


Research Article

Trend of Caesarean Section and Obstetric Anesthesia: A Retrospective Study at Keren Regional Referral Hospital 2002-2020

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Abstract

Introduction: Despite the rising trends of caesarean section worldwide, there had been less impact on reducing maternal and fetal mortality. Regional anesthesia has become predominant method due to its easier technical placement, faster onset of action, reliable surgical anesthesia and allows more direct experience of childbirth. The aim of the study was to assess the trend of caesarean section and obstetric anesthesia at Keren Regional Referral Hospital.

Methodology: A retrospective study design on anesthesia and obstetric record review was conducted on parturients who had caesarean section at Keren Regional Referral Hospital from January 1st 2002 to December 31st 2020. After securing permission from Ministry of Health data regarding the age of the parturients who underwent caesarean section, the total number of caesarean sections performed, the type of obstetric anesthesia administered, the indications for caesarean section and the type of caesarean section based on timing were collected. After data collection was completed and cleaned in MS Excel it was exported to SPSS version 25 for analysis. Frequency distribution and percentage were the focus of the analysis.

Results: A total of 40,270 parturients delivered at Keren Regional Referral Hospital out of this 6440 (16.9%) parturients had caesarean section. There was an increment of cesarean section from 16.4% in 2002 to 20.6% in 2020. Majority (53.1%) of the parturients laid between the age group of 20-29. Regarding the type of anesthesia given 3411 (53.1%) were operated under spinal anesthesia (SA) while the rest 3010 (46.9%) were done under general anesthesia. Majority (89.9%) were emergency and only 10.1% were elective, with the main medical indication being cephalo-pelvic disproportion (25.6%).

Conclusion: The increase of cesarean section rate beyond the WHO recommendation and majority of the cases being emergency is certainly a cause of concern. Therefore, there is a need to address the clinical and socio-demographic factors association with the increase of caesarean section rate as well as most of the cases being emergency.

Keywords: Obstetric anesthesia; caesarean section; spinal anesthesia; general anesthesia.

Abbreviations

CPD: Cephalo-pelvic disproportion CS: Caesarean section

EA: Epidural anesthesia

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Citation: Samuel Fikremariam Bein, Betiel Yihdego Kidanemariam, Fitsum Kibreab . Trend of Caesarean Section and Obstetric Anesthesia: A Retrospective Study at Keren Regional Referral Hospital 2002-2020. *Anesthesia and Critical Care* 5 (2023): 06-10.

Received: January 09, 2023

Accepted: January 20, 2023

Published: March 29, 2023

GA: General anesthesia

OA: Obstetric anesthesia

RA: Regional anesthesia

SA: Spinal anesthesia

Background

Caesarean section (CS) is a widely performed obstetric procedure which was introduced in late 19th century to save the lives of women and their newborns from life-threatening pregnancy and childbirth related complications [1]. When medically justified, CS can effectively prevent maternal and perinatal mortality and morbidity [2]. On the contrary performing CS without medical indication had resulted in maternal and fetal complications, despite its rise it had less input to improve maternal health [3-4]. In addition, this puts the overworked health systems particularly in low- and middle-income countries under unnecessary pressure [5].

Worldwide almost 18.5 million parturients deliver via CS yearly [6]. The rate of CS is considered as a process indicator in maternal health to monitor health services progress (WHO, 1994). The World Health Organization (WHO) has recommended 5%-15% population-based CS rate. Nonetheless a tremendous increase in the rate CS has been observed globally and an increase is expected in the current decade [7-8]. In 2013 alone, an average rate of 27% CS has been documented from both developed and developing countries [5].

On the contrary in Africa CS rate is relatively low with the exception of Egypt [7]. Eritrea has been very successful in reducing the maternal mortality rate from the extremely high 998/100,000 in 1995 to 450/100,000 in 2005 [9]. Even though many tasks still await, access to basic and comprehensive emergency obstetric care is increasing satisfactorily. A study done in Eritrea reported a CS rate of 13.3% and 35.3% in Orotta National Maternity Referral Hospital (public hospital) and Sembel Hospital (private hospital) respectively [10].

