Cross-sectional Study

Knowledge and attitude towards anesthesia for cesarean section and its associated factors among pregnant women attending antenatal care: A cross sectional study

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\textbf{ABSTRACT}

\textbf{Background:} Cesarean section is an effective technique for preventing maternal and perinatal mortality when performed properly. Evidence suggested that pregnant women who have had good knowledge about their condition are able to participate in shared decision-making and can alleviate fears related to anesthesia. However, only a few studies have been conducted in Ethiopia assess the level of knowledge and attitude of pregnant women towards anesthesia for cesarean section.

\textbf{Methods:} A hospital based cross-sectional study was conducted from April 18 to June 25, 2021. A total of 362 pregnant women attending antenatal care were selected using a systematic random sampling technique. Face-to-face interviews were used to collect data using pretested and structured questionnaires. For statistical analysis, both bivariate and multivariable binary logistic regression models were used. The adjusted odds ratio was used as the measure of association. At the 95\% confidence level, a p-value of less than 0.05 was considered statistically significant.

\textbf{Results:} A total of 354 pregnant women from the ANC clinic participated, with a response rate of 97.8\%. The overall proportion of good knowledge and a positive attitude towards anesthesia for cesarean section was 56.5\% (95\% CI: 51.4\%, 61.9\%) and 50.8\% (95\% CI: 45.8\%, 56.2\%), respectively. Pregnant women who had previous operations (AOR = 4.47, 95\% CI: 1.77, 11.32) and had anesthesia-related health information (AOR = 10.06, 95\% CI: 5.41, 18.69) had significantly better knowledge of anesthesia for cesarean section. Pregnant women who had secondary education (AOR = 6.71, 95\% CI: 1.19, 37.99), college and above education (AOR = 13.63, 95\% CI: 2.26, 82.21), and had health information about anesthesia (AOR = 2.02, 95\% CI: 1.09, 3.77) significantly associated with a positive attitude towards anesthesia for CS.

\textbf{Conclusion:} This finding indicates that a significant number of pregnant women continue to have inadequate knowledge and attitudes towards anesthesia for CS. Previous operations and anesthesia-related health information were significantly associated with knowledge, whereas higher education and anesthesia-related health information were significantly associated with a positive attitude towards anesthesia for cesarean section. Health professionals must provide anesthesia-related health information to mothers with CS indications during ANC visits and in operating theater areas.

1. Background

Casarean section (CS) can be a life-saving procedure for women and babies when potentially life-threatening complications occur during pregnancy or childbirth, such as abnormal fetal presentation, non-reassuring fetal conditions, obstetric hemorrhage, and obstructed labor \cite{1-3}. In maternal health, anesthesia has contributed significantly to reducing pain related to surgery including CS. It can be performed under either neuraxial anesthesia or general anesthesia \cite{4}, but regional anesthesia is the preferred technique in terms of risk and benefits for both the mother and fetus \cite{5}.

Although clients may be willing to be anesthetized, many clients still

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have concerns regarding anesthesia. Some clients have misconceptions regarding the process and risks of anesthesia, which influences their decision and willingness to undergo anesthesia and surgical interventions [6]. For instance, many people believe that once the patient is “asleep” the anesthesiologist will leave the room [7]. Patients also have numerous concerns, including the possibility of not waking up postoperatively, experiencing pain, and becoming paralyzed. This may contribute to the delayed presentation of patients, which impacts negatively on outcomes and quality of health care [8].

As a standard preoperative patient education, improving pregnant women’s knowledge and attitude towards anesthesia is essential for a good perioperative outcome, managing medico-legal conditions and patients’ decision making. Good clients’ knowledge and a favorable attitude towards anesthesia have been shown to have a positive effect on clients’ outcome [9].

Although a substantial number of studies regarding knowledge and attitudes towards anesthesia (6) have been conducted worldwide, there is a dearth of evidence on pregnant women regarding anesthesia for CS. Hence, this study aimed to assess the knowledge and attitudes of pregnant women attending antenatal care (ANC) in our institution and to identify their sources of information about these options. Generating such evidence will help pregnant women to alleviate such misconceptions about anesthesia for their CS and may play an important role in how to participate in choosing anesthesia for their CS.

