

INDICATIONS FOR CESAREAN SECTION IN
ST. JOSEPH MEDICAL HOSPITAL
MOSHI, TANZANIA

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Abstract

Cesarean section (CS) is a surgical procedure used to deliver one or more babies. CS is usually performed when vaginal delivery will put the mother or child's health or life at risk. In recent years, the number of CS has risen worldwide. Since CS also involves risk for adverse outcome for both mother and child, concern has been expressed regarding its increased use.

The main aim of this study was to investigate indications used for CS in St. Joseph Medical Hospital in Moshi, Tanzania.

The study involves a review of the hospital records of women who previously had undergone CS in the period 2009-2011.

All together 212 CS were reviewed.

The prevalence of CS at St. Joseph Medical Hospital was 18%. The most common indication overall for CS was prolonged or obstructed labour, it counted for 30 %. The indications were different for nulliparous and multiparous women, the most common indication among nulliparous was prolonged or obstructed labour, and the most common indication for multiparous women was previous CS.

Malpresentation of the baby (20%), and fetal distress (11%), were also commonly used as indications.

Similar studies have been, or are being, conducted in other countries worldwide. Thus, the results will not only elucidate possible indications for cesarean section in the Moshi region, but also contribute to an overall comparison of indications for cesarean section in these countries. Comparison of international differences in indications for cesarean section is of importance to explain the increased prevalence of the procedure.

Introduction

Justification for the study

Cesarean section rates have risen worldwide. Studies from industrial countries show that the indications for CS have changed over the last decades. Our study will focus on the indications that are dominant in Tanzania today. Similar studies will be conducted by other students in other countries worldwide. Furthermore, increased knowledge about current indications could contribute to reduce the prevalence of CS through correct information and advice to pregnant women and health workers.

Project

Initially, when we planned the study, our intention was to visit Kilimanjaro Christian Medical Centre, KCMC, for four weeks. Permission to do the study was sought. Unfortunately we did not get the permission in time for our arrival. With good help from the municipality in Moshi, we were allowed to perform the study at the local hospital of St. Josephs.

St. Joseph Medical Hospital is a much smaller hospital than KCMC, with less CS; therefore we had to change our methodology. Originally, we had planned to interview women who just had had CS at the hospital with a structural questionnaire. This questionnaire had previously been used in a similar study in Ghana. Because of the less number of CS, we had to use the records from the hospital of St. Josephs and the information we found there. Information about all cesareans was written down in books, rather than on computers. This made the collection of information more time consuming. The information we found in the records were about the indication for the cesarean, age of mother, gravida, para, days at the hospital before the cesarean section, and number of cesareans. It also included information about the gender of the newborn, weight, Apgar score, and type of anesthetics used.

In the questionnaire we had planned to use, we sought more information about the mothers, including social status, education level, medical conditions, antenatal care, personal preferences of the mother according to vaginal delivery versus cesarean, and family planning methods. Due to the less recorded data at St. Josephs, this was information we were now unable to include in our study.

Background



Fig 1. Map of Tanzania

About Tanzania

Tanzania consists of 26 regions, Kilimanjaro is one of them. The capital of this region is Moshi Urban. The region borders to Kenya in the north and the east, to the Tanga region in the south, the Manyara region in the southwest, and to the Arusha region in the west. The Kilimanjaro region is the smallest among the Tanzania mainland regions and the population of the region is 1,4 mill, which is 4 % of Tanzania's population. The Kilimanjaro region is administratively divided into 7 districts; one of them is the Moshi Urban district. The town of Moshi is situated on the lower slopes of Mt. Kilimanjaro, the highest mountain in Africa. Moshi's altitude is 700-950 meters above sea level, and it covers an area of 58 km².¹

In the Kilimanjaro region, 99 % of women who gave birth received ANC from a professional health care worker. The overall professional ANC percentage for Tanzania is 94%.²

About St. Joseph Medical Hospital

The study was conducted at St. Joseph Medical Hospital in Moshi, Tanzania.

The hospital was founded in 2001, on the outskirts of the town of Moshi. It is a Catholic hospital. The director is Dr Sr Urbani Lyimo. It is equipped partly with modern equipment, some of it is gifts. It has Western standard, and in particular the operating theatres. In the hospital's annual report for 2009, the population it served was 175 283. It has internal medicine, surgery, pediatrics and maternal wards. The maternity ward has 45 beds. The 1st

cesarean section was performed 11.02.2007. All pregnancy care is free of charge, including cesarean section, except if the CS is performed on maternal request.

The number of employed doctors in the maternity clinic is 5, and there are 9 midwives. At daytime there are 1 doctor and 3 midwives present. During nightshift, there are no doctors present, only one on call. The ward has 3 incubators for newborns, but all of them were out of function. If a baby needs incubator, it is transported to KCMC, the large referral hospital, also localized in Moshi.

Soon after delivery, the mothers are placed in a large room with approximately 12 beds. They keep their babies in the same bed as themselves, and start breastfeeding as soon as possible. There are no serving of food, so family has to bring food and beverages, and also towels and clothes for the babies. The mothers usually arrive the day before or the same day, and leave two days after vaginal delivery. If she lives far away from the hospital, it can be arranged so that she can come earlier. After CS, the mothers stay for 2-5 days.

The delivery room contains three beds, where mothers in labour can stay. The midwives switch between the delivering mothers, and help the one that needs it the most. There is one theatre where they perform CS.³

During our stay, we followed Dr. Josephine Rogath Laswai in the labour ward, and in the theatre. We also joined during the daily round.

Cesarean section at St. Joseph Medical Hospital

The surgeons and gynecologists of St. Joseph Medical Hospital followed the international guidelines regarding the performance of the cesarean. Lower uterine section was the procedure performed. The anesthesia most often used was spinal, but in some cases general anesthesia.

