



Cross-sectional Study

Practice towards perioperative care of cesarean delivery in Debre Tabor Comprehensive Specialized Hospital, North Central Ethiopia: Cross-sectional study

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ABSTRACT

Background: Perioperative obstetric care is vital in clinical practice to improve maternal and neonatal outcomes. The standardized practice of perioperative obstetrics care service has a great role in the reduction of both expected and unexpected adverse outcomes. So, the purpose of this study was to assess the implementation of perioperative obstetric care services based on standards of Enhanced Recovery after Cesarean Delivery and the Society of Anesthesiology and Perinatology.

Method and materials: A cross-sectional study was conducted on 161 mothers with an elective cesarean delivery from August 10, 2021, to May 15, 2022. The standard of this study was taken from evidence-based practice guidelines of perioperative practice for an elective cesarean delivery. Informed consent was taken from all study participants. The data was collected through direct observation using a standard checklist changed to standardized question forms with two checking components ("Yes", and "No"), and data were entered into SPSS version 20 for analysis and interpretation. Descriptive analysis was done and the results were expressed in numbers and percentages using a table.

Results: A total of 161 elective cesarean sections were involved to identify the level of perioperative care. Administration of first-generation antibiotics prophylaxis, aqueous povidone-iodine solution-based skin preparations, and preparation for immediate neonatal resuscitation were fully performed based on the standards.

Conclusions: The majority of elective caesarian deliveries were carried out below the recommended level as per the checklists for perioperative practice. So, added interventions are needed to improve perioperative obstetrics care services on those standards which are not totally applied and partially performed.

1. Introduction

The global Cesarean delivery rate is high with the improvement of maternal and neonatal outcomes [1–3]. But, maternal and neonatal deaths are highest in sub-Saharan Africa caused by reduced safety and access to cesarean deliveries [4]. Currently, the cesarean delivery rate in Ethiopia has increased but, maternal and neonatal mortality rates are high, this is because of the low level of obstetric care [5,6].

Mortality and morbidity following cesarean section vary depending on the quality of perioperative care delivered by health professionals [7, 8]. Standardized protocols and guidelines are established to improve

maternal and neonatal outcomes with the reduction of a patient and hospital costs [9–11].

Quality improvement in obstetric care is the most challenging clinical practice that needs the application of evidence-based guidelines in actual practice along with frequent auditing and regular re-auditing [12]. The Society of Anesthesiology and Perinatology (SOAP) and Enhanced Recovery After Cesarean Delivery (ERAC) recommendations for the care of cesarean delivery focus on evidence-based practice of a multidisciplinary approach with preoperative, intraoperative, and post-operative components [8,11,13].

Those protocols are currently implemented to standardize

Abbreviations: CD, Cesarean Delivery; ECG, Electrocardiography; ERAC, Enhanced Recovery after Cesarean Section; GA, General Anesthesia; IV, Intravenous; NIBP, None Invasive Blood Pressure; NSAIDs, None Steroidal Anti-Inflammatory Drugs; OR, Operation Room; PONV, Post-Operative Nausea and Vomiting; SOAP, Society of Anesthesiology and Perinatology; SA, Spinal Anesthesia; USA, United States of America; VTE, Venous Thromboembolism.

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perioperative care services [14]. But the main challenges of ERAC and SOAP protocols are their implementation in actual practice as a result of difficulties in changing from trend-based practice to standardized protocols [8]. Also, health professionals' discordances and inconsistent application of evidence-based practices reduce perioperative cesarean delivery care services [15].

The current practice of perioperative care of cesarean delivery (CD) focuses on evidence-based practice along with tackling barriers and applying regular auditing to deliver quality obstetric care services [12, 16].

Debre Tabor Comprehensive Specialized Hospital is currently working on the quality of perioperative obstetrics care service and protocol-based practice to improve the level of obstetric care along with reducing maternal and neonatal deaths. So this clinical audit will identify the level of perioperative obstetric care service regarding standards of practice.

2. Aims and objectives

2.1. Aims

This study aimed to assess the practice of perioperative care of elective cesarean deliveries.

