INDICATIONS FOR CESAREAN SECTIONS AT KORLE BU TEACHING HOSPITAL GHANA

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CONTENT

ABSTRACT

Background:

Cesarean section (CS) is a procedure that can be life saving in many cases. In several developing countries the procedure is scarcely performed, while it is overly performed in many high- and middle-income countries. The World Health Organization recommends a cesarean section rate of 10–15%. In Ghana the rate for CS is 6.9%. The aim of the study was to determine the indications for CS and identify the characteristics of women undergoing CS at the Korle Bu Teaching Hospital (KBTH) in Accra, Ghana.

Method:

The study was cross sectional and compromised of two parts, both taking place at the KBTH. All CSs from 08.12.2010 until 10.02.2011 were recorded, and their indications and outcomes registered. The first 348 CSs were retrospectively looked into, while from 17.01.2011, 200 women undergoing CS were interviewed regarding their socioeconomic background, using a semi-structured questionnaire.

Results:

In the period from 08.12.2010 until 10.02.2011 there were 548 CSs; 70% were emergency and 30% were elective. The main indications were previous CS (37.6%), fetal distress (9.1%) and fetal malpresentation including breech (8.6 %). Only 0.2% were due to maternal request. Younger women and nulliparas had significantly more emergency CSs than older women and multiparas. The nulliparas tended to have difficult labors, with higher rates of the indications 'failure in progress' and 'arrest of labor'. There was a significantly higher rate of elective CSs in the socioeconomic benefited group compared to the lower class group. The outcome of singletons shows us that 46% were female infants and 56% male infants.

Conclusion:

The main indications of CS at the KBTH reflect indications necessary to good obstetric care. There were very few non-absolute indications; only one CS was performed on the indication maternal request. This reflects a developing country with low health resources. Due to a lack of diagnostic equipment as CTG and fetal scalp sampling, indications such as fetal distress might be over-diagnosed. Elective CSs had a significantly higher rate in the upper socioeconomic class, suggesting that class influences the decision to having the procedure.

ABBREVIATIONS AND DEFINITIONS

APH: Ante partum hemorrhage (Incl. placenta praevia and placenta abruptio)

BOH: Bad obstetric history

BTL: Bilateral tubal ligation (sterilization)

CPD: Cephalo-pelvic disproportion (obstructed labor)

CS: Cesarean section

CTG :   Cardiotocography

Fansidar :   Anti-malaria medication

Gestational DM: Gestational diabetes mellitus

IUFD: Intrauterine fetal death

IUGR: Intrauterine fetal growth retardation

KBTH: Korle Bu Teaching Hospital

VBAC: Vaginal birth after cesarean delivery

TFR: Total fertility rate

TRO-TRO: A shared taxi

WHO: World Health Organization

INTRODUCTION

CS is a procedure that may be lifesaving. A lack of resources to perform the procedure can be fatal to both mother and child (1). In many developing countries the procedure is scarcely performed, such as in Niger, Ethiopia and Madagascar, where the rates of births by CS are 1.0% (2).

Cesarean section is a necessity, but it is also problematic when the procedure is overly performed (3). The WHO recommends a CS rate of 10-15% (4). Nevertheless, we can observe in many high- and middle-income countries that the rate is clearly above the recommended rate, such as the US and Italy where the rates of CS are respectively 30.2 % and 37.4% (2). This can occur due to maternal request to reduce the pain of vaginal delivery. In some countries, the procedure might be done excessively even though there are lacking resources, this due to lack of equipment to verify the indication and therefore having no other choice than to undergo the procedure (5).

One of the reasons for the recommended WHO-rate is the complications of the surgery. There are six to ten times more complications among women having a CS than a vaginal delivery, with emergency CSs being two to four times more risky than elective (6, 7). Complications include damage to the bladder, bowel, blood vessels and damage to the child, as well as bleeding and difficulties in delivering the child. Postoperative complications are bleeding (potentially resulting in reoperation and hysterectomy) infection, and thrombo-embolism (8).

Other long-term complications may be present at the subsequent pregnancy; these include placenta praevia, placenta -accreta, -increta and -percreta and scar pregnancy. Vaginal birth after CS is possible, though there is an increased risk of uterine rupture. The risk of complications increases if the CS was unplanned, if the baby is born preterm (< 30 weeks), being macrosomic or if the surgical procedure in done with general anesthesia (8).

Another reason for the recommended WHO-rate is the global economic results of over-performance. The cost of the global saving by a reduction of CS rates to 15% was estimated to be $2.32 billion (US dollars); the cost to attain a 10% CS rate was $432 million (US dollars) (9).

Unequal distribution of the performance of CS is due to unequal distribution of resources, and by looking at world statistics and identifying the indications, we can see if a nation's health care policy should be changed in order to optimize the health effect of this procedure (10).

The rate of CSs in 2010 at the KBTH in Accra, Ghana was 35% (11). This is a referral hospital, and the biggest public hospital in Ghana. The rate is therefore not representative of Ghana as a nation. The national rate on the other hand, on statistics in the period of 2000-2008, showed a rate of 6.9%. Rural and urban statistics differ significantly, with the rate being 5% in rural areas, and 11% in the urban parts (12).

During our four-week stay we interviewed 200 women, as well as retrospectively collecting data from 348 women. The aim was to identify the different indications for CS. In addition we identified the characteristics of the women undergoing CS, and studied if factors such as age and parity determined their indication. We also observed if socioeconomic factors had an influence on the decision to have the procedure, as some studies indicate this as a common practice (13). Finally, we noted the immediate outcome of the births.

BACKGROUND

The Republic of Ghana is centrally located on the West African coast. Ghana is divided into ten regions and is bordered by three French-speaking countries: Côte d'Ivoire on the west, Burkina Faso on the north and northwest, and Togo on the east (14).

The population of Ghana is 23.4 million inhabitants (2008), with 39% of the population below the age of 15, while only 6% is above the age of 60. Life expectancy at birth for a Ghanaian is estimated to be 64 years for females and 60 years for males (2008) (2).

Common diseases:

Malaria is the disease claiming the highest number of victims with a mortality rate of 109 per 100 000 (2008). The prevalence of tuberculosis is 400 per 100 000, with a mortality rate of 44 per 100 000 (2).

In 2007 the prevalence of HIV among adults aged 15-49 years was 1.9% with a mortality rate of 89 per 100 000 (2). The knowledge of AIDS is universal in Ghana: 98% of women and 99% of men have heard of AIDS. Nevertheless, only one in four woman and one in three men have a comprehensive knowledge of HIV/AIDS prevention and transmission. General knowledge of HIV transmission during breastfeeding is high: 85% among woman and 78% among men (14).

