



DEPARTMENT OF PUBLIC HEALTH

Outcome and Factors Associated with Cesarean Section Delivery in
Saint Paul's Hospital Millennium Medical College

BY: ABDURAHMAN ADEN (MD)

A RESEARCH PAPER SUBMITTED TO THE DEPARTMENT OF PUBLIC
HEALTH SPHMMC IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF MEDICINE

October, 2017

Addis Ababa, Ethiopia



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LIST of ACRONYMS

APGAR_____ Appearance Pulse Grimace Activity Respiration

BMI _____Body Mass Index

C/S_____ Cesarean section

CSA_____ Central Statistical Agency of Ethiopia

DHS_____ Demographic Health Surveillance/survey

EMNOS_____ Emergency Obstetric and Neonatal Care

IESO_____ Integrated Emergency Surgery and Obstetrics.

FMOH_____ Federal Ministry of Health

HEW_____ Health Extension Workers

MDG_____ Millennium Development Goal

SPHMMC_____ Saint Paul’s Hospital Millennium Medical College

SPSS_____ Statistical Packages for Social Sciences

WHO_____ World Health Organization

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ABSTRACT

Background: Cesarean section is one of life saving procedures medical intervention attributed to the decrease of the maternal mortality and morbidity rates. The safety of the operation has improved with time largely due to improved surgical and anesthetic techniques as well as the availability of blood transfusion services. According to Demographic and Health Survey in 2016 the percent of births by caesarean section at national level was 2%.cesearan section are higher among first birth (4.3%) and more educated people are more likely to undergo cesarean section .

Objective: To assess outcome and associated factors of cesarean section in SPHMMC, Addis Ababa Ethiopia.

Methods: Hospital based retrospective descriptive study was done in St. Paul's millennium medical college from Meskeram 2008 to Nehassie, 2008 E.C. A total of 285 mothers were included in this study which was selected based on systemic sampling technique .Data was collected by using a structured data-collecting checklist prepared for this purpose developed from different literature review. The data was entered and analyzed with SPSS version 22. Different descriptive variables was analyzed and presented with tables and graphs. Bivariate analysis was done to identify the significant factors associated with outcome of Cesarean Section. A P –value < 0.05 was considered statistically significant.

Result: Medical records of 285 mothers were reviewed covering for of the 97.2% planned sample size. The age of study subjects ranges from of which 18-38 with the mean 24 ± 5.1 years. The commonest indication for cesarean delivery was non reassuring fetal heart rate pattern in 129(45.3%). Anesthesia used for the operation was spinal anesthesia for 275(96.5%) of the mother. Birth weight analysis showed that 68.1% have normal birth weight The neonatal fifth or last minute Apgar score shows that 228(80%) have APGAR of 7 or more . On bivariate analysis maternal age, gestational age at the time of the operation and type of surgery has statistically significant association with birth weight ($P < 0.05$).

Conclusion and recommendation: the study shows that the commonest reason for the delivery via cesarean is non-reassuring fetal heart rate pattern. The hospital and other researchers are recommended to have research this topic.

Key words: cesarean section, Apgar score, outcome, SPHMMC

1. INTRODUCTION

1.1. Background

Cesarean section is an operative procedure whereby the fetus/es after the end of 28th week/s is/are delivered through an incision on abdominal and uterine walls (1).

Cesarean section is the most common obstetric operation aside from episiotomies and also the oldest operations in surgery (2). The objective of cesarean section in ancient times was mainly postmortem delivery of dead or alive fetus, not to bury both together (2) . In the early medieval period, cesarean section is performed by midwives or clergy purely in a religious context. Withdrawal of surgery from religious authority in renaissances times led to the emergence of cesarean section as a medical procedure (2).The safety of the operation has improved with time, largely due to improved surgical and anesthetic techniques as well as the availability of blood transfusion services (2).

Globally, at least 160 million women become pregnant annually, of which only 15% of them develop pregnancy related complications. Annually, 529,000 women die of pregnancy related complication of which 99% is in developing countries like Ethiopia. This high maternal mortality rate with unattended delivery by skilled birth attendant shows low utilization of maternal health services which could be explained by low institutional delivery rate (10%) (3).

Ethiopia is implementing different strategies to overcome the three delays .Out of this implementation strengthening health facilities, training health professionals at all level including health extension workers (HEW), so that at least each low and mid-level facility will be able to give basic emergency obstetric and neonatal care (EmMONC) at community level .Of 751 facilities surveyed only 25% function as basic and 58 of 112 hospitals as comprehensive care. Basic care includes services including parenteral antibiotics, parenteral oxytocin, parenteral anticonvulsant and anti-hypertensive, removal of retained product of conceptus, assisted vaginal delivery (forceps and vacuum extraction) and comprehensive additionally has cesarean section and blood transfusions services. SPHMMC is one of these facilities which are equipped with all the facility to give comprehensive obstetric service including cesarean section and blood transfusion service (4).

1.2 Statement of the problems

The World Health Organization (WHO) has recommended a cesarean section rate of between 10 and 15% (average 12.5%) as an acceptable level (5). This recommendation, the consensus of an expert committee more than two decades ago has formed the basis on which cesarean rates have been considered normal, low or high (5). The international health care community has previously considered the rate of 10% and 15% to be ideal for cesarean sections. Some evidence finds a higher rate of 19% may result in better outcomes. More than 45 countries globally have cesarean section rates less than 7.5% while more than 50 countries have rates greater than 27%. There are efforts to both improve access to and reduce the use of cesarean section. In the United States about 33% of deliveries are by cesarean section (5).