CS can be performed under either regional anesthesia (RA) including spinal anesthesia (SA) and epidural anesthesia (EA), or general anesthesia (GA) [11]. The anesthesia preference for CS generally depends on clinical indications, experience of the anesthetist and maternal preferences [12]. Generally present practice favors RA for CS worldwide

due to high airway and maternal complications associated with GA compared to RA [13]. RA offers the benefit of using fewer drugs, a more direct experience of childbirth, less blood loss and least anesthetic exposure to the neonate compared to GA [14]. SA has become the principal method of inducing anesthesia for CS due to its easier technical placement, faster onset of action, reliable surgical anesthesia, and provides better and more cost-effective anesthesia [15]. GA is generally used for CS when RA is contraindicated or during emergency

because of its rapid and predictable effect [11].

Despite the advantages of RA specifically SA, some resource poor countries had shown preferences toward the use of GA for CS [16]. A survey in sub-Saharan countries showed the use of GA for 90% of the cases in the year 2002 and this got decreased to 52.8% in 2006 [17]. A study conducted in Ethiopia which reviewed a fifteen year of practice from 1996-2010 revealed that mothers who underwent CS 65.6% were operated under GA and the rest 34.4% were operated under SA [18].

The increase in CS rate worldwide and the predominance of GA for CS in resource poor countries is certainly a cause of alarm. Therefore, the purpose of the study was to assess the trend of CS and obstetric anesthesia (OA) at Keren Regional Referral Hospital

Methods

Study design and study setting

Medical records review on anesthesia and obstetric registration books was done on parturients who underwent CS at Keren Regional Referral Hospital from January 1st 2002 to December 31st 2020. Keren Regional Referral Hospital is located in the Keren city 91km away from the capital city Asmara. As a regional referral hospital, it serves as referral hospital for the entire Anseba zone and part of Gash Barka and Northern Red Sea zones with an estimated total population of 600,000. The hospital has six main departments; out-patient department, emergency department, pediatric department, internal medicine department, surgical department and obstetrics and gynecology department. The study was conducted in the obstetrics and gynecology department. The obstetrics and gynecology department provide spontaneous and assisted birth canal deliveries, abortion care, CS and gynecology services.

Study population

The study population constituted all women who underwent CS at Keren Regional Referral Hospital from January 1st 2002 to December 31st 2020. Mothers who delivered by CS outside the study period were excluded. Data was retrieved from the Obstetrics and anesthesia registry record books. The measured variables include; assisted or spontaneous vaginal deliveries, age of the parturients, type of OA (SA or GA), indication for CS and type of CS based on timing (emergency or elective).

Data source

The anesthesia and obstetric registration record books were reviewed regarding the age of the mothers who underwent CS, the total number of assisted or spontaneous vaginal deliveries, the total number of CS performed per year, the type of anesthesia administered, indication for CS and the type of CS based on timing.

Data management and analysis

Data collection and cleaning was done in MS-Excel. The collected and cleaned data was exported to Statistical Package for Social Sciences (SPSS) version 25 for analysis. The CS rate, the indications for CS, the type of OA administered and the type of CS based on timing was analyzed in terms of frequency distribution and percentage.

Results

Trend of caesarean section

A total of 40,270 parturients delivered at Keren Regional Referral Hospital from the period 2002 to 2020. Of this 6440 (16.9%) parturients had CS (Fig 1). Majority (53.1%) of the parturients were between the age group of 20-29 (Fig 2).