About the topic

History of cesarean section

A cesarean section is a surgical procedure in which one or more incisions are made through abdomen and uterus of the pregnant mother to deliver one or more babies, or to remove a dead fetus. The first modern cesarean section was performed by German gynecologist Ferdinand Adolf Kehrer in 1881. ⁴

The indications for CS has varied tremendously through its documented history, and they have been shaped by religious, cultural, economic, professional and technological developments. Cesarean section has been part of human culture since ancient times, but the early history of CS remains unclear. It is commonly believed to be derived from the surgical birth of Julius Caesar, but this seems unlikely, since his mother Aurelia is reputed to have lived to hear of her son's invasion of Britain. At that time the procedure was performed only when the mother was dead or dying, in an attempt to save the child. Cesarean sections were also made because of religious beliefs, so that the baby could be buried separately from the mother. The operation was not intended to preserve the life of the mother. It was not until the nineteenth century that saving the mother really was a possibility. ⁵

Today, a cesarean section is usually performed when a vaginal delivery would put the baby's or mother's life or health at risk, although in recent times it has also been performed upon request for childbirths that could otherwise have been natural. In later years the rate has risen to a record level of 46% in China, and to levels of 25% and above in many Asian, European and Latin American countries. In 2009 the cesarean section rate was 34 % in the United States. ⁶ Across Europe there are significant differences between countries: in Italy the rate is 40%, while in the Nordic countries it is about 17-20%. ⁴

In 1967, The Norwegian Medical Birth Registry started to register all births in Norway. At that time, almost 2 % of the babies were delivered with cesarean section. ⁷ In the 1990s, it was about 12-13 %, and in 2011 it was 17%. ⁸ The increase in the amount of cesarean deliveries can partly be explained with increased use of technical, medical equipment. During the labour, it is now easier to discover risks concerning the mother and the baby earlier. The increase can also be explained with increasing age among mothers, maternal request, that more women have had previous cesarean section, and because it has become more common with multiple babies.

In 1985, an expert group in WHO stated that 15 % should be the upper limit for the amount of cesareans in a country. The number was based on the section rate in some countries with low perinatal morbidity. The USA put 15 % as a goal for 2000, but did not reach it.

Indications

Here we will present the most common indications for CS.

Maternal indications:

Prolonged/Obstructed labour: Prolonged labour is when the duration of the labour exceeds 24 hours. This may be due to a prolonged latent phase, more than 20 hours in a primigravida or more than 14 hours in a multipara, or due to delayed or lacking cervical dilatation in the active phase of labour and protracted descent of the fetus.⁹

In a prolonged labour, fetal distress can occur and the baby will need to be monitored. If there is any indication that the baby is suffering one should proceed with forceps, vacuum or emergency cesarean section depending on the situation.¹⁰

Previous cesarean delivery: The risk of complications in the mother rises with increasing number of cesarean deliveries, especially the risk of placenta accreta. Although previous cesarean is not a condition that qualifies for repeat CS, it is normal practice to do it again. Previous CS increases the risk of placenta previa and uterine rupture.¹¹

Pelvic anatomy: The pelvis consists of three bones that comes together and form the birth canal. The inner diameters of the birth canal and how these correlate with the head of the fetus is important in terms of weather a vaginal birth is possible.¹²

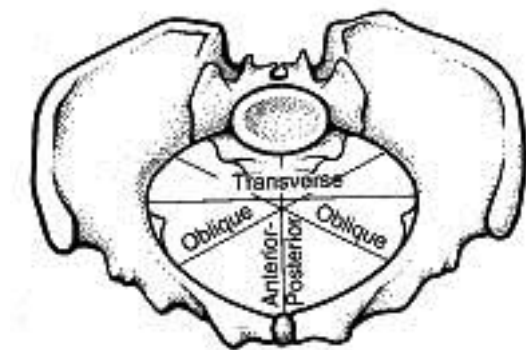


Fig. 4 Pelvic anatomy

There can be several reasons why the pelvis is not suited for birth. The ideal pelvis has a gynecoid shape, while an android shape which is more like a male pelvis will make a birth difficult. A broad pubic angle is also important for a normal birth.

Different conditions, including rickets, previous pelvic fractures, spondylolisthesis and malnutrition when growing up, may cause malformations of the pelvis. X-ray of the pelvis can help decide whether it is suitable as a birth canal, but this is not a common screening procedure.¹²

The pelvis matures and changes during puberty, cesarean section rates increase the younger the mother is, suggesting that pelvic size is an indicator for cesarean delivery.¹³

Preeclampsia: Preeclampsia is defined as hypertension after 20th gestational week.¹⁴ The disease affects 2-3% of all pregnant women, it can develop quite rapidly and be life threatening for both mother and fetus. The disease leads to two syndromes, one in the mother and one in the fetus. The maternal disease consists of high blood pressure, proteinuria, possible edema and activation of the coagulation system.

The maternal disease can further develop into HELLP syndrome (Hemolysis, Elevated Liver Enzymes, Low platelets) which is a rare, but very dangerous disease. The woman usually has pain in the epigastrium or underneath the right costal arch. She might be nauseous. Suspicion of HELLP syndrome is an emergency. This condition is a threat to the mother's life and therefore emergency cesarean section should be done immediately.¹⁴

The fetal syndrome starts with failing placental function.

PIH- pregnancy induced hypertension: Pregnancy induced hypertension is hypertension after 20 weeks of gestation without proteinuria, that regresses within 12 weeks postpartum.¹⁴

Infection: Many infections and diseases in the mother can affect the neonatal child. Infections lead to an increased risk of spontaneous abortion, preterm birth, intrauterine growth restriction and infection of the fetus. We have chosen to focus on HIV and Herpes genitalis since these are the diseases present in our material.

In a mother with HIV infection, contamination to the fetus can happen throughout the pregnancy, but is most common during birth. Modern treatment reduces the risk of contamination to about two percent.¹⁵

CS has proven effective for prevention of mother to child transmission in women who are not on antiretroviral medications, or only Zidovudine.¹⁶

Herpes genitalis can infect the fetus during the passage through the birth canal and can lead to serious herpes encephalitis.

