



## Cross-sectional Study

# Prevalence and factors associated with caesarean section in a comprehensive specialized hospital of Ethiopia: A cross-sectional study; 2020

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## ARTICLE INFO

**Keywords:**  
Prevalence  
Caesarean section  
Ethiopia

## ABSTRACT

**Introduction:** Caesarean section is one of the lifesaving procedures of medical interventions attributed to the decrease of maternal and newborn mortality and morbidity rates. The World Health Organization (WHO) shows a cesarean rate between 5% and 15%. However, the prevalence of cesarean section is increasing globally as well as in Ethiopia. Different scholars argue that the prevalence and factors of the caesarian section vary in different countries and health institutions. The aim of this study was to assess the prevalence and factors associated with cesarean section in Debre Tabor Comprehensive Specialized Hospital.

**Method:** An institutional-based cross-sectional study was conducted on a total of 320 mothers who gave birth at Debre Tabor Comprehensive Specialized Hospital from July 01, 2020, to October 30, 2020. The samples were selected using the convenience sampling technique. The Data were collected using a structured checklist. Bivariable and multivariable logistic regressions were used to check the association. P-values less than 0.05 were considered statistically significant.

**Results:** The overall prevalence of cesarean section was 39.1% in the current study. Mothers age 35–39 years, educational level college and above, employed, mothers with a monthly income of >6000, and mothers with a previous history of cesarean section were significantly associated with an increased risk of cesarean section.

**Conclusion:** The prevalence of cesarean section was high in Debre Tabor Comprehensive Specialized Hospital. Age of the mothers, educational status, occupation, monthly income, and previous history of cesarean section were significantly associated with an increased occurrence of cesarean section.

## 1. Introduction

Cesarean section is a surgical technique in which incisions are made through a mother's abdomen and uterus to deliver her baby [1].

Many factors are attributed to the rapid increase of cesarean section. These include but not limited to financial incentives, maternal request, lack of regulations, the safety of the operation, improved anesthesia services, availability of blood transfusion and antibiotics, rising incidence of primary cesarean section due to clear indications, the decline in operative vaginal delivery and identification of high-risk pregnancy [2–5].

Cesarean section (C/S) can be done on an elective or emergency basis based on the time of operation. In elective cesarean section, the

operation is done at a pre-arranged time during pregnancy to ensure the best quality of obstetric care, anesthesia, neonatal resuscitation, and nursing services. Whereas, in emergency C/S, the operation is done due to an acute obstetric emergency resulting in endangering to lives of mother and child [6–8]. In recent years, the rate of cesarean deliveries increased dramatically worldwide and has had exceeded the World Health Organization (WHO) recommended rate in many countries [9].

Globally, there is an ongoing debate on what should be the optimal rates of cesarean deliveries [9–11]. As per the WHO report, “At the population level, Cesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates [9]. Even though the disparity is observed, the C/S rate is increasing worldwide [9–12]. Different studies showed that the rate of Cesarean section in Ethiopia ranges from 11[14]to 49% [7].

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<https://doi.org/10.1016/j.amsu.2021.102520>

Received 21 May 2021; Received in revised form 18 June 2021; Accepted 18 June 2021

Available online 23 June 2021

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### Abbreviations

|       |                                  |
|-------|----------------------------------|
| ANC   | Anti-natal care                  |
| AOR   | Adjusted Odds Ratio              |
| C/S   | Cesarean Section                 |
| COR   | Crude Odds Ratio                 |
| NRFHR | Non-re-assuring Fetal Heart Rate |
| VD    | Vaginal Delivery                 |
| WHO   | World Health Organization        |

Maternal mortality remains the global challenge where it is unacceptably high in low- and middle-income countries particularly in sub-Saharan African countries [13]. In Ethiopia, obstetrics-related care at public health institutions is freely available to decrease maternal mortality and morbidity.

Identification of factors associated with a cesarean section is important to minimize the unnecessary practice of such life-saving intervention and increase its access to those who need it the most. Studies showed that factors related to include but not limited to mother's educational status, previous history of C/S, doctor's recommendations, type of health facility (public/private), bad obstetric history, fetal weight, socioeconomic status, residence [1,5,14–16].

