



Cross-sectional Study

“Prevalence and associated factors of preoperative anxiety among obstetric patients who underwent cesarean section”: A cross-sectional study

Yonas Admasu Ferede^{a,*}, Yosef Belay Bizuneh^a, Misganaw Mengie Workie^a,
Biruk Adie Admass^b

^a Department of Anesthesia, College of Medicine and Health Sciences, University of Gondar, Ethiopia

^b Department of Anesthesia, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

ARTICLE INFO

Keywords:

Prevalence
Preoperative anxiety
Obstetric patients
Cesarean section

ABSTRACT

Background: Anxiety is the most common problem in the preoperative period. This anxiety increases post-operative pain, delay healing, and prolong the hospital stay. Among the surgical population, a higher level of preoperative anxiety has been seen in obstetric patients.

Objective: The aim of this study was to assess the prevalence and associated factors of preoperative anxiety among obstetric patients undergoing cesarean section.

Methods: An institutional-based cross-sectional study was conducted from January 01, 2021, to May 30, 2021. A total of 376 obstetric patients who underwent cesarean sections were included. Descriptive statistics, cross-tabs, and binary logistic regression analysis were performed to identify the association shivering and independent variables. The strength of the association was presented using an adjusted odds ratio with a 95% confidence interval and a p-value < 0.05 was considered as statistically significant state versions of state-trait anxiety inventory scale (S-STAI) were used for this study.

Results: The overall prevalence rate of preoperative anxiety was 63% (95% CI: 58.2, 68.1). The patient's preoperative mean anxiety score of STAI was (43.81 ± 8.81). There was a high level of preoperative anxiety in patients undergoing emergency cesarean section as compared to elective patients. Patients' age less than 30 years, level of education, and previous anesthesia and surgery exposure were also highly associated with the dependent variable.

Conclusion: In this study, fear of complications and fear of death result of operation were the most common factors responsible for preoperative anxiety while few patients were anxious about financial loss and osmotic issues.

1. Introduction

Cesarean section (Cs) is one of the most common surgical procedures performed on obstetric patients, and regional or general anesthesia techniques are based on patients' indications [1,2]. However, in modern obstetric anesthesia practice, the percentage use of regional anesthesia for Cs has become a marker of quality in terms of risk and benefits for both mother and fetus [3]. World Health Organization (WHO) recommended the optimal rate of Caesarean section should be lying between 5% and 15% [4]. However, it is around 29.7% in Gondar university hospital, Ethiopia [5].

Preoperative anxiety is often described as an uncomfortable, tense

unpleasant mood before surgery, an emotional response to a potential challenge or threat to reality and it has big complications by stimulating the sympathetic nervous system, causing tachycardia, increased blood pressure, and arterial vessel contraction, decreased blood circulation to wounds, decreased partial pressure of tissue, chronic pain, and depression [6].

Preoperative anxiety is a challenging concept in the preoperative care of patients. Most patients awaiting surgery experience anxiety and it is widely accepted as an expected response [7,8]. Untreated anxiety ended up with major cardiac events like; congestive heart failure, acute myocardial infarction, pulmonary edema. In addition to this, increases readmission rate, poor quality of life and high rate of cardiac mortality,

* Corresponding author.

E-mail addresses: yonasadmasu2010@gmail.com (Y.A. Ferede), phanuelyosef@gmail.com (Y.B. Bizuneh), mengiemisganaw@rocketmail.com (M.M. Workie), birukadie@yahoo.com (B.A. Admass).

<https://doi.org/10.1016/j.amsu.2022.103272>

Received 10 December 2021; Received in revised form 8 January 2022; Accepted 23 January 2022

Available online 4 February 2022

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high postoperative pain, increased analgesic and anesthetic consumption, prolonged hospital stay, influence during anesthetic induction, delay patient recovery and decrease patient satisfaction with the perioperative experience [9,10].

Anxiety is a set of behavioral manifestations. It is broadly of two types, state-anxiety and trait anxiety. State anxiety is driven by episodes of anxiety that do not persist beyond the situation and it is a temporary emotional state. This state varies over time. Trait anxiety is a condition in which individual experiences a lifelong pattern of anxiety [11,12].

Worldwide the prevalence rate of preoperative anxiety among adult patients was ranged between 11 and 80% [12,13], and prevalence rates of preoperative anxiety in Ethiopia ranged from 47% to 70.3% [14,15]. However, most studies showed that a higher level of preoperative anxiety in obstetric patients compared to the general surgical population and reported in the range of 73.3–86% [16,17].