Child health:

One in every thirteen Ghanaian child dies before reaching the age of five. The under-five mortality rate is 76 per 1000 live births. Over two-thirds of these deaths occur in the first year of life: the infant mortality is 51 deaths per 1000

live births. Neonatal deaths account for 60% of the deaths in infancy with a mortality rate of 30 per 1000 live births. Post-neonatal mortality is 21 deaths per 1,000 live births (2, 14).

Concerning children aged under 5 years, malaria also stands out as the number one killer (26% of the deaths), followed by prematurity (12%), birth asphyxia (11%), pneumonia (10%), diarrhea (9%) and neonatal sepsis (9%). HIV/Aids cause 3% of the deaths (2).

Fertility and family planning:
The total fertility rate (TFR) in Ghana is 4.0 children per woman (2008). This TFR is considered as one of the lowest in sub-Saharan Africa. The fertility varies by background characteristics. The women's education is strongly associated with lower fertility. The TFR for rural areas (4.9 births) is higher than the TFR for urban areas (3.1 births). Unplanned pregnancies are common, despite a steady rise in the level of contraceptive use. Overall, 14% of births are unwanted, while 23% are mistimed (wanted later) (14). The median age at first birth is 21.2 years (15).

Knowledge of family planning is nearly universal, with 98% of all women and 99% of all men age 15-49 knowing at least one modern method of family planning (14). One in five women aged 15-49 (21%) is currently using a method of family planning. Injectable, the pill, and the male condom are the most popular modern methods of contraception, used by about 3-4% of women (15).

Maternal health:
Over nine in ten mothers (95%) receive antenatal care from a health professional (doctor, nurse, midwife, or community health officer). The proportion of women receiving no antenatal care is 4%. More than half (56%) of women in Ghana receive two or more tetanus injections during pregnancy and 72% of births are protected against neonatal tetanus. It is recommended by the Ministry of Health and the Ghana National Malaria Control Programme that pregnant women take at least two doses of Fansidar during pregnancy as

intermittent preventive treatment against malaria, but only half of the women receive such treatment (14).

Nationally, 57% of births occur in health facilities, with 48% in public health facilities and 9% in private health facilities. 42% of births take place at home. Medically trained providers assist 59% of the deliveries, traditional birth attendants assisted 30% and relatives or friends assisted 8% of deliveries. Two in three women receive postnatal care within two days of delivery (67%) (14).

Pregnancy care and delivery is covered by the National Health Insurance, but if you are in need of epidural or extra drugs you have to cover the expenses yourself. You also have the option of paying and getting private care (16).

Abortion and Miscarriage:
More than four in five pregnancies in Ghana result in a live birth (82%). The most common reason for pregnancy losses are miscarriage (9%), induced abortion (7%) and stillbirths (less than 2%) (15).

Fifteen percent of women report that they have had at least one induced abortion in their lifetime. Abortion is most common among women aged 20-24, and the main reason for the abortions is that there is no money to take care of the infant. Knowledge of abortion is high in Ghana, with nine in ten women knowing about the procedure (15).

The procedure of Cesarean sections:
Today a CS is usually performed using a lower segment transverse incision. The women receive pitosin and prophylactic antibiotics. In high risk cases the woman will receive prophylactic anti-thrombotic therapy (heparin/ fragmin). Spinal anesthesia is most frequently used under the procedure, but general anesthesia can be used in emergencies, i.e. bleeding or fetal distress (6, 5).

After the intervention, breastfeeding is started as soon as the woman is out of the operating theatre. In cases where general anesthetics are used, breastfeeding starts after an aesthetic recovery (6, 5).

Korle Bu Teaching Hospital:

Korle Bu Teaching Hospital (KBTH), as well as being a teaching hospital, is the largest tertiary hospital in Ghana. It has a big department of obstetrics and gynecology, with 10,000-12,000 deliveries per year, as well as a neonatal intensive unit (NICU) with 20 incubators. The delivery rate in KBTH in year 2010 was 11067 deliveries. Vacuum extraction was used in 0.07-0.1% of vaginal deliveries, and there was no use of forceps at the hospital (5). The total number of CS was 3856, which is 34.8% of all the deliveries. The maternal mortality rate was 80 women (762 per 100 000 live birth), where 16 (20%) out of these, were women undergoing CS (11).

Generally, women who are undergoing a CS are admitted to the hospital one day before the intervention and stay for minimum of three days after their CS. The women stay in dorms, but if you pay extra you can have your own private room (5).

METHODS

The study took place at the Korle Bu Teaching Hospital in Accra, Ghana. The study had a cross sectional design and consisted of two parts:

1) Retrospective collection of information on 348 women who had their CS from 8.12.10-16.01.11. The information was collected from the 'doctor's book', a register book in the labor ward where the doctors manually noted the basic information:

- Maternal age
- Parity
- Indication of CS
- Category (emergency/elective)
- Outcome of the baby: sex, weight, Apgar score
- Maternal outcome: blood loss

2) During a period of 4 weeks (16.01.11 – 11.02.11), 200 women at the maternity ward at the KBTH recently having a CS, were interviewed. A semi-structural questionnaire was used. The same information as in part 1 was collected. In addition, the interview registered information about their:

- Social factors
- Education
- Medical conditions
- Antenatal care
- Family planning method
- Residency
- Transportation mode to the hospital

• Number of days at the hospital before their CS

Statistics

All information was put into SPSS version 18 and subsequently analyzed.

The results were divided into two parts:

- The basic information collected in both the retrospective and the interview study; a total of 548 women.

- The additional information collected from the semi-structural interview, consisting of 200 women.

Out of the total 548 CSs recorded, 284 women had multiple indications. In co-operation with our supervisor we therefore selected the main indication for these cases. Associations between main and additional indications were subsequently recorded.

In the interview study we formed a category called 'Social status', which was divided into three groups: 'low class', 'middle class' and 'upper class'. The division was based on the occupation of the woman and her husband, place of residence and the education level.

The analysis was done with chi-square. $P < 0.05$ was considered statistically significant.

RESULTS

These are the results of the 548 women undergoing CS based on both the retrospective and the prospective parts of the study. Some of the information was incompletely registered in the 'doctor's book'. We marked this as U (unknown).

