

# Analysis of Obstetrical Lethality in the Department of Gynecology and Obstetrics of the University Teaching Hospital Yalgado OUEDRAOGO (UTH-YO)

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**Abstract:** *Objectives:* Analyze the determinants of obstetric lethality in the Department of Obstetrical Gynecology at the University Teaching Hospital Yalgado OUEDRAOGO (UTH-YO) of Ouagadougou from 2015 to 2018. *Methodology:* We conducted an analytical, descriptive cross-sectional study on maternal deaths in the UTH-YO. The data were collected retrospectively. All patients meeting the World Health Organization (WHO) definition of maternal death and patients who died as a result of direct obstetric complications in the Department of Gynaecology and Obstetrics at the University Teaching Hospital Yalgado OUEDRAOGO (UTH-YO) of Ouagadougou from January 1, 2015 to December 31, 2018 were included. *Results:* We recorded 484 maternal deaths and 22947 births, for a maternal mortality ratio of 2109 deaths per 100,000 live births (NV). Patients who died as a result of direct obstetric complications accounted for 412 out of 10,564 cases, representing an obstetric lethality rate of 3.9%. These were patients with an average age of 27.6 years, without income generating activities (93.6%), nulliparous and pauciparous patients respectively (26%) and (31%). Most of them came from health facilities in the city of Ouagadougou (50%). The 4 main causes of death were haemorrhages (29.7%), hypertensive disorders (20.8%), abortion complications (16.8%) and infections (14%) respectively. The most lethal causes were thromboembolic pathology (27.27%), infections (13%), abortion complications (7.6%), bleeding (5.4%) and hypertensive disorders (4.2%). The notion of the 3 delays, the insufficient technical platform, the lack of financial resources and the lack of staff qualification were the contributing factors to the causes of death. *Conclusion:* From our study, it appears, as elsewhere, that most maternal deaths are preventable, hence the need for coordinated action to take effective action against maternal mortality.

**Keywords:** Direct Obstetric Complication, Lethality, UTH-YO, Ouagadougou

## 1. Introduction

In Burkina Faso, the maternal mortality ratio was 307 per 100,000 NV in 2010 [13]. It should be noted that the main causes of maternal deaths in Burkina Faso are haemorrhages, infections, complications of unsafe abortions, hypertensive disorders and dystocias [13, 14, 21]. Indeed, direct obstetric

causes account for more than two thirds of deaths. According to the national committee for monitoring the implementation of maternal and neonatal mortality reduction strategy programmes: in 2012 there were 702 cases of maternal death compared to 532 cases of maternal death in 2013 [14, 21]. This decrease in mortality is explained by strategies such as the creation of medical centres with surgical antenna, training of health centre providers, state subsidies to emergency

obstetric care centres, the availability of contraceptive products and control of the distribution channel for reproductive health products. Indeed, the points of service increased from 25% in 2012 to 75% in 2013 [14].

Despite these different strategies adopted, we can see that the figures are still very high. Thus, improving maternal health remains one of the development priorities adopted by the international community to reduce maternal mortality at  $\frac{3}{4}$  between 1990 and 2015 [15].

The objective of our study was to analyze the different complications, especially direct obstetric complications and determine their impact on maternal mortality while identifying contributing factors to better guide policy makers and health authorities in strengthening the strategy for improving maternal and child health.

## 2. Patients and Methods

### 2.1. Framework of the Study

Our study took place in the obstetrical gynaecology department of the University Teaching Hospital Yalgado OUEDRAOGO (UTH-YO) of Ouagadougou. The UTH-YO is one of the reference centres in Burkina Faso and is located in the heart of the city of Ouagadougou. It contributes to the training of medical students, pharmacies and students at the National School of Public Health. It is divided into 10 departments, including the Gynaecology-Obstetrics Department, which receives gynaecological and obstetrical emergencies from the city of Ouagadougou and the surrounding provinces. It is divided into 3 departments: the Gynaecology Department, the Obstetrics Department and the Family Planning Department.

### 2.2. Type and Period of Study

This was a descriptive, analytical, cross-sectional study conducted over a four-year period (04) from 1 January 2015 to 31 December 2018. The data were collected retrospectively.