2.2. Objectives

- 1 To identify gaps in the practice of perioperative obstetric care.
- 2 To determine the level of practice for perioperative obstetric care.

3. Method and study period

A cross-sectional study was conducted at Debre Tabor Comprehensive Specialized Hospital, Northwest Ethiopia, from August 10, 2021, to May 15, 2022. This study is registered at <https://www.researchregistry.com> with research registry UIN: researchregistry8042. Also, it is reported according to STROCSS criteria [17].

Source population: All pregnant mothers that came for delivery at Debre Tabor Comprehensive Specialized Hospital.

Study population: All elective cesarean deliveries at Debre Tabor Comprehensive Specialized Hospital.

3.1. Inclusion and exclusion criteria

Inclusion criteria: All elective cesarean deliveries.

Exclusion criteria: Elective cesarean deliveries with bad obstetric outcomes (intraoperative maternal and neonatal death).

Sample size: The sample size was calculated with a Raosoft sample size calculator considering an estimated population size of about 18000 with a 95% confidence interval and a 5% margin of error. The total sample size was calculated to be 161.

Sampling procedure: Consecutive sampling technique was applied until the calculated sample size was achieved. All elective cesarean deliveries that meet the inclusion criteria were audited until the required sample is achieved.

3.2. Data collection method and analysis

The data was collected through direct observation using a standard checklist changed to standardized question forms with two checking components ("Yes", and "No" forms). All Study participants were informed about the purpose and importance of this clinical audit. The English version of the standard checklist was translated to the Amharic version of the local language to collect data from study participants. Also, written informed consent was taken before the data collection. The data of the preoperative and intra-operative components were collected by two trained anesthetists and the post-operative component was

collected by two trained midwives. The data was entered into SPSS version 20 for analysis and interpretation. Descriptive analysis was done and the results were expressed in numbers and percentages using a table.

3.3. Ethics approval

Ethical clearance was obtained from Debre Tabor University Ethical Review Committee and a permission letter was obtained from Debre Tabor Comprehensive Specialized Hospital.

4. Practice standards

The standard was taken from evidence-based practice guidelines on the perioperative practice of obstetric care service. The standard checklist has three components, preoperative, intraoperative including neonatal care, and post-operative obstetric care. The target practice of perioperative obstetric care was 100% achievement [Table 1].

5. Result

There were about 533 emergency and elective cesarean deliveries during the study period and 161(30.2%) were elective cesarean deliveries. The majority of the study participants were multiparous 137 (85.1%) and higher numbers (87.7%) of elective CDs were done with Spinal anesthesia. About 32(19.9%) of elective CDs have hypertension (pregnancy-induced and chronic) or comorbid illness and multiple CD was the most common indication for elective CD [Table 2].

In this study, preoperative components, those first-generation antibiotics prophylaxis, and aqueous povidone-iodine solution-based skin preparations were performed 100% based on the standard practice. Also, the application of standard monitoring (NIBP and pulse oximeter), leaving the peritoneum not closed, and preparation for immediate neonatal resuscitation were intraoperative components' of obstetric care applied to all elective CDs. Preloading for treatment of post-operative hypotension and written discharging criteria with counseling were post-operative components of obstetrics care performed 100% based on the standards of practice [Table 3].

6. Discussion

The overall cesarean delivery rate in Ethiopia was about 29.55% and the level of maternal and neonatal outcomes was poor but the incidence in this study area is not yet studied [20]. The result of this study is higher compared with an overall incidence in Africa of about 8.8% but, it is nearly similar to the incidence of CD in Latin America about 33% [21, 22].

Implementation of ERAC and SOAP protocols improves the outcomes of CDs [23]. In this study implementation of the protocols in actual practice is minimal and this might be due to the low level of WHO checklist implementation in this study area (30.4%) [24]. Also, lack of ERAC and SOAP practice protocols in the working area as checklist forms for every elective cesarean delivery, reduced multidisciplinary team spirit and lack of regular training on the importance of protocols are possible reasons that reduced the level of perioperative obstetric practice.

In this study, Informing patients about the procedure with risk benefits, preoperative assessment, and antacid prophylaxis with H2 blockers were relatively applied in higher numbers of elective cesarean deliveries which have a great role in the risk reduction of complications.