Age
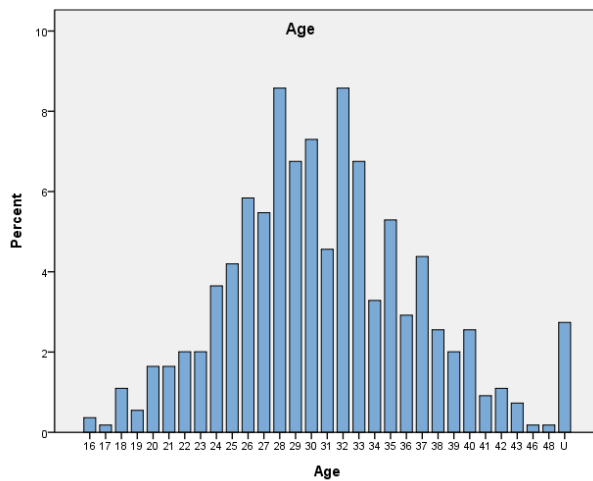
The youngest was 16 years and the oldest was 48 years. The mean age was 30.4 years (excluding the women with unknown age). The mean age for nulliparas was 27.3 years.

Figure 1: Age of 548 women undergoing CS at the KBTH from 8.12.10-10.02.11.

Parity
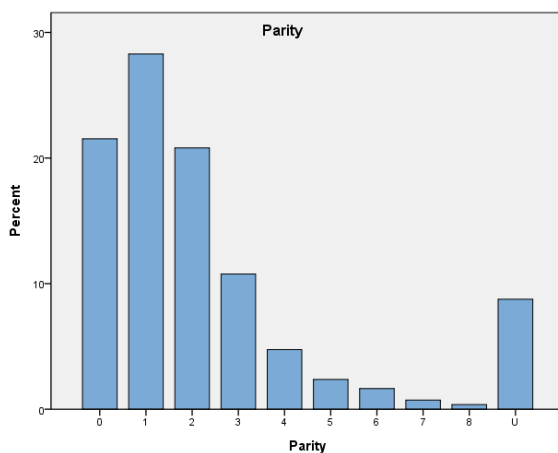
The highest parity was P8. The mean parity was 1.65 (excluding the women with unknown parity).

Figure 2: Parity of 548 women undergoing CS at the KBTH from 8.12.10-10.02.11.

The indications for CS

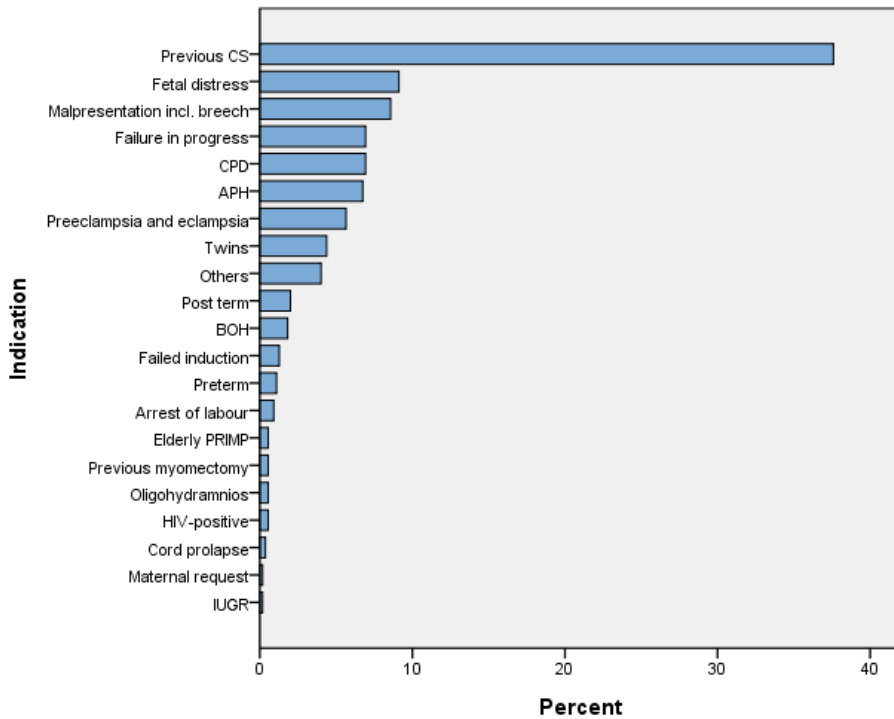Figure 3 and table 1 illustrate the indications for CS amongst the 548 women. As seen, 37.6% of the women underwent CS because of a previous CS. Other frequent indications were fetal distress (9.1%), malpresentation incl. breech (8.6%), failure in progress (6.9%), cephalo-pelvic disproportion (6.9%) and antepartum hemorrhage (6.8%).

Figure 3: Main indication of 548 women undergoing CS at the KBTH from 8.12.10-10.02.11.

Indication	Frequency	Percent
Previous CS	206	37.6
Fetal distress	50	9.1
Malpresentation incl. breech	47	8.6
Failure in progress	38	6.9
Cephalopelvic disproportion	38	6.9
Antepartum hemorrhage	37	6.8
Preeclampsia and eclampsia	31	5.7
Twins	24	4.4
Others	22	4.0
Post term	11	2.0
Bad obstetric history	10	1.8
Failed induction	7	1.3
Preterm	6	1.1
Arrest of labour	5	.9
Elderly PRIMP	3	.5
Previous myomectomy	3	.5
Oligohydramnios	3	.5
HIV-positive	3	.5
Cord prolapse	2	.4
IUGR	1	.2
Maternal request	1	.2
Total	548	100.0

Table 1: Main indication of 548 women undergoing CS at the KBTH from 8.12.10-10.02.11

Indications for nulliparas and multiparas undergoing CS

Out of 548 women, 114 women (20.8%) were nulliparas and 402 women multiparas (73.4%). Thirty-two women (5.8%) had unknown parity.

There were differences in the indications for the two groups, as shown in table 2 and figures 4 and 5. There were 206 women out of 402 multipara women (51.2%) who had previous CS as a main indication. To be able to compare the indications for CS for nulliparas and multiparas we excluded this group in the analysis in table 2. As seen, 'failure in progress' and 'arrest of labor' were significantly more common among the nulliparas, while 'APH' and 'BOH' were significantly more common among the multiparas.