### 2.3. Study Population

Our study examined patients admitted for direct obstetric complications as well as those with the same types of complications after admission. In our study, patients who died as a result of direct obstetric complications in the Department of Gynaecology and Obstetrics at UTH-YO were

included in the period from 1 January 2015 to 31 December 2018. Patients who met the inclusion criteria but whose medical records were unusable were not included in our study. With regard to the mode of termination of pregnancy, we have selected five modes of termination of pregnancy: the lower route, cesarean section, pregnancy not expelled before death, abortion, laparotomy.

### 2.4. Data Collection

The data collection medium was the collection sheet. Our data were collected from patient clinical records, admission records, birth records, operating room records and maternal death records during the study period. The variables taken into account were: marital status, age, occupation, marital status, mode of admission, origin, time of evacuation, reason for evacuation, distance travelled to UTH-YO, history, pregnancy follow-up, clinical signs, diagnoses selected, therapeutic modalities, causes, time of death and factors contributing to maternal deaths.

### 2.5. Data Analysis

The data were entered and analyzed on a computer using the statistical analysis software EPI info version 3.5.1 and EPI data. The graphs were created using the EXCEL spreadsheet Version 2013.

### 2.6. Operational Definitions

Lethality rate: Number of deaths related to a condition as a proportion of the total number of cases of that condition

Obstetric Lethality Rate: Number of maternal deaths related to direct obstetric causes as a proportion of the total number of cases of direct obstetric complications.

Late maternal death: is defined as the death of a woman from direct or indirect obstetric causes beyond 42 days, but less than one year after the termination of pregnancy.

## 3. Results

### 3.1. Frequency

#### 3.1.1. Number of Maternal Deaths by Direct Causes

During the study period, 412 deaths related to direct obstetric complications were recorded for 10,564 admissions due to these complications, representing a frequency of 3.9%. The distribution of maternal deaths and admissions by year has been presented in Table 1.

**Table 1.** Annual distribution of maternal deaths and admissions due to direct obstetric complications.

Year	Maternal Deaths	Maternal deaths due to direct obstetric complications	Admissions due to direct obstetric complications
2012	98	69	2905
2013	115	105	2818
2014	121	110	2396
2015	150	128	2445

#### 3.1.2. Maternal Mortality Ratio

During our study period, we recorded 484 maternal deaths and 22947 births, for a ratio of 2109 deaths per 100,000 live

births. Figure 1 shows the evolution of the different maternal mortality ratios from 2012 to 2015.

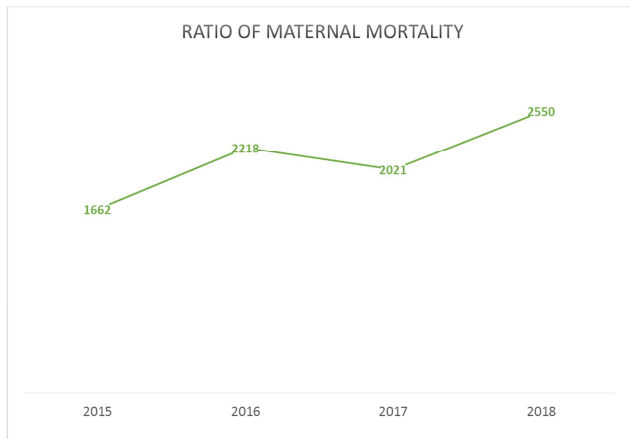


Figure 1. Evolution of maternal mortality ratio from 2015 to 2018.

### 3.1.3. Birth Rate of Lethality

From 1 January 2012 to 31 December 2015, we recorded a total of 412 maternal deaths out of 10,564 patients admitted for direct obstetric complications, for an obstetric lethality rate of 3.9%.

Table 2 presents the annual obstetric fatality rate from 2012 to 2015. There is an increase in the case-fatality rate from 2012 to 2015.

Table 2. Annual presentation of the obstetric lethality rate from 2015 to 2018.

Year	Death due to direct obstetric complications	Number of cases	Lethality rate (%)
2012	69	2905	2.3
2013	105	2818	3.7
2014	110	2396	4.6
2015	128	2445	5.2

The distribution of the specific lethality of the different direct obstetric complications is presented in Table 3. Only the lethality of the dystocia was less than 1%.

Table 3. Lethality rate for each of the direct obstetric complications.