Different studies have shown that the prevalence of C/S is varied in different areas of Ethiopia [14,17–22]. A systematic review and meta-analysis done by Gedefaw G. et al. Showed that the pooled prevalence of C/S was 29.5% in Ethiopia [7]. Studies done to explore the prevalence and factors associated with cesarean section in the current study area are limited. This article identifies the prevalence of cesarean section and socioeconomic, obstetrics, and other related determinants among women giving birth at Debre Tabor Comprehensive Specialized Hospital. This information can help key stakeholders shape policy on maternal health care services in governmental health facilities of Ethiopia.

This study will help in filling the gap of information on the prevalence and association factor of cesarean section on an institutional basis. It can also be used as baseline information for future researches. Cesarean section has many complications and its associated factors when used inappropriately the potential harm may exceed the potential benefit of C/S. It also costs more than vaginal births and can result in increased risk to mother and newborn.

## 2. Methods

### 2.1. Study design, area, period and population

This study was conducted in Debre Tabor Comprehensive Specialized hospital from July 01 to October 30, 2020. Debre Tabor Comprehensive Specialized Hospital is a public Hospital established in 1934 and located in South Gondar Zone, Amara region. It is 667 km northwest of Addis Ababa, the capital city of Ethiopia.

The climate of this town is woynadega and has a latitude and longitude of 11,051°N3801'E/11.8500 N 38.0170 E with an elevation of 2706 m (8878 ft) above sea level [19]. The Hospital has three surgical operation rooms, two orthopedic operation rooms, and two gynecologic and obstetrics operation rooms. Mothers who gave birth in the study area and met the inclusion criteria during the study period were included in this study.

This research is registered at <http://www.researchregistry.com> with a UIN of researchregistry6842. This study is reported according to STROCSS criteria [23].

#### 2.1.1. Inclusion criteria

Mothers who gave birth after a gestational age of viability (after 28

weeks) at Debre Tabor Comprehensive Specialized Hospital and willing to participate in the study were included in the study.

#### 2.1.2. Exclusion criteria

Mothers who underwent cesarean section for extra-uterine pregnancy were excluded in this study.

### 2.2. Sample size determination and sampling technique

The sample size was determined by using single population proportion formula by taking the previously known magnitude of CS which was 29.55% from a study done in Ethiopia [7] and adding a non-response rate of 10%. By considering the assumption of a 95% confidence level, a 5% margin of error the required sample size was 351 mothers. A non-probable convenient sampling technique was used to select study participants.

### 2.3. Data collection technique

Data were collected using a structured questionnaire. The questionnaire was developed from different bibliographic research [1,5,14–16] which includes socio-demographic and parturient-related data, obstetric characteristics, and obstetric outcomes.

Socio-demographic and parturient-related characteristics: age, educational status, occupation, average monthly income, residence; obstetric characteristics: gravidity, parity, previous obstetric history, ANC follow-ups; obstetric outcomes: Fetal outcome, fetal weight, gestational age were included in the questionnaire.

### 2.4. Data quality assurance

The training was given to data collectors. Data were properly collected and filled in the prepared questionnaire and checklist. To ensure the quality of data, a pre-test of the questionnaire was done on 10% of the samples outside the study area. After pre-testing further adjustments to the data collection tool were made to improve the clarity, and understandability of the questions. Close supervision and monitoring were maintained throughout the data collection period.

### 2.5. Data analysis

After completion of data collection, the data were manually checked for errors; coded, and entered into STATATM Version 15 for analysis. Descriptive statistics were used to summarize data. Initially, bivariate logistic regression was carried out to see the association of each of the independent variables with the outcome variable. Thereafter, the multivariable logistic regression method was used to check the association of variables with a P-value of <0.25 in bivariate logistic regression. In multivariable analysis, a P-value of less than or equals to 0.05 was used as a cut of point for the presence of association. Tables were used to display the results of the study.

### 2.6. Operational definition

Prevalence of cesarean section: is the proportion of cesarean sections performed in a hospital to the total number of live births in a study area [7].

## 3. Result

### 3.1. Socio-demographic and obstetric characteristics

From a total of 351 sampled mothers, 320 questionnaires were included in the final analysis giving a 91.2% response rate. The rest 31 questionnaires were discarded due to the incompleteness of the data. Many of the mothers (41.56%) were within the age group of 25–29.