2. Methods

2.1. Study design and period

From April 18 to June 25, 2021, a hospital based cross-sectional study design was used among pregnant women attending ANC clinic.

2.2. Study area

The study was conducted at one of Ethiopia’s comprehensive specialized hospitals. The hospital staff, which includes anesthesia, midwives, interns, residents, and obstetricians, provides delivery services 24 h a day, 7 days a week. In its catchment area, the hospital serves about 5 million people. According to hospital ANC clinic reports, approximately one thousand two hundred (1,200) pregnant women visit the ANC clinic on a monthly basis.

A source population for this study consisted of all pregnant women who attended ANC clinic. The study population was all selected pregnant women who attended ANC clinic. Pregnant women who had at least one ANC clinic visit in their current pregnancy, regardless of delivery or anesthetic history, were eligible for the study, while those who were seriously ill, had psychiatric illness, or were unable to communicate were excluded.

2.2.1. Sample size determination and sampling procedure

A single population proportion formula was used to estimate the minimum sample size. It was calculated using a 31.3% proportion of knowledge about anesthesia for CS from a previous study in Jimma, Ethiopia [10], a 95% confidence level (\( \alpha = 0.05 \)), 5% margin of error, and a nonresponse rate of 10%.

\[
    n = \frac{(Z_{\alpha/2})^2 \cdot p(1-p)}{d^2}
\]

Where \( n \) is the minimum sample size required, \( \alpha \) = level of significance at 5% level, \( p \) = proportion of good knowledge about anesthesia for CS (0.31), \( 1-p \) = proportion of poor knowledge about anesthesia for CS (0.69), and \( d \) = level of precision or maximum tolerable error (5%). Based on the above assumptions and accounting for a 10% non-response rate, a total of 362 pregnant women attending the ANC clinic at the UoGCSh were required to determine the proportion of knowledge and attitude towards anesthesia for CS.

Pregnant women attending ANC clinics were chosen using a systematic random sampling technique. Based on the average daily attendance at the ANC, a sampling interval of 3 was obtained. The first pregnant woman was selected using a lottery method, with a number between one and three. Following that, every third pregnant woman who visited the clinic was chosen to participate in the study.

2.3. Operational definitions

A pregnant woman is classified as having a positive attitude if her response was higher than the median value.

Pregnant women were considered knowledgeable if they correctly responded to more than 60% of the knowledge-related questions, otherwise categorized as having poor knowledge (10).

2.4. Data collection tools and procedures

Face-to-face interviews were held to collect the data using pretested and structured questionnaires. Both closed and open-ended questionnaires were used to collect the data. The questionnaires were translated into the local language (Amharic) and health care professionals were recruited to collect the data. Data collectors collected data on the sociodemographic characteristics of pregnant women (age, residence, marital status, educational status, occupational status, and family monthly income (FMI)), health service utilization, health information about anesthesia, previous exposure to surgery and anesthesia, and knowledge and attitudes towards anesthesia for caesarean section. The knowledge domain contained 9 questions to assess pregnant women’s levels of knowledge regarding anesthesia for CS. Within the knowledge domain, the respondents were asked to respond to any choices they thought might be correct. Each correct answer was scored as one, and each incorrect answer was scored as zero. Thus, the total score of knowledge for each study participant ranged from 0 to 9, and a higher score indicated good knowledge. The attitude domain contained 8 questions to assess pregnant women’s attitudes towards anesthesia for CS. A 5-point Likert scale ranging from strongly disagree [1] to strongly agree [5] was used to assess pregnant women’s attitude towards anesthesia [5]. A negative question was coded in the reverse direction during the analysis. Each question or item was scored, and the final attitude score ranged between 8 and 40. The mean and median values were computed and tested for normality. The median value was used to classify women’s attitudes as positive or poor.

2.5. Data analysis

The completed questionnaire was entered into Epidata. The data was exported into SPSS version 25 statistical software for its analysis. The data was cleaned, coded, and checked for completeness and consistency. A descriptive analysis was used for frequency, proportions, means, and SD to describe the data. Texts, tables, and graphs were used to present the study findings. Bivariate logistic regression analysis was used to check which variables had associations with knowledge and attitude. Variables with \( p \)-values up to 0.2 in the bivariable logistic regression analysis were fitted in the multivariable binary logistic regression to control the possible effects of confounders. Adjusted odds ratios (AOR) were used as the measure of association between the dependent variable and independent variables. \( p \)-values of less than 0.05 at a 95% confidence interval were considered statistically significant. Model goodness-of-fit was checked by the Hosmer-Lemeshow test.