State-Trait Anxiety Inventory (STAI) has been valid, reliable and it is currently taken as a gold standard tool and has shown consistent results in different populations and ethnic groups in assessing anxiety [19,20]. Due to this reason, many studies used this tool to assess preoperative anxiety including the current study. It is better to avoid subjective assessment to minimize overestimation of patients' anxiety [21].

Studies have shown that high preoperative anxiety levels can lead to an increased postoperative analgesic requirement, prolonged hospital stay [22], coughing during induction of anesthesia, autonomic fluctuations, and increased anesthetic requirement, increased nausea and vomiting in the postoperative period, prolonged recovery, and increased risk for infection [23–26] and significant contribution to the adverse perioperative outcomes and poor patient satisfaction [27].

2. Methods

2.1. Study design, area, and period

An institution-based cross-sectional study was conducted from January 01 to May 30, 2021. A total of 376 patients were enrolled by consecutive sampling techniques. The article has been registered with the UIN of the research registry (7408) and it has been reported in line with the STROCSS criteria [28]. University of Gondar Comprehensive Specialized Hospital was the study area, and it is a Referral and Teaching Hospital, which is found in Gondar town, Ethiopia. This Hospital is located 738 km Northwest of Addis Ababa, Medina in Ethiopia, and 230 Km from the Ethiopia-Sudan border. The Hospital is estimated to serve over 5 million people around the area.

2.2. Sample size determination

The required sample size was calculated using a single population proportion formula. Prevalence of preoperative anxiety 59.6% [29] was taken to calculate the sample size.

$$n = (Z \alpha/2)^2 p (1-p)/d^2$$

Assumptions n = is the required sample size, Z = critical value for normal distribution at 95% confidence level (1.96), W = 0.05 (5% margin of error), α = the level of significance = best estimate of the population proportion.

$$n = (1.96)^2 \times (0.596 \times 0.404)$$

$$(0.05)^2$$

$$= 369.99 - 370. \text{Then } 10\% \text{ non-response rate was added}$$

$$= 370 \times 10\% = 37$$

$$= 370 + 37 = 407, \text{ this was the total sample size.}$$

2.3. Data collection procedure

Two anesthetists were involved in the data collection after training. The data were collected by interviewing participants and reviewing patients' charts using structured and semi-structured questionnaires. We have used the English version of STAI for patients who understood English and a translated Amharic version of STAI for those who did not understand the English language. After explaining the purpose of the study and instructions for filling STAI, written informed consent was obtained and demographic data were recorded by the data collectors. Elective cesarean section patients were then asked to fill the forms in the presence of a primary investigator a day before surgery. However, the second investigator was collecting the data emergency cesarean section patients were 30 min before the operation. 10–15 min was given to each participant to fill the questioner and the data were collected consecutively until reached the sample size. The questionnaire included a short scale of STAI which has 6 items that measure baseline (trait T-STAI) and situational (state S-STAI) anxiety levels. The reliability and validity of the STAI were reported (Cronbach's α = 0.842). Preoperative pain was assessed with a visual analog scale (VAS).

2.4. Study variables

The dependent variable of this study was the level of preoperative maternal anxiety which was assessed with STAI. The independent variables were, socio-demographic variables (age, BMI, education level, religion, residence, occupation, marital status, annual income), clinical characteristics ASA physical status, parity, preoperative pain, previous anesthesia and surgery, chronic illness) and the possible factors (concern about family, fear of complications, postoperative pain, financial loss, waiting for an operation, fear of one's life, harm from doctor/nurse mistake, change of environment, needing a blood transfusion, getting stuck with a needle, awareness during surgery, unable to recover from anesthesia, fear of unknown and osmotic issues).

2.5. Inclusion and exclusion criteria

The study included all obstetric patients who were scheduled for elective or emergency cesarean section during the study period. Patients with known anxiety disorder, known psychiatric illness, unable to communicate and took any type of anxiolytics, complicated pregnancy, or having congenital fetal anomaly were excluded from the study, and those unwilling to participate in the study were also excluded.

2.6. Operational definitions

State-Trait Anxiety Inventory: A standard tool for measuring situational (state) and baseline (trait) anxiety with strong validity and reliability [12,20,30–34].