This study shows that administration of antibiotic prophylaxis with the first-generation cephalosporin was done for all CDs but the addition of azithromycin to the first-generation cephalosporin was not applied at all. This finding is nearly similar to a study in the USA about 96% of antibiotics prophylaxis was with first-generation antibiotics and less than 3% was with the addition of azithromycin [25]. Even though chlorhexidine-alcohol is preferred for skin preparation before cesarean

Table 1
Standards of perioperative obstetric care.

Standardized questioner	Target	Evidence	Data source
Preoperative care of cesarean delivery			
Patients should be informed about procedures before, during, and after cesarean delivery.	100%	SOAP, ERAS [9,13]	Observation
Preoperative evaluation should be done and informed about the harms and benefits to both the mother and her baby.	100%	SOAP, ERAS [9,13]	Observation
Antacids and histamine H2 receptor antagonists should be administered as premedication to reduce the risk of aspiration pneumonitis.	100%	SOAP, ERAS [9,13]	Observation
Women should be encouraged to drink clear fluids (pulp-free juice, coffee, or tea without milk) until 2 h before surgery.	100%	SOAP, ERAS [9,13]	Observation
Women might be encouraged to eat a light meal up to 6 h before surgery.	100%	SOAP, ERAS [9,13]	Observation
Oral carbohydrate fluid supplementation, 2 h before cesarean delivery should be offered to non-diabetic women.	100%	SOAP, ERAS [9,13]	Observation
Maternal hypertension should be managed during pregnancy.	100%	SOAP, ERAS [9,13]	Observation
Gestational diabetes mellitus should be managed properly.	100%	SOAP, ERAS [9,13]	Observation
Maternal anemia during pregnancy should be identified and corrected.	100%	SOAP, ERAS [9,13]	Observation
Maternal cigarette smoking should be stopped before or in early pregnancy.	100%	SOAP, ERAS [9,13]	Observation
Intravenous antibiotics should be administered within 60 min before the cesarean delivery of the skin incision.	100%	SOAP, ERAS [9,11]	Observation
First-generation cephalosporin antibiotics should be used for prophylaxis.	100%	SOAP, ERAS [9,11]	Observation
Azithromycin might be given in addition to the first-generation cephalosporin for women in labor or with ruptured membranes.	90%	SOAP, ERAS [9,11]	Observation
Chlorhexidine-alcohol might be preferred for abdominal skin cleansing before cesarean delivery.	90%	SOAP, ERAS [9,11]	Observation
The aqueous povidone-iodine solution might be used for abdominal skin cleansing before cesarean delivery.	90%	SOAP, ERAS [9,11]	Observation
Vaginal preparation with the povidone-iodine solution should be considered for all mothers done CD.	100%	SOAP, ERAS [9,11]	Observation
Intraoperative care of cesarean delivery			
Regional anesthesia is preferred for cesarean delivery.	100%	SOAP, ERAS [9,11]	Observation
All standard monitoring's should be applied	100%	SOAP, ERAS [9,11]	Observation
Forced-air warming should be applied to prevent hypothermia during cesarean delivery.	100%	SOAP, ERAS [9,11]	Observation
Intravenous fluid warming should be applied to prevent hypothermia during cesarean delivery.	100%	SOAP, ERAS [9,11]	Observation
Operating room temperature should be increased to prevent hypothermia during cesarean delivery.	100%	SOAP, ERAS [9,11]	Observation
Blunt expansion of a transverse uterine hysterotomy should be applied at the time of cesarean delivery to reduce surgical blood loss.	100%	SOAP, ERAS [9,11]	Observation
Closure of the hysterotomy in 2 layers should be done to lower the rate of uterine rupture.	100%	SOAP, ERAS [9,11]	Observation
The peritoneum should not be closed during CD which increases operative times.	100%	SOAP, ERAS [9,11]	Observation

Table 1 (continued)