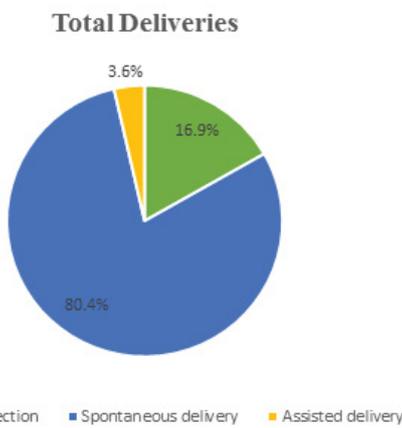


Figure 1: Distribution of parturients by type of deliver

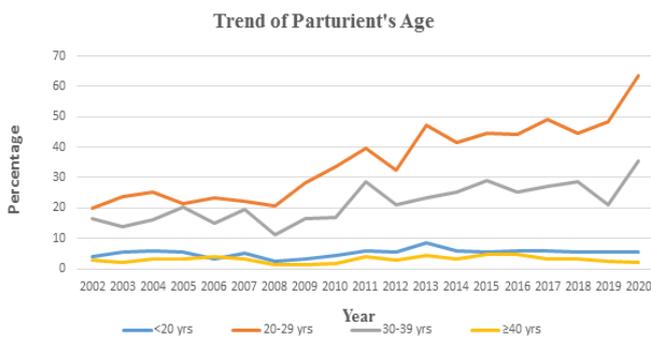


Figure 2: Trend of parturients by age group

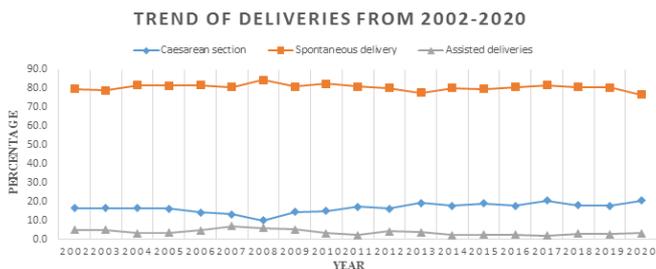


Figure 3: Trend of deliveries from 2002 to 2020

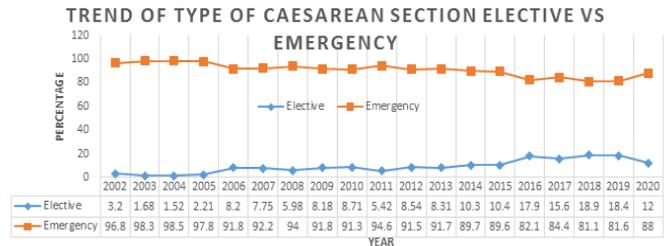


Figure 4: Trend of type of CS based on timing (Elective Vs Emergency)

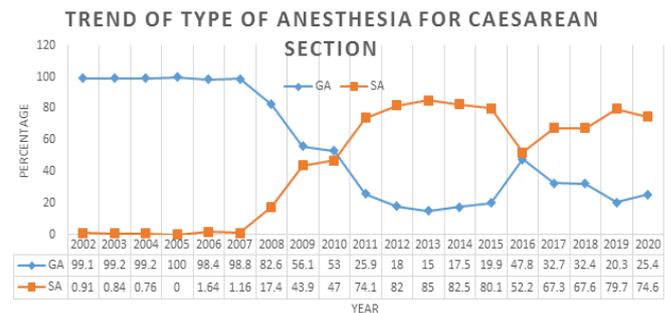


Figure 5: Trend of obstetric anesthesia(type of anesthesia for caesarean section)

Table 1: Indications for caesarean section

Indications for Caesarean Section	Frequency	Percent
CPD	1650	25.60%
Previous CS	1047	16.30%
Obstructed labour	735	11.40%
Malpresentation	631	9.80%
Fetal distress	609	9.50%
Antepartum Hemorrhage	412	6.40%
Prolonged labour	405	6.30%
Uterine rapture	228	3.50%
Preeclampsia/Eclampsia	119	1.80%
*Others	604	9.40%

*Includes: bad obstetric history, big abdomen, coexisting medical condition, cord prolapse, post term, multiple pregnancy

During these eighteen years the rate of CS increased steadily from 16.4% in 2002 to 20.6% in 2020 (Fig 3). The lowest (9.9%) CS rate was observed in 2008. Moreover, throughout the study years the rate of spontaneous delivery was higher than the other delivery types and the highest spontaneous delivery was observed in 2008 (84.3%).Majority 89.9% of the CS done in Keren Regional Referral Hospital were emergency and the rest 10.1% were elective. The trend shows a gradual increase in the elective CS done from 1.6% in 2003 to 12% in 2020 (Fig 4). Furthermore, parturients who delivered with spontaneous, assisted and CS seemed constant during the study periods with very little fluctuations.

Trend of indications and type of anesthesia for caesarean section

From the total parturients who underwent CS (53.1%) were operated under SA while the rest (46.9%) were done under GA. General anesthesia was the only anesthetic technique done for CS until 2008. The use of SA for CS increased year by year from 17.3% in 2008 to more than 80% in the years 2012 to 2015. Besides, SA was consistently higher than GA from 2011 up to 2020 with the lowest value observed in 2016 (Fig 5). The most common indications for CS during these 18 years period was cephalo-pelvic disproportion (CPD) 25.6% followed by one or more previous CS 16.3% and obstructed labour 11.4% as shown in Table 1.

