilities, 46.9%.

OBJECTIVE: To assess the magnitude of CS delivery and associated risk factors among women who give birth in private health facilities in Addis Ababa

METHODS: This is a cross-sectional study on magnitude, indications and associated factors with CS deliveries from 24 private facilities in Addis Ababa.

RESULTS: The finding from this study show that the magnitude of CS in private health facilities was 57.3%. CS was highest amongst age group 25-29 years (42.0%) while those above the age of 40 were 1.8 times likely to have a CS delivery unlike other age groups. Similarly, CS was higher in primiparous (35.0%) and at GA of 37- 42(84.0%) weeks. Majority were primary CS 253(55.0%) . The three most common indications were Non- reassuring fetal heart rate (14.6%), maternal request, (10.8%), and breech presentation (8.8%). The mean CS procedure and 48 hrs hospital cost were 4,905.00 and 14,657.00 ETB respectively..

CONCLUSION AND RECOMMENDATIONS: We have documented higher magnitude of CS delivery. The rates were higher amongst relatively young age group and primiparous. Previous CS, non-reassuring fetal heart rate, and client request were the commonest indications. The reasons behind the high CS rate are likely a combination of provider behavior and incentives, social and cultural factors affecting the mothers' decision. We recommend the conduct of further studies to uncover and address the causes the high CS rates.

KEY WORDS: CS rate, private facilities, Addis Ababa.

(The Ethiopian Journal of Reproductive Health; 2-20; 12;1: 1-8)

1 PHSP

2 ABT Associates Inc.

INTRODUCTION

CS deliveries can be life-saving for both the mother and child when it is medically required¹. However, there is a growing concern regarding the increasing rate of CS deliveries globally where there is no medical need¹. The risks and costs associated with CS deliveries are significant, and evidence shows that CS delivery and maternal death are positively associated largely due to bleeding, infection and anesthesia related complications. CS delivery is a marker of access to, and availability and utilization of obstetric services but, where rates are extremely high, it may also indicate a mismatch between evidence and practice¹. WHO recommends an ideal CS rate of 10-15%. According to this guidance, when rates fall below 10%, it indicates mothers are not able to access what can be a lifesaving procedure. Moreover, a WHO survey on maternal and perinatal health carried out in 24 countries and 373 facilities (using data from 289,635 deliveries) had showed higher CS rates were associated with increased maternal mortality and morbidity¹. More alarming is that the increased CS rates were associated with poor newborn health outcomes in all three regions, after controlling for many factors. In Africa, increasing emergency cesarean rates were associated with increased intrapartum stillbirths, neonatal deaths, and severe neonatal morbidity². Therefore, the decision to perform CS should be based on clear, compelling, and well-supported medical justifications. Clients/patients should be clearly informed about the benefits and the risks of the procedure and be guided ethically for either informed consent or informed refusal for the procedure. Further research showed that CS rates beyond 15% are considered medically unjustified or unnecessary, with negligible benefits for most mothers, and are costly and often unequally distributed amongst the population². According to the 2010 FMoH annual report, the CS rate in Addis Ababa was 36%. A study investigating CS delivery practices in teaching public, NGO and private MCH hospitals in Addis Ababa, found that the CS rate in public hospitals was 31.1%, and in NGO and private hospitals 48.3%². And in Ethiopia, the national CS rate currently stands at 3.79%, which is below the WHO with significant regional variations, ranging as low as 0.76% in Somali

region to a high of 41 % in Addis Ababa, FMoH 2011, which may indicate unequal access across different groups³.

The contrast between the extremely low cesarean rates for most of the population of the country and the high institutional rates in Addis Ababa and the private for-profit hospitals is a dramatic indicator of a country in transition; struggling to ensure equitable and appropriate access to comprehensive obstetric and newborn care.

The FMoH states that every pregnant woman in Ethiopia has the right to information about her health, to discuss her concerns with a provider, to know in advance about any planned procedure to be performed, privacy, confidentiality, and to express her views about the services. To fulfil these rights, in 2010 the FMoH developed an Obstetrics Management Protocol based on the WHO's goal-oriented model which focuses on a limited set of essential antenatal, delivery, postnatal and newborn care services, and prescribed statements about indications in the use of procedures such as CS⁴.

Moreover, in the above mentioned document, it was established that "CS is performed when safe vaginal delivery is either not feasible (absolute) or would impose undue risks to the mother and/or fetus (relative)".