Standardized questioner	Target	Evidence	Data source
Re-approximation of the tissue layer performed should be performed for women with 2 cm of subcutaneous tissue gaps.	100%	SOAP, ERAS [9,11]	Observation
Skin closure should be done with a subcuticular suture.	100%	SOAP, ERAS [9,11]	Observation
Women undergoing C/S should be euvolemic in the perioperative period.	100%	SOAP, ERAS [9,11]	Observation
Neonatal care of cesarean delivery			
Delayed cord clamping for at least 1 min should be applied for term delivery.	100%	Alex Friedman Peahl [18]	Observation
Delayed cord clamping for at least 30 s should be applied for preterm delivery.	100%	Alex Friedman Peahl [18]	Observation
Skin to skin/breastfeeding in OR.	100%	Alex Friedman Peahl [18]	Observation
The Body temperature of the neonate should be measured as immediate C/ S.	100%	Alex Friedman Peahl [18]	Observation
The body temperature of a neonate should be maintained between 36.5C and 37.5C after birth through admission and stabilization.	100%	Alex Friedman Peahl [18]	Observation
Routine suctioning of the airway or gastric aspiration should be avoided.	100%	Alex Friedman Peahl [18]	Observation
Routine neonatal supplementation with room air should be avoided.	100%	Alex Friedman Peahl [18]	Observation
There should be preparedness for immediate neonatal resuscitation.	100%	Alex Friedman Peahl [18]	Observation
Post-Operative care of cesarean delivery			
Early sham feeding should be applied to all neonates.	100%	ERAS [19]	Observation
A urinary catheter should be removed 6–12 h after cesarean delivery if placed during surgery.	100%	ERAS [19]	Observation
Fluid preloading, IV administration of ephedrine or phenylephrine, and lower limb compression might be applied to reduce hypotension and postoperative nausea and vomiting.	100%	ERAS [19]	Observation
Multimodal antiemetic agents should be applied to treat PONV.	100%	ERAS [19]	Observation
Pneumatic compression stockings should be used to prevent thromboembolic disease with high risks.	100%	ERAS [19]	Observation
Heparin should not be used for VTE prophylaxis routinely in post-cesarean patients with high risks.	100%	ERAS [19]	Observation
Multimodal analgesia including regular NSAIDs and paracetamol should be given for cesarean delivery postoperatively.	100%	ERAS [19]	Observation
A regular diet within the 2 h after cesarean delivery might be started.	100%	ERAS [19]	Observation
Gum chewing might be applied to start early oral feeding.	90%	ERAS [19]	Observation
Tight control of capillary blood glucose should be applied.	100%	ERAS [19]	Observation
Early mobilization after cesarean delivery should be applied.	100%	ERAS [19]	Observation
Standardized written discharge instructions should be used to facilitate discharge counseling.	100%	ERAS [19]	Observation

Observation = direct physical observation of data collector on the application standard checklists.

section [26] but in this study, it was not used at all, instead, an aqueous povidone-iodine solution was used for skin preparation corroborating other published studies [27]. Vaginal preparation with a povidone-iodine solution was done for only 3.7% of CDs in this study but, it is highly recommended to be applied for all CDs to reduce the

Table 2
Socio-demographic characteristics and indications for elective cesarean Delivery (n = 161).

Socio-demographic characters	Number of study participants(n)	Frequency (%)
Age(years)		
Below 18	2	1.2
18–35	103	64.0
Above 35	56	34.8
Residency		
Urban	64	39.8
Rural	97	60.2
Parity		
Prime	24	14.9
Multi	137	85.1
Type of anesthesia		
General anesthesia	20	12.3
Spinal anesthesia	141	87.7
Comorbid Illness		
Hypertension	32	19.9
Diabetics Mellitus	17	10.6
Cardiac diseases	4	2.5
Obesity	8	5.0
Others	9	5.6
Indications for CD		
Previous cesarean delivery	63	39.1
Malposition	26	16.1
Major degree placenta previa	7	4.4
Hypertensive disorders of pregnancy	24	14.9
Fetal macrosomia	17	10.6
Bad obstetric history	5	3.1
Multiple pregnancies	8	4.9
Previous vesico-vaginal fistula	1	0.6
Retroviral positive pregnancy	4	2.5
Special baby	2	1.3
Severe Intrauterine growth retardation	1	0.6
Others	3	1.9

Others = additional similar conditions that are not mentioned in the list, Special baby = babies that need special care at birth due to being born with problems or with comorbid illnesses.

post-operative maternal mortality rate secondary to postoperative infection [28]. The possible explanation for a low level of preoperative vaginal preparation with povidone-iodine in this setup might be the trend-based practice of health care providers.

