

## Trends in Obstetrics Anesthesia, at Gondar University Hospital

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### Abstract

**Introduction:** Trend analysis in anesthesia is one way of evaluating previous practice and projecting future performance. Obstetric anesthesia is being challenged currently due to changes in population character. This shifts obstetric anesthetic practice worldwide in favor of regional technique.

The objective of this study is to assess the type of anesthesia used for obstetric practice over the period of 15 years in Gondar university teaching Hospital and trends in anesthetic professionals' qualification.

**Methods:** A cross sectional study design was used to see anesthetic practice in obstetrics. Information on Sociodemographic variables and other variables of interest were collected from anesthesia and obstetric log books. These documents were reviewed after getting ethical clearance from the Gondar University's Ethical review board and permission letter from UOG clinical director's office. All mothers for whom caesarean section was done within 15 years period were included in this study, Data entry and analysis was done using SPSS version 16 and excel 2007, charts and graphs were used to summarize the results.

**Result:** A total of 4398 mothers under gone caesarean section within 15 years, from this 2887 (65.6%) were operated under GA and the rest 34.4% were operated under spinal anesthesia. There was a sudden shift of obstetric anesthesia from general anesthesia to spinal anesthesia starting from 2000 and the dominance of General anesthesia over spinal anesthesia re emerged starting from 2004 onwards.

**Conclusion:** General anesthesia is still the predominant anesthetic technique in obstetric practice in University of Gondar hospital. Anesthetic technique for caesarean section needs to be revised in University of Gondar hospital based on trends of rest of the world.

**Keywords:** *Obstetrics; Caesarean; Anesthetic technique*

### Introduction

Obstetric anaesthesia is generally considered to be one of the higher-risk areas of anesthetic practice. Physiologic changes during pregnancy and presence of two individuals; the fetus and the mother under the same anesthesia; challenges the anesthetist in obstetric anesthesia. Though there is advancement in anesthesia monitoring and techniques, due to population character changes as advanced age increased obesity, and incidence of cardiovascular diseases, anesthesia practice in obstetric patients is becoming risky for the mother and the fetus [1].

The caesarean delivery rate has been increasing steadily over the past decade with the current trend favoring regional anesthesia over general anaesthesia, because of the fear of airway complications with the use of general anesthesia [2,3].

The emerging challenges in the practice of anesthesia due to population character change; obliges anesthesiologists to preferably use the anesthetic technique that does not involve air way management and has relatively less cardiovascular effect, which is regional anesthesia in obstetric patients [4].

Trend analysis is one way of comparing outcomes of health practice of a particular indicator variable by comparing it over geographic areas or population group. It can compare practice in one area over a period of time and can help to project future practice [5].

Trend analysis in anesthesia is one way of evaluating anesthesia related deaths, severe injuries, permanent brain injuries, cost of anesthesia service to the hospital and the anesthetic type that is resulted in maximum charge to the patient, minimum and maximum stay in the recovery room after anesthesia [6].

Trend analysis in obstetric anesthetic practice can help us in identifying the frequently used anesthetic type and its outcomes both in maternal and neonatal perspectives.

Caesarean section rate is becoming increasing steadily, worldwide. Anesthesia is responsible for 3-12% of maternal deaths. Majority of these deaths is associated with the use of general anesthesia [7].

Current practice generally favor regional anesthesia for caesarean section worldwide; due to high maternal complications associated with general anesthesia as compared to regional anesthesia. Better neonatal profile as evidenced by APGAR score is also associated with the use of regional anesthesia, as shown by different studies [8].

The use of general anesthesia is challenged in developed countries because of increased obesity and cardiovascular diseases, but currently this is also becoming a problem in developing countries like our country, even with significant effect due to poor set up for managing, so revising our anesthetic practice is vital to decrease maternal morbidity and mortality in an attempt to meet the millennium development goals.

In addition to better neonatal and maternal out comes, regional anesthesia is associated with less cost to the hospital, less charge to the patient and better client satisfaction to the service due to good post operative analgesia without additional analgesics [9 ].

Though the use of regional anesthesia is associated with better neonatal and maternal out comes, there are also situations where urgency of the case and difficulty with the technique obliges us to use general anesthesia, therefore the purpose of this study is not to discourage the use of general anesthesia totally, but to see the trend and update our practice [10].