Cesarean delivery has its risks; there are risks related to the surgical procedure as well as risks related to the anesthetic procedure. Compared with other modes of delivery, cesarean delivery involves more resources and increased length of stay in hospital. Efforts at reducing high cesarean section rates aim to improve maternal and child health outcomes but also have as a secondary aim, reduction of expenditure. High cesarean section rates while indicating adequate access to essential and lifesaving obstetric care have not been shown to be associated with improved maternal and fetal outcomes (6).

The increased risks of maternal and perinatal morbidity and mortality associated with high cesarean section rates underlie the growing concern by health professionals; Obstetricians in the UK have instituted studies to address these issues. A woman who delivers by cesarean section gets a uterine scar. This scar has important implications for future pregnancies; she is predisposed to uterine rupture, placenta praevia and placenta accrete. Induction of labour in a woman with previous cesarean section carries a higher risk of uterine rupture than in a woman with no previous cesarean section (1).

According to global survey done by WHO Maternal outcomes were maternal death before discharge from hospital, and severe maternal morbidity which can lead to admission to intensive care unit, hysterectomy, postpartum fistula, antibiotic treatment excluding prophylaxis. Perinatal outcomes were neonatal death before discharge from hospital, fresh stillbirths, delayed breast feeding (initiation >1 hour after birth), and admission to intensive care unit for 7 days or more (7).

According to the 2016 EDHS the national cesarean section delivery rate in Ethiopia is 2%, with regional rates varying from 0.7%(afar) to 21.4% (AA) (8).

1.3 Significance of the study

This study will help in filling the gap of information on the outcome and associated factors of cesarean in Saint Paul's Hospital Millennium Medical College. It can also be used as baseline information for future valuable researches to be undergone around the subject of interest. This study will also help in comparing findings our hospitals to other hospitals in our country or other countries. the rate of cesarean section is increasing and we can use results we obtain from this research to reduce the factors contributing to cesarean section.

2. LITERATURE REVIEW

Here are the summary of the researches done assessing the outcome factors associated with cesarean delivery in different parts of the country and the world.

2.1 factors associated with outcome of cesarean section

A cross-sectional study based on a cohort of live births between April 2004 and March 2005 done in northern east Brazil concluded that prevalence's of cesarean delivery were 29.9 % and 86.2 % in the public and private sectors, respectively. Through hierarchical logistic regression, the risk factors for cesarean delivery presented in the public hospital were maternal age greater than or equal to 20 years ($p = 0.003$), Primiparity ($p = 0.004$), twinning ($p = 0.039$), prenatal care provided in the private network ($p = 0.004$), delivery in hospitals providing high complexity medical care ($p = 0.000$) and prenatal care with greater than or equal to 6 consultations ($p = 0.035$). In the private sector, no association was observed between the variables studied and cesarean delivery (9).

In Sweden A case-control study of 5877 birth records of women undergoing caesarean sections without medical indication and a control group of 13 774 women undergoing births through spontaneous onset of labour was conducted in 2012. Maternal complications occurred more frequently among women undergoing caesarean section with odds ratios (OR) for bleeding complications of 2.5 (95% CI 2.1–3.0) in the elective caesarean group and 2.0 (95% CI 1.5–2.6) in the emergency caesarean group. The OR for infections was 2.6 in both groups. Breastfeeding complications were most common in women having an elective caesarean section: 6.8 (95% CI 3.2–14.5). Infant outcomes showed a higher incidence of respiratory distress with an OR of 2.7 (95% CI 1.8–3.9) in the elective caesarean section group compared with infants born by emergency caesarean section. The risk of hypoglycemia was at least twice as high for infants in the caesarean group (10).

A retrospective record review study done at Felegehiwot referral hospital, Northwest Ethiopia, in 2013, the proportion of women who underwent cesarean section in this study was 25.4 %. Obstructed labor (30.7 %), fetal distress (15.9 %) and abnormal presentation (13.4 %) were the major obstetric indications for cesarean section. The odd of undergoing cesarean section was higher among mothers in rural residence (AOR=1.63, 95 % CI: 1.21, 2.20), mothers reported to have pregnancy risk factors (AOR = 2.31, 95 % CI: 1.74, 3.07) and lower among mothers in age category of 15–19 (AOR = 0.63, 95 % CI: 0.43, 0.93). In this study, 269 (9.06 %) newborns were stillbirths. The still birth rate for CS (excluding 36 cases due to

uterine rupture) and vaginal delivery was 6.5 and 9.9 % respectively. On the other hand, ten of the 13 immediate newborn deaths were incriminated to CS delivery and the majority (80 %) of these immediate newborn deaths was related to the use of general anesthesia. However, the overall perinatal mortality rate in the reference hospital was 10.5 % (8.4 % for CS and 11.1 % for vaginal delivery) (11).