Anxiety is a state of feeling, of an unlikable disturbing experience of the respondents with an STAI score of 44 and above. Substance use: is the improper usage of any type of psychoactive chemicals within the last 3 months [15]. A value of 44 and above was considered as the presence of clinically significant parental anxiety [35].

Score of 20: Patients feel no anxiety at all.

Score of 80: Patients feel high level of anxiety.

2.7. Data processing and analysis

Data clean-up and cross-checking were done for inconsistencies and missed values. Appropriate coding and editing were performed before data entry. The coded data were entered to Epi-info software version 7 and exported to SPSS version 24. A value of more than or equal to 44 on the SATI scale was taken as significant preoperative anxiety. Bivariate and multivariate linear regression analyses have used A p-value of <0.05 was considered significant and a p-value of <0.0001 was considered

highly significant. Quantitative variables were calculated as mean ± SD. The relationship of nominal data with anxiety was analyzed by using cross-tabulations. The results were summarized using tables and figures and presented with narrative descriptions.

3. Results

During the 5 month study period, 407 patients were screened and 376 patients were enrolled in this study with a response rate of 92.4%. Thirty-one patients were excluded from analysis for incomplete data. The patient's preoperative mean anxiety score of STAI was (43.81 ± 8.81). The minimum and maximum STAI scores were 27 and 73 respectively. Out of the total respondents, (237) patients had STAI values of 44 and above. The remaining 139 (37%) patients had no significant anxiety during the preoperative period 237(63%). High levels of preoperative anxiety were experienced by most patients (77.2%) scheduled for emergency cesarean section. The mean (±SD) age was 28.5 ± 5.9 years. Two hundred and ninety-two patients (77.7%) were classified as American Society of Anesthesiologists (ASA) II, while the remaining patients (22.3%) were ASA III. The majority of the study population was an orthodox Christian (68%) (Table 1).

3.1. Economical and clinical characteristics of patients

Among 376 patients 47.8% of study patients had no income. The majority of patients' pregnancies (81.3%) were planned and wanted and 63.3% were multigravida. The majority of patients did not have previous awareness about anesthesia (65.4%) and surgery (63.8%). 67.8% of patients were choice spinal anesthesia, however by decision of anesthesiologists 81.4% of patients were done under spinal anesthesia (Table 2).

Table 1
Socio demographic characteristics of study participants (N = 376).

Variables	category	Frequency (N)	Present (%)	Preoperative anxiety	
				Yes (%)	No (%)
Age(year)	≤30	217	57.7	127 (58.5)	90 (41.5)
	>30	159	42.3	76 (47.8)	83 (52.2)
BMI (kg/m2)	<30(non-obese)	306	81.4	156 (52.0)	150 (48)
	≥30(obese)	70	18.6	40 (57.1)	30 (42.9)
ASA	II	292	77.7	142 (48.6)	150 (51.4)
	III	84	22.3	44 (52.4)	40 (47.6)
Level of Education	Uneducated	113	30.1	151 (57.4)	112 (42.6)
	Educated	263	69.6	43 (38.1)	70 (61.9)
Religion	Orthodox	228	60.6	100 (43.9)	128 (56.1)
	Muslim	100	26.6	62 (62.0)	38 (38.0)
	Protestant	48	12.8	29 (60.4)	19 (39.6)
Residency	Urban	223	59.3	116 (52)	107 (48)
	Rural	153	40.7	80 (52.3)	73 (47.7)
Marital status	Married	307	81.6	171 (55.7)	136 (44.3)
	Not married	38	10.1	20 (52.6)	18 (47.4)
	Divorced	31	8.2	24 (77.4)	7 (22.6)

Table 2
Economical and clinical characteristics participants (N = 376).

Variables	category	Frequency (N)	Percent (%)	Preoperative anxiety	
				Yes (%)	No (%)
Income/month	No income	180	47.8	100 (55.6)	80 (44.4)
	<3871 birr	68	18.1	30 (44.1)	38 (55.9)
	>3871 birr	128	34	60 (46.9)	68 (53.1)
Gravidity	Primigravida	138	36.7	76(55)	62(45)
	Multigravida	238	63.3	120 (50.4)	118 (49.6)
Chronic illness	Yes	40	10.6	24(60)	16(40)
	No	336	89.4	195 (58)	141 (42)
Preoperative pain	Yes	150	39.9	90(60)	60(40)
	No	226	60.1	99 (43.8)	127 (56.2)
Anesthesia exposure	Yes	198	52.6	68 (34.3)	130 (65.7)
	No	178	47.3	94 (52.8)	84 (47.2)
Awareness about anesthesia	Yes	130	34.6	54 (41.5)	76 (58.5)
	No	246	65.4	150 (61)	96(39)
Awareness about surgery	Yes	136	36.2	54 (39.7)	82 (60.3)
	No	240	63.8	138 (57.5)	102 (42.5)
Urgency of the surgery	Emergency	220	58.5	138 (62.7)	82 (37.3)
	Elective	156	41.5	61 (39.1)	95 (60.9)