The protocol further states that appropriate indications, and the presence of a trained manpower and instruments required. It also requires providers explain the procedure to the client or relatives to seek informed consent. The protocol has details of the possible complications of the procedure and it states that maternal mortality is higher after CS than after vaginal delivery. Although the protocol does not discuss high rates of inappropriate CS that can be due to maternal requests, provider misjudgment, or an overall failure to properly counsel on birth preparedness during ANC, the protocol does caution about the possible inappropriate and excessive reliance on technology or procedures that can ultimately increase complications and cost⁴.

Additionally, according to the PHSP project data collected from the 30 PHSP-supported MNCH facilities, the CS rate increased by nearly twice between April 2017 -Dec. 2018 from 25% to 47%. And CS rate Addis Ababa during similar period stands was 44%. These figures raises alarm of high rates of the performance

of the procedure possibly without justifiable medical indications. Therefore, this study aims to explore the details regarding the magnitude, indications and associated factors and cost of CS deliveries in private health facilities in Addis Ababa city⁵.

METHODS:

This is a cross-sectional study based on information retrieved from delivery registration book and CS client charts for the number, indications, outcomes and associated factors for CS delivery using a semi-structured data collection tool.

To select facilities for this study, PHSP obtained facility profiles from the Addis Ababa RHB. Based on this information, a total of 60 facilities were found (36 private for-profit, 20 government, and 4 non-profit NGO facilities) who are performing CS. All government facilities were excluded from the study. To ensure included facilities had sufficient numbers of CS deliveries for study, those with less than 100 CS deliveries per 6 months, between July and Dec. 2018 were excluded. Based on this, 24 facilities were selected for the study.

The study population was mothers who delivered by CS at private facilities in Addis Ababa from Jan.-Dec 2018 and the study subjected were those who delivered in the selected 24 facilities with 100 or more CS deliveries in last 6 months. To collect information on CS deliveries, one month from each quarter in Jan.-Dec.20182018 was randomly selected, assuming there could be seasonal variation in the number of deliveries and, hence CS deliveries. Accordingly, the months of March, May, August, and November 2018 were selected.

All deliveries conducted in the above months were reviewed for this study from the 24 selected facilities. From each month, 10% of the CS delivery charts were randomly selected, and data was abstracted at the using a standardized pretested data collection tool. And information regarding coast of delivery services was obtained by interviewing hospital managers using standard format.

Data entry and analysis was conducted at Private Health Sector project using SPSS 25.0. Data abstracted at the facilities using the standardized tool was entered into SPSS. The CS rate in the facilities was determined, and

analysis conducted to indications and outcomes of CS. The data collection tool did not abstract patient names and collected data was kept confidential. Ethical clearance was obtained from Abt Associates Inc. (Institutional review board) IRB and was submitted to the Addis Ababa Regional Health Bureau(RHB) with data collection tools for review following which a written support letter from was obtained and presented to the facility heads.

RESULT

There were a total of 7522 deliveries documented with 4350 (57.8%) CS deliveries, 2693 (34.9 %) SVDs and 291 (3.9%) instrumental assisted vaginal deliveries.

Details regarding maternal age, parity, gestational age at CS delivery, ANC follow-up, previous obstetric, medical and surgical histories, indications for CS, type of CS delivery (elective verses emergency, and primary verses repeat) and fetal and maternal outcomes following CS procedure were abstracted from the 460 CS charts selected randomly (10 % CS charts of the four randomly selected months from Jan.-Dec.2018 as stated above) with the findings stated below.

Accordingly, the mean age was 29.6 with a standard deviation of ± 4.3 years and a median and mode of 29 and 26 years respectively. The minimum and maximum age was 19 and 43 years. The majority, 195 (42 .0 %) were in the age range of 25-29 years.

Regarding parity, 158 (35.0 %) were primiparous, 148 (33.0 %) were para one, 86 (19.0 %) were para two, 41 (9.0 %) were para three and 18 (4.0 %) were para four and above.

And regarding history of previous deliveries, 180 (70.0 %) gave birth to their first (singleton only) children by CS, 76 (29.4 %) by SVD with episiotomy. And on delivery of twins, 88 (75.0%) delivered by CS.

And it was only in 2.8% and 3.5% of the cases that history of medical and surgical conditions respectively was documented. History of post-date, post-term, pre-eclampsia and GDM were documented in 10.1%.

And 401 (87.0%) had ANC follow-up at the same facility whereas 13 % were referred. Counselling for birth preparedness during ANC was documented in 54 (12.0%).