Post-operative maternal complications, the most common of which was respiratory infection 7(2.5%), followed by post-operative fever 6 (2.1%), according to cross-sectional study conducted in Attat Hospital in South-Western Ethiopia in 2013. Mothers with ANC follow-up have good post-operative outcome than those who didn't have follow-up (p-value = 0.024, AOR = 0.295, 95%CI= 0.102, 0.849) and those mothers whose pre-operation hemoglobin > 11 have good post-op outcome than mothers with pre-operation hemoglobin <11 (p-value = 0.034, COR = 3.168, 95%CI = 1.06, 9.41) (12).

Another Institution based cross sectional study conducted in MizanAman hospital, south western, Ethiopia, in 2011 on Cesarean Section and associated factors, majority (91%) of the new born were alive. Out of this alive new born large number (88.5%) of them have APGAR score of greater than seven, for those new baby who were alive and weighed less number (8.1%) of them weight less than 2500gram. Of all mothers two (0.6%) of them were dead (13).

According to cross-sectional study conducted in Eastern Ethiopia, in Harar urban government and private hospitals, being rural resident, having a monthly family income of 4000 ETB (200 USD) or more, previous CS delivery, parity of three or more, fetal birth weight of greater than 4000 g, private hospital delivery, and private clinic/hospital ANC visit were found significantly associated to cesarean section delivery in the bivariate logistic regression. In the multivariate logistic regression model, independent of other factors, birth weight of more than 4000 g, previous CS delivery, and private hospital delivery were positively and significantly associated with cesarean section delivery (14).

A Cross-sectional retrospective study which was conducted in Attat Hospital, Gurage zone SNNPR, Ethiopia in 2013 the prevalence of cesarean section was 27.6%. The age of the patients ranged between 28.12 ± 5.14 years. The leading indications for cesarean birth were, cephalopelvic disproportion (CPD) (38.1%), previous CS (18.9%), fetal distress (12.5%),

malpresentation and malposition (7.1%), and Ante partum Hemorrhage (APH)(6%) accounting for 82.6% of the indications for cesarean section (12).

Another Institution based cross sectional study which was conducted in MizanAman hospital, South West Ethiopia, shows on bivariate analysis age of the mothers, gestational age at labor and the outcome of the new born were significantly associated with Cesarean section after adjusting for other variables in the final model. Mothers whose age is between 20-24 are 3.2 times more likely to undergo Cesarean section as compared with those age is between 15-19 years with (COR: 3.4, 95% CI:1.03, 8.4, and (AOR: 3.2, 95% CI: 1.03, 10). Those whose age is between 25-34 years are 3.6times more likely to undergo Cesarean section as compared with those who age is between 15-19 with, (COR: 3.8, 95% CI: 1.45, 9.5 and (AOR: 3.6, 95% CI: 1.15, 11.6). Mothers those age is 35and above are 10 times more likely to undergo CS as compared with those age is between 15-19with (COR: 6.7, 95% CI: 1.3, 35.1, and (AOR: 10, 95% CI: 1.06, 93.01). CS is 63% less likely among mothers whose gestational age at labor is greater than thirty eight weeks as compared with those who gestational age at labor is less than thirty eight (COR: 0.32, 95% CI: 0.14, 0.7, and(AOR: 0.37, 95% CI: 0.15, 0.9). The likelihood of being undergone CS is 5 times higher among mothers whose new born dead as compared to those whom their new born is alive (COR: 2.3,95% CI: 2.52, 11, and (AOR: 5, 95% CI: 2.06, 11.8) (13).

According to institutional based cross sectional study done in Gondar University Hospital, North West Ethiopia in 2012 show that, the use of general anesthesia for caesarean section in this particular study was more frequent when compared with spinal anesthesia (65%). The risk of Low APGAR score 5 was increased in babies born under general anesthesia as compared with babies born under Spinal anesthesia(AOR=3.19,95% C.I.(1.73, 5.90)). Low Fetal weight was associated with low APGAR score of newborns (AOR=1.38 with 95% C.I. (1.10, 1.70)). Pre anesthetic fetal heart rate and uterine incision to delivery time were also found to be associated with APGAR score 5 of neonates (AOR=2.12,(95% CI, 1.20; 3.60) and 2.57, (95% CI, 1.20, 3.50) respectively (15)

Birth outcome was one of the variables used during the study conducted in Jimma University Specialized Hospital in 2012. Therefore, from those fetus who delivered by CS majority of them (25.4%) were alive and 1.2% were still births which was followed by Early Neonatal Death(ENND) 3 (0.9%). But, out of the fetus delivered vaginally 6.8% were still births which

were followed by ENND (3.8%) and Intra Uterine Fetal Death (IUFD) (2.1%). But, 59.2% of them were alive. According to this study, APGAR score of the fetus delivered by C/S were (17.8%) have APGAR score between 4 and 6 at 1st minute and 1.8% have between 0 and 3. But at 5th minute most of them (16.9%) have APGAR score between 7 and 10 which were followed by 10.4% of those have between 4 and 6. But from those delivered vaginally 41.1% have APGAR score between 4 and 6 at 1st minute which was followed by 26.9% of those have between 7 and 10. But at 5th minute most of them (38.5%) have between 7 and 10 which were followed by 31.1% of those have between 4 and 6 (16).