More than half (52.5%) of the mothers were living in urban areas. Regarding educational status, 146 (45.63%) mothers completed high school, and only 48 (15%) completed college and above educations (Table 1).

Out of the total respondent, most of the mothers (71.24%) were gravid 3 and lower. The majority of the mothers (97.18%) had antenatal care follow-ups and most of them (61.31%) visited health facilities three times for the current pregnancy. The overall prevalence of cesarean section was 39.1% in the current study among which more than half (54.06%) were performed for emergency reasons. The majority of the mothers (97.19%) had live birth outcomes (Table 1).

3.2. Factors associated with cesarean section

After inclusion of all significant variables in the multivariable logistic regression model, there was a significant association of cesarean section with the age of the mothers, educational status, occupation, monthly income, and previous history of C/S. In the final multivariable regression model, odds of cesarean section were 2.67 times higher among women who were an employee that hos who were house-wives (AOR: 2.67; 95% CI 1.39–5.11; p-value: 0.003). Mothers with ages of 35–39 were 5.3 times more likely to undergo C/S than those with age groups of 20–24 (AOR: 5.3; 95% CI 1.43–19.62; p-value: 0.013). Among women who had a previous history of C/S, the odds of cesarean section was 3.4 times higher than those who did not have previous C/S (AOR: 3.4; 95% CI 1.64–7.03; p-value: 0.001). Odds of C/S were 3.43 times higher in mothers whose educational status was college and above than those who had no formal education (AOR: 3.43; 95% CI 1.33–8.81; p-value: 0.01). Mothers with a monthly income of 6000 Ethiopian birrs and above were 2.43 times more likely to undergo C/S than those whose monthly income is less than 3000 Ethiopian berr (AOR: 2.43; 95% CI 1.20–4.94; p-value: 0.013) (Table 2).

4. Discussion

In the current study, we assessed the prevalence and associated factors of cesarean section in a comprehensive specialized hospital in Ethiopia. The overall prevalence of C/S was 39.1%, which was higher than the upper limit of the WHO critical threshold of C/S (15%) for any country [9]. Prevalence of cesarean section was higher among women who were employed than those who were housewives and among women who had a previous history of C/S than those who did not. Socio-demographic factors such as women’s religion, residence, and obstetric factors such as the number of ANC visits, gravidity, parity, the urgency of C/S, and fetal weight were not significantly associated with C/S.

The prevalence of C/S was 39.1% in this study which was higher than the World Health Organization (WHO) recommended rate [9]. This prevalence is also higher than the pooled prevalence of cesarean section (29.55%) in Ethiopia [7]. This increase could be due to the reason that this hospital is a referral site for more than six primary hospitals that could make the prevalence high. To the contrary, a study done by Vivec V. et al. Showed that the prevalence of C/S was lower (13%) [5]. The prevalence was of C/S was also low (19%) in a study done in Addis Ababa [20].

The current study showed that the odds of having C/S were higher among mothers aged 35–39 years than those aged 20–24 years. This finding was in line with a study done in Abu Dhabi, the United Arab Emirates by Zainab et al. [13]. A similar study done in Tahiran, Iran showed that there was a significant association of C/S with maternal age [18]. On the contrary, studies done by Farhana et al. [15], Hiwot et al. showed that age has no significant association with the rate of C/S [14].

Our study showed that mothers who have an educational level of college and above are 3.43 times more likely to have C/S than those who did not have formal education This finding is in line with studies done by different scholars [13–15,24,25].

Table 1  
Socio-demographic and obstetric characteristics (N = 320).