3.2. Indications for cesarean section

In our study, among 376 patients (58.5%) were done cesarean section under emergency schedule and the remaining (41.5%) patients were elective cesarean section. The most frequent cases in the emergency cesarean section were fetal distress (42.8%) and previous cesarean section with labour (26.5%). However, the least frequent case was Twin and first breech presentation (1.4%). Previous cesarean section (28.2%) and Pregnancy Induced Hypertension (21.8%) were the frequent cases among elective cesarean sections (Table 3).

3.3. Possible associated factors for preoperative anxiety

Among the total of study participants, 81.4% of study populations had fear of complications and 60.6% a fear of death. 54% of the study populations were concerned about their family and 52.1% of mothers were worried unable to recover from anesthesia. Financial loss and cosmetic issues were the least factors for preoperative anxiety in this study (16% and 11%) respectively (Table 4).

3.4. Factors associated with perioperative anxiety

We have used bivariate analysis and factors with a p-value less than 0.25 were entered into multivariate logistic regression. Multivariate logistic regression revealed a significant association between preoperative anxiety and other independent variables with a p-value less than 0.05.

In the present study age, BMI, religion, level of education, residency, income, gravidity, previous anesthesia exposure, and urgency of the surgery were associated with the dependent variable in the bivariate logistic regression.

However, only variables like patients' age, level of education,

Table 3
Indications for Elective and Emergency Cesarean section (N = 376).

Elective Cesarean sections	Frequency (n = 156)	(%)	Emergency Cesarean sections	Frequency (n = 220)	(%)
Previous Caesarean Section	44	28.2	Previous caesarean section with labour	58	26.5
Oligohydramnios	8	5.2	Cord Prolapse	8	3.7
polyhydramnios	6	3.8	Fetal Distress	94	42.8
Cephalic Pelvic Disproportion	10	6.3	Failed Induction	21	9.6
Antepartum Hemorrhage	12	7.7	Antepartum Hemorrhage with active bleeding	10	4.6
Malposition without labour	16	10.3	Malposition with labour	9	4.4
Twins pregnancy	6	3.8	Eclampsia	5	2.3
Bad Obstetrical History	8	5.2	Obstructed Labour	6	2.3
Pregnancy Induced Hypertension	34	21.8	Meconium	6	2.3
Maternal Wish	12	7.7	Twin and first breech	3	1.4

Table 4
Preoperative anxiety and possible factors (N = 376).

Variables	Frequency (N)	Percent (%)
Fear of complications	306	81.4
Concern about family	202	54
Postoperative pain	200	53.2
Fear of death	228	60.6
Unexpected results of operation	224	59.6
Harm from doctor mistake	78	20.7
Fear of unknown	145	38.5
Fear of physical disability	117	31.1
Waiting for operation	70	18.6
Financial loss	60	16
Unable of recovery	196	52.1
Awareness during surgery	96	25.5
Cosmetics issues	42	11.1

previous anesthesia and surgery exposure, and urgency of the surgery were significantly associated with preoperative anxiety in multivariate logistic regression.

In this study, age was significantly associated with preoperative anxiety. Patients' age less than 30 years were two times more likely to develop preoperative anxiety than >30 years [AOR = 2.2;(95%CI: 1.85, 7.32) and p-value<0.0001] (Table 5).

Level of education was one of the significant variables which affect preoperative anxiety. The present study showed that educated persons were 2.5 times more likely to develop preoperative anxiety than uneducated people [AOR = 2.5;(95%CI: 2.11, 6.73) and p-value = 0.0032] (Table 5).

Another important finding observed during the study was a significant association between previous anesthesia and surgery exposure and the dependent variable so, our result showed that patients who had previous exposure to anesthesia had 61% less risk to develop preoperative anxiety than patients who had no previous exposure to anesthesia [AOR = 0.39;(95%CI: 0.27, 0.82) and p-value = 0.002] (Table 5).