Other Institution based cross sectional study conducted at Ghandi Memorial Hospital in Addis Ababa, Ethiopia in 2013 revealed that types of anesthesia were independent predictor of maternal and neonatal outcomes. Mothers who underwent caesarean section under spinal were more likely to have postoperative nausea and vomiting (COR= 38.5, 95% CI= (12,123). Incidence of low Apgar score in first minute was two and half times more likely to occur in general anesthesia, (AOR=2.54, 95% CI= (1.26,25.4). The first analgesic request in mothers underwent caesarean section under spinal anesthesia was three times more than mothers underwent caesarean section under general anesthesia (AOR=3.4, 95%CI= (1.4, 6.7) (17).

3. OBJECTIVES

3.1 General objectives

To assess outcome and associated factors of cesarean section in SPHMMC from Meskarem1, 2008 to 30, Nehassie 2008.

3.2 Specific Objectives

- To identify the Sociodemographic characteristics associated with outcome of cesarean section
- To identify obstetric characteristics associated with outcome of cesarean section

4. METHODOLOGY

4.1. Study area and period

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), A.A will have a total population of 3,433,999 by 2017 and lies at an altitude of 7,546 feet (2,300 meters). The City has surface area of about 530.14 km². The city possesses a complex mix of highland Climate zones. The study was conducted in SPHMMC Gynecology and Obstetrics department; the SPHMMC area is selected because it is the second largest central referral hospital in Ethiopia that provides service for patients referred from all over the country. The Hospital was built by Emperor Hailese lasie I in 1969 G.C as a source of medical care for underserved populations was named St Paul General specialized Hospital till 2008 and a medical college was formed in 2007. The college has undergraduate programs in medicine, emergency nursing & ICU care. The postgraduate programs were launched in 2012 with departments of OBS & GYN and IESO (Integrated Emergency Surgery and Obstetrics). The college has already started the postgraduate program in departments of gynecology and obstetrics, internal medicine, pediatrics and surgery. It currently has 392 beds, has an annual average of 280,000 patients and a catchment population of more than 5 million. Approximately 75% of the patients receive medical services free of charge. There is over 2300 clinical and non-clinical staff in over 13 departments; most recently launched its new hemodialysis unit and transplant center (18). The data was collected from February 1 to May 7 2017 G.C.

4.2. Study design

Hospital based retrospective descriptive study (Meskeram 1, 2008 to Nehassie 30 2009) was done.

4.3. Source population

The source population was all records of delivering mothers by cesarean section in the maternity ward of St. Paul's millennium medical college.

4.4. Study population

The study population was all record of mothers who delivered by cesarean section in the maternity ward of SPHMMC during the reference period (from Meskerem 1, 2008 to Nehassie 30, 2008) which are selected based on the sampling techniques used.

4.5. Inclusion and exclusion criteria

4.5.1 Inclusion criteria

- ✓ All mothers who gave birth via cesarean section at SPHMMC from Meskerem 1, 2008 to Nehassie 30, 2008).

4.5.2 Exclusion criteria

- ✓ Mothers who gave birth outside the Hospital and admitted to maternity ward for postpartum complications.

4.6. Sample size determination

The sample size for the study was computed by using the formula for single population proportion formula using the following assumption: the level of confidence of 95%, 5% margin of error, proportion of caesarean section from other previous study done in Felegehiwot referral hospital, Northwest Ethiopia, in 2013, was 25%. Based on this the following sample size is calculated.

$$n_0 = (Z_{\alpha/2})^2 \cdot p(1-p) / d^2$$

$$n_0 = (1.96)^2 (0.25)(1-0.25) = 0.727$$

$$(0.05)^2 0.0025$$

$$= 288$$

Since the total number of cesarean delivery is less than 10000(3549), adjustment is made

$$n = 288 / (1 + 288 - 1) / 3549$$

$$n = 266$$

After adding 10% for incomplete data it is $267 + 26 = 293$

4.7. Sampling method

To select the study units, systematic sampling technique was used. Therefore, the interval (K) is calculated by dividing the total number of cesarean section delivery in that year is for the number of the sampled c/s delivery.

$$K = N/n_0$$

$$K = 3549/293$$

$$K = 12$$

Therefore study units were selected by systematic sampling every 12nd C/S delivery after identifying the registry of delivery from labor ward registry logbook.

4.8. Variables

4.8.1 Dependent variables

- ✓ APGAR score of the neonate
- ✓ Birth weight of the neonates
- ✓ Length of hospital stay

4.8.2 Independent variables

- ✓ Age
- ✓ Residence
- ✓ Parity
- ✓ Educational status
- ✓ Occupation
- ✓ Marital status
- ✓ Gravidity
- ✓ ANC
- ✓ Previous Hx of Cesarean Section
- ✓ The type of Cesarean Section
- ✓ Indications for Cesarean Section

4.9. Definition of terms

Apgar score- is the score given to a fetus at or immediately after birth to assess the status of oxygenation. In this study the final score will be assessed. Apgar score of less than 6 is considered low while 7 or above is considered high apgar for this research.