The majority, 84.0 % occurred at GA of 38-42 weeks followed by 28-37 weeks and ≥ 42 weeks, accounting for 13.0% and 1.0% respectively.

And 59.0% were electively done and 41.0% were emergency CS. The majority, 253 (55.0%), were primary while repeat while 207(45.0%) were primary CS. And the three commonest indications for primary CS were NRFHR in 38, (15.0%), maternal request in 28, (11%) and breech presentation in 23 (9%) of the cases (Table 1).

Table 1: Indications for CS, private health facilities, Addis Ababa, Jan.-Dec. 2018

Indications	Number	Percent
NRFHR	38	15.0 %
Others *	28	11.0 %
Maternal request	28	11.0 %
Breech presentation	23	9.0 %
Failure to progress	21	8.3 %
Failed induction	21	8.3 %
Cephalo-Pelvic Disproportion (CPD)	20	7.9 %
Poor Bio physical profile	14	5.5 %
Pre-eclampsia/eclampsia	13	5.1 %
Post term	11	4.3 %
APH	9	3.5 %
Obstructed Labor	7	2.7 %
Multiple pregnancy	6	2.3 %
Not documented	5	1.9%
Cord prolapsed	4	1.5%
Malpresentations/malpositions (other than breech)	3	1.1%
Unfavorable cervix	2	0.7%
Not documented	5	1.9%
Total	253	100.0 %

*The word "Others" describes a group of other indications other than mentioned in the list.

Labor follow-up with partograph was documented for only 20.0 % of the laboring mothers before CS.

Regarding maternal outcome, 7308 (97.2%) mothers had stable outcome, while 9 (0.1 %) resulted in death. The likelihood of having a CS delivery and a stable maternal outcome was 1.3 times more than in other modes of delivery (1.0-1.7) with p value > 0.05 .

Regarding fetal outcome for the first baby, 7,398 (98.3 %) were live births. The likelihood of having an outcome of livebirth is 3.2 times more in CS delivery unlike other modes of delivery, with 95% CI (1.7-6.1), $P < 0.001$.

On the Apgar score of the first newborns at 1st and 5th minutes in 87.2 % had scores of 8-10 at 1st minute which improved at 5th minutes for 96.2 % of the newborns. The likelihood of having a CS birth with an Apgar score of the first baby 1-7 and 8-10 were 1.8 times (1.3-2.5) and 1.6 times (1.2-2.1) at 1st minute and 5th minutes respectively, $p < 0.05$.

And a total of 136 twin deliveries were recorded, in which 93.0 % were live, 47 % weighed more than 2,500 grams, and 71% had Apgar scores of 8-10 at the 1st minutes which improved in 87.0 % at the 5th minutes (Table 2).

Table 2: The fetal outcome of CS delivery in private health facilities, Addis Ababa, Jan.-Dec., 2018

Fetal outcome	Number	Percent
Live birth	7398	98.4 %
Stillbirth fresh	52	0.7 %
Still birth macerated	27	0.4 %
Still birth not labelled	18	0.2 %
Not documented	27	0.4 %
Fetal outcome second baby		
Live birth	133	98.0 %
Still birth (fresh and macerated)	3	2.0 %
Fetal weight (first baby) n=7488		
Less than 1500 grams	94	1.2 %
1500-2500 grams	543	7.2 %
2501-3500 grams	4592	61.0 %
Greater than 3500 grams	2259	30.0 %
Fetal weight (second baby) n=136		
Less than 1500 grams	14	10.0 %
1500-2500 grams	58	43.0 %
2501- 3500 grams	61	45.0 %
Greater than 3500 grams	3	2.0 %
First baby, Apgar score, e at 1st minute		
Apgar score of 1-7	881	11.9 %
Apgar score of 8-10	6454	87.2 %
No record of Apgar	63	0.9 %
First baby Apgar score, at 5th minutes		
Apgar score of 1-7	147	2.0 %
Apgar score of 8-10	7118	96.2 %
No record of Apgar	131	1.8 %
Apgar score of second baby live birth (n=133)		
Second baby, Apgar score, at 1st minute		
Apgar score of 1-7	33	25.0 %
Apgar score of 8-10	94	71.0 %
No record of Apgar	6	4.0 %
Second baby Apgar score, at 5th minutes		
Apgar score of 1-7	10	8.0 %
Apgar score of 8-10	116	87.0 %
No record of Apgar scores	7	5.0 %

And 94.9 % of the births weighted were above 2,500 grams, and 5.7% were above 4,000 grams for singletons while all second born twins had a birth weight of greater than 1,500 grams.