| Characteristics                 |                     | Mode of delivery |                |                |
|---------------------------------|---------------------|------------------|----------------|----------------|
|                                 |                     | VD n (%)         | C/S n (%)      | Total N (%)    |
| Age of the mother               | 20–24               | 47<br>(14.69)    | 26 (8.12)      | 73<br>(22.81)  |
|                                 | 25–29               | 84<br>(26.25)    | 49<br>(15.31)  | 133<br>(41.56) |
|                                 | 30–34               | 60<br>(18.75)    | 33<br>(10.31)  | 93<br>(29.06)  |
|                                 | 35–39               | 4 (1.25)         | 17 (5.31)      | 21 (6.56)      |
| Residence                       | Rural               | 97<br>(30.31)    | 54<br>(16.88)  | 151<br>(47.19) |
|                                 | Urban               | 98<br>(30.63)    | 71<br>(21.87)  | 169<br>(52.5)  |
| Religion                        | Other               | 22 (6.88)        | 6 (1.87)       | 28 (8.75)      |
|                                 | Orthodox            | 173<br>(54.06)   | 119<br>(37.19) | 292<br>(91.25) |
| Educational status              | No formal education | 39<br>(12.19)    | 19 (5.94)      | 58<br>(18.13)  |
|                                 | Primary school      | 45<br>(14.06)    | 23 (7.19)      | 68<br>(21.25)  |
|                                 | High school         | 96 (30)          | 50<br>(15.63)  | 146<br>(45.63) |
|                                 | College and above   | 15 (4.69)        | 33<br>(10.31)  | 48 [15]        |
| Occupation                      | Housewife           | 157<br>(49.06)   | 66<br>(20.63)  | 223<br>(69.69) |
|                                 | Employee            | 38<br>(11.87)    | 59<br>(18.44)  | 97<br>(30.31)  |
| Average monthly income          | <3000               | 121<br>(37.81)   | 54<br>(16.88)  | 175<br>(54.69) |
|                                 | 3000–6000           | 50<br>(15.63)    | 46<br>(14.37)  | 96 (30)        |
|                                 | >6000               | 24 (7.5)         | 25 (7.81)      | 49<br>(15.31)  |
| Gravidity                       | Three & lower       | 134<br>(41.87)   | 94<br>(29.37)  | 228<br>(71.24) |
|                                 | Four and more       | 61<br>(19.06)    | 31 (9.69)      | 92<br>(28.75)  |
| Parity                          | Two and lower       | 135<br>(42.19)   | 90<br>(28.13)  | 225<br>(70.32) |
|                                 | Three and more      | 60<br>(18.75)    | 35<br>(10.94)  | 95<br>(29.69)  |
| Previous history of still birth | No                  | 188<br>(58.75)   | 122<br>(38.13) | 310<br>(96.88) |
|                                 | Yes                 | 7 (2.19)         | 3 (0.94)       | 10 (3.12)      |
| Previous history of C/S         | No                  | 179<br>(55.94)   | 95<br>(29.69)  | 274<br>(85.63) |
|                                 | Yes                 | 16 [5]           | 30 (9.37)      | 46<br>(14.37)  |
| Number of previous C/S          | Zero                | 187<br>(58.44)   | 87<br>(27.19)  | 274<br>(85.63) |
|                                 | One                 | 8 (2.5)          | 31 (9.69)      | 39<br>(12.19)  |
| ANC follow up                   | No                  | 6 (1.87)         | 7 (2.19)       | 7 (2.19)       |
|                                 | Yes                 | 189<br>(59.06)   | 122<br>(38.12) | 311<br>(97.18) |
| Number of ANC follow-ups        | < three times       | 6 (1.87)         | 7 (2.19)       | 13 (4.06)      |
|                                 | Three times         | 137<br>(42.81)   | 72<br>(22.50)  | 209<br>(65.31) |
|                                 | >Three times        | 52<br>(16.25)    | 46<br>(14.37)  | 98<br>(30.62)  |
| Gestational age                 | <37 weeks           | 27 (8.44)        | 14 (4.37)      | 41<br>(12.81)  |
|                                 | 37–42 weeks         | 143<br>(44.69)   | 84<br>(26.25)  | 227<br>(70.94) |
|                                 | >42 weeks           | 24 (7.50)        | 27 (8.44)      | 51<br>(15.94)  |
| Urgency of current C/S          | Emergency           | 110<br>(34.37)   | 63<br>(19.69)  | 173<br>(54.06) |
|                                 | Elective            | 85<br>(26.56)    | 62<br>(19.37)  | 147<br>(45.93) |
| Current indication for C/S      | Obstructed labor    | 29 (9.06)        | 14 (4.37)      | 43<br>(13.43)  |

(continued on next page)