The risk is highest during a primary infection at the time of labour, in a recurrent infection the risk is below 3% if the mother has eruption at the time of delivery. ¹⁵

Placenta praevia and abruptio placenta: In placenta praevia the placenta is situated partly over the exit for the fetus. This can lead to a severe bleeding with an extensive blood loss for both mother and child. The typical symptom of placenta praevia is a sudden bleeding without pain or contractions. The bleeding increases as the pregnancy moves forward and pregnant women with this condition is advised to stay close to the hospital. With complete placenta praevia the placenta is covering the whole exit. In this condition cesarean is absolutely necessary and usually takes place in week 37-38. In partly placenta praevia birth is possible.¹⁷ Abruptio placenta can present in a traumatic way with severe pain, contractions, blood loss and a bad general condition or it can be without symptoms. The condition is an indication for immediate cesarean section. ¹⁸

Fetal indications:

Fetal distress: The fetus react to the onset of asphyxia. This can lead to a series of responses. The most common reaction in the fetus is changes in fetal heart rate patterns with late deceleration, variable deceleration or prolonged bradycardia. ¹⁹Fetal distress is monitored by surveying the heart rate using a Pinard horn or CTG. In the hospital they used a Pinard horn. If hypoxia occurs during birth the fetal heart rate will fall below 100.

Cord prolapse happens in 0,5 % of all births. If one continue towards vaginal birth it must happen within minutes. If that is not possible an emergency section should be done. ¹⁰

Presentation of the baby:

-Breech presentation: The incidence of breech presentation decreases with increased gestational age, the prevalence of babies in breech position is 3-4% at term. ²⁰ Early in the pregnancy many babies are breech, but most turn before birth. If the baby has not turned, it is possible to try an external cephalic version. ²¹ Some studies show fewer complications for the baby with planned cesarean. ²²

-Transverse presentation: Transverse lie is present in about 2 out of 1000 births. The fetus can be in complete or partly transverse lie. This condition is more usual in multiparous women

and in multiple baby pregnancies.¹⁰ The condition usually passes as the birth start with the baby turning its head down due to contractions.

-Compound presentation: Compound presentation is defined as presentation of a fetal extremity alongside the presenting part. It occurs in 1 to 700 to 1 to 1000 of deliveries. It is more common when the pelvis is not fully occupied by the fetus because of low birth weight, multiple gestation, polyhydramnios, or if there is a large pelvis. If the compound presentation does not resolve spontaneously one should do cesarean section.²³

Large babies: In Norway a birth weight of 4500 gram is the lower limit for a large baby. A baby weighing more than 4500 gram has increased risk of a long lasting birth, shoulder dystocia, injuries of plexus brachialis and clavicle fracture. There is also a risk of vaginal tear, perianal damage and bleedings in the mother.²⁴

Symphysis-fundus measurements and ultrasound is used to diagnose a big baby. If the mother has had birth complications before due to a large baby, the case should be evaluated by an obstetrician.

Multiple babies: If not everything is in place for an uncomplicated vaginal birth cesarean is recommended when there is more than one baby.¹⁰

Maternal request refers to CS performed because of maternal request and in the absence of a medical indication. The prevalence of cesarean on maternal request is estimated to be between 1-18 percent worldwide.²⁵²⁶

Preterm birth is before 37 gestational weeks. Choice of delivery method when a baby is preterm is dependent on duration of the pregnancy, the position of the neonatal child and the current situation.¹⁰ The main focus is that the birth should be as harmless as possible. Preterm babies have an increased risk of intracranial bleeding, and the passage through the birth canal can be rough.¹⁰

Procedure

Surgical procedure

There is no standard technique for cesarean delivery. Opening the abdomen can be performed with either a transverse or a vertical skin incision, but a transverse is the preferred. A transverse incision is associated with less postoperative pain, greater wound strength, and better cosmetic results than the vertical midline incision.

For the hysterotomy, a transverse rather than a vertical incision is recommended for most women. This is associated with less blood loss, less need for bladder dissection, is easier to reapproximate, and has a lower risk of rupture in subsequent pregnancies. Despite this, a vertical hysterotomy is indicated in some settings. Using blunt rather than sharp expansion of the hysterotomy incision is quick and has less risk of inadvertent trauma to the fetus and may reduce blood loss and extension of the incision. A spontaneous, rather than a manual extraction of the placenta is recommended.²⁷

For women who consider a trial of labour after a previous cesarean delivery, it is suggested a two-layer uterine closure. It is not necessary to close the visceral or parietal peritoneum. If the woman has subcutaneous tissue depth ≥ 2 cm, the subcutaneous tissue layer should be closed with sutures.²⁸

Postoperative issues

The concern about the increasing rate of cesarean delivery globally, is due not only to the fact that a cesarean section is an expenditure for the society, but it also infers several postoperative issues for the mother.

As with all types of surgery, there will always be possible complications during, and after the surgery, and a cesarean section is no exception.

Postoperative period

In the immediate postoperative period, the woman is monitored for evidence of uterine atony, excessive vaginal or incisional bleeding, and oliguria. The blood pressure is also monitored to assess for hypo or hypertension, which could be signs of intra abdominal bleeding or preeclampsia respectively. The mother may need some instruction on how to hold her newborn to avoid contact with the incision.²⁹ Early ambulation and oral intake is encouraged, the mother can eat within four to eight hours of surgery, and randomized trials have shown

that these interventions enhance the return of bowel function.³⁰ The usual drugs and procedures associated with cesarean birth are not a contraindication to breastfeeding.³¹

Complications

The major non-anesthesia-related complications related to cesarean delivery are hemorrhage, infection, injury to pelvic organs, and thromboembolic disorders.

There are no randomized trials comparing the outcomes of planned vaginal versus planned cesarean delivery for the term cephalic gestation. Moderate quality evidence shows that planned cesarean delivery is associated with less maternal hemorrhage, longer maternal hospital stay, and greater mild neonatal respiratory morbidity than planned vaginal delivery.³² The risks of severe maternal morbidity are generally higher in women with an unplanned cesarean delivery during labour.³³ Cesarean delivery in the second stage of labour is associated with a slightly higher maternal composite morbidity than in the first stage of labour; however, neonatal morbidity rates are similar for first and second stage cesareans.³⁴ In a Norwegian study 21.4% of the women had more than one complication from CS. The complication rates were higher for the operations performed at 9 to 10 cm cervical dilatation. General anesthesia, low gestational age, and fetal macrosomia were also identified as independent risk factors for complications.³⁵

Short term risks

Infection: The overall risk of developing postpartum infection is increased after cesarean delivery, compared to vaginal delivery.³⁶ The three major causes of postpartum fever after cesarean delivery are endometritis, wound infection and OVT(ovarian vein thrombophlebitis) and DSPT (deep septic pelvic thrombophlebitis).