Cesarean section- is an operative procedure whereby the fetus/es after the end of 28th week/s is/are delivered through an incision on abdominal and uterine walls. (1)

Primary- is the first cesarean section performed on a patient (10)

Repeat- is when operation is performed in subsequent pregnancies (10)

Fetal birth weight- is also stratified as extremely very low birth weight (<1000gm), very low birth weight (1000-1499gm), low birth weight (1500- 2499gm), normal birth weight (2500-3999gm) and macrosomia (> 4000gm). (1)

Parity- is the number of deliveries after 28 weeks of pregnancy despite the outcome (15)

Gravidity: the number of pregnancy regardless of the outcome.

Length of hospital stay: the number of day's mother stays at hospital from immediate post op to the day of discharge

4.10. Data collection method and procedure

After sample was selected based on the systemic sampling techniques from registration book, charts were retrieved from the chart office of the college. Data was collected by using a structured data-collecting checklist prepared for this purpose developed from different literature review. Chart numbers were initially retrieved by the researcher and then data was copied to the checklist the charts were returned to the chart office. Data was entered collected by the researcher himself.

4.11 Data quality control

Pretest was employed on 5% of the sample size with structured questionnaire in SPHMMC on cesarean section deliveries in two weeks prior to the actual study to check usually recorded variables on the patient's medical record. Daily evaluation of the data for completeness was checked.

4.12 Data analysis and processing

After the completeness of the data was checked the data then entered into SPSS version 22.0. Different socio-demographic variables were computed for descriptive variables. Bivariate and multivariate analysis was done for different possible factors associated with outcome of cesarean section. P-value of < 0.05 was considered statistical significant. The result of this data was presented with sentence, graphs and tables.

4.13 Ethical consideration

After the research proposal was approved by SPHMMC public health department, data collection was started. The charts of the patients were seen by the researcher and were used for this research only. No identification markers were copied to the data collection instrument or the SPSS. After the data was taken the charts were returned to the proper body of chart keeping.

4.14 Dissemination of Results

The result will be presented for the fulfillment of degree in medicine. Soft copy and hard copy will be submitted to the department. Efforts will be done to publish the findings of the study and disseminated through different journals and scientific publications. The results of the research will finally be presented to the medical college's community.

5. RESULTS

This study was conducted among mother who delivered in SPHMMC via cesarean section during the study period of Meskerem 1, 2008-Nehassie 30, 2008 E.C. Charts of 285 mothers were reviewed covering for of the 97.2% planned sample size. Records of eight mothers were not included since their chart couldn't be retrieved despite adequate pursuit.

5.1 Socio-demographic data of study subject

Among the study subjects the age of the study subjects ranges from of which 18-38 with the mean 24+5.1 years. The majority of the pregnant women in the study were married (96.5%). With regard to the residency 184(64.6%) were from urban and 101(35.4%) from rural (Table 1).

Table 1: Sociodemographic characteristics of pregnant women who delivered by cesarean section in SPHMMC from Meskerem1, 2008 to Nehassie 30, 2008(n=285)

variables		Frequency	Percent
Age	<19	19	6.7
	20-34	237	83.2
	>34	29	10.2
Residency	Urban	184	64.6
	Rural	101	35.4
Marital status	Married	275	96.5
	Separated/divorce/widowed	10	3.5
Religion	Orthodox	145	50.9
	Muslim	71	24.9
	Protestant	62	21.8
	Catholic	6	2.1
	Others	1	.4
Educational status	Illiterate	90	31.6
	Primary (1-8)	105	36.8
	Secondary (9-12)	50	17.5
	Tertiary	40	14.0
Occupation	House Wife	71	24.9
	Private employee	60	21.1
	Government employee	54	18.9
	Daily laborer	42	14.7
	Merchant	41	14.4
	Student	17	6.0

5.2 Obstetric variables and type of surgery of study subject

Among the pregnant women in this study 219(76.8%) had antenatal care while 23.2% didn't have antenatal care. Regarding to the gravidity of the study subjects figure1 61(56.5%) were primigravida while 124(43.5%) had previous pregnancy. In this research majority (75.4%) of the study subjects were in the term (37-42 weeks) of their pregnancy when they delivered.

Table 2: Obstetrics variables of pregnant women who delivered by cesarean section SPHMMC from Meskerem1, 2008 to Nehassie 30, 2008(n=285)

Variables		Frequency	Percent
Gravidity	Primigravida	161	56.5
	Multigravida	124	43.5
Do they have ANC follow-up?	Yes	219	76.8
	No	66	23.2
Gestational age in weeks	28-34	7	2.5
	34-36	41	14.4
	37-42	215	75.4
	>42	11	3.9
	unknown GA	11	3.9

The type of surgery done was emergency in 217(76.1%) and elective in 68(23.1%) of the study subjects. The commonest indication for cesarean delivery was non reassuring fetal heart rate pattern in 129(45.3%). Other common indications were failed induction (14.7%) previous cesarean scar (10.2%) and malpresentation and malposition's (9.5%). Anesthesia used for the operation was spinal anesthesia for 275(96.5%) of the mother (table 3).