**Table 1** (continued)

| Characteristics              | Mode of delivery |             |             |
|------------------------------|------------------|-------------|-------------|
|                              | VD n (%)         | C/S n (%)   | Total N (%) |
| NRFHR Pattern                | 33 (10.31)       | 27 (8.44)   | 60 (18.75)  |
| Cephalo-pelvic disproportion | 38 (11.88)       | 17 (5.31)   | 55 (17.19)  |
| Previous C/S                 | 32 [10]          | 24 (7.50)   | 56 (17.5)   |
| Antepartum hemorrhage        | 26 (8.12)        | 11 (3.44)   | 37 (11.56)  |
| Malpresentation/ malposition | 11 (3.44)        | 12 (3.75)   | 23 (7.19)   |
| Sever preeclampsia           | 26 (8.12)        | 20 (6.25)   | 46 (14.37)  |
| Fetal out come               |                  |             |             |
| Dead                         | 7 (2.19)         | 2 (0.63)    | 9 (2.82)    |
| Alive                        | 188 (58.75)      | 123 (38.44) | 311 (97.19) |
| Fetal weight                 |                  |             |             |
| <2500 g                      | 59 (18.44)       | 26 (8.12)   | 85 (22.56)  |
| 2500–4000 g                  | 133 (41.56)      | 95 (29.69)  | 228 (71.25) |
| >4000 g                      | 3 (0.94)         | 4 (1.25)    | 7 (2.19)    |

We found that employed mothers are highly likely to undergo C/S than those who are housewives. This is in line with a study done in under-served Asian countries by Melissa et al. [24]. This is also in line with different studies [13,14,16,24,25].

The study also showed that mothers who have a monthly income of greater than 6000 Ethiopian birrs have a higher chance of having a cesarean section than those whose income is less than 3000. This finding is in line with studies done in different countries [5,13,14,16,25].

The study showed that mothers with a previous history of C/S are highly likely to undergo C/S than those who did not have. This finding is in line with various previous studies [1,5,13,14].

In the current study, C/S was not associated with maternal religion, residence, obstetric characteristics (parity, gravidity, and fetal weight), the urgency of cesarean section, and the number of ANC follow-ups.

## 5. Conclusion

The prevalence of cesarean section was high in Debre Tabor Comprehensive Specialized Hospital. Age of the mothers, educational status, occupation, monthly income, and previous history of cesarean section were significantly associated with an increased occurrence of cesarean section.

**Table 2**

Factors associated with cesarean section (N = 320).

| Characteristics         | Mode of delivery    |           | Odds ratio (95% CI) |                   |                   |                    |
|-------------------------|---------------------|-----------|---------------------|-------------------|-------------------|--------------------|
|                         | VD (195)            | C/S (125) | COR                 | AOR               | P- value          |                    |
| Age of the mother       | 20–24               | 47        | 26                  | 1                 | 1                 |                    |
|                         | 25–29               | 84        | 49                  | 1.05 (0.58–1.91)  | 1.43 (0.74–2.78)  | 0.284              |
|                         | 30–34               | 60        | 33                  | 0.99 (0.52–1.88)  | 1.05 (0.51–2.14)  | 0.891              |
|                         | 35–39               | 4         | 17                  | 7.68 (2.34–25.25) | 5.30 (1.43–19.62) | 0.013 <sup>a</sup> |
| Educational status      | No formal education | 39        | 19                  | 1                 | 1                 |                    |
|                         | Primary school      | 45        | 23                  | 1.05 (0.49–2.20)  | 1.31 (0.58–2.97)  | 0.510              |
|                         | High school         | 96        | 50                  | 1.07 (0.56–2.04)  | 1.37 (0.67–2.80)  | 0.387              |
|                         | College and above   | 15        | 33                  | 4.52 (1.98–10.25) | 3.43 (1.33–8.81)  | 0.010 <sup>a</sup> |
| Occupation              | Housewife           | 157       | 66                  | 1                 | 1                 |                    |
|                         | Employee            | 38        | 59                  | 3.69 (2.24–6.08)  | 2.67 (1.39–5.11)  | 0.003 <sup>a</sup> |
| Average monthly income  | <3000               | 121       | 54                  | 1                 | 1                 |                    |
|                         | 3000–6000           | 50        | 46                  | 2.06 (1.23–3.44)  | 1.18 (0.61–2.30)  | 0.610              |
|                         | >6000               | 24        | 25                  | 2.33 (1.22–4.45)  | 2.43 (1.20–4.94)  | 0.013 <sup>a</sup> |
| Previous history of C/S | No                  | 179       | 95                  | 1                 | 1                 |                    |
|                         | Yes                 | 16        | 30                  | 3.53 (1.83–6.80)  | 3.40 (1.64–7.03)  | 0.001 <sup>a</sup> |

<sup>a</sup> - P value less than 0.05, 1- Reference.