### Methods

This is a document review of anesthesia and obstetric log book, in Gondar university hospital from November 2011-December 2011. The hospital provides health care for about 5 million people coming from Amhara national regional state and partly from Tigray and Benishangul Gumuz regions. The hospital has 700 beds, 20 beds from maternity ward and currently opened Fistula department with 70 beds. Report from the hospital's statistics shows that in the year 2002, 2235 mothers visited the hospital for delivery service, from this 1608 mothers delivered spontaneously and 627 under gone caesarean section; making caesarean section rate 28%. [24].

Anesthesia and obstetric log books were reviewed by trained data collectors using checklist; after getting permission letter from the hospital's clinical director office.

The check lists were checked for completeness before data entry. Data entry and analysis was done using SPSS version 16 and excel 2007. Tables and graphs were used to summarize results.

### Results

A total of 4398 mothers undergone caesarean section within fifteen years (1996-2010). From this 3953 (89.9%) were emergency caesarean sections and 445 (10.1%) are elective cases. Majority of the mothers were in the age range of 25-35. From the total of 4398

caesarean sections 2889 (65%) were operated under general anesthesia and the rest 35% were done under spinal anesthesia. The most frequent indication of caesarean section in this 15 years period was obstructed labor followed by fetal distress.

General anesthesia was almost the only anesthetic technique for caesarean section till 1999 in our hospital. The Spinal anesthetic technique slowly started to be practiced in the department starting from 1999, but the sudden increase in use of spinal anesthesia for caesarean section was seen in 2001. There was a surprising increase in use of spinal anesthesia from 7.3% from 1996-2000 to 57.2 from 2001-2004.

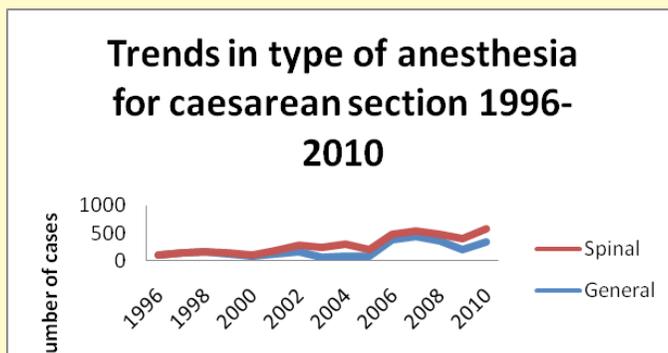


Figure 1: Trends in type of anesthesia used for caesarean section, University of Gondar, 1988-2002 E. C. Gondar Ethiopia.

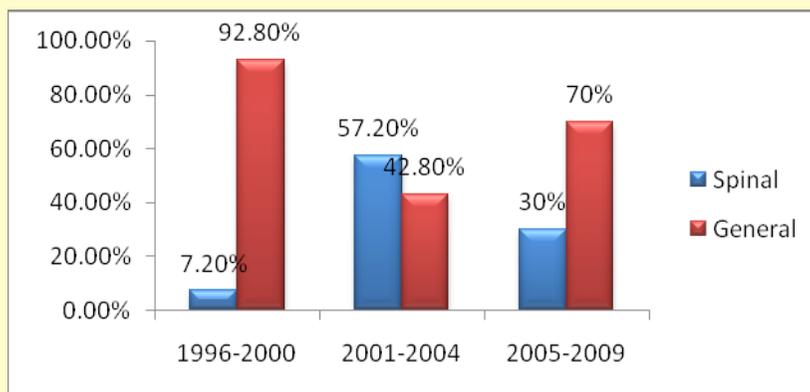


Figure 2: A five years trend in anesthesia practice for obstetric surgery, University of Gondar, 1996-2010, Gondar Ethiopia.