Direct obstetric complications	Number of cases	Number of deaths	Lethality rate (%)
Hemorrhages	2555	138	5.4
Abortion complications	1297	99	7.6
Hypertensive disorders	2034	87	4.2
Infections	544	71	13
Thromboembolic disorders	11	3	27.27
dystocias	4123	14	0.3

## 3.2. Sociodemographic Characteristics

### 3.2.1. Age

The extreme ages were 12 and 47 years with an average age of  $27.6 \pm 6$  years. The 20-24 age group with 66 cases accounted for 21.4% of cases. More than half of the deceased women (190) were under 30 years of age or 61.9%.

### 3.2.2. Parity of Deceased Women

The highest parity observed was 7, with an average parity of  $2.1 \pm 2$ .

### 3.2.3. Socio-professional Status

The socio-professional status of women was clarified in 234 cases. There were 219 women without income-generating activities (housewives, pupils and students), or 93.6%.

### 3.2.4. Marital Status

Single deceased patients accounted for 26.7%, those leading a married life (concubines or married) accounted for 73.3%.

### 3.2.5. Pregnancy History

#### 1) Special history

Nineteen (19) deceased patients had positive HIV status, 21 or 26% were major sickle cell disease, 7 or 8.7% were known to have high blood pressure, 3 or 4% were known to have diabetes and 2 or 3.1 had known and monitored heart disease.

#### 2) Number of prenatal consultations (ANC)

The number of ANC performed ranged from 0 to 5 with an average of 1.28. Patients with at least 3 ANC accounted for 25.2%.

## 3.3. Clinical Aspects

### 3.3.1. Distance Travelled to Reach UTH-YO

The distance travelled to reach UTH-YO was specified in 249 cases. Deceased patients from a community more than 100 km away accounted for 23.5%. The average distance travelled was 62.2 km. The extremes ranged from 0 km to 225 km.

### 3.3.2. Diagnostics Selected

The main diagnoses selected have been grouped together in Table 4. Bleeding, including delivery period bleeding, postpartum bleeding, placental abruptio, uterine rupture and placenta previa, accounted for 29.7% of the diagnoses selected.

Table 4. Distribution of deceased patients by main diagnoses (n=346).

Main diagnoses	Number	Percentage
Pre-eclampsia/Eclampsia	72	20.8
Hemorrhage from the period of delivery	65	18.7
Abortion complications	58	16.8
Severe anemia	53	15.3
Infections	48	14
Postpartum hemorrhage	38	11
Others	12	3.4
Total	346	100

### 3.3.3. Period of Death

Table 5 shows the distribution of deceased women by period of death. Women who died in the postpartum period accounted for 43%.

Table 5. Distribution of deceased women by period of death (n=231).

Period of occurrence	Number	Percentage (%)
1 <sup>st</sup> trimester	17	7.4
2 <sup>nd</sup> trimester	42	18.3
3 <sup>rd</sup> trimester	72	31.3
Post-partum	99	43
Total	230	100

### 3.4. Therapeutic Aspects

#### 3.4.1. Time to Take Charge of an Intervention

Fifteen of the patients died (15) after being admitted to the emergency room for surgery. Extreme delays in obstetric care ranged from 20 to 180 minutes with an average of 108 minutes. Table 6 shows the distribution of deceased women by time of surgical management. Nine (60%) of the deceased patients received surgical management after more than an hour of waiting.

**Table 6.** Distribution of deceased women by time of surgical management (n=15).

Time Limit	Number	Percentage
0-10 mn	0	0
11-20 mn	2	13.3
21-30 mn	1	6.7
31-60 mn	3	20
More than 60 mn	9	60
Total	15	100

#### 3.4.2. Mode of Pregnancy Termination

Table 7 provides a breakdown of deceased patients by mode of pregnancy termination. The mode of termination of pregnancy could not be specified in 16 patients.