	NULLIPARAS		MULTIPARAS		
	N	%	N	%	P-VALUE
Fetal distress	20	17.5	26	13.3	0.307
Failure in progress	20	17.5	17	8.7	**0.020**
Malpresentation incl. breech	18	15.8	26	13.3	0.539
CPD	14	12.3	19	9.7	0.476
Preeclampsia and eclampsia	13	11.4	15	7.7	0.267
Twins	8	7.0	15	7.7	0.837
Arrest of labour	5	4.4	0	0	**0.002**
APH	4	3.5	27	13.8	**0.004**
Preterm	3	2.6	3	1.5	0.497
Previous myomectomy	2	1.8	1	0.5	0.281
Post term	2	1.8	7	3.6	0.358
Failed induction	1	0.9	5	2.6	0.302
Cord prolapse	1	0.9	1	0.5	0.697
BOH	0	0	9	4.6	**0.024**
HIV-positive	0	0	3	1.5	0.238
Maternal request	0	0	1	0.5	0.620
Others	3	2.6	21	10.7	**0.010**
Total	114	100	196	100	

Table 2: Comparison of indication for CS of 114 nulliparas and 196 multiparas undergoing CS at the KBTH from 8.12.10-10.02.11. Multiparas with previous CS as their main indication (206 women) are excluded in this analysis.
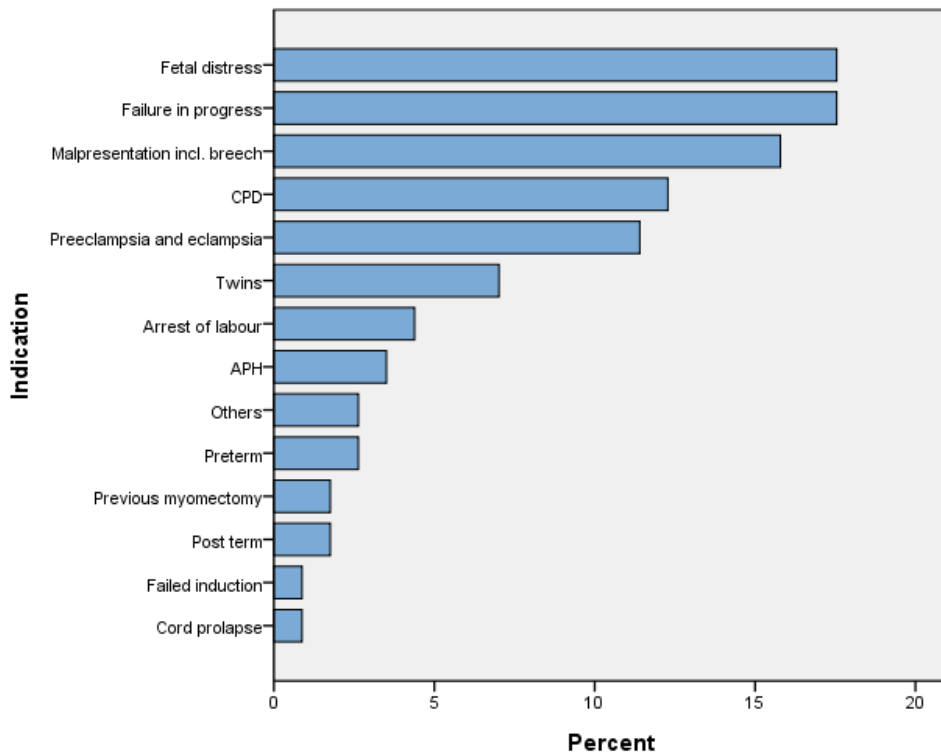
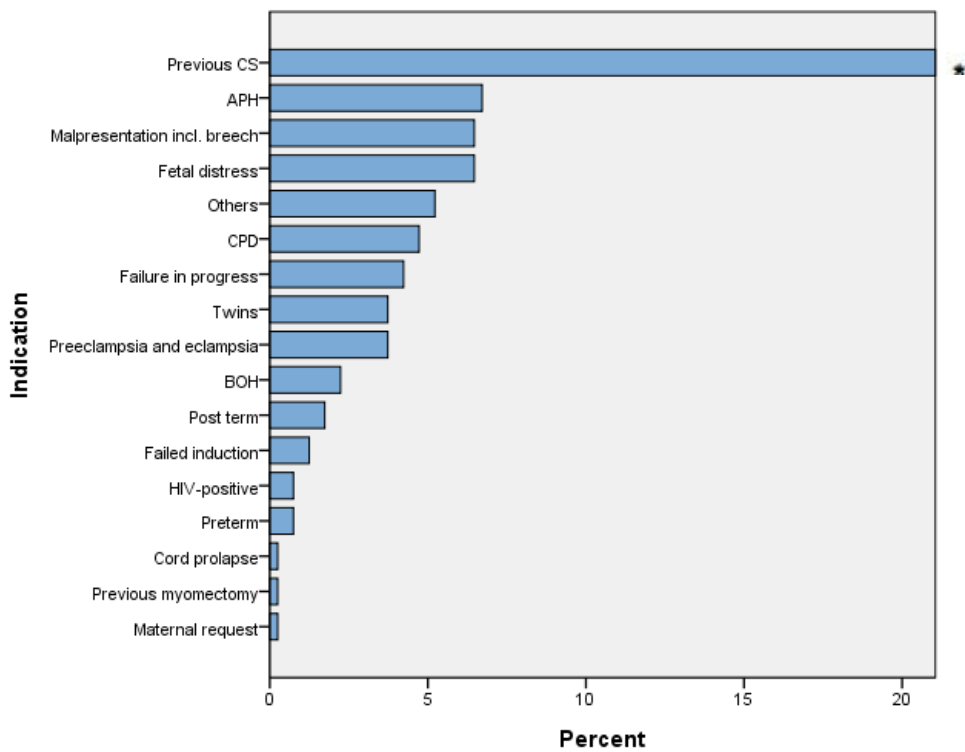**Figure 4: Main indication of 114 nulliparas undergoing CS.**

Figure 5: Main indication of 402 multiparas undergoing CS. *51.2% previous CS.

Category of CS

There are two categories of CS: emergency and elective. Out of the 548 CSs in our study, 164 (30%) cases were elective and 382 (70%) were emergency. The remaining 2 cases were not classified, and are therefore excluded in the analysis below.

As seen in table 3, there are significantly higher rates of emergency CS in the younger age group (16-25 years) compared to the older age group (36-48 years). The rate for emergency CS is also significantly higher among the nullipara compared to the P≥3 group.

Among the indications 'previous CS', 'fetal distress', 'failure in progress', 'CPD' and 'preeclampsia and eclampsia' there are significantly higher rates of emergency CS than elective CS.