Table 3: Summary of surgery and indications of pregnant women who delivered by cesarean section in SPHMMC from Meskerem1, 2008 to Nehassie 30, 2008(n=285)

Variable		Frequency	Percent
Type of surgery	Emergency	217	76.1
	Elective	68	23.9
Type of anesthesia	General	10	3.5
	Spinal	275	96.5
Indication of cesarean section	NRFHR	129	45.3
	failed induction	42	14.7
	Previous C/S	29	10.2
	Mal presentation & malposition	27	9.5
	APH	23	8.1
	CPD	11	3.9

	Failure to progress	9	3.2
	Cord prolapse	5	1.8
	Multiple gestation	5	1.8
	Obstructed labor	5	1.8

5.3 Outcome of cesarean delivery

With regard to the outcome of delivery the Apgar score of the neonate, sex of the neonate, duration of hospital stay and post-op complication was assessed. Among the total 285 neonates 151(53%) were female. Birth weight analysis showed that 68.1% have normal birth weight while 15.1% have low birth weight. The remaining has very low birth weight (7.7%) and Macrosomia (9.1%). Among the total of 285 neonates 278(97.5) were live birth while 7(2.4%) were still birth. The neonatal first/fifth minute Apgar score shows that 228(82%) have APGAR of 7 or above while 16(5.7%) have APGAR of 0-3 at the first/fifth minute. The remaining 34 (12.2%) have an Apgar score of 4-6 as shown in table 4. The length of hospital stay among mother with cesarean delivery was also assessed. The mean length of hospital stay is 3.7 with SD of 1.375. The majority of the study subjects stay in hospital 2-4 days (81.4%) while it ranges from 2-13 days. With regards to the post-op complication of the study subjects 21(7.3%) have different post-op complications including surgical site infection, pneumonia and postpartum hemorrhage. All of the mothers in the study were discharged improved. No maternal deaths were recorded among the study subjects.

Table 5: outcome of cesarean section delivery in SPHMMC from Meskeram 1.2008 to Nehassie 30.2008(n=285)

Variables		Frequency	Percent
Fetal weight	1000-1499g	22	7.7%
	1500-2499g	43	15.1%
	2500-3999g	194	68.1%
	≥4000g	26	9.1%
APGAR score	0-3	16	5.7%
	3-6	34	12.2%
	≥7	228	82%
Sex of newborn	Male	134	47%

	Female	151	53%
Status of neonate on delivery	Live birth	278	97.5%
	Still birth	7	2.4%

5.4 Association between socio-demographic factors and outcome of delivery

In this part the possible association between different Sociodemographic and obstetrics characteristic of the study subjects with outcome variables (birth weight and Apgar score) is analyzed. On bivariate analysis maternal age, gestational age at the time of the operation and type of surgery has statistically significant association with birth weight ($P < 0.05$).

Table 4: Association between different Sociodemographic and obstetrical variables with birth weight of pregnant mother who undergo cesarean delivery in SPHMMC in 2008(n=285)

Independent variables		Birth weight		p-value
		Non-NBW	NBW	
Age	<19	3	16	.002
	20-34	72	165	
	>34	16	13	
Residence	Urban	57	127	.643
	Rural	34	67	
Marital status	Married	88	187	.981
	Single	0	1	
	separated/divorce/widowed	3	6	
Occupation	House Wife	21	50	.674
	Government employee	16	38	
	Merchant	18	23	
	Daily labourer	16	26	
	Student	5	12	
	Private employee	15	45	

Religion	Muslim	26	45	.879
	orthodox	42	103	
	protestant	20	42	
	catholic	2	4	
	others	1	0	
Education	Primary (1-8)	41	64	0.116
	Secondary (9-12)	13	37	
	tertiary	12	28	
	none	25	65	
Gestational age	28-34	6	1	.020
	34-36	21	20	
	37-42	54	161	
	>42	6	5	
	unknown GA	4	7	
ANC	Yes	63	156	.051
	No	28	38	
Gravidity	Primigravida	49	112	.412
	2-4	39	79	
	>4	3	3	
Type of surgery	emergency	76	141	.046
	elective	15	53	
Type of anesthesia	General	3	7	.894
	spinal	88	187	

With regard to the association between different socio-demographic, obstetrical variables and the neonatal Apgar score at the first/fifth minute, none of the Sociodemographic and obstetrical variables have statistically significant association with outcome variable Apgar score. Comparing to the length of hospital stay none of the socio-demographic variable and obstetric characteristic of the study subjects are found to have statistically significant association.

In multivariate analysis shows that maternal age group of <19 years, and 20-34 years had 4.6 times AOR [4.655 95%CI(1.197-18.102)] and 2.6 times AOR [2.696 95%CI: (1.213-5.994)] higher odds of having normal birth weight neonate than those whose age were >34 years respectively. Those study subjects who had GA >42 had 2.8 times AOR [2.833 95%CI: (0.854-9.396)] higher Odds of having NBW neonates than those whose GA age was 28-34 as shown in table 5.

Table 5: multivariate analysis of factors associated with the outcome of cesarean section done in SPHMMC I in 2008(n=285)

variables		Birth weight		OR(95%CI)	
		Non-NBW	NBW	Crude	Adjusted
Age	<19	3	16	4.750(1.302-17.327)	4.655(1.197-18.102)
	20-34	72	165	3.036(1.458-6.324)	2.696(1.213-5.994)
	>34	16	13	1	1
Gestational age	28-34	6	1	1	1
	34-36	21	20	1.200(.233-6.185)	1.018(.191-5.423)
	37-42	54	161	0.821(.233-2.893)	0.945(.259-3.444)
	>42	6	5	3.038(.939-9.83)1	2.833(.854-9.396)
Type of surgery	Elective	15	53	1	1
	Emergency	76	141	0.429(0.220-0.835)	0.482(.241-.965)

6. DISCUSSION

In this research it is found that the pregnant women who had delivered via cesarean section 76.8% had antenatal care. This is in consistent with the research done in eastern Ethiopia (82.6%) and North West Ethiopia (71.3%). The slight difference between these results may be due to the difference in socio-demographic characteristics and methods used (11) (15)

In this research 56.5% of the women who delivered via cesarean were primigravida. This result is lower to the research done in North West Ethiopia (69.3%). The gap may be explained by the difference in sample size and method used between this two studies (11) (15).