The urgency of the surgery was one of the associated factors for preoperative anxiety in our study, and emergency cesarean section was four times more likely to develop preoperative anxiety than elective cesarean section [AOR = 4.3, (95%CI: 3.5,12.1) and p-value<0.0001] (Table 5).

Table 5
Cross tabulation, Bivariate and multivariate logistic binary regression analyses of the result, Northwest Ethiopia, 2021(N = 376).

Variables	Preoperative anxiety		OR (95%CI)		
	Yes n (%)	No n (%)	Crude OR (95%CI)	Adjusted OR (95%CI)	p-value
Age(year)					P =
=<30	127 (58.5)	90 (41.5)	1.8(1.3,5.3)	2.2 (1.85,7.32)	0.013
>30	76 (47.8)	83 (52.2)	1 ^a	1 ^b	
Level of education					P =
Educated	43 (38.1)	70 (61.9)	2.0 (1.89,6.11)	2.5 (2.11,6.73)	0.0032
Uneducated	151 (57.4)	112 (42.6)	1 ^a	1 ^b	
Urgency of the surgery					P <
Emergency Cs	138 (62.7)	82 (37.3)	3.6 (3.1,10.9)	4.3(3.5,12.1)	0.0001
Elective Cs	61 (39.1)	95 (60.9)	1 ^a	1 ^b	
Exposure for anesthesia and surgery					P =
Previous exposure	68 (34.3)	130 (65.7)	0.42 (0.2,0.83)	0.39 (0.27,0.82)	0.002
No previous exposure	94 (52.8)	84 (47.2)	1 ^a	1 ^b	

OR=Odd ratio, C I=Confidence interval.

^a Significant from the bivariate logistic regression model.

^b Significant from the multivariate logistic regression model.

4. Discussion

Preoperative anxiety becomes a psychological issue when your fear of surgery is so significant that you may begin to have physical symptoms like a racing heart, nausea, and chest pain. If patients are prone to anxiety, surgery can be the trigger for a panic attack. Thus, it is crucial for health care providers to examine and understand the mental health of patients who are undergoing surgical procedures. It is often accompanied by restlessness, fatigue, problems in concentration, muscular tension, and an uneasy feeling[36]. In addition, preoperative anxiety is also associated with increased nausea, vomiting in the postoperative period, prolonged infection, and perioperative pain [14].

There are tools that have been used in the assessment of levels of anxiety in adult surgical patients in developed countries, including the Depression, Anxiety and Stress Scale (DASS) [37], STAI [19,38] and the Visual Analogue Scale of Anxiety (VAS) [39].

The prevalence rate of preoperative anxiety of patients who underwent various types of surgery in many studies ranged from 60% to 90% [40]. In addition to this, the prevalence rates of preoperative anxiety was vary between 20% and 80%, depending on the type of surgery undergone [41,42]. In this study, a preoperative prevalence rate was 63% of the subjects who were waiting for cesarean section delivery as suggested by an STAI score of 44 and above. Therefore; our result was comparable to those of previous studies. This result was also similar to the previous studies which were done in Europe and the Middle East [33, 35].

The prevalence rate of preoperative anxiety in the current study was high compared to previous studies which were done in Ethiopia [15,29, 43]. The possible reason might be the study population. In the present study only obstetric patients were included and they were preoperatively feared and worried about their fetuses in addition to themselves.

Factors affect preoperative anxiety, including age, gender, marital status, level of education, the uncertainty of the exact day of surgery, fear of surgery, fear of anesthesia, fear of complications, fear of death,

fear of disability, the patient's ability to understand the events that occur during surgery, concern about their family, financial loss, post-operative pain, unable of recovery, fear of unknown causes(12).

We found that age has negative associations with preoperative Anxiety. As the age increases, the prevalence rate of preoperative anxiety decreases. Patients with younger age less than or equal to 30 years had a higher level of preoperative anxiety than older age greater than 30 years. This finding was consistent with studies [33,44]. However, some studies showed that elderly patients were experiencing high preoperative anxiety than younger age due to comorbidities [46]. But our studies were done on obstetric patients who gave birth. On the other way, some studies showed that age did not a significant factor for preoperative anxiety [47].