			Elective (30%)	Emergency (70%)	Total	P-value
Age	16-25	N	13	83	96	
		%	13.5%	86.5%	100.0%	
	26-35	N	103	238	341	<0.0001
		%	30.2%	69.8%	100.0%	
	36-48	N	41	54	95	
		%	43.2%	56.8%	100.0%	
Parity	P0	N	16	102	118	
		%	13.6%	86.4%	100.0%	
	P1-2	N	89	179	268	<0.0001
		%	33.2%	66.8%	100.0%	
	≥3	N	47	66	113	
		%	41.2%	58.4%	100.0%	
Indic.	Previous CS	N	102	104	206	
		%	49.5%	50.5%	100.0%	<0.0001
	Fetal distress	N	0	50	50	
		%	.0%	100.0%	100.0%	<0.0001
	Malpresentation incl. breech	N	16	31	47	
		%	34.0%	66.0%	100.0%	0.531
	Failure in progress	N	0	38	38	
		%	.0%	100.0%	100.0%	<0.0001
	CPD	N	4	34	38	
		%	10.5%	89.5%	100.0%	0.007
	APH	N	7	30	37	
		%	18.9%	81.1%	100.0%	0.127
	Preeclampsia and eclampsia	N	2	28	30	
		%	6.7%	93.3%	100.0%	0.004
	Twins	N	5	19	24	
		%	20.8%	79.2%	100.0%	0.314
	Others	N	28	48	76	
		%	36.8%	63.2%	100%	0.163
	Total	N	164	382	546	

Table 3: Associations between category of CS in relation to age, parity and indication for CS. This is based on information collected from 546 women undergoing CS.

Additional indications

Out of the 548 CSs, 284 had additional indications. The main associations are seen in figure 6. In the biggest group, 'previous CS', only 25% had previous CS as the sole indication.

Failure in progress (38)
- 19 single indications(50%)
- 7 fetal distress(18%)

Fetal distress(50)
- 37 single indications(74%)
- 5 CPD(10%)

Malpres. incl.breech(47)
- 23 single indications(49%)
- 5 failure in progress(11%)

Post term(11)
- 2 single indications(18%)
- 3 CPD(27%)

Previous CS (206)
- 52 single indications(25%)
- 29 CPD(18%)
- 22 preeclamp. and
- 18 fetal distress(12%)
- 17 failure in progress(11%)
- 16 post term (10%)
- 6 gestational DM (4%)
- 5 malpres. incl. breech(3%)
- 4 fetal macrosomia(3%)

Preeclamp. and eclampsia(31)
- 13 single indications(42%)
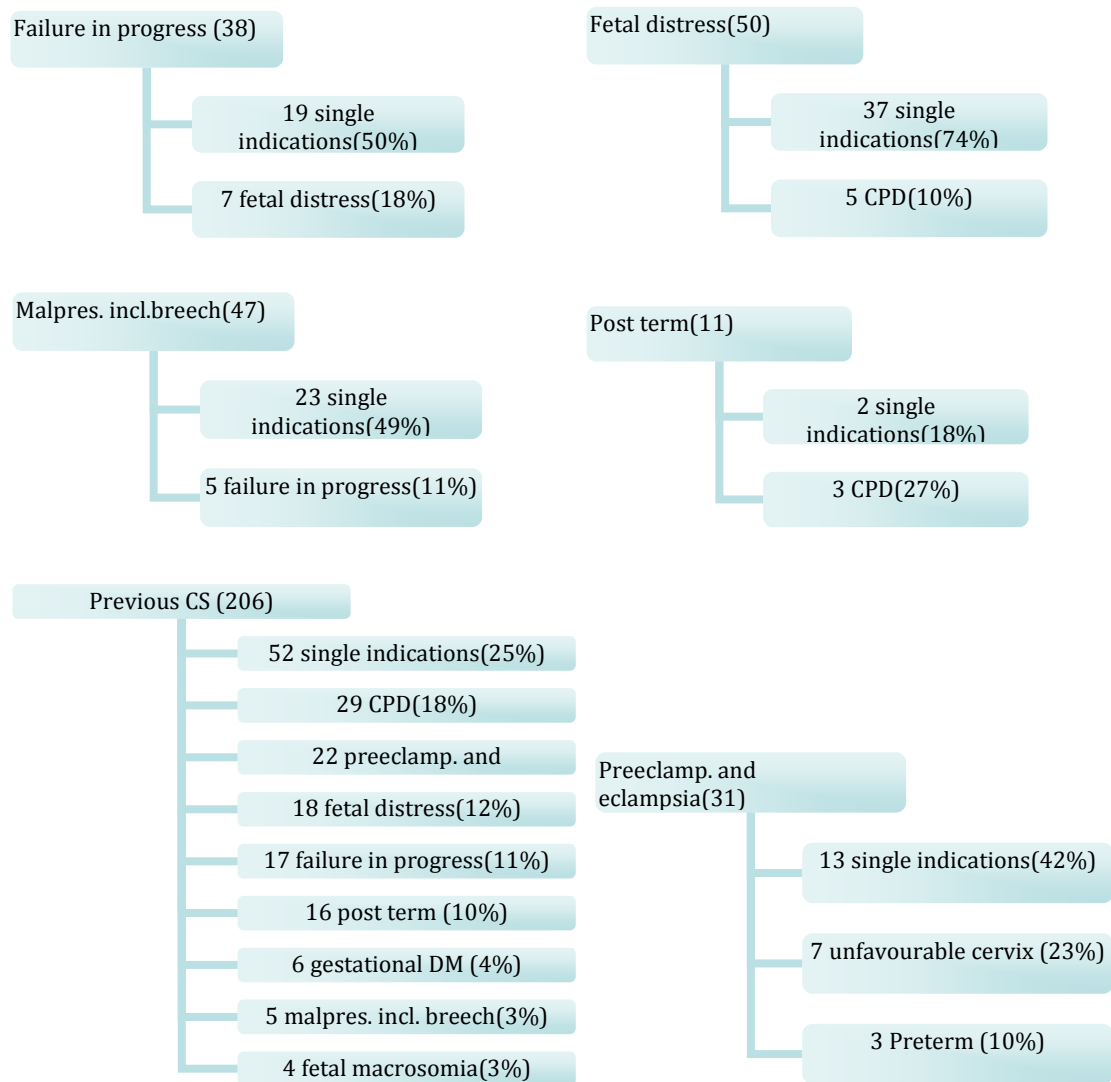- 7 unfavourable cervix (23%)
- 3 Preterm (10%)

Figure 6: Associations between the main indications and their additional indications among 284 women undergoing CS.