Hemorrhage: The mean blood loss during a cesarean is approximately 1000 ml. About 2-3 percent of all patients undergoing cesarean delivery require blood transfusion.³⁷

Urinary tract or bowel problems: Urinary and gastrointestinal injuries are uncommon.³⁸

Venous thrombosis and embolism: The risk of postpartum venous thromboembolism can be illustrated by two large studies:

-One serie involved 395 225 women with live births, and the incidence of deep vein thrombosis (DVT) was approximately four-fold higher after cesarean than after vaginal delivery.³⁹

-In another serie of 268 525 births over an 11-year period, pulmonary embolus (but not DVT)

was strongly associated with cesarean deliveries.⁴⁰

Wound disruption: Disruption of the cesarean laparotomy is not uncommon, and reclosure with sutures is preferable.⁴¹

Psychological outcome: Some studies have reported that women who deliver by cesarean express less satisfaction with their birth experience, are less likely to breastfeed, and take longer before their first interaction with the newborn.⁴² In addition, some women have strong feelings of loss, failure, and anger.⁴³

Fetal and neonatal risks: A cesarean is usually performed for the benefit of the fetus, but there are also fetal risks associated with cesarean birth. These risks include iatrogenic prematurity, and birth trauma. Birth trauma occurs in 0.4-3 % of cesareans, and usually confer mild lacerations related to emergency delivery.⁴⁴

Maternal morbidity: A significant proportion of the morbidity and mortality of cesarean delivery is related to the underlying medical and obstetrical factors that necessitated the surgical delivery in the first place.⁴⁵

Long term risks

Long term risk of morbidity significantly increases with the number of cesarean deliveries performed.⁴⁶

Abnormal placentation: Cesarean delivery increases the risk of abnormal placentation.⁴⁷

There is an increased risk of placenta accreta in women with placenta previa, and a prior hysterotomy abruption also occurs more often in women with a prior cesarean birth. But the risk of abruption does not increase with increasing number of prior cesarean deliveries.⁴⁸

Scar complications: Complications rarely develop in the scars resulting from hysterotomy or abdominal incision.

Uterine rupture in a subsequent term pregnancy: An interdelivery interval of ≤ 24 months and single layer closure have been associated with increased risk of uterine rupture.⁴⁹

Adhesions: Formation of adhesions is common after cesarean delivery, and the extent and density increase with increasing numbers of repeat cesarean deliveries.⁵⁰

Planning the next pregnancy and birth: When a cesarean has been performed, the surgeon should describe the uterine incision in the operative note and discuss with the patient the feasibility of a trial of labour in a future pregnancy.

Literature review

Analysis from National Centre of Health Statistics in the United States of America concludes that the amount of CS has risen by 53 % from 1996 to 2007, reaching 32 % of all births in USA.⁵¹ In 2009 the CS rate reached 34 % in the United States.⁵²

A retrospective cohort study from Sweden found that the rate rose from 11% to 20% from 1992 to 2005. The main indications for CS in Sweden in 1992 were either fetal distress or a uterine factor. In 2005, the dominant indication for planned cesarean was psychosocial, defined as maternal fear or maternal request without any co-existing medical indication. Presumed fetal compromise and prolonged labor remained the main indications for urgent and emergency cesareans.⁵³ The study concludes that the increased rate of elective cesareans for psychosocial indications would reflect altered attitudes towards mode of delivery in the childbearing population and among obstetricians. They suggests that extended support from community antenatal care should be provided and that standardized keys aiding a physician in decision-making procedures concerning the CS practice should be developed.⁵³

A Norwegian paper based on a non-systematic literature search in Pubmed discuss causes and consequences of the increased prevalence of caesarean section that has been observed in most parts of the world during the last decades. It points out that among the medical factors are increasing maternal age and body mass index, as well as changes in obstetric practice and technology. Among non-medical factors are cesarean section requested by the mother and inappropriate organization of maternity care. Overall, there are several and complex causes of the rise in cesarean section rates in industrialized countries. The Norwegian paper concludes that the procedure may have inherent negative consequences both in a short- and long-term aspect for both mother and child. It is also an economic burden to society. This implies there is every reason to attempt prevention of a further increase in cesarean section rates.⁵⁴

What about the developing world? A literature research from Nigeria shows that there has been a progressive rise in cesarean section rates from the 1970s up to 2002, from 9.4% to 34.6%. Similar to the Norwegian paper, this paper concludes that there is a need to reduce the cesarean section rate and that there should be a clear and unquestionable indication for cesarean section in any patient.⁵⁵

The 2004-2008 WHO Global Survey on Maternal and Perinatal Health state that Cesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes. This was a multi country, facility-based survey. It included a sample of 24 countries and health institutions worldwide. Data collection took place during 2004 and 2005 in Africa, during 2007 in America and 2008 in Asia. A total of 286,565 deliveries were analyzed. The overall cesarean section rate was 25.7%. A total of 1 % of all deliveries were cesarean sections without medical indications, either due to maternal request or for unknown reasons. Compared to spontaneous vaginal delivery, all other modes of delivery including antepartum CS without medical indications request or in the absence of other recorded indications, presented an association with increased risk of death, admission to ICU, blood transfusion and hysterectomy. This association is stronger in Africa, compared to Asia and Latin America. Cesarean sections were also associated with an intrinsic risk of increased severe maternal outcomes. The survey concluded that cesarean section should be performed when a clear benefit is anticipated, a benefit that might compensate for the higher costs and additional risks associated with this operation⁵⁶

Objectives

Broad objective

-To investigate the indications for caesarean section in St. Joseph Medical Hospital, Moshi urban district, Northern Tanzania.

Specific objectives

- Prevalence of cesarean section at St. Joseph Medical Hospital in the study period.
- Common indications for cesarean section at St. Joseph Medical Hospital in the study period.
- Outcomes for mothers and babies after cesarean section.
- Different indications among nulliparous and multiparous women.

Material and Methods

Study design

The study is an analytic, observational study combined with a literature review.

Study population

Women who have undergone cesarean section at St. Joseph Medical Hospital from January 2009 to August 2011, 32 months.

Inclusion and Exclusion Criteria

Inclusion

Women who have or have had cesarean section. The study also record the number of women who gave vaginal birth in the period, in order to estimate prevalence

Exclusion

Initially, we collected data of the cesarean sections in 2008. St. Joseph was a new hospital at that time and the number of cesarean section was quite low. We have chosen not to include the data from 2008 in our analysis because they are not representative for the region.