2.6. Ethical considerations

Ethical clearance was obtained from the Institutional Ethical Review Committee of GCMHS. Informed consent was obtained from pregnant women after an explanation of what would be done in the research. Confidentiality was ensured by the data collectors and investigators by
using code numbers rather than names and keeping questionnaires locked. This study was registered at https://www.researchregistry.com/browse-the-registry#home/Research Registry UIN: researchregistry7476 and reported according to STROCSS criteria [11].

3. Results

3.1. Sociodemographic characteristics of participants

Three hundred fifty-four pregnant women from the UoGCSH ANC clinic participated in the study, giving a response rate of 97.8%. The mean age of the participants was 27.6 (SD = 5.04) years. Of the participants, 328 (92.7%) were urban residents, 285 (80.5%) were Orthodox Tewahido Christianity followers, 337 (95.2%) were married, and 74 (20.9%) were government employees (Table 1).

3.2. Obstetrics related characteristics of the respondents

Of the total respondents, 224 (63.3%) have had two or more pregnancies, 128 (35.9%) have had 2 or more deliveries, 145 (41.0%) had 4 or more ANC visits for the last delivery, and 167 of them gave vaginal birth (Table 2).

3.3. Health service utilization factors of the respondents

Among the total respondents, 344 (97.2%) visited the health facility, of whom 334 (96.8%) obtained health care services for their health. Regarding the site of health care services, 292 (82.5%), 73 (20.6%), and 52 (14.7%) received health care services from the hospital, health centre, and clinic, respectively (Table 3).

Table 1

| Variables | Frequency | Percent |
|-----------|-----------|---------|
| Residence |           |         |
| Urban     | 328       | 92.7    |
| Rural     | 26        | 7.3     |
| Age in years |       |         |
| 16-24     | 93        | 26.3    |
| 25-29     | 146       | 41.2    |
| 30-34     | 79        | 22.3    |
| 35+       | 36        | 10.2    |
| Religion  |           |         |
| Orthodox  | 285       | 80.5    |
| Muslim    | 69        | 19.5    |
| Marital status |     |         |
| Married   | 337       | 95.2    |
| Others ³ | 17        | 4.8     |

³ Single, divorced, and widowed.

| Educational status | Frequency | Percent |
|--------------------|-----------|---------|
| Unable to read and write | 20 | 5.6 |
| Read and write      | 20 | 5.6 |
| Primary school (1-8) | 117 | 33.1 |
| Secondary school (9-12) | 124 | 35.0 |
| College and above   | 73 | 20.6 |

| Occupational status | Frequency | Percent |
|---------------------|-----------|---------|
| Housewife           | 124       | 35.0    |
| Merchant             | 105       | 29.7    |
| Government employed | 74        | 20.9    |
| Farmer              | 17        | 4.8     |
| Student             | 20        | 5.6     |
| Others              | 14        | 4       |

| Family monthly income, Ethiopian Birr (ETB) | Frequency | Percent |
|--------------------------------------------|-----------|---------|
| ≤2000                                      | 96        | 27.1    |
| 2001-4100                                  | 81        | 22.9    |
| 4101-7000                                  | 90        | 25.4    |
| >7001                                      | 87        | 24.6    |

4 and more visit = 145, 40.4%

Table 2

Obstetrics related characteristics of the respondents, University of Gondar Comprehensive and specialized hospital, 2021.

| Variables | Frequency | Percent |
|-----------|-----------|---------|
| Number of pregnancy |           |         |
| Primigravida | 130 | 36.7 |
| Multiparvada | 224 | 63.3 |
| Number of deliveries (Parity) |           |         |
| Nullipara | 133 | 37.5 |
| Para 1       | 93 | 26.3 |
| Multipara | 128 | 36.2 |
| Number of ANC visit/s for previous pregnancy |           |         |
| No visit | 138 | 39.0 |
| 1-2 visit | 71 | 20.0 |
| 3 and more visit | 67 | 19.2 |