Outcome

There were 522 singletons and 26 pair of twins born by CS at the KBTH. Among the singletons 54% were male while 46% were female. The mean weight for the singletons was 3.1 kg, while it was 2.4 kg for the twins. The statistics of the outcome are further shown in figure 7 and table 4.
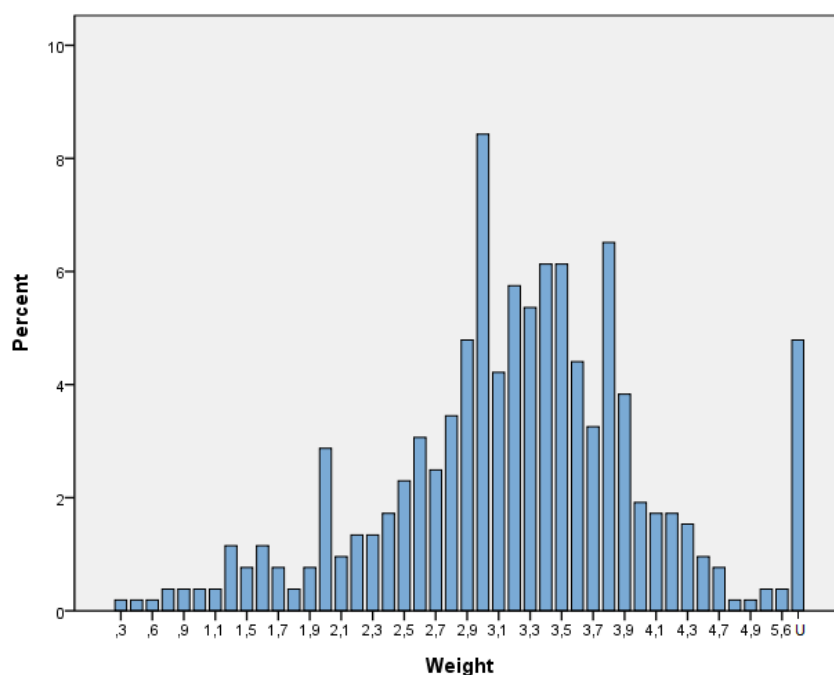

Figure 7: Weight of 522 singletons born by CS.

	SINLGETONS		TWINS	
	N (%)	No of women incl.	N (%)	No of women /infants incl.
Mean weight	3.1 kg	497	2.4 kg	47 infants
Sex – male (out of live births)	269 (54%)	499	24 (59%)	41 infants
Sex – female (out of live birhts)	230 (46%)	499	17 (41%)	41 infants
Stillbirths • **Females** • **Males** • **Unknown**	14 (2.8%) 2 infants 7 infants 5 infants	499	3 (6.8%) 0 1 infant 2 infants	44 infants
Apgar 5 min ≤5	15 (3.4%)	435	0 (0%)	35 infants
Blood loss • **<500mL** • **500-1000mL** • **>1000mL**	 360(81.4%) 64 (14.5%) 18 (4.1%)	 442 442 442	 14 (63.6%) 7 (31.8%) 1 (4.5%)	 22 women 22 women 22 women

Table 4: Outcome of singletons and twins born by CS at the KBTH from 8.12.10-10.02.11.

Interview study

Demographics of the 174 interviewed women

Out of the 200 women undergoing CS in the period from 17.01.11 to 10.02.11, eleven had already been discharged, eight were unlocatable, three were unable to be interviewed due to illness and four did not want to participate. Therefore there were 174 interviewed. Among these, 18.1% did not speak English and needed translation. The nurses at the KBTH-wards conducted the translation.

Among the 174 interviewed women, 79% of the nullipara and 93% of the multipara were married. In total, only four women were single. The majority lived with their husband only. One out of five lived with their parents or with their extended family (table 5). Most of the women had basic education. There was a higher rate of 'no education' among the multiparas; 10% versus 2% among the nulliparas. The rate of higher education was relatively high in both groups; 28% of nulliparas and 21% of multiparas (table 5).

	Nullipara	Multipara	Total
N	58 (33%)	116 (67%)	174 (100%)
Mean age	26.9	31.7	
Civil status			
Married	46 (79%)	108 (93%)	154 (89%)
Boyfriend/engaged	11 (19%)	5 (4%)	16 (9%)
Single	1 (2%)	3 (3%)	4 (2%)
Education			
None	1 (2%)	11 (10%)	12 (7%)
Primary school	4 (7%)	13 (11%)	17 (10%)
Junior High School	22 (38%)	54 (47%)	76 (44%)
Senior Secondary	15 (26%)	14 (12%)	29 (17%)
Higher education (secondary courses, university degree)	16 (28%)	24 (21%)	40 (23%)
Occupation			
Unemployed	4 (7%)	10 (9%)	14 (8%)
Student	3 (5%)	1 (1%)	4 (2%)
Hair dresser	13 (22%)	7 (6%)	20 (12%)
Seamstress	7 (12%)	10 (9%)	17 (10%)
Trader	16 (27%)	63 (55%)	79 (45%)
Nurse/midwife	2 (3%)	3 (3%)	5 (3%)
Doctor	1 (2%)	1 (1%)	2 (1%)
Others (with higher education)	12 (20%)	16 (14%)	28 (16%)
Farmer/ Housewife	0	5 (5%)	5 (3%)
Living situation			
Extended family /Parents	12 (21%)	24 (21%)	36 (21%)
Boyfriend/fiancée	5 (9%)	4 (3%)	9 (5%)
Husband	41 (71%)	88 (76%)	129 (74%)

Table 5: Demographics of the 174 interviewed women undergoing CS at the KBTH from 8.12.10-10.02.11.

Associations between social class and category of CS

There is a significantly higher rate of elective CS in the upper class group compared to the lower class group. This is shown in the table below.

			Category		Total	P-value
			Elective	Emergency		
Class	Low	N	28	91	119	
		%	23.5%	76.5%	100.0%	
	Middle	N	7	23	30	0.013
		%	23.3%	76.7%	100.0%	
	Upper	N	12	13	25	
		%	48.0%	52.0%	100.0%	
Total		N	47	127	174	
		%	27.0%	73.0%	100.0%	

Table 6: Association between 'social class' and 'CS category' of the 174 interviewed women undergoing CS at the KBTH from 8.12.10-10.02.11.

Family planning

Eighty-three percent did not use any contraception prior to their pregnancy. The number decreased to 53% post-CS. Out of the 174 women interviewed, 19 underwent sterilization during their CS. This was performed by bi-tubal ligation. All were multipara, with their parity ranging from P2 to P8. The mean parity was 3.7. The youngest was 26 years, the oldest 40 years and the mean age was 34.7.

Method	Before CS	After CS
None	144 (83%)	91 (52%)
Condoms	4 (2%)	2 (1%)
Pill	8 (5%)	5 (3%)
Implant	3 (2%)	4 (2%)
Injection	13 (8%)	7 (4%)
IUD	2 (1%)	1 (1%)
Sterilization	0	19 (11%)
Unsure of method	0	45 (26%)

Table 7: Family planning method before and after undergoing CS of the 174 interviewed women at the KBTH from 8.12.10-10.02.11

Additional results of the 174 interviewed women

All the 174 women, except one (0.6%), had at least one pregnancy check up. Only 9 (5.2%) did not have their Hb taken, and interestingly only 4 out of 174 (2.3%) did not have an ultrasound.