CS delivery was found to be associated with fetal weight, Agar score at first and fifth minutes, fetal outcome of the first baby, maternal outcome and the absence of obstetric complications. With logistics

regression analysis, all of the above variables were found to be confounders except maternal age, fetal outcome and fetal weight of the first baby with $p < 0.001$, 0.05 and 0.05 respectively (Table 3).

Table 3: Association of CS delivery with maternal; age, maternal and fetal outcome in private facilities, Addis Ababa, Jan.-Dec., 2018

Indicator	C/S delivery	None-C/S Delivery	Crude OR and 95 % CI	Adjusted OR and 95 % CI
1.Age of the mothers				
15-20 years	59	133	1	1
21-29 years	2275	1928	2.7(1.9-3.6)	0.93(0.5-1.7)
30-39 Years	1857	1039	4.0(2.9-5.5)	1.2(0.8-1.7)
40 years and above	59	26	5.1(2.9-8.9)	1.8(1.3-2.6)**
No record	100	46	4.9(3.0-7.9)	4.9(3.1-7.8)**
2. Fetal weight of the 1st baby				
Less than 1500 grams	79	50	1.1(0.8-1.6)	1.68(1.11-2.62)*
1500-2500 grams	343	200	1.2(0.9-1.4)	1.23(1.0-1.45)*
2501-3500 grams	2596	1996	0.9(0.8-1.0)	1.0(0.9-1.1)
Greater than 3500 grams	1332	926	1	1
3. Fetal outcome of the first baby				
Live birth	4304	3094	2.4 (1.6-3.4)	3.2(1.7-6.1)
Still births	46	78	1	1
4. Apgar score of first baby at 1st minute				
1-7	536	346	1.8 (1.3-2.5)	0.8(0.38-1.62)
8-10	3729	2726	1.6(1.2-2.1)	0.8(0.39-1.64)
No score	85	100	1	1
5. Apgar score of first baby at 5th minute				
1-7	104	44	2.2(1.5-3.4)	0.97(0.5-1.8)
8-10	4115	3004	1.3(1.0-1.7)	1.5(0.8-2.4)
No score	131	124	1	1
6. Maternal outcome				
stable	4239	3069	1.2(0.9-1.5)	1.2(0.87-1.56)
None -stable	111	103	1	1
7. Have Obstetrics complications				
Yes	13	8	1.2(0.5-2.9)	0.86(0.35-2.1)
No	4336	3153	1	1

Finally, the amount clients are paying currently for CS procedure ranges from 2,500.00-7,000.00 ETB (\$87.0-\$242.4 USD with conversion rate of \$1 USD to 28.8 ETB), with mean and median costs to conduct the procedure of 4,905.00 ETB and 4,900.00 ETB (\$169.8 and \$169.6 USD) respectively. Conversely, the cost for normal SVD ranges from 1,000.00 ETB to 10,000.00 ETB (\$34.6-\$346.2

USD), with mean of 4,404.00 ETB (\$152.5 USD). If episiotomy was performed, the price is increased up to 12,000.00 ETB (\$415.5 USD), with mean 5,315.00 ETB (\$184.0 USD). The total cost including procedure, beds, medication, physician rounds, and meals that CS clients pay at discharge at 48 hours in uncomplicated cases ranges from 3,500.00 ETB-22,000.00 ETB (\$121.0-\$761.7 USD), with a mean of 14,657.00 ETB, and median of 16,000.00 ETB (\$507.0 and \$554.0 USD) respectively.

DISCUSSION

We have documented CS delivery rate of 57.3% with commonest indication 45, 0% being for previous CS. And it was commonly done in age group of 25-29 years, 42.0% and for primi parous in and 35.0 % of the cases. The CS rate (57.8%) from our study is somewhat higher than a retrospective study done in maternity hospital at Albania and public tertiary hospital in Northwestern Nigeria, and an analytic study conducted at the NGO and government-run Tanzania St. Joseph Medical Hospital with CS rates of 32.3%, 11.3%, and 18% respectively^{6,7,8}. It is also higher than the study conducted on CS delivery practices in teaching public and non-government/private MCH hospitals in Addis Ababa where the CS rate in private hospitals was 48.3%². Similarly our CS rate is higher than the rates reported from the PHSP program data from 30 MNCH facilities, 25% -47.0%, from April 2017-Dec. 2018⁵. Higher rates found in this study may be due to the fact that all the other studies were conducted in public facilities.