In our study a high level of anxiety in patients undergoing emergency cesarean section as compared to elective patients and supported by a study done in India(13). It might be the patient has no adequate time for a decision whether they give birth by vagina or cesarean section. It leads to fear and more anxious. In contrast, elective patients had a higher anxiety level than emergency patients [44].

Level of education is one of the common risk factors of preoperative anxieties. In the present study preoperative anxiety was high prevalence rate in patients with educated patients than uneducated patients and supported by studies done in India, Brazil and Pakistan [12,13,33]. The possible reason might be regarded the various complications of anesthesia and surgery, educated patients were more aware and worried than uneducated patients. In contrast, less educated patients had a higher anxiety level than educated patients, which was done in Turk [48].

This study also showed that previous surgical and anesthetic exposure was decreased the preoperative anxiety than patients who had no exposure and this finding supported by different studies [12,33]. The possible reason might be if patients had exposure to surgery and anesthesia, minimize misconception and fear of the unknown complications. However, in some studies, patients with previous surgical and anesthetic exposure had high levels of anxiety [49]. The investigators justified the results patients may develop stressful complications, such as death due to previous anesthesia and surgical exposures.

Income was one of the determining factors of preoperative anxiety in different studies. Patients with higher income experience higher anxiety [14]. In contrast, patients with no and low-income experience higher anxiety than patients with high income [29]. It might be fear of financial frustration and incapability. But, in the present study patients' income had no statistically significant factor for the dependent variable.

Some studies showed that preoperative pain was highly associated with preoperative anxiety. Patients who had moderate to severe pain had higher anxiety than mild pain(12). In the current study, patients with severe pain were found to have higher anxiety (58.2%) compared to mild to moderate pain (47.8%). However, it was not a statistically significant factor to the preoperative anxiety in our study and supported by studies done in Ethiopia [14,29].

In the current study, the three major possible factors of preoperative anxiety were fear of complications (81.4%), fear of death was (60.6%) and fear of unexpected results of operation were (59.6%). The finding of these results were supported by a study was conducted in Yirgalem, Ethiopia which was fear of death accounts (83.1%), fear of complications(76.4%), and unexpected results of operation(71.4%) [15], and a study done in Nigeria [50].

Factors such as BMI, ASA physical status, marital status, religion, gravidity, residency, and presence of chronic illness have not shown significant association on preoperative anxiety in the current study [49].

4.1. Limitations of the study

The major limitation of our study was difficult to get adequate information from laboring mothers who came for emergency cesarean sections due to lack of adequate time. That is why, 31 patients were

excluded from the analysis. The other big concern was COVID 19 and there was no adequate space during the data collection period. Another limitation in our study was uneducated patients were difficult to understand and fill (STAI), and it needs some explanation.

5. Conclusion and recommendation

The prevalence rate of preoperative anxiety among obstetric patients who underwent cesarean section was 63% (95% CI: 58.2, 68.1). Age, level of education, type of schedule, anesthesia, and surgery exposure were factors for preoperative anxiety. In his study emergency, cesarean section delivery had a high level of anxiety than elective patients. All obstetric patients who were scheduled for cesarean section delivery should be assessed for the presence of anxiety in their routine preoperative anesthesia evaluation. However, still it needed additional counseling time. We believe that detailed preoperative anesthesia visits are important to reduce preoperative anxiety.

Ethical approval

Ethical clearance to conduct the research was obtained from the ethical review committee of the school of Medicine, College of Medicine and Health Sciences, University of Gondar. Written informed consent was obtained from each study participant after a clear explanation. Confidentiality was guaranteed by avoiding personal identification and keeping the completed questionnaires locked. If patients were not willing to participate in the study were informed that they had full right not to participate or stop during the data collection period.

Consent for publication

Not applicable.

Availability of data and materials

All data analyzed during this study were included in this published article and it is available from the corresponding author on reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Funding

No funding has been received for this study.

Authors' contributions

YA and YB: conceived, designed the study, supervised the data collection, and performed the data analysis, interpretation of the result, and drafting the manuscript. MM and BA participated in designing the study, data analysis and, data interpretation, editing the manuscript. All authors read and approved the final manuscript.

Declaration of competing interest

No conflict of interest was declared by the authors.

Acknowledgement

The authors appreciate the high cooperation of the Anesthesia, GYN/OBS, and Midwifery department which facilitates the interviewing of the patients and the collection of data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.103272>.

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