Table 3

Respondents anesthesia or surgery related factors, University of Gondar Comprehensive and specialized hospital, 2021.

| Variables | Frequency | Percent |
|-----------|-----------|---------|
| Any operation or surgery in the past (n = 354) |           |         |
| Yes | 86 | 24.3 |
| No | 268 | 75.7 |
| Type of anesthesia given (n = 86) |           |         |
| Spinal | 54 | 62.8 |
| General | 27 | 31.4 |
| Both | 5 | 5.8 |
| Type of health facility where they received the anesthesia (n = 86) |           |         |
| Tertiary hospital | 64 | 74.4 |
| General hospital | 19 | 22.1 |
| District hospital | 1 | 1.2 |
| Private hospital | 2 | 2.3 |
| Any health information about anesthesia (n = 354) |           |         |
| Yes | 183 | 51.7 |
| No | 171 | 48.3 |
| Type of anesthesia you heard (n = 183) |           |         |
| General anesthesia | 39 | 21.3 |
| Regional anesthesia | 93 | 50.8 |
| Both | 51 | 27.9 |

3.4. Respondents’ anesthesia or surgery-related factors

Among the total respondents, 86 (24.3%) had a history of any operation in the past, and all of them received anesthesia for their surgery. Of the total 86 respondents who had a history of anesthesia, 54 (62.8%) of them received spinal anesthesia, 27 (31.4%) of them received general anesthesia, and five (5.8%) received both anesthesia forms. Of those who received anesthesia, the majority (74.4%) of them received their anesthesia from a tertiary hospital. Of the total respondents, 183 (51.7%) heard any health information about anesthesia. Of the respondents who heard information about anesthesia, 39 (21.3%), 93 (50.8%), and 51 (27.9%) heard about general anesthesia, regional anesthesia, and both types of anesthesia, respectively (Table 3).

Regarding the source of anesthesia information, 74 (40.4%), 58 (31.7%), and 36 (19.7%) of them heard the information from previous exposure, friends, and the anesthetists, respectively (Fig. 1).

3.5. Knowledge of pregnant women towards anesthesia for cesarean section

The overall proportion of good knowledge about anesthesia for CS among pregnant women attending ANC at the University of Gondar comprehensive specialized hospital was 56.5% (95% CI: 51.4%, 61.9%). The proportion of knowledge about anesthesia for CS was higher among those who have had previous operations (90.7%) compared with those...
who had not any previous operations (45.5%) and who have had any health information about anesthesia (84.7%) as compared with who had not any health information about anesthesia (26.3%).

Of the total respondents participated in the study, 192 (54.2%) correctly responded what anesthesia mean, 268 (75.7%) correctly responded the purpose of anesthesia, 280 (79.1%) responded that anesthesia is necessary for CS, 223 (63%) responded correctly the route of anesthesia administration, 301 (85%) responded that anesthesia is not always safe, 151 (42.7%) have had some knowledge about complications of anesthesia, 98 (27.7%) had knowledge that which anesthesia have high complications, and 206 (58.2%) had knowledge some types of anesthesia complication/s (Table 4).

### Table 4
Knowledge about anesthesia for CS among pregnant women in University of Gondar Comprehensive and specialized hospital, 2021.

| Variables                              | Frequency | Percentage |
|----------------------------------------|-----------|------------|
| What is anesthesia for you             |           |            |
| Know                                   | 192       | 54.2       |
| Don’t know                             | 162       | 45.8       |
| Purpose of anesthesia                  |           |            |
| Know                                   | 268       | 75.7       |
| Don’t know                             | 86        | 24.3       |
| Anesthesia is necessary for CS         |           |            |
| Yes                                    | 280       | 79.1       |
| No                                     | 74        | 20.9       |
| Know about the different forma of anesthesia |       |            |
| Yes                                    | 223       | 63.0       |
| No                                     | 131       | 37.0       |
| Route of Anesthesia administration     |           |            |
| Know                                   | 264       | 74.6       |
| Don’t know                             | 90        | 25.4       |
| Anesthesia is always safe              |           |            |
| Yes                                    | 53        | 15.0       |
| Not                                    | 301       | 85.0       |
| Knowledge about complications of anesthesia |       |            |
| Know                                   | 151       | 42.7       |
| Don’t know                             | 203       | 57.3       |
| Type of anesthesia having high complication |       |            |
| Know                                   | 98        | 27.7       |
| Don’t know                             | 256       | 72.3       |
| Types of anesthesia complication       |           |            |
| Know                                   | 206       | 41.8       |
| Don’t know                             | 148       | 58.2       |