### Trends in Anesthetists qualification

In 1995 all the anesthesia services were given by health assistants that were given a short term training (3 months in anesthesia), from 1996 to 2001 anesthesia was given dominantly by Diploma nurses that have certificate in anesthesia (1 year training in anesthesia), at this time health assistants were also there, but the trend shows us that only, few cases were given anesthesia by HA's (Health assistants), and the HA's disappeared totally from the department since 1998. and the diploma nurses disappread from the department starting from 2005. The MD anesthetists started giving service in the department since 1999, and disappread from the department of anesthesia since 2007. Anesthesia training service started in the university since 2001, and the BSc students started giving anesthesia for obstetric surgery from 2002-2004. The first batch of BSc students was grauated in 2004, and since then BSc holders under taken anesthesia service in the departmen.

**Trends in caesarean section operators in the hospital (1996-2010)**

From 1996-2000, the trends in operator status shows that 61% of the cases were operated by GP's and residents. the proportion of mothers operated by Senior obstetricians decreases from year to year and within the year 2001-2005, only 15.3% (186 from 1217) caesarean sections were done by seniors and the rest majority, 84.7% were done by general practitioners and residents.

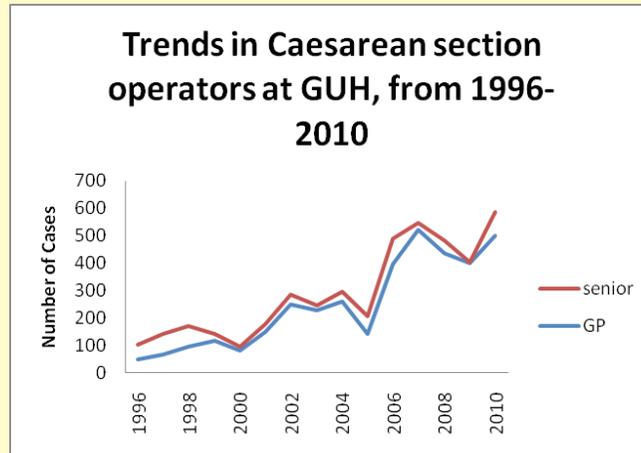


Figure 3: Trends in anesthetists qualification, University of Gondar, 1996-2010. Gondar Ethiopia.

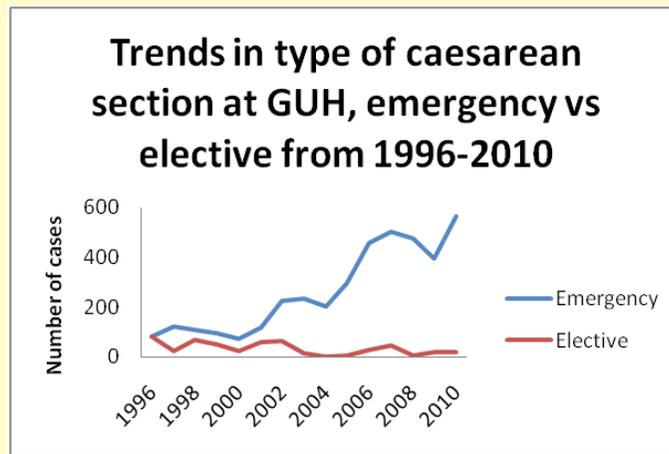


Figure 4: Trends in type of caesarean sections, emergency vs elective University of Gondar, 1996-2010, Gondar Ethiopia.

This proportion further get decreased within the year 2006-2010, and it became 10.8% i.e. from the total of 2459 caesarean sections 266(10.8%) were done by senior gynacologists and 2193 (89.9%) were done by general practitioners.

**Trends of type of caesarean sections (Elective versus emergency)**

The trend shows that there is a decrease from year to year in the rate of elective caesarean section, and the emergency caesarean section is increasing in rate from year to year.

### Trends in caesarean section Rate

There is an increase in caesarean section rate from year to year; between the years 1996-2000., caesarean section rate was 7% and this figure increased to 13.3% and 16% between the years 2001-2005 and 2006-2010 respectively.

### Discussion

Majority of the caesarean sections were emergency (89.9%) the leading indication being obstructed labor. This could be explained by the fact that the hospital is the only referral hospital in the area so that, parturient often referred from surrounding worked as after being in labor and they are operated as emergency case. There is similar observation of 16, Sub-Saharan countries where 70% of the surgical procedures are emergency cases [25].