Most of the women, 145 (83.3%), claimed to have no disease. The most common diseases were asthma (6 women), hypertension (7 women), sickle cell disease (3 women), anemia (3 women) and gestational DM (3 women).

The results show that the majority (72.4%), independent of class, ate 3 meals per day.

The most common transportation mode to the hospital was by taxi (54.6%). Others came by car, tro-tro and ambulance-transfers. Only 2 came walking.

DISCUSSION

CS at the KBTH

The CS rate at the KBTH in 2010 was 35% (3856 births). This is a high number, but KBTH is a referral hospital, which means it is the hospital where all the complicated pregnancies in the district are referred. The number is therefore not representative for the country. The national rate for CS is 6.9%, which is below the recommended rate. This reflects that Ghana is a developing country with low health resources.

Another reason for the high rate of CS at the KBTH could be scarce use of instrumental delivery. At the KBTH, vacuum extraction is used in 0.07-0.1% of vaginal deliveries and no forceps deliveries are done (5). An increased use of instrumental deliveries could reduce the rate of CS at the KBTH.

The mean age among the CS nullipara was 27.2 years. The number differs a lot from the median age for the first birth in Ghana, which is 20.1 years in rural areas, and 22.1 years in urban areas (14). This is an interesting finding and could indicate that older nulliparas tend to have more difficult labors and therefore more CSs.

Out of all the CSs, 70% were emergencies. This is quite a high number as expected in a developing country. Anyhow, the number is not so different from Norway which has one of the highest rates of emergency CSs in the western world with 60% emergencies (6).

Indications for CS

The dominating indication for CS among the women was previous CS (37.6%) (table 1). Elective CSs counted for 49.5% of this group (table 3). This implies that around half of the women with previous CSs attempted vaginal birth after cesarean delivery (VBAC). This is similar to the 51% VBAC-rate in Norway (17). As shown in the results, only 25% had previous CS as a single indication. The remaining had additional indications with the majority being of acute nature,

such as 'CPD', 'pre-eclampsia and eclampsia', 'fetal distress' and 'failure in progress' (figure 6).

The second largest group is fetal distress, accounting for 9.1% of all CSs during the period of our study (table 1). After discussion with the doctors at the KBTH we discovered that this might be due to lack of technology and instruments, for instance lack of CTG and fetal scalp sampling to get a clear diagnosis. Therefore, simple measurements like meconium stained liquor and fetal tachycardia are used to diagnose fetal distress, causing more patients to get the diagnosis (5).

The third largest group was malpresentation incl. breech, accounting for 8.6% of the total CSs (table 1). In half of this group, malpresentation was the single indication (figure 6). In addition, only 34% in this group were elective (table 3). This indicates that breech presentation is not an absolute indication for CS. This differs from many countries, such as New Zealand, where both recommendations and common practice suggest CS due to its many complications by normal vaginal delivery (18, 19). At the KBTH breech is an absolute indication in nullipara with breech, or if a first twin is in breech position (5).

The rate of 'preeclampsia and eclampsia' accounted for 5.7% of all the 548 CSs (table 1). There was a significantly higher rate of emergency compared to elective CSs in this group (p-value: 0.004) (table 3), with emergency CS accounting for 93.3% (table 3). This is expected, as women with high blood pressure in their antenatal screening are primarily induced vaginally if detected early, and are therefore not in need of an elective CS. A reason for the low rate of elective CS could also be lack of antenatal visits with screening of blood pressure and urine analysis for early detection of the disease.

It is notable that only 1 out of all 548 women (0.2%) had the indication maternal request (table 1). This is an indication that would be higher in many other countries of the world, as well as in private hospitals and non-referral hospitals in Ghana. A lack of resources might suggest this fact, as there are fewer resources to perform elective CSs with non-absolute indications like maternal request.

Other reasons could be that the women simply prefer vaginal delivery, or that they do not know about CS as an option.

Indications for nulliparas compared to multiparas

There are significantly higher rates of the indications 'failure in progress' (p-value: 0.020) and 'arrest of labor' (p-value: 0.002) among the nulliparas than the multiparas (table 2). This confirms that nulliparas generally have more difficulties in labor. This is further confirmed as nulliparas and the younger age group(16-25 years) have significantly higher rates of emergency CS than the multiparas and the older age group (36-48 years). The rate of emergency CS among the 16-25 year olds is 86.5% (table 3).

There are significantly higher rates of the indications 'APH' (p-value: 0.004), BOH (p-value: 0.024) and 'others' (p-value: 0.010) among the multiparas than the nulliparas (table 2). The higher rate in the group 'others' suggests that multiparas have more uncommon indications. There is a significantly higher rate of elective CSs in the elder age group (36-48 years) as well as in the group with parity ≥P3, compared to the younger group (16-25 years) and the nulliparas (table 3). A reason for this could be bad obstetric history.

Outcome

Out of the 548 women in our study, 522 had singletons. The sex of 499 of these singletons was registered. A very interesting finding is that 54% were male infants, while 46% were females (table 4). This gives a male to female ratio of 1.17, which is high. Statistics for Ghana from 2011 shows the rate to be 1.03. (20). Another notable fact is that the majority of the 174 we interviewed, 97.7%, had an ultrasound in their pregnancy. Induced abortion has a rate of 7% in Ghana. We can only speculate if there is a connection between the male to female ratio and these occurrences.

The rate of Apgar score ≤5 after 5 minutes was 3.4% (table 4). This means that there is generally a good outcome for the infants.

Twins accounted for 4.7% of the 548 CSs in our study period. The preterm rate among the twins was 43%. In similarity with the singletons, we see a tendency of increased male to female ratio (59% male, 41 % female). The rate of Apgar score ≤5 after 5 minutes was interestingly 0% (table 4).

Interview study

Demographics of the women

Our intention to ask the woman how many meals they ate per day and the transportation mode to the hospital was to get an overview of the women regarding their resources concerning economy and health care access. The culture and development of Accra makes the results to these questions irrelevant, as it is impossible to make an assumption of their economic status from such information.

Social class

In reference to table 6, 'Associations between social class and category of CS', there is a significantly higher rate of elective CS in the upper class compared to the low class (p- value: 0.013). We can speculate that more women with higher education might influence the decision to have a CS.

Family planning

Generally there was scarce use of contraception. In total 83% of the women claimed that they did not use any contraception prior to the pregnancy (table 7). The number decreased to 53% post-CS, although this is still a high number. One of the main reasons for increased use of contraception could be the family planning program at the KBTH. Family planning educators were in the wards both pre- and post nataly speaking to the women about their options. The doctors also emphasized future contraception during their ward rounds, making it a big priority.