## 5.1. Strength of the study

- We had no incomplete data with missing values.
- The calculated sample size was attained on the planned schedule of time.
- Study participants were homogenous.

## 5.2. Limitation of the study

- Lack of randomization and control
- Lack of blinding
- The study was a single center study with limited sample size

## Ethical approval

Ethical clearance was obtained from Debre Tabor University ethical review committee.

## Sources of funding

There is no funding.

## Author contribution

All authors have made equal contributions to the conception and design of the study, or acquisition of data, or analysis and interpretation of data, drafting the article or revising it critically for important intellectual content. All authors read and verify the manuscript for publication.

## Registration of research studies

Name of the registry: <https://www.researchregistry.com/register-now#home/addregistration/register-research-study-please-note-it-costs-99-to-register-payment/60a74fa538bfcd001e73c895/>

Unique Identifying number or registration ID: researchregistry6842.

Hyperlink to your specific registration (must be publicly accessible and will be checked):

## Consent

Informed written consent was secured from every study participant before the start of the data collection.

**Guarantor**

Moges Gelaw.

**Data sharing statement**

Data will be shared upon reasonable request.

**Declaration of competing interest**

We declare that there is no any conflict of interests.

**Acknowledgments**

We would like to acknowledge study participants, Debre Tabor University and Debre Tabor Comprehensive Specialized Hospital Staffs.

**Appendix A. Supplementary data**

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.102520>.

**Provenance and peer review**

Not commissioned, externally peer-reviewed.