### 3.6. Factors associated with knowledge towards anesthesia for cesarean section

The bivariate logistic regression analysis showed that being aged 25–29 years, urban, having primary and more education, being government employed, having an FMI of more than 4000 birr, having a previous operation, and having previous information about anesthesia were positively and significantly associated with good knowledge about anesthesia for CS. After adjusting for possible confounders, having previous operations and history of anesthesia remained positively and significantly associated with good knowledge of anesthesia for CS.

Accordingly, pregnant women who have had previous operations were nearly five times (AOR = 4.47, 95% CI: 1.77, 11.32) more likely to have good knowledge about anesthesia for CS as compared to those who hadn’t had any previous operations. Moreover, pregnant women who had any health information about anesthesia were 10 times (AOR = 10.06, 95% CI: 5.41, 18.69) more likely to have good knowledge about anesthesia for CS as compared to women who hadn’t had any health information about anesthesia (Table 5).

### 3.7. Pregnant women’s attitudes toward anesthesia for cesarean section

The overall proportion of positive attitudes towards anesthesia for CS was 50.8% (95% CI: 45.8%, 56.2%). Of the total respondents, only 17 (3.8%) agreed on the item/question of “any physician or nurse can administer the anesthesia”, 281 (62.6%) agreed on the item “I would like to know as much as possible about anesthesia”, 257 (62.6%) agreed on the item “prior to operation any pregnant women would require discussion about anesthesia”, 39 (11%) agreed on the item “the less I know about anesthetic for my operation, the better the outcome”, 176 (49.7%) agreed that “we would like to meet the anesthetist before my operation every time”, 42 (11.8%) agreed on the item “I am more nervous about the anesthetic than the surgery itself”, 33 (9.4%) agreed on the item that “I don’t care about the anesthetic as long as my operation turns out well”, and 62 (17.5%) agree on the item “anesthesia is risky for the baby” (Table 5).

### 3.8. Factors associated with attitude towards anesthesia for cesarean section

The bivariate logistic regression analysis also showed that age, being urban residents; having primary and higher educational status, FMI of more than 4000 birr, number of previous ANC visits, number of
In this study, a strong association was found between previous exposure to anesthesia or surgery and positive attitudes towards anesthesia for CS in this study, was 50.8% (95% CI: 45.8%, 56.2%).

Table 5
Bivariate and multivariable logistic regression analysis of factors associated with knowledge towards anesthesia for CS.

| Variable           | Knowledge                                      | COR (95% CI) | AOR (95% CI) |
|--------------------|------------------------------------------------|--------------|--------------|
| Age                | Good: 16-24                                    | 2.03 (0.93,1.99 (0.66,3.55) |             |
|                    | Good: 25-29                                    | 2.12 (1.01,1.82 (0.65,5.10) |             |
|                    | Good: 30-34                                    | 1.59 (0.72,1.23 (0.41,3.69) |             |
| Residence          | Good: Rural                                    | 2.20 (0.97,0.97 (0.19,4.74) |             |
| Educational status | Good: Unable to read and write                   | 1.24 (0.64,0.49 (0.07,3.44) |             |
|                   | Good: Can read and write                        | 4.02 (1.37,1.68 (0.30,9.35) |             |
|                   | Good: Secondary (9-12)                          | 3.64 (1.25,0.98 (0.17,5.54) |             |
|                   | Good: College and above                        | 6.96 (2.25,1.45 (0.22,9.39) |             |
|                   | Good: Occupation status                         | 21.50        |              |
| FMI, ETB           | Good: < 2000                                   | 1.07 (0.35,1.98 (0.49,7.93) |             |
|                   | Good: 2001-4100                                 | 1.26 (0.69,1.11 (0.52,2.40) |             |
|                   | Good: 4101-7000                                 | 1.94 (1.08,1.51 (0.70,3.26) |             |
|                   | Good: > 7000                                   | 2.89 (1.57,1.48 (0.64,5.22) |             |
| Previous operation | Good: Yes                                      | 11.67 (5.42,4.47 (1.77,11.32) |         |
|                   | Good: No                                       | 15.5 (9.15,10.06) |              |
| HI about anesthesia| Good: Yes                                      | 15.5 (9.15,10.06) |              |

Hosmer and Lemeshow Test = 0.619.