Data collection methods

We used book review of previous cesarean sections at St. Joseph Medical Hospital to chart indications used in the hospital.

From investigation of the birth records at the hospital we were able to collect information of the performed cesarean sections and the indication for the procedure. We also collected date on the age of the woman, date of delivery, number of pregnancies and number of living children, days spent at the hospital before birth and what kind of anesthesia that was used.

On the babies we collected information on weight, sex and Apgar score after 1, 5 and 10 minutes.

Most of the records contained all this information, but in some there where lacking or it was written in a way that was difficult to interpret.

Ethical consideration

Permission to do the study was sought from Medical Department and Moshi Municipal Council. Confidentiality and personal privacy was respected in all levels of the study. Collected data will not be used for any other purpose.

Data processing

Data was collected from the birth records. When searching for articles and guidelines, we used McMaster+, which is a search engine that arranges the results with international guidelines and meta-analysis on the top. We have also used PubMed for article search, and literature.

Plan for utilization of results

We will deliver our findings to the head of the respective clinic where our study is conducted, and the results will be submitted to The University of Oslo, Norway. Project supervisor Babill Stray-Pedersen may want to compare the results to similar studies performed in other countries and use the results in an international scientific journal.

Results and discussion

Prevalence of cesarean section

Cesarean section can be divided into two main categories, elective cesarean which is planned at least 8 hours before and emergency section. ⁷

From January 2009 – August 2011, it was a total of 1167 births at St. Joseph Medical Hospital. Out of these, 212 were cesarean section, counting for 18 % of the births. Compared to many other countries this is a normal prevalence, in Norway the prevalence of cesarean section was 17 % in 2011.⁵⁷ It is reason to believe that the prevalence is lower at St. Joseph than at referral hospitals in the area. This can be because elective cesareans and complicated cases might get addressed to larger hospitals early in the process.

Three of the cesarean sections delivered twins. Out of 212 cesarean sections, five babies were dead or died short after birth.

St. Joseph started performing deliveries in 2008, and therefore, it is as expected that the prevalence of births rose from 2009 to 2011.

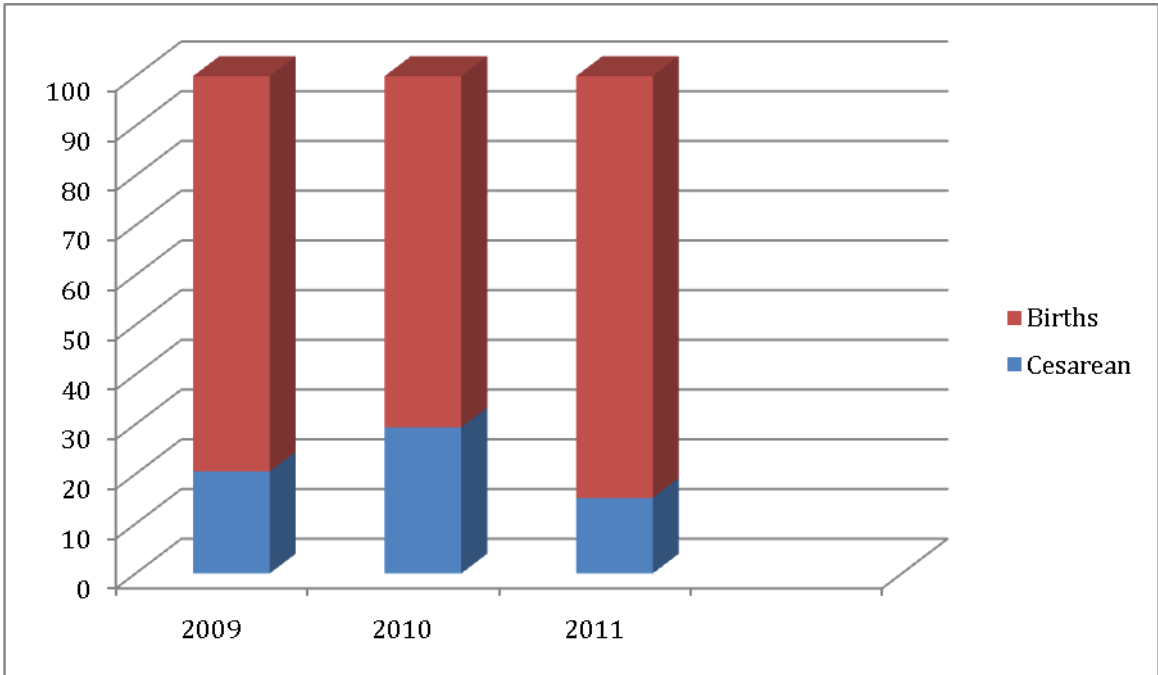


Fig. 2 Percentage of cesarean sections out of total births from January 2009 to August 2011.

Indications for cesarean section at St. Joseph Medical Hospital

When a cesarean section is performed there is often more than one indication present. In the following the indications are presented separately. Furthermore, in our project we have focused upon the main indication that led to the procedure.

In this part we will present our findings, and discuss whether they are what we expected.