Oral fluid and carbohydrate supplementation are important for the preoperative well-being of obstetric patients [29] so, in this study higher number of elective CDs took oral fluid and carbohydrate supplementation (33.5% vs. 35.4%) than eating a light meal (3.1%). The possible reason may be to ease of supplementation of oral fluids than a light meal.

Perioperative optimization of comorbid illnesses such as hypertension, diabetes, anemia, and cigarette smoking are vital in the reduction of obstetric mortality [30]. So, in this audit optimization of comorbid illness was done in a higher number of CDs [Table 3] even though, maternal cigarette smoking was a rare case.

In this study, a higher number of CDs was done under RA compared to GA (87.7% vs 12.3%). This was in contrast to a recent study from the University of Gondar hospital that showed around 95% of CDs were performed under SA [31]. The possible explanation for this variation might be due to differences in sample size or study participants, technical variations of anesthetists, and variations in patient preference of anesthesia type.

Minimum standard monitoring devices such as Pulse oximeter, NIBP, ECG, Capnograph, and thermometer are recommended to be applied for all patients during anesthesia and surgery [32] but in this study, only NIBP and pulse oximeter monitoring were applied to all patients(100%) whereas thermometer was not used at all. The possible reason for this might be due to the lack of a checklist on the application of standard monitoring devices in the clinical setup.

Table 3
Practice of perioperative obstetric care for elective CD (n = 161).

Standards	Number of patients audited	Number of patients that meet the standard	Percentage of patients who meet the standard
Preoperative care of cesarean delivery			
Are patients informed about procedures before, during, and after cesarean delivery?	161	157	97.5%
Is preoperative evaluation done and informed about the harms and benefits to both the mother and her baby?	161	156	96.9%
Are Antacids and histamine H2 receptor antagonists administered as premedication to reduce the risk of aspiration pneumonitis?	161	148	91.9%
Are Women encouraged to drink clear fluids (pulp-free juice, coffee, or tea without milk) until 2 h before surgery?	161	54	33.5%
Are Women encouraged to eat a light meal up to 6 h before surgery?	161	5	3.1%
Is oral carbohydrate fluid supplementation, 2 h before cesarean delivery offered to non-diabetic women?	144	51	35.4%
Is maternal hypertension managed during pregnancy?	32	27	84.4%
Is maternal gestational diabetes mellitus managed properly?	17	12	70.6%
Is maternal anemia during pregnancy identified and corrected?	161	135	83.9%
Is maternal cigarette smoking stopped before or in early pregnancy?	1	0	0.0%
Are intravenous antibiotics administered within 60 min before the cesarean delivery of skin incision?	161	161	100%
Are the antibiotics used for prophylaxis first-generation cephalosporin?	161	161	100%
Is azithromycin given in addition to the first-generation cephalosporin for women in labor or with ruptured membranes?	161	0	0.00%
Is chlorhexidine alcohol used for abdominal skin cleansing before cesarean delivery?	161	0	0.0%
Is an aqueous povidone-iodine solution used for abdominal skin cleansing before cesarean delivery?	161	161	100%
Is vaginal preparation with povidone-iodine solution done for patients done C/S?	161	7	4.3%
Intraoperative care of cesarean delivery			
Is regional anesthesia done for cesarean delivery?	161	141	87.7%
Is general anesthesia done for cesarean delivery?	161	20	12.3%
Which standard monitoring's applied?			
NIBP?	161	161	100%
ECG?	161	20	12.4%

(continued on next page)

Table 3 (continued)