**References**

- [1] V.K. Maktha, A. Ghatam, H. Padamata, A. Ravulakol, Prevalence and factors associated with caesarean section , a community based cross sectional study in rural parts of 3 (8) (2016) 2054–2057.
- [2] N. Miseljic, E. Basic, S. Miseljic, Causes of an Increased Rate of Caesarean Section 30 (4) (2018) 287–289.
- [3] M. Tadevosyan, A. Ghazaryan, A. Harutyunyan, V. Petrosyan, A. Atherly, K. Hekimian, Factors contributing to rapidly increasing rates of cesarean section in Armenia , a partially mixed concurrent quantitative- qualitative equal status study 6 (2019) 1–10.
- [4] M. Besio, Cesarean section, The Reason of it Increasing Rate Clinics in Mother and Child Health 13 (2) (2016) 2–4.
- [5] V. Verma, R.K. Vishwakarma, D.C. Nath, H.T.A. Khan, R. Prakash, O. Abid, Prevalence and determinants of caesarean section in South and South-East Asian women, 1-15 Available from: <https://doi.org/10.1371/journal.pone.0229906>, 2020.
- [6] M.E. Hannah, Planned elective cesarean section: a reasonable choice for some women? CMAJ (Can. Med. Assoc. J.) 170 (5) (2004) 813–814.
- [7] G. Gedefaw, A. Demis, B. Alemnew, A. Wondmieneh, A. Getie, Prevalence , indications , and outcomes of caesarean section deliveries in Ethiopia , a systematic review and meta-analysis (2020) 1–10.
- [8] I. Waniala, S. Nakiseka, W. Nambi, I. Naminya, M.O. Ajeni, J. Iramiot, et al., Prevalence , Indications , and Community Perceptions of Caesarean Section Delivery in Ngora District , Eastern Uganda : Mixed Method Study, 2021, p. 2020.
- [9] World Health Organization, WHO Statement on Caesarean Section Rates, World Health Organization, 2015, pp. 1–8.
- [10] D. Montoya-williams, L. Spiryda, What are optimal cesarean section rates in the U . S, 00, of Evidence-Based Recommendations and Interventions (2017) 1–7, 00.
- [11] A.P. Betran, M.R. Torloni, J. Zhang, J. Ye, R. Mikolajczyk, C. Deneux-tharoux, et al., What is the optimal rate of caesarean section at population level ?, in: A Systematic Review of Ecologic Studies, 2015.
- [12] J. Wise, Alarming global rise in caesarean births , figures show [Internet], Thebmj 3419 (October) (2018) 1, <https://doi.org/10.1136/bmj.k4319>. Available from: .
- [13] Zainab Taha, Ali Hassan Ahmed, D.P. Ludmilla Wikkeling-Scott, Prevalence and associated factors of caesarean section and its impact on early initiation of breastfeeding in Abu Dhabi , United Arab Emirates, Nutrients 11 (2723) (2019) 1–10.
- [14] T. Hiwot, D. Birehanu, W. Biresaw, et al., Prevalence and associated factors of caesarean section in Addis Ababa hospitals, Ethiopia, Pan Afr Med J 34 (136) (2019) 1–9.
- [15] F.K. Id, N.B. Ali, A. Nurus, S. Khan, A. Hassan, M.M. Hasan, et al., Prevalence and factors associated with caesarean section in four Hard-to-Reach areas of Bangladesh : findings from a cross- sectional survey [Internet], PloS One 15 (6) (2020) 1–16, <https://doi.org/10.1371/journal.pone.0234249>. Available from: .
- [16] M. Rafiei, M. Saei, G. Naz, M. Akbari, F. Kiani, F. Sayehmiri, et al., Prevalence, causes, and complications of cesarean delivery in Iran, A systematic review and meta- analysis 16 (4) (2018) 221–234.
- [17] A.G. Azene, A.M. Aragaw, M.G. Birlie, Multilevel modelling of factors associated with caesarean section in Ethiopia: community based cross sectional study [Internet], BMC Res. Notes 12 (1) (2019) 1–7, <https://doi.org/10.1186/s13104-019-4705-2>. Available from: .
- [18] M.B. Meless, A.B. Geremew, S.M. Abebe, High prevalence of caesarean birth among mothers delivered at health facilities in Bahir Dar city, Amhara region, Ethiopia. A comparative study [Internet], PloS One 15 (4) (2020) 1–15, <https://doi.org/10.1371/journal.pone.0231631>. Available from: .
- [19] T. Asfaw, A. Tesema, Determinant factors, trend and outcomes of cesarean delivery in Debre Berhan referral hospital, North Shewa Zone, Ethiopia, Pediatr. Rep. 12 (2) (2020) 42–45.
- [20] Yibeltal T. Bayou, J.S. Yohana, G.T.-T. Mashalla, Patterns of caesarean-section delivery in, African J Prim Heal Care Fam Med 8 (2) (2016) 1–6.
- [21] A. Gebreegziabher Hailu, T. Kebede Fanta, F. Tekulu Welay, N. Etsay Assefa, S. Aregawi Hadera, G. Aregawi Gebremeskel, et al., Determinants of cesarean section deliveries in public hospitals of Addis Ababa, Ethiopia, 2018/19: a case-control study, Obstet Gynecol Int (2020) 2020.
- [22] M. Ayalew, B. Mengistie, M. Dheressa, A. Demis, Magnitude of Cesarean Section Delivery and its Associated Factors Among Mothers Who Gave Birth at Public Hospitals in Northern Ethiopia : Institution-Based Cross-Sectional Study, 2020.
- [23] R. Agha, A. Abdall-Razak, E. Crossley, N. Dowlut, C. Iosifidis, G. Mathew, STROCSS 2019 Guideline: strengthening the reporting of cohort studies in surgery [Internet], Int. J. Surg. 72 (November) (2019) 156–165, <https://doi.org/10.1016/j.ijsu.2019.11.002>. Available from: .
- [24] P. Amini, M. Mohammadi, R. Omani-samani, A. Almasi-hashiani, Osong public health and research perspectives factors associated with cesarean section in tehran, Iran using Multilevel Logistic Regression Model 9 (2) (2018) 86–92.
- [25] M. Neuman, G. Alcock, K. Azad, A. Kuddus, D. Osrin, N.S. More, et al., Prevalence and Determinants of Caesarean Section in Private and Public Health Facilities in Underserved South Asian Communities : Cross-Sectional Analysis of Data from Bangladesh, 2014. India and Nepal.