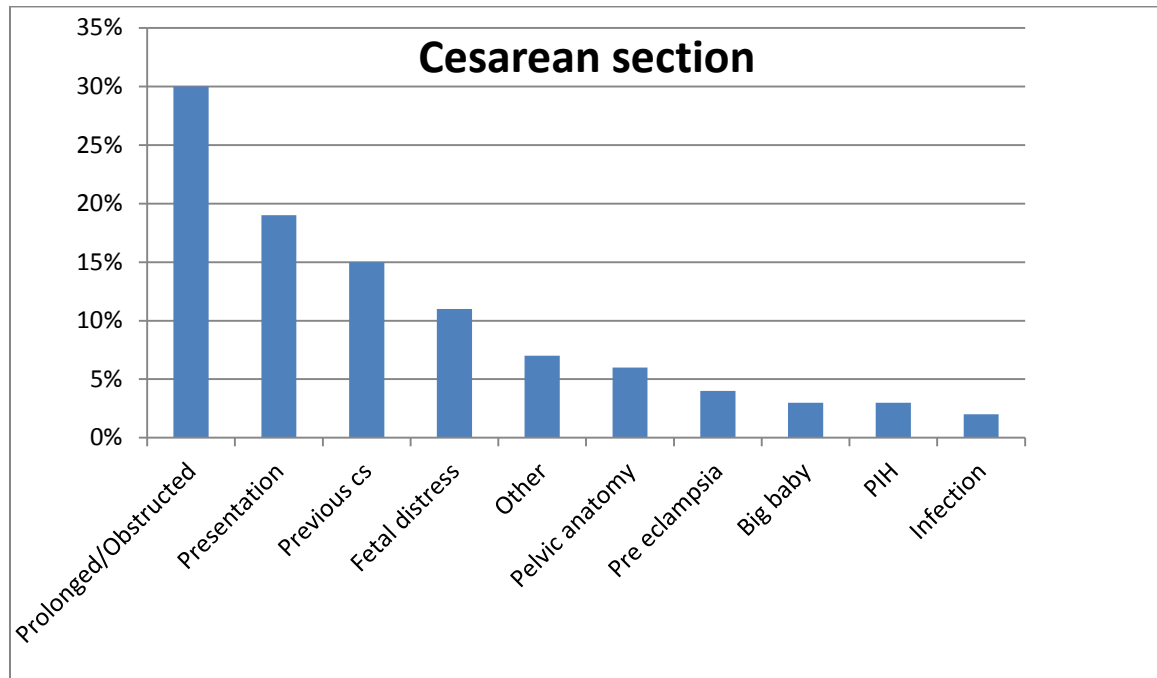


Fig. 3 Indications for cesarean section at St. Joseph Medical Hospital

Maternal indications

Prolonged/Obstructed labour: Out of the women who underwent cesarean section at St. Joseph Medical hospital, 30% had prolonged or obstructed labour as an indication. This was the most common indication. In Norway 21 % of the cesareans are due to prolonged or obstructed labour. In addition to this, 4% is due to failure of initiation of labour. ⁷A large number of the women with poor progress or prolonged labour as an indication for cesarean section also had fetal distress as an indication in the end.

Previous cesarean delivery: Previous CS was a common indication at St. Joseph Medical Hospital, it counted for 14.7 % of the cesareans. We were also told that previous cesarean section was an absolute indication for cesarean section at the hospital. In some cases this is

probably because the primary reason for cesarean is still present. Other than that the amount is quite surprising in a rural area. The risk of perinatal death associated with labour after previous cesarean delivery is low, but it is higher than the risks of planned cesarean section.⁵⁸ This, combined with limited possibilities to monitor the baby during labour, might be the reason why they have previous cesarean as an absolute indication for CS at St. Joseph. Despite this, the prevalence of cesareans performed because of previous scar is much lower at St. Joseph than in USA, where it is estimated that up to one third of cesarean deliveries is repeat.⁵⁹ The reason for this is difficult to know, but it could be because cesarean performed on maternal request is more common in USA. In Norway, previous cesarean delivery counts for nearly 9% of all cesareans.⁷ The average age of the mothers with previous cesarean section as indication was 29.7 years.

Pelvic anatomy: We found that 5,7 % of the women had pelvic anatomy as an indication for cesarean section. When pelvic anatomy was recorded as an indication for CS, it was not written down why the pelvis was not suited for birth.

Preeclampsia: In our material the prevalence of preeclampsia was 4 %, in Norway it is the indication for cesarean in 6,2 % of all cases.⁷

PIH- pregnancy induced hypertension: Pregnancy induced hypertension is a retrospective diagnosis. PIH was an indication in our material. We find this strange since the indications were written down when the cesarean section was already performed. One explanation for this could be that some of these might have developed into preeclampsia but that it was written down as PIH. At St. Joseph PIH counted for 3% percent of the cesarean sections at the hospital.

Infection: There were only four women who underwent cesarean section due to an infection. Two out of these were HIV positive and had cesarean to prevent mother to child transmission. At the hospital they used a snap test on all women to test for HIV. The two other women, 2% had extensive genital warts.

Placenta praevia and abruptio placenta: In our material, it was three cases of placenta praevia, and one case of abruption placenta.

Fetal indications

Fetal distress: We have counted fetal distress where this was the main indication for cesarean section. Many of the women who underwent cesarean for another reason, also had a baby with fetal distress. Fetal distress was the main indication in 11% of the cesareans at the hospital. This is the most common reason for cesarean section in Norway, counting for nearly 22% of the cesareans.⁷

Malpresentation: We found that malpresentation was often used as an indication instead of the more specific terms breech and transverse. We also had a few cases of compound presentation. Most of these babies probably had a breech or transverse presentation but malpresentation was the term that was used for these. Overall any kind of malpresentation was one of the most common reasons for cesarean in our material with a total of 20%.

Large babies: At the hospital, 3 % of the cesareans were due to large neonatals. The average weight of these babies was 4 kg. Diabetes is one of the common reasons of macrosomia. Unfortunately diseases in the mothers were not mentioned in the records we reviewed at the hospital.²⁴

Multiple babies: In our material, three pair of twins were delivered by CS.

Other indications

In Fig 3 there is a category called other indications, this refers to the cases that rarely occurred in our material. We put the limit at 3 or lower. In our graphics, uterine rupture, placenta previa and abruption are part of this category although it is also featured in the section on maternal indications. In this category we also find previous gynecological history, multiple babies, cord prolapse, overdue pregnancies and some rare conditions. There was one case of vulval elephantiasis which made regular vaginal birth impossible.

Indications that were not present in our material

Maternal request: The prevalence of CS on maternal request is estimated to be between 1-18 percent worldwide. In Norway maternal request is an indication in 7,6 % of the cesareans.⁷ We found no maternal request recorded as an indication for cesarean section in our material.

There are potential benefits of a planned cesarean contra an emergency. However, the mother should be fully informed of complications concerning the procedure and possible complications in future pregnancies.⁶⁰

At St. Josephs, cesarean sections were performed only when it was necessary. If mother wanted a cesarean section, she would have to pay for the expenses.

Preterm birth: Preterm and low birth weight was not an indication in our material. There might be several reasons for this. One is that this was a suburban hospital, many of the women we met had travelled to get to the hospital. They of course did this when they were close to term. Thus, many preterm babies are probably born away from a hospital. Another possible reason is that being preterm is not an indication for cesarean in this area. We found no information to confirm this.