Concerning indication this study found that previous history of CS was higher than what was found by Hiwot et al, 27.2 %⁹. Also in Hussen et al. study it is similarly documented that pervious CS delivery accounted for 29.3 %¹. However, our finding was different from the study conducted in Felegehiwot Referral Hospital in Northwest Ethiopia where the most frequent indication was obstructed labor, 30.7 %, followed by fetal distress, 15.9%, and abnormal presentation, 13.4%. It is different than the study in Attat Hospital, Gurage Zone SNNPR, the leading causes for caesarean birth were CPD (38.1%), previous CS, and 18.9%⁸. These difference might be due to a decline in the trend to consider vaginal birth after CS in the private facilities^{2,10,11}.

The majority of mothers who delivered through CS in this study were between 25 and 29 years old (42.0%), yet CS delivery was found to be 1.8 times more likely to be the mode of delivery in mothers aged 40 years and above to other age groups. This is unlike what was reported in a cross-sectional survey conducted in Addis Ababa where women older than 30 years were found to be more likely to have CS delivery than younger age groups. However, it is consistent with the findings from the Yebeltal et al. study, where compared with young mothers ages 15-24 years, older mothers aged 30-49 years had greater odds of CS delivery, (odds ratio = 2.56) (Hussen, Shifewaw, and Lukman 2014). In is interesting to note however, that the three most recent EDHS data (2000, 2005 and 2011) did not show significant variation in CS rate across the categories of maternal age groups. The higher likelihood of CS in older age groups found in this and other studies may be related to the fact that many of the indications for CS, including previous CS, and other risk factors, occur more often in older women.

When it comes to parity, 35.1% of the CS cases were primiparous which is somewhat similar to study conducted in Addis Ababa which found 48.7 % primiparous. Regarding GA at CS, the majority, 91.0% occurred 37-42 weeks which is similar to Hiwot et al. study of 85.2 % for GA of 37-42 weeks⁹.

Regarding CS timing, 59.0% were elective in our study which is somewhat higher than Hiwot's et al. study which documented a CS performed on elective bases to be 41.2% of cases. Moreover, our emergency CS rate of 41.0% is less than Hiwot's study finding of 58.8%. However, the rate of elective CS operations in this study was lower than a study conducted in Atat Hospital, Gurage Zone SNNPR, Ethiopia which found 90.4% emergency CSs, and only 9.6% as elective. A similar trend was identified in Felegehiwot referral hospital in Northwest Ethiopia; 90.3% emergency, and 9.7% elective^{9,10,11}. The observed discrepancy could be the increasingly large number of previous CS cases and failure to consider trial of scar for possible vaginal delivery in private facilities currently.

Our study also found that about 52.4% of CS's were primary, which is less than the study conducted in Addis Ababa, Attat Hospital Gurage Zone SNNPR which

documented rates of primary CS at 64.0%, 68.7%, rates respectively. The repeat CS rate in this study was 45.0 %, is similar to study by Hiwot, (46.1%). However it is more than the study in Attat Hospital, Gurage Zone SNNPR, and a study in Harar which documented rates of repeat of 36.0% and 31.3 % respectively^{9,10,11}. This is likely due to the fact that the public facilities are handling referred and difficult cases and hence perform more of first CS (primary).

The partograph labor follow up rate of 20% was higher than the finding of Fesseha et al. group which was 12%. On the other hand, 87.0% of mothers had ANC visits in the same facility, only 12% of cases received some form of counselling on birth preparedness¹².

Regarding outcomes of CS deliveries, 98.4% of the first born baby was born alive; this finding is higher than the 81% live birth documented in Fesseha et al. study. No maternal deaths were documented in this study, unlike the findings in the above mentioned study where two out of the 267 (0.7%) died¹².

The percentage of births having birth weight of 2,500-3,999 grams, 88.8% is somewhat higher than the Hiwot study of 76.2%⁹. This could be due to the fact that the private for-profit clients are from higher socioeconomic groups with better nutritional status, resulting in higher birth weight.