Discussion

The overall trend of parturients who underwent CS from 2002-2020 were 16.9%, with majority being at the age of 20-29 years old. The trend showed an increment in the CS rate throughout the past two decades.

Concerning the rate of CS there had been a steady uphill from 16.4% in 2002 to 20.6% in 2020. This could be due to medical indication, intolerance to labour pain, increased tendency to choose CS and better access to emergency obstetric care. Even though the rate of CS was within WHO recommendation in the previous years in the last five years a rise beyond the WHO recommendation was observed. Various studies had shown similar trend where CS has been increasing in both developed and developing countries [19]. In Sweden the rate of CS rose from 10% in the 1990s to 17% in 2015[12]. Moreover, an Indian study showed a rise in CS rate extending from 33% to 41% [4]. A trend analysis done in Egypt showed that the CS rate has more than doubled from 2005 to 2014. Multiple studies done in the sub-sahran African countries reported a rise in CS rate despite the rate is still below the WHO recommends[15-20].

In the present study, the CS performed under SA and under GA was 53.1% and 46.9% respectively. However, the introduction of SA for CS was not prudent till 2008. This could be due to lack of practice and skill on SA for CS, fear of complications such as hypotension and GA's rapid and predictable effect. Incongruent to this study, a study in Ethiopia found increment of SA at the former years but at the later years most of the CS was done under GA(18). Similarly, a Jordan study found out an increased number of SA than GA[11]. Similarly, a study done in Cameroon found out CS was mostly done under SA [21].

Even though CS done as elective case increased gradually the majority were done as emergency case. This could be due to the fact that the hospital is the only one which perform CS within the zone. Therefore, most of the parturients come as emergency referral case from all the health facilities in the zone and near zones. In a study conducted in Ethiopia a

similar finding was founded where majority (89.9%) of the CS were emergency[18]. Congruent to this study, most of the obstetric surgeries were done on emergency bases according to a Cameroon finding[21]. On the contrary in a study conducted in Jordan majority of the CS were elective[11]. Moreover, a study done in Sweden found out that most of the CS were planned [12].

The main indications for CS were found to be CPD, previous CS and obstructed labour. Similarly, a study done in South Africa resulted in maternal indications such as CPD, previous CS and malpresentation. Incongruent to this study, finding in Ethiopia, south Africa and India found out fetal distress as the main indicator for CS[3, 14, 18]. A study done in India reported previous CS as the main indication [4].

Conclusion and Recommendation

In the past two decades there was a steady increment in the CS rate. Even though elective cases are rising majority of the CS were emergency. Despite SA for CS was introduced late it has become the main type of anesthesia for CS for the past ten years. The main indications for CS were CPD, previous CS and obstructed labour. The increase of CS rate beyond the WHO recommendation and majority of the cases being emergency is certainly a cause of concern. Therefore, there is a need to address the clinical and socio-demographic factors association with the increase of CS rate as well as with most of the cases being emergency.

Acknowledgements

We are thankful to the Scientific and Research Ethical Committee of the Ministry of Health and Keren Regional Referral Hospital for all their support.

Authors' contributions

SFB and BYK: participated in designing and coordination of the study, drafting and revising the manuscript critically for important intellectual content. FK: design of the study, analysis and interpretation of the data, drafting and critical commenting of the manuscript.

Availability of data and materials

The complete dataset supporting the conclusion of the study is available from the corresponding author and can be accessed upon a reasonable request.

Ethical clearance

Permission to conduct the study was initially obtained from the Scientific and Research Ethical Committee of the Ministry of Health. Moreover, permission to perform the study was sought from the Keren Regional Referral Hospital ethical committee. All the data collection

procedures were performed in accordance with the declaration of Helsinki on protection of human subjects. Consent form was not sought from participants of the study; however, the collected data were kept anonymous and confidential.

Funding

There was no source of funding for the study, for the authors or for the manuscript preparation.

Consent for publication

This manuscript has not been published elsewhere and is not under consideration by another journal. All the authors have approved the final manuscript and agreed for its publication.

Competing interests

The authors declare that they have no competing interests.

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