Disease in the mother was not in our findings, we had infection as a separate category. Some maternal diseases might still be there, but turn up in a different category. For example mothers with big babies might have diabetes. The records at the hospital did not state whether the mothers had any diseases prior to the cesarean. It would have been interesting to know how different diseases affected whether it ended as a vaginal birth or a CS.

Emergency indications

The hospital did not state whether the cesarean was emergency or planned. Our impression was that nearly none of the cesareans were planned long before. Still there was a difference between a mother with poor progress in which the cesarean is somewhat foreseen and a sudden incident leading to rushing into the theatre.

In our material we had 9 cases of pre-eclampsia, some of these stating that it was a crash section. Of these nine, 8 were confirmed to be in good health. There was no information on the 9th.

There were 3 cases of placenta praevia, all of these babies had an Apgar score of 9 after one minute and 10 after 5.

There were also 1 case of abruptio placenta and 1 uterine rupture.

In the uterine rupture the baby died. This was a gravida 2 para 1 woman, but she had not had cesarean before which is the most common reason for uterine rupture.

The abruptio placenta baby was born by a gravida 2 para 1 woman who had come to the hospital the same day. The baby had an Apgar score of 9 after 1 min and 10 after 5 min.

The good survival rate for cesarean in these complicated cases shows the high competence and the quality of the work that is done at the hospital.

Differences in indications between nulliparous and multiparous women

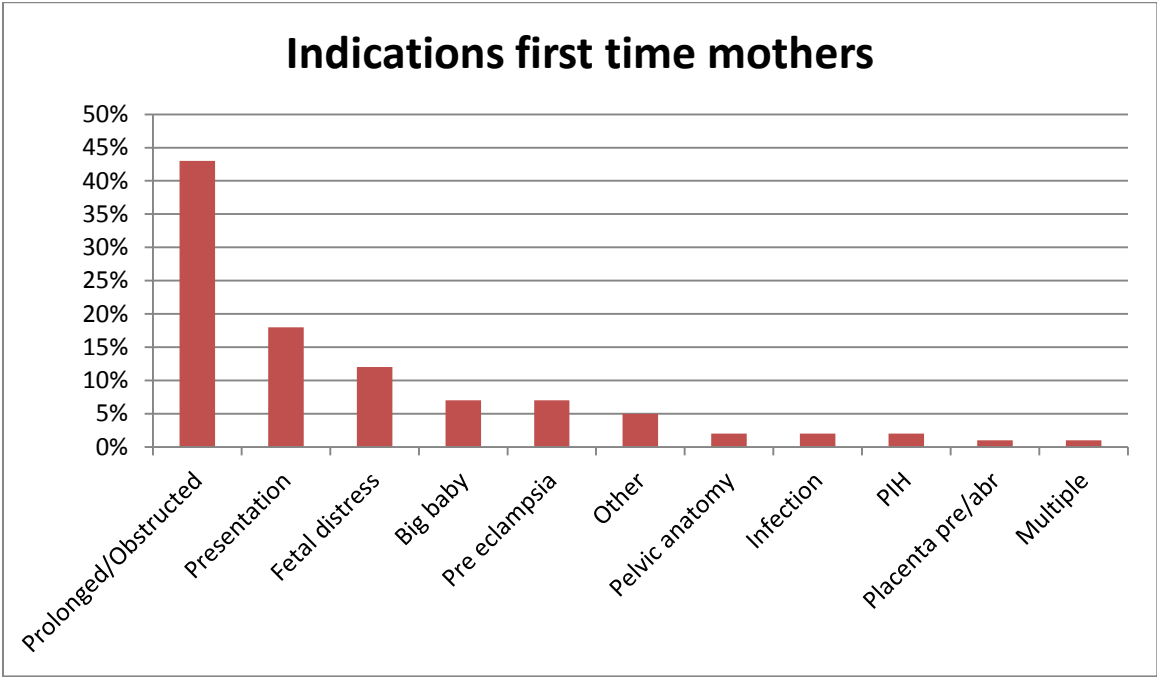


Fig. 6 Indications for cesarean section in nulliparous women

In first time mothers the most common reason for cesarean was prolonged or obstructed labour. The average age for women who had their first baby by cesarean was 20 years. Average number of days at the hospital before cesarean for nulliparous women that had cesarean section was 1,63 days in a total of 90 women.