4. Discussion

In this study, the overall proportion of good knowledge about anesthesia for CS was 56.5% (95% CI: 51.4%, 61.9%). This finding is in agreement with a study conducted in Northern Ghana (53%) [12]. The reason might be due to the similar socio-economic status of the two countries.

It was higher than studies conducted among pregnant women on knowledge and attitudes towards anesthesia for CS in Turkey (37.5%) [15], and in Pakistan (62.4%) [6]. The reason for the high prevalence of knowledge in this study as compared to Tikur Anbessa Specialized Hospital might be due to the majority (92.7%) of the study participants in this study were from urban areas while only 42.5% of participants from Tikur Anbessa Specialized Hospital were from urban areas. There is evidence that people who lived in cities were more likely to be knowledgeable about anesthesia than those who lived in rural areas [13, 16]. The difference in economic status might be the possible reason for the high proportion of knowledge in this study as compared with the Jimma University Specialized Hospital; where the FMI in this study was >4000 ETB among 50% of the study participants, while 73.8% of participants in the Jimma study had no source of income. The difference in the proportion of knowledge about anesthesia for CS in this study compared to that of India could be explained by the fact that the majority of the study participants in India were housewives (82.5%). There is also evidence that reveals participants who were housewives were less knowledgeable about anesthesia techniques compared to civil servants or working women [10, 17].

However, this finding was lower than studies conducted in India (89.5%) [18], Pakistan (82.4%) [17], the University of Ilorin Teaching Hospital, Nigeria (78%) [19], the Aminu Kano Teaching Hospital-Nigeria (65.5%) [20], and Ghana (62.4%) [6]. The reason for the low prevalence of knowledge in this study might be that only 20.6% of the study participants were graduated/college and above, while the majority of the study participants in studies done in Nigeria (61.4%), India (74.5%), and Pakistan (69%) were graduated. There is adequate evidence that educated women may expend more effort to get accurate information about anesthesia, which in turn leads to better knowledge of anesthesia than those with less education [6, 14, 16, 21, 22].

A number of studies suggest that having positive attitudes towards anesthesia may be associated with positive health outcomes, such as improved maternal and child health outcomes and a lower risk of death from conditions such as heart disease. The overall proportion of positive attitudes towards anesthesia for CS in this study, was 50.8% (95% CI: 45.8%, 56.2%).

In this study, a strong association was found between previous exposures to operations and pregnant women’s knowledge of anesthesia for CS. As a result, pregnant women who have previously had operations or exposure to anesthesia were five times more likely to have good knowledge about anesthesia for CS than pregnant women who had no previous operations. This finding is consistent with studies conducted in Jimma University specialized hospital in Ethiopia [10], India [23], Pakistan [17, 23], Turkey [24], and Nepal [25] which showed that patients with previous exposure to anesthesia or surgery had good knowledge of anesthesia techniques compared to those without previous exposure. This could be because pregnant women who have had...
Table 6
Bivariate and multivariable logistic regression analysis of factors associated with attitude towards anesthesia for CS.