The type of surgery done was emergency in 217(76.1%) and elective in 68(23.1%) of the study subjects. This is similar to the study done in North West Ethiopia which found 79% of the cesarean were emergencies while lower to the other studies done in North West Ethiopia (85.2%) and East Ethiopia (87.3%). This gap may be due to the difference in year of the data collection, method of study and hospitals system of patient monitoring and decision (12) (15).

The commonest indication for cesarean delivery was non reassuring fetal heart rate pattern in 129(45.3%). Other common indications were previous cesarean scar (10.25) and failed induction (14.7%). Fetal distress (previous term for NRFHRP) was mentioned as commonest indication (25%) in North West Ethiopia followed by CPD (24%), obstructed labor (11%) and prolonged labor (11%). Similarly another research in north west Ethiopia report the indications: obstructed labor (30.7 %) followed by fetal distress (15.9 %), abnormal presentation (13.4 %), previous CS scar (7.9%) and failure to progress (6.8%).The gap may be explained by the sample size and method difference in addition to in maternal pelvis anatomy difference between this populations (15) (19).

In this study 97.5%were live birth while 2.4% were still birth which much lower than research done in north west Ethiopia which 9.06%newborns were stillbirths and its also higher than other research done in Jimma hospital in which 1.2% of cesarean section delivery were still births (11) (16).

The neonatal fifth minute Apgar score shows that 228(80%) have APGAR of 7or more which is slightly lower than study done in southern west Ethiopia which 88.5% of them have APGAR score of greater than seven (13).

7. LIMITATION OF THE STUDY

As any research on secondary data this research may be biased since primarily the data was collected to manage the patients not for the purpose of this research.

The researcher couldn't access the futures of the neonates born as there was nothing registered on the maternal chart regarding their neonates. This hinder the researchers from assessing the postnatal outcome if the neonates born to mothers with cesarean section.

Additional the researcher couldn't find some of the variables from the charts as it were not recorded.

8. CONCLUSION

This study was done to assess the factors associated with the outcome of cesarean section among mother who delivered in SPHMMC. Charts of 285 mothers were reviewed. The majority of the pregnant women in the study were married.

In the obstetric history among the pregnant women in this study three fourth had antenatal care and more than half were primigravida. Nearly three quarter of the study subjects of this research delivered at term (37-42 weeks).

With regard to the type of surgery done only a quarter were done electively as the majorities were operated as emergency. Non reassuring fetal heart rate pattern was the commonest indication for cesarean delivery covering for almost half of the study subjects. Other less common indications were failed induction and previous cesarean scar. According to the data collected in this research the type of anesthesia used for almost all of the study subjects was spinal anesthesia.

There is slight female predominance (53:47) among the delivered neonates. Nearly seventy percent of the delivered neonates have normal birth weight followed by Macrosomia, low birth weight and very low birth weight. The Apgar score of the newborns showed that majority have favorable Apgar (>6) in their fifth or last recorded score.

Maternal age, gestational age and type of surgery were found to have statistically significant association with birth weight ($P<0.05$). But none of the socio-demographic and obstetric characteristic of the study subjects has statistically significant association with Apgar score.

9. RECOMMENDATION

After completing this research the researcher recommends the following for the hospital s and other researchers. The indication of cesarean delivery for majority of the cases in this research was non-reassuring fetal heart rate pattern. This is higher to any of the studies referred. This may be due to liberal diagnosis and management of mothers as non-reassuring fetal heart rate pattern. The researcher recommends the college to have another study regarding this area and adjust the diagnosis and management of non-reassuring pattern. Additionally equipment's with better sensitivity than intermittent/continuous fetal heart rate follow-up may improve the accurate diagnosis of fetal heart rate pattern. This may decrease the rate of cesarean delivery.

Researchers are recommended to have similar research in the college and similar areas regarding the topic to answered some of the new questions raised during this study.