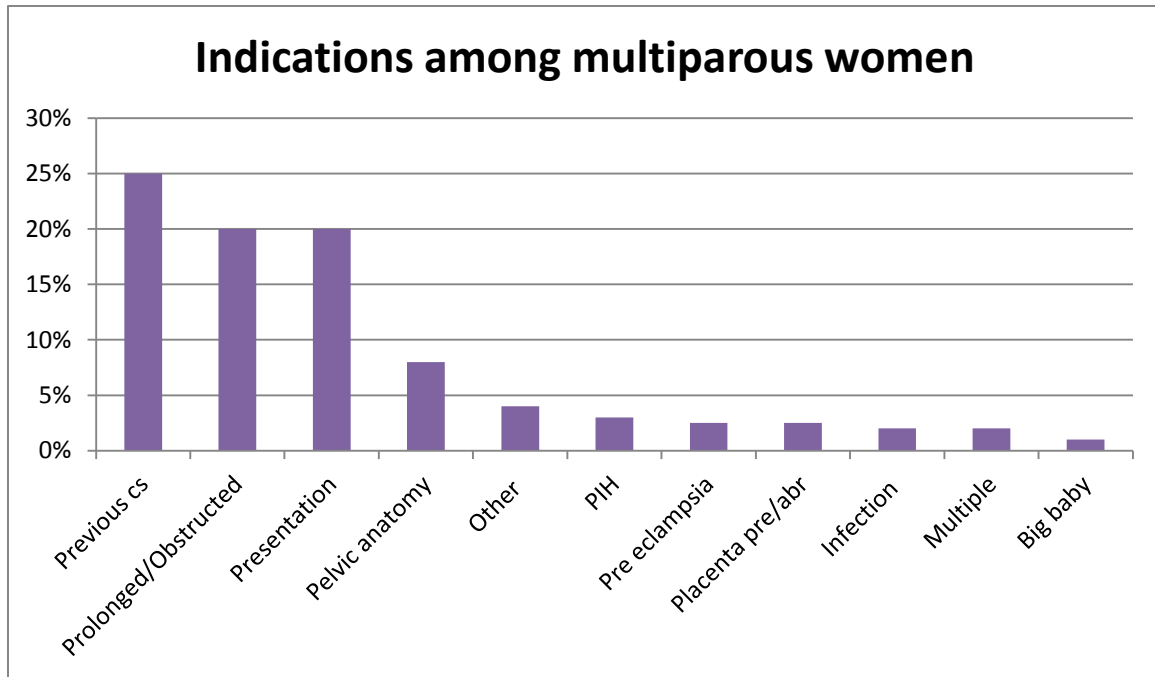


Fig. 7 The indications for cesarean section in multiparous women

The most common indication for cesarean in multiparous women was previous CS. The multiparous women who now had cesarean section had an average age of 29,8. The oldest woman in our material was 42 and the youngest 15. Average number of days spent at the hospital before cesarean for mothers who had earlier pregnancy was 2,94.

The multiparous women spent almost twice as long time at the hospital before cesarean as the nulliparous.

Outcome of children

Weight of the babies

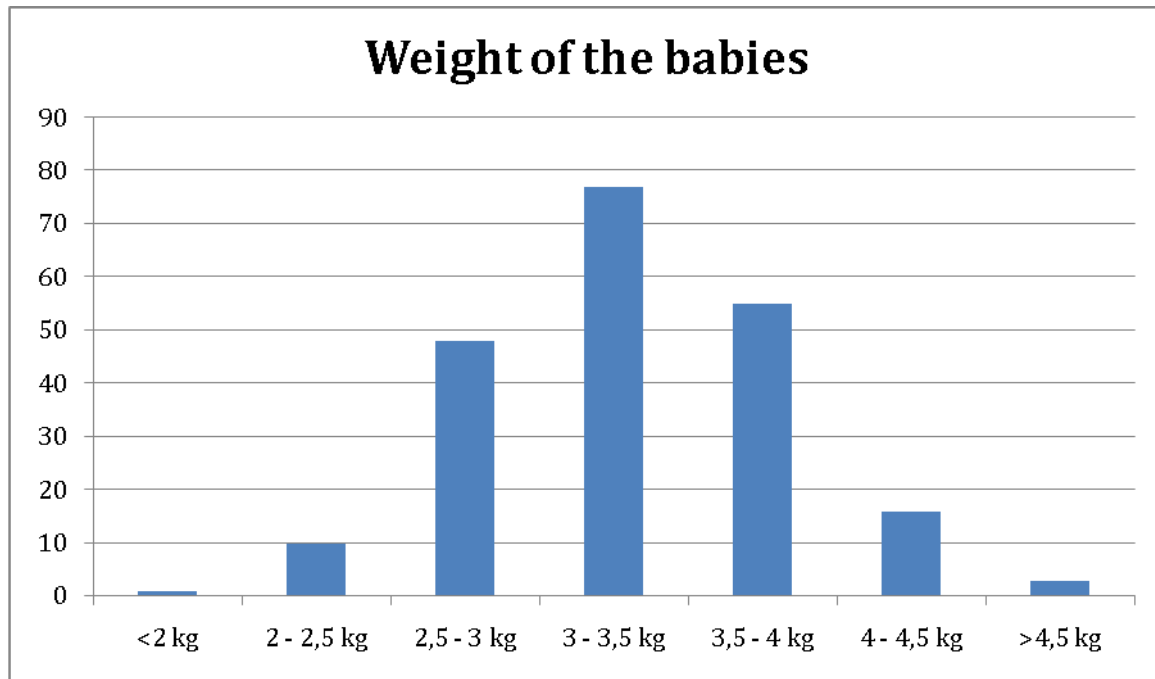


Fig. 8 The birth weight of 208 babies delivered by cesarean section, including 3 pair of twins. Seven babies with unknown birth weight.

The average weight of the babies was 3,25 kg.

Apgar score

All children were measured by Apgar score after 1, 5 and 10 minutes. We recorded the Apgar scores in 206 out of 212 cesarean section deliveries.

5 babies were either dead when they were born, or died short after delivery. In two of those babies, no Apgar score was written down, it was written dead, in one it was 2, 3, 0, in one it was 2,0, and in one it was written 9, 10, dead. There were also four babies with no Apgar score written down.

Most of the 206 babies had scores above 7 after 5 and 10 minutes.

In the babies that died, the indication for cesarean section was prolonged labour in three cases, uterine rupture in one, and fetal distress in one.⁶¹

Personal experience and comments

When we arrived at St. Joseph Medical Hospital, and started to collect data, we had a presumption that we would discover differences between what we knew as common indications for cesarean in the industrialized countries and indications common in developing countries. Some of our results were like we expected, others made us realize that the differences are not as large as presumed.

SUMMARY

Cesarean section has traditionally been performed when a vaginal delivery would put the mother or baby's life at risk. Cesarean section rates has risen worldwide in the last decades, in 2009 it was 34% in the USA. Development of modern surgical procedures has contributed to reduction of complications associated with cesarean section. Complications still occur, and most are due to the surgical procedure. Long term risks increases with the number of cesarean deliveries in the woman.

In our study we found that the prevalence of cesarean was 18% or 212 of 1167 births.

The most common indication for cesarean section in our material was prolonged/obstructed labour. However we found different results in nulliparous and multiparous women. In the multiparous, previous cesarean was the most common indication; this was considered an absolute indication for cesarean section. Other common indications in our study were malposition of the baby, fetal distress and pelvic anatomy. From the 212 cesarean deliveries, a total of 215 babies, 5 babies were born dead, or died short after delivery. The weight of the babies was distributed like a bell curve.

While there is sound reason to believe that cesarean section has been employed too frequently in some societies during the last two or three decades, the operation clearly changes the outcome favorably for a significantly percentage of woman and babies. The increased rate of cesarean deliveries can partly be explained with increased use of technical, medical equipment. During the labour, it is now easier to discover risks concerning the mother and the baby earlier. In our society, women may be afraid of the pain of childbirth, but they do not expect it to kill them. Such could not be said of many women as late as the nineteenth century. Moreover, most women now expect their babies to survive birth.

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