Standards	Number of patients audited	Number of patients that meet the standard	Percentage of patients who meet the standard
Pulse oximeter?	161	161	100%
Capnograph?	161	12	7.5%
Thermometer?	161	0	0.0%
Is Forced-air warming applied to prevent hypothermia during cesarean delivery?	NA	NA	NA
Is intravenous fluid warming applied to prevent hypothermia during cesarean delivery?	161	3	1.9%
Is operating room temperature increased to prevent hypothermia during cesarean delivery?	161	0	0.0%
Is the blunt expansion of a transverse uterine hysterotomy applied at the time of cesarean delivery to reduce surgical blood loss?	161	151	93.8%
Is the closure of the hysterotomy in 2 layers done to lower the rate of uterine rupture?	161	155	96.3%
Is the peritoneum not closed during the closure of C/S?	161	161	100%
Is re-approximation of the tissue layer performed for women with 2 cm of subcutaneous tissue gaps?	43	30	69.8%
Is skin closure done with a subcuticular suture?	161	155	96.3%
Are women undergoing C/S euvolemic perioperative?	161	98	60.9%
Neonatal care of cesarean delivery			
Is delayed cord clamping for at least 1 min applied for term delivery?	149	3	2.0%
Is delayed cord clamping for at least 30 s applied for preterm delivery?	11	0	0.0%
Is skin-to-skin/breastfeeding applied in OR?	141	0	0.0%
Is the Body temperature neonate measured as immediate C/S?	161	7	4.3%
Is the body temperature of neonate maintained between 36.5C and 37.5C after birth through admission and stabilization?	161	155	96.3%
Is routine suctioning of the airway or gastric aspiration applied?	161	112	69.6%
Is routine neonatal supplementation with room air applied?	161	13	8.1%
Is there preparation for immediate neonatal resuscitation?	161	161	100%
POST Operative care of cesarean delivery			
Is early sham feeding applied to the neonate?	161	30	18.6%
Is a Urinary catheter removed immediately after cesarean delivery, if placed during surgery?	161	19	11.9%
Is fluid preloading applied to reduce hypotension and postoperative nausea and vomiting?	161	161	100%
Is IV administration of ephedrine or phenylephrine	161	0	0.0%

Table 3 (continued)

Standards	Number of patients audited	Number of patients that meet the standard	Percentage of patients who meet the standard
to reduce hypotension and postoperative nausea and vomiting?			
Is lower limb compression applied to reduce hypotension and postoperative nausea and vomiting?	161	0	0.0%
Are multimodal antiemetic agents applied to treat PONV?	161	34	21.1%
Are Pneumatic compression stockings applied to prevent thromboembolic disease for high risks mothers?	17	3	17.6%
Is Heparin used for VTE prophylaxis in post-cesarean patients with high risks?	17	1	5.9%
Is multimodal analgesia including regular NSAIDs and paracetamol given for cesarean delivery postoperatively?	161	23	14.3%
Is a regular diet within the 2 h after cesarean delivery started?	161	0	0.0%
Is Gum chewing applied to start early oral feeding?	161	0	0.0%
Do tight control of capillary blood glucose applied?	12	8	66.7%
Is Early mobilization after cesarean delivery applied?	161	72	44.7%
Is Standardized written discharge instructions used to facilitate discharge counseling?	161	161	100%

*NA-not applicable in the setup, SOAP-society of anesthesiology and perinatology, ERAS- enhanced recovery after surgery, CD- Cesarean delivery.

Hypothermia during anesthesia and surgery is common and needs effective strategies in place to prevent it. In this study, intravenous fluid warming was applied in a small number of CDs (1.9%), operating room temperature was not increased at all and forced-air warming was not applicable in a clinical setup. This result contradicts a review in which the application of preventive methods avoids inadvertent hypothermia [33].

In this study, surgical techniques such as a blunt expansion of a transverse uterine hysterotomy (93.8%), closure of the hysterotomy in 2 layers (96.3%), leaving peritoneum not closed (100%), re-approximation of the tissue layer (69.8%) and subcuticular suturing (96.3%) were applied. So, results that are not fully performed might be due to differences in skill and experience of the five different gynecologists in this study. This is in line with a study done in the USA on obstetricians that states treatment styles of obstetricians differ and might not always work to standard protocols [34].