The mean cost for the CS procedure alone (4,905.00 birr) was slightly higher than the mean for a SVD (4,404.00 birr), though lower than the mean for an SVD with episiotomy (5,315.00 birr). However, when adding in the cost of the required 48-hour stay for uncomplicated CS, the mean cost rises to 14,657.00 birr. It is important to note that it is common practice for the attending physician to receive a percentage of the delivery procedure cost (not including the 48-hour stay) in private facilities, regardless of delivery mode. Given the relatively small difference in the mean cost for CS versus SVD (not including SVD with episiotomy), it is difficult to extrapolate whether this may or may not provide an incentive for providers to indicate CS over SVD. However, at the facility management level, there may be a financial incentive to favor CS, given the high cost of the 48-hour stay.

However our study has all the limitations of a retrospective study. Moreover, only 24 of the 60 facilities met the study inclusion criteria and hence this small size

may not be representative. And the fact that only 10% of the CS delivery charts were analyzed also is a potential limitation. It also doesn't implement capture client, providers, and managers perspectives.

CONCLUSION

We have provided evidence of higher CS rates in private facilities in Addis Ababa compared to the available literature on CS rates in private and public facilities in Addis Ababa, Ethiopia, and other low- and middle-income countries. These high rate could indicate unjustified overuse, which is of equal concern as underuse. Factors such as suboptimal client birth preparedness and counselling on safe delivery options, and the presence of non-medical factors such as cultural norms, personal characteristics of the woman/mother, and socioeconomic factors, and financial incentives for the providers/facilities could be the drivers for the observed high CS rate in this study.

RECOMMENDATIONS

We recommend that the findings of this study be used by the FMOH, AARHB, ESOG, and the AA PHFA to begin a policy dialogue to address the problem of high CS rates. Providers must be advised to inform expectant mothers about birth preparedness in general and the risks and benefits of CS in particular, provide pain relief medications during labor and delivery, provide trial of vaginal birth as per the standard recommendation for previous CS, and refrain from unnecessary increased medicalization of labor and delivery by decreasing intervention as recommended by the WHO. We highly recommend the conduct of prospective study to uncover clients, providers and managers perceptions and roles in the increasing CS delivery.

ACKNOWLEDGEMENT

We would like to acknowledge USAID for funding this study and Abt Associates Inc. home office for the all rounded support they have provided.

CORRESPONDING AUTHOR:

Dereje Negussie, MD, MPH
USAID/PHSP, Addis Ababa, Ethiopia
Email: Dereje_Tuijje@phsp-et.com

REFERENCES

1. JP Souza, AM Gülmezoglu, P Lumbiganon, M Laopaiboon, G Carroli, B Fawole, P, Ruyan &. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 who global survey on maternal and perinatal health. The WHO Global Survey on Maternal and Perinatal Health Research Group: BMC Medicine volume 8, Article number: 71 (201).
2. Hussen A., Shiferaw N.,, Lukman Y. Cesarean delivery practices in teaching public and non-government/private MCH hospitals, Addis Ababa. Ethiop. J. health dev. 2014; 28(1).
3. FMOH 2011 annual report, Unpublished.
4. Federal Ministry of Health. Management protocol on selected obstetrics topics. Federal Democratic Republic of Ethiopia; 2010.
5. PHSP year three quarter second quarter report, unpublished, Jan. 2018.
6. Gjonej.R, Poloska.A, Keta.M, Zybeaj.F, Bezhani.V, Smakaj.E, The reasons of rising trends of caesarean section rate year after year. IJNM 2015, 7(1), 2141-2456.
7. Daniel CN, Singh S. Caesarean delivery: An experience from a tertiary institution in north western Nigeria. Niger J ClinPract 2016; 19:18-24.
8. Linn Becher and Siril Stokke (2009-2011) indications used for CS in St. Joseph Medical Hospital in Moshi, Tanzania.
9. Hiwot T. Prevalence of caesarean section and associated factors in Addis Ababa hospitals, Addis Ababa, Ethiopia, 2017 (Unpublished study).
10. Abebe F, Ashebir N, Gizachew, A, factors leading to caesarean section at Felegehiwot referral Hospital, North West Ethiopia, Reproductive health, 2015 vol.13.
11. Moges A, Ade me B, Akessa G, Prevalence and Outcome of Cesarean Section in Attat Hospital, Gurage Zone , SNNPR, Ethiopia. Arch Med. 2015; 7:4.
12. Fesseha Nebreed, Atnafu Getachew , Mihret Hiluf , Yirgu Gebrehiwot , Patricia Bailey. A national review of cesarean delivery in Ethiopia. 2011. Int J Gynecol Obstets 115: 106-111.