Reference

1. Conor H. Dutta Text book of Obstetrics New central book agency(p) Ltd,chapter 36. 6th ed.: JAYPEE BROTHERS MEDICAL PUBLISHERS(P)LTD; 2005.
2. Lure S.Glezerman M. The history of ceseran technique. obstet gynocol. 2003; 189:1803-6.
3. Mesganaw FA. Achieving the Maternal Health Millennium development Goals in Ethiopia: Where are we and what needs to be done? Addis AbabaUniversity school of public health, Addis Ababa. Ethiopan Journal of Health Development. 2011 july; 24(1).
4. EPHA (Ethiopian Public Health Association) "Maternal and Newborn Health in Ethiopia "as a Main theme. Proceeding of the annual conference of Brother's PP, March, 2011. In.
5. WHO (2010) Trends in Maternal Mortality: 1990 to 2008. Geneva: World Health Organization. .
6. Factors associated with high cesearan section,South Africa. ukeme sunday in yang-out. 2014.
7. Archana Shah,Bakula Fawale,James Machoki.fauzi.amokrane,kidza Mugewa. cesearan section outcomes from WHO global survey on maternal and perinatal health in africa. International journal of gynecology and obstetrics. 2009 august; 7(ijg-06410).
8. Ethiopian demographic health survey. In.; :2016.
9. Graciete Oliveira Vieira1, Lorena Gabriel Fernandes(2015). Factors associated with cesarean delivery in public and private hospitals in a city of northeastern Brazil: a cross-sectional study. BMC Pregnancy and Childbirth (2015) 15:132 DOI 10.1186/s12884-015-0570-8. .
10. Karlstrom A, Lindgren H, Hildingsson I. Maternal and infant outcome after caesarean section without recorded medical indication: findings from a Swedish case-control study.BJOG 2013; 120:479–486.Section rates in developing countries, an analysis of six countries, Social Science and Medicine,. , Social Science and Medicine, vol.67, No 8 (October 2008) PP. (1236- 1246). PMID: 18657345. .
11. Abebe F,Gebeyehu A,Kidane A,Eyassu G. Factors leading to cesearan section delivery at Felegehiwot refferal hospital,Northwest,Ethiopia. Reproductive Health. 2016.
12. Moges A ABAG. Prevalence and Outcome of Cesarean Section in Attat Hospital,Gurage Zone, SNNPR, Ethiopia. Arch Med. 2015; 7:4.28. .
13. Hordofa G aAS. cesearan section and associated factors at Mizan Aman General Hospital Southwest Ethiopia. Journal of GYneology and Obstetrics. 2014;; p. 37-41.
14. Tsega F, Mengistie B, Dessie Y, Mengesha M (2015). Prevalence of Cesarean section in Urban Health facilities and associated factors in Eastern Ethiopia: Hospital Based Cross Sectional study. J Preg Child Health 2: 169. Doi: 10.4172/2376- 127X.100016. .

15. Abdissa Z, Awoke T, Belayneh T, Tefera Y. Birth Outcome after Caesarean Section among Mothers who Delivered by Caesarean Section under General and Spinal Anesthesia at Gondar University Teaching Hospital North-West Ethiopia. 2013 may.
16. Ayanos T, Mohammed Y. One year retrospective analysis of prevalence of cesarean section in Jimma University Specialized Hospital, southern Western Ethiopia. *preg child Health*. 2015: p. 2-4.
17. Mekonen S, Eshete A, Desta K, Molla Y. Mekonen S, Maternal and Neonatal outcomes in mothers who undergo caesarean section under General and spinal Anesthesia in Gandhi Memorial Hospital, Addis Ababa. *Adv Tech Biol Med* 3: 119. doi: 10.4172/2379-. 2015.
18. porter, Annie. www.Wikipedia.com. [Online].; 2012 [cited 2017 February 14].

ANNEXES

1. data check list

Age	Question	Categories
1	Mother age in years	
2.	Residency	1 .Urban 2. Rural
3	Marital status	1.married 2.single 3Separated/Divorce/Widowed
4	occupation	1.House wife 2, Governmental employee 3.Merchant 4.Daily laborer 5. Student 6.private employee
5	Religion	1.muslim 2.christian 3.protestant 4.catholic
6	Education	1.Primary, 2.Secondary 3.Tertiary 4.None
7	GRAVIDA	1.Primigravida 2.2-4 3.5 or more
8	Gestational age in weeks	1. 28-34 2. 34-36 3. 37-42 4.>42

9	ANC follow-up	1. Yes 2. No
10	Previous cesarean section	1. yes 2. no
11	Type of surgery	1. Emergency 2. Elective
12	Type of anesthesia	1. General Anesthesia 2. Spinal Anesthesia
13	Indication of cesarean section	1. Obstructed Labor 2. NRFHR 3. CPD 4. APH 5. Previous C/S 6. Malpresentation and malposition (other than breech) 7. Severe pre-eclampsia /eclampsia 8. Failure to progress 9. Failed induction 10. Breech presentation 11. Cord prolapsed 12. Post-term (> 42 completed weeks) 13. Other (specify-----)
14	Presence of risk factors	1. yes 2. no

Part 2-Outcome of cesarean section

No	Question	Categories
1	Sex of newborn	1.male 2.female
2	Fetal weight	1. 1000-1499g 2.1500-2499g 3.2500-3999g 4.≥4000g
3	APGAR score	1.0-3 2.3-6 3.≥7
	Status of neonate on delivery	1.live birth 2.still birth
4	Maternal post op complication	1.no 2.yes If yes specify_____
5	Length of hospital stay	

2. Declaration

The undersigned agrees to accept responsibility for the scientific ,ethical and technical conduct of the research project and for provision of required progress as per terms and conditions of the Research and Publication Directorate or/and Department of Public Health of St Paul's Hospital Millennium Medical College.

Name: Abdurahman Aden

Date: _____ Signature: _____

Approval of advisor(s)

Advisors name: _____Signature _____

Date: _____

Advisors name: _____Signature_____

Date: _____