Neonatal care during cesarean delivery is vital for a good neonatal outcome and in this study preparation for immediate neonatal resuscitation and maintaining neonatal body temperature between 36.5C and 37.5C was performed at a higher number [Table 3]. Routine suctioning of the airway was done in a greater number of neonates which is not recommended by the standards and this might be due to trend-based practice. Early neonatal sham feeding promotes the development of sucking and swallowing [35]. But, in this clinical audit only 18.6% of the neonates, sham feeding was practiced a smaller number of neonates which might be due to the attitudinal problems of care providers.

In this study, hemodynamic maintenance with preloading, using

vasopressors, and lower limb compression was done in a few indicated CDs. This might be due to cost and limitations in the availability of drugs. Multimodal post-operative pain management is important in the prevention of thromboembolism due to immobility caused by pain [36]. In this study, postoperative pain management with a multimodal approach was done in a few patients, this might be misperceptions of health care providers on pain and the cost of anti-pain medication.

Regarding post-caesarean thromboembolism prevention and management, Pneumatic compression stockings are cost-effective with minimal adverse effects than heparin [37,38] while the use of routine Heparin for VTE prophylaxis is not recommended [19]. But, both of them were used in a few CDs in this study. This might be because of a limited number of Pneumatic compression stocking devices that hinder application for a greater number of high-risk mothers.

Early mobilization after cesarean, early hydration/light meal, and gum chewing facilitates gastric motility that prevents gastric ileus with a reduction of overall costs and facilitates early discharge [39]. In this study, early mobilization was done in less than 50% of cesarean sections but, gum chewing and initiating an early regular diet were done for none of the CDs. This might be due to the lack of standard protocols in working areas contributing to the problem.

Strict glycemic control of CDs with diabetes Mellitus has a great role in the reduction of multiple complications [19]. About 66.7% of cesarean deliveries with DM were strictly followed and managed their glucose level in this study and it is still below the standard. This might be because of a shortage of glucometers or even drugs. Besides, all patients in this study were discharged based on standard discharging criteria after necessary information and medical counseling were delivered.

Even though COVID-19 positive cases were not done under elective CDs during the study period, the outbreak could have affected the level of perioperative care given. This would likely be due to government policies on human power reduction; limitations of transportation and reduced availability of medical supplies greatly challenge the practice of perioperative obstetric care.

7. Conclusion

The majority of elective caesarian deliveries were carried out below the recommended level as per the checklists for perioperative practice. So, added interventions are needed to improve perioperative obstetrics care services on those standards which are not totally applied and partially performed.

8. Recommendation

Perioperative obstetric care of emergency CDs plays a great role in the reduction of maternal and neonatal mortalities so, further studies are needed. Proper use of standard checklists on perioperative obstetric care and developing multidisciplinary team working is important for the improvement of care services. Also, regular auditing, training, and awareness creation have a great role to improve care service.

9. Strength of the study

This study has its strengths such as the data collection standard was changed to Yes or No question forms and translated to the Amharic language for ease of patients to understand and data collection was done by trained professionals with a proper checkup.

10. Limitation of the study

One limitation of the present study was that emergency CDs were not included which would provide additional information regarding how the perioperative care guidelines are followed and how reduced compliance may impact maternal and fetal outcomes. Additionally, the study sample size was relatively small in size; perioperative care

administered by care professionals was likely to differ based on the level of training and experience. Furthermore, additional studies are required to establish whether the results of the present study are similar to those observed in other healthcare establishments.

Sources of funding

Nothing to declare.

Ethical approval

Ethical clearance was obtained from the College of Health Sciences Research and Community Service Coordination Ethical Review Committee of Debre Tabor University with reference number Ref CHS/33109/2021.

Consent

Informed consent was taken from study participants parents after telling them the aim of the study, benefit, harm of participating in the study, and they have been told as they can withdraw from the study at any step if they feel so.

Author contributions

All authors equally contributed to the study concept or design, data collection, data analysis or interpretation, writing the paper.

Registration of research studies

1. Name of the registry: <http://www.researchregistry.com>
2. Unique Identifying number or registration ID: researchregistry8042
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): https://www.researchregistry.com/browse-the-registry#home/?view_2_sort=field_21|asc

Guarantor

Mr. Yewlsew Fentie Alle.

Data sharing statement

The data will be shared upon reasonable request.

Declaration of competing interest

There is no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104409>.

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