| Variable                  | Attitude | OOR (95% CI) | AOR (95% CI) |
|---------------------------|----------|--------------|--------------|
|                           | Positive |              |              |
|                           | Negative |              |              |
| Age                       |          |              |              |
| 16-24                     | 43       | 50           | 1.35 (0.62, 2.51) | 0.49 (0.16, 1.50) |
|                           |          |              |              |
| 25-29                     | 84       | 62           | 2.13 (1.01, 4.49) | 0.86 (0.32, 2.30) |
|                           |          |              |              |
| 30-34                     | 39       | 40           | 1.53 (0.69, 3.42) | 1.07 (0.41, 2.78) |
| ≥35                       | 14       | 22           | 1             | 1             |
|                           |          |              |              |
| Residence                 |          |              |              |
| Urban                     | 176      | 152          | 6.37 (2.15, 20.06) | 3.38 (0.92, 12.45) |
|                           |          |              |              |
| Rural                     | 44       | 22           | 1             | 1             |
|                           |          |              |              |
| Educational status        |          |              |              |
| Unable to read and write  | 2        | 18           | 0.86 (0.67, 1.23) | 0.51 (0.33, 0.87) |
|                           |          |              |              |
| Able to read and write    | 6        | 70           | 3.86 (2.01, 21.21) | 1.74 (0.90, 3.32) |
|                           |          |              |              |
| Primary school            | 47       | 70           | 6.04 (1.83, 27.27) | 3.68 (0.64, 21.06) |
|                           |          |              |              |
| Secondary                 | 69       | 55           | 1.12 (2.51, 50.77) | 6.71 (1.19, 37.99) |
| College and above         | 56       | 17           | 29.64 (6.24, 140.86) | 13.63 (2.26, 82.21) |
| FMI, ETB                  | 4 (15.4%)| 22           | 1             | 1             |
| Number of ANC visit       |          |              |              |
| No visit                  | 72       | 66           | 1             | 1             |
|                          | (52.2%)  | (47.8%)      |              |              |
| 1-3 visit                 | 28       | 43           | 0.59 (0.33, 1.96) | 0.91 (0.47, 1.76) |
|                          | (39.4%)  | (60.6%)      |              |              |
| 4 or more visit           | 80       | 65           | 1.13 (0.71, 2.44) | 0.87 (0.46, 1.65) |
|                          | (55.2%)  | (44.8%)      | (34.5%)      | (44.4%)      |
| Number of delivery        |          |              |              |
| Nullpara                  | 70       | 63           | 1             | 1             |
|                          | (52.6%)  | (47.4%)      |              |              |
| Para I                    | 58       | 35           | 1.49 (0.87, 2.56) | 5.52 (0.83, 36.98) |
|                          | (62.4%)  | (37.6%)      |              |              |
| Multipara                 | 52       | 76           | 0.62 (0.38, 1.00) | 2.32 (0.36, 15.04) |
|                          | (40.6%)  | (59.4%)      |              |              |
| Previous operation/surgery|          |              |              |
| Yes                       | 51       | 35           | 1.57 (0.96, 2.57) | 0.82 (0.41, 1.62) |
|                          | (59.3%)  | (40.7%)      |              |              |
| No                        | 129      | 139          | 1             | 1             |
|                          | (48.1%)  | (51.9%)      |              |              |
| HI about anesthesia       |          |              |              |
| Yes                       | 111      | 72           | 2.28 (1.49, 3.49) | 2.02 (1.09, 3.77) |
|                          | (60.7%)  | (39.3%)      |              |              |
| No                        | 69       | 102          | 1             | 1             |
|                          | (40.4%)  | (59.6%)      |              |              |
| Knowledge about anesthesia|          |              |              |
| Good                      | 118      | 82           | 2.14 (1.39, 3.28) | 1.37 (0.77, 2.45) |
|                          | (59.0%)  | (41.0%)      |              |              |
| Poor                      | 62       | 92           | 1             | 1             |
|                          | (40.3%)  | (59.7%)      |              |              |

Hosmer and Lemeshow Test = 0.146.

*P-value<0.05.
Potential ethical issues were addressed accordingly during the study period.

Consent for publication
The article did not contain any personal or any clinical detail of any individual participant.

Availability of data and materials
Any data or supporting material can be found here via the address of the corresponding author on reasonable request.

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Author contribution
All authors (MA, NS, AF, DF and ZA) participated in the design of the study and the interpretation of data. MA conceived of the study and performed data analysis and drafted the manuscript. All authors (MA, NS, AF, DF and ZA) approved the final work for publication. All authors critically revised the manuscript and have approved the final version.

Consent
Verbal consent obtained.

Registration of research studies
1. Name of the registry: research registry
2. Unique Identifying number or registration: researchregistry7476
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): https://www.researchregistry.com/browse-the-registry/home/

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Declaration of competing interest
All authors declared that they have no competing interests.

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List of abbreviations
ANC  Ante Natal Care
AOR  Adjusted Odds Ratio
CS  Cesarean Section
FMI  Family Monthly Income
UGOCSH  University of Gondar Comprehensive Specialized Hospital
SD  standard deviation

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jamsu.2022.103299.

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