The rate of protective contraception (condoms) is low; four women (2%) claimed to use this before their CS while two women (2%) intended used it after their CS. This information could reflect the description in the background; that

only one in four women has a comprehensive knowledge of HIV prevention and transmission and therefore barrier contraception is not widely practiced.

The rate of sterilization (bi-tubal ligation) was 11%. As a bi-tubal ligation can be performed at the same time as a CS, this can explain the high rate of the use of this contraception.

Sources of error

There were limitations and possible sources of error in our study, and there were different reasons for these. There were three information sources: 'the doctor's book', 'the nurse's book' and first hand information from the interview. Firstly, we found that the information in the 'doctor's book' was not always reliable. For instance, there were eleven 'post term' written as indications, yet 2 of them were classified under term, and the rest were not classified.In the P0 group, four were classified under having had a previous CS, which for obvious reasons are impossible. In addition, the parity sometimes varied in the 'doctor's book' and the 'nurse's book'. This indicates that the information given is not always correct. As a solution to this we tried to ask the women, if present, about the correct information, as well discussing the issues with the nurses and doctors for correct notification in the future.

The hand writing in the book was in many cases hard to interpret, leaving some of the indications not a hundred percent certain. Also, there were several information points missing in many of the cases, for instance the sex, birth weight and Apgar score.

Another information bias is the language barrier; some of the women did not speak adequate English, and we had nurses to translate.

Initially there were some 'lost cases', where we could not locate some patients. They might have been on the 6th floor, the 'private floor', causing selection bias. After some days we got more familiar with the hospital and could better locate the patients wherever they were, for instance in the NICU with their infants. We

also have to keep in mind that KBTH is public hospital, and the clientele most probably varies from a private hospital.

Other issues are that we chose to divide our women into different classes, a main indication and additional indications to make our analyzations possible. This could be a potential source of error, as there is no fixed way of doing these divisions. Multiple indications and overlap of indications has also been a challenge to deal with.

CONCLUSION

The WHO recommends a CS-rate of 10-15 %. The CS rate at the KBTH in 2010 was 35% (3856 births). This is a high number, but KBTH is a referral hospital and the number is therefore not representative for the country. The national rate for CS in Ghana is 6.9%, which is below the recommended rate. This reflects a developing country with low health resources.

Instrumental delivery was not a common practice at the KBTH; vacuum extraction was used in 0.07-0.1% of vaginal deliveries, and no forceps deliveries were done. This could also be a reason for the high rate of CS at the KBTH.

Out of the 548 CSs, 70% were emergencies and 30% elective. The dominating indication was previous CS (37.6%), followed by fetal distress (9.1%) and malpresentation incl. breech (8.6%). Only one woman had maternal request as an indication.

Regarding the characteristics of the women, the mean age of all the CS women was 30.4 years. Among the nullipara the mean age was 27.2 years. Further, the results show that younger women and nulliparas have significantly more emergency cesarean sections than older women and multiparas. The nulliparas tended to have difficult labors, with indications like 'failure in progress' and 'arrest of labor' dominating.

There was a significantly higher rate of elective CSs in the socioeconomic benefited group compared to the lower class group, suggesting that class influences the decision to having the procedure.

The outcome of singletons shows us that 46% were female infants and 56% male infants.

After observing the results we can see that the indications for the procedure were necessary according to good obstetric care. We also observed that due to a

lack of diagnostic equipment like CTG and fetal scalp sampling, indications such as fetal distress might be over-diagnosed. There are very few non-absolute indications. The only patient who had the procedure done based on maternal request was a "6th floor" patient, a private floor where she had paid extra to be.

The rate of CS is generally rising in many parts of the world, including Ghana. With a country's development comes better health care and health technology, and rates increase. Cesarean sections can save lives, but it has complications. It should not be used excessively, but offered to those in need.

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UNIVERSITY OF OSLO

INDICATIONS FOR CESEREAN SECTIONS AT KORLE-BU TEACHING HOSPITAL

1. Indication for CS

Mother:	*Baby:*
CPD	Fetal distress
Pre-eclampsia	Breech presentation
Maternal diseases: Diabetes, _____	Transverse lie
Bleeding: Placenta praevia, abruptio	Preterm / low birth weight
Infection (HIV, HepB)	Intrauterine growth restriction
BOH	Twins
Previous CS	IVF pregnancy
Maternal request	

Others (Specify_____)

Category of CS:

1. Elective   _____
2. Emergency   _____

2. Maternal and pregnancy information

1) Maternal:
   a. Age   _____
   b. Social status
      i. Married?   _____
      ii. Nr. of meals per day   _____
      iii. Own income and type of work   _____
      iv. Hubands occupation   _____
      v. Living situation(with extended family?)   _____

   c. Education level:
      i. Primary school   ____
      ii. Middle school   ____
      iii. Junior high school
      iv. Senior secondary school   ____
      v. University degree   ____

2) Gravida/para and type of previous deliveries

3) Maternal medical conditions:
   Anemia   _____
   Sickle cell disease   _____
   Others   _____

4) Antenatal care:
   i.   Visits in pregnancy? ___
   ii. Hb taken?   ___
   iii. Ultrasound taken?   ___

5) Gestational age

6) Family planning method:
   - Contraceptive pill   _____   - Injection   _____
   - IUD   _____   - None   _____
   - Condoms   _____   - Others   _____

Thoughts of family planning *after* pregnancy

7) Place of residence/distance from hospital

8) Transportation to hospital (ambulance, taxi, etc)

9) Number of days at the hospital (before)

10) Birth:
   a. Date   _____
   b. Sex   _____
   c. Birth weight   _____
   d. Length   _____
   e. Apgar score after **1 min:** _____   **5 min:** _____

General hospital routine:

1) Number of days at the hospital
   Before: _____
   After: _____

2) Payment for CS

3) Indication: What about breech delivery?

4) Number of staff in maternity clinic
   a. No of:
      i. Doctors   _____
      ii. Midwives   _____
   b. On duty at night?

5) Paediatrics
   a. Do an NICU exist?
   b. Number of incubators? How many ar in use?

6) Mother/child contact: when does breast feeding start?

7) Anesthesia method: - General, epidural, other?

8) Application of pitosin/fragmin/antibiotics?

9) Number of deliveries at the hospital?
% CS?

Country:
- Population statistics
Fertility rate (TFR)
% HIVpositive
        Main diseases in the country: (malaria, tbc, etc)

- Maternal mortality rate (Lancet Mai 2010, appendix)