But the prevalence of fetal distress as indication of caesarean section increases from time to time. It was 9.3% between the years 1996-2000 and 21.9% between the years 2001-2010. This could be explained by improvement in intra uterine monitoring that is able to diagnose intra-partum fetal compromise by sophisticated monitors as ultrasonography as compared to previous monitor i.e. is fetoscope.

General anesthesia was used in 65% of the cases, but it was almost the only anesthetic technique between the years 1996-2000 (92.7%), and this figure dropped over the years between 2001-2005, where the use of general anesthesia was 42.3%. this is consistent with a survey done in sub-Saharan countries that showed the use of general anesthesia for 90% of the cases in the year 2002 and this get decreased to 52.8% in 2006 [22]. There is also similar trend in Ghana Accra that showed the increase in use of regional technique for caesarean section from 6% in 2006 to 48% in 2007, and 78% in 2008 [26].

In our case this sudden shift of the technique could be explained by the advancement of level of trainers of anesthetists from short term on job training to diploma holders and anesthesiologists during the time. Though there has been professional development in the department; when compared with the previous trend, the dominance of general anesthesia are emerged in the department starting from, 2005. This could be explained by lack of sustainable supply of materials to perform regional technique and preference of general anesthesia by some obstetricians.

In 1996 anesthesia was entirely provided by health assistants with short term training in anesthesia. There is similar trend in Chad where only one anesthesiologist and 22 untrained nurses and midwives provide anesthesia [25].

But since 1997 this trend was gradually replaced by diploma nurse anesthetists, physician anesthetists, and anesthetists at BSc level. Starting from 2007 Anesthesia service is being given by BSc anesthetists only, and there is no anesthesiologist in the department. There is similar trend in most developing countries, where qualified professionals leave districts and accumulated in towns and partly due to brain drain [27].

Trends concerning operator status showed us, the proportion of caesarean sections done by senior obstetricians' decreases from year to year. For instance between the year 1996-2000; 39% of mothers were operated by seniors, but this figure get decreased to 15.3% between the years 2001-2005 and 10.8% between the years 2006-2010. This could be due to partly start of post graduate program in the department of Gyne OBs and another important reason could be due to a year to year decrease of number of senior Obstetricians in the Hospital. This could be due to being attracted by better payment and facility in the Capital city and nongovernmental organizations' payment and because of too little salaries, poor working facility low morale, and inadequate compensation. There is similar trend in Burkina Faso where majority of caesarean section is performed by General practitioners and non physician officers [28].

### Trends in caesarean section rate

The rate of caesarean section is gradually increasing in the hospital from year to year. Within the first 5 years of this study (1996-2000) it was 7%, between the years 2001-2005 it became 13.3% and between the years 2006-2010 it was 16%. Except there is a slight increase in the third five years of this study period; these figures are actually within WHO, recommendation for caesarean section i.e. 5-15%.

### Conclusion

Emergency caesarean section is the predominant caesarean section in university of Gondar hospital General anesthesia is the predominant anesthetic technique in Gondar University for obstetric practice, hence Anesthetic technique for caesarean section needs to be revised in University of Gondar hospital based on trends of rest of the world.

Though there is advancement in qualification of anesthetists, currently, there is no anesthesiologist in Gondar university hospital therefore Professionals with better qualification should be attracted to the hospital, and there should be retention mechanism for qualified anesthetists and senior Obstetricians.

Majority of caesarean sections are performed by GP's and residents in University of Gondar; Though use of General practitioners for caesarean section is cost effective and saves lives of many mothers in areas where there is shortage of obstetricians, future research should be done on maternal and neonatal outcomes of caesarean sections by General practitioners in comparison to that of senior obstetricians.

Though caesarean section rate is within the range of WHO's recommendation; it is alarmingly increasing from year to year in Gondar University's hospital; hence clinicians in the area should revise their practice and develop clear indications for caesarean section.

### Competing interests

The authors declare that they have no competing interests.

### Authors' contributions

Zewditu Abdissa Denu initiated the research idea, designed the study, performed the statistical analysis and drafted the manuscript. Tadesse Awoke participated in the study design, implementation of the study, statistical analysis and contributed to the draft manuscript. All authors contributed to the data analysis, read and approved the final manuscript.

### Competing interests

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