**Table 7.** Distribution by mode of termination of pregnancies of deceased patients (n=396).

Termination mode	Number	Percentage
Low track	212	53.6
Pregnancy not expelled	80	20.2
Caesarean section	12	3
Abortion	89	22.4
Laparotomy (Uterine rupture, ectopic pregnancy )	3	0.8
Total	396	100

**Table 8.** Distribution of maternal deaths by direct obstetric causes (n=412).

Direct obstetrical causes	Number	Percentage (%)
bleeding	138	33.5
1. Hemorrhage from the period of delivery	61	14.8
2. Postpartum hemorrhage	38	9.2
3. Uterine rupture	20	4.8
4. Placental abruptio	7	1.7
5. Hemorrhagic shock	6	1.6
6. Placenta previa	5	1.2
7. Coagulation disorder	1	0.2
Abortion complications	99	24
Hypertensive disorders	87	21.1
1. Eclampsia	83	20.1
2. Pre-eclampsia	3	0.8
3. HELLP syndrome	1	0.2
Infections	71	17.2
1. Septic shock	28	6.8
2. Septicaemia	26	6.3
3. Endometritis	11	2.7
4. Pelviperitonitis	6	1.4
Dysocias	14	3.4
Thromboembolic disorders	3	0.8
Total	412	100

### 3.5. Causes of Death

#### 1) Direct obstetrical causes

Direct obstetric causes accounted for 85.1% of maternal deaths and indirect causes for 14.9%.

Table 8 shows the distribution of women who died by direct obstetrical causes. Deaths following abortion complications represent 24% after haemorrhages which represented 33.5%.

#### 2) Indirect obstetrical causes

Table 9 shows the distribution of women who died by indirect obstetric causes.

**Table 9.** Distribution of maternal deaths by indirect obstetric causes (n=72).

Indirect obstetrical causes	Number	Percentage (%)
Chronic anemia	33	45.8
Malaria	14	19.4
Sickle cell disease	5	7
Hepatitis H	4	5.6
Meningitis	3	4.1
Cardiopathy	3	4.1
HIV/AIDS	2	2.8
Renal insufficiency	1	1.4
Others	7	9.8
Total	72	100

Other causes were: metabolic disorders, acute lung disease, acute intestinal obstruction, bleeding from perforated peptic ulcers and traffic accidents. The other causes are not due to pregnancy

#### 3) Factors contributing to maternal deaths before admission

Table 10 summarizes the factors contributing to maternal deaths before admission. The inadequacy of the technical platform was represented by the non-functional operating room, the lack of reagents in the laboratory, the closed blood bank and the lack or unavailability of specialists.

**Table 10.** Summary of factors contributing to maternal deaths before admission.

Contributing factors	Number	Percentage (%)
Delay in evacuation	119	32.7
Delay in consultation	112	30.8
Lack of financial resources	72	19.8
Insufficiency of the technical platform	61	16.7

#### 4) Factors contributing to maternal deaths after admission

Table 11 summarizes the factors contributing to maternal deaths after admission.

**Table 11.** Summary of factors contributing to maternal deaths after admission.

Contributing factors	Number	Percentage (%)
Delay in taking charge	97	31.4
Lack of transfusion products	84	27.2
Lack of financial resources	72	23.3
Late diagnosis	56	18.1

### 3.6. Length of Hospital Stay

The duration varies from a few minutes to 45 days. Table 12 summarizes the distribution of deceased patients by length of hospital stay.

**Table 12.** Distribution of deceased patients by length of hospitalization.

Length of hospital stay	Number	Percentage
≤24 hours	204	50.4
25-72 hours	77	19
96-144 hours	68	16.8
≥168 hours	56	13.8
Total	405	100

## 4. Discussion

### 4.1. Frequency

In our study, the number of maternal deaths gradually increased over the years 2012 to 2015, with in 2012 (98 deaths), 2013 (115 deaths), 2014 (121) and 2015 (150 deaths). Akpadza and al. [2] in Lomé on a study conducted from 1987 to 2007 noted a gradual increase in the number of deaths over the years. The maternal mortality ratio of 2109 deaths per 100,000 live births is high compared to some series:

- 1) 1933 per 100,000 live births in the Akpadza and al. [2] in Lomé.
- 2) 1245 per 100,000 live births in the Andria Mady and al. [3] in Antananarivo.
- 3) 604 per 100,000 live births in Takpara and al. [20] in Cotonou.
- 4) 30.4 per 100,000 live births in the Hamouda and al. [9] in Tunis.

The maternity ward at UTH-YO remains the last level of the health pyramid. The malfunction of some surgical antennas and the unavailability of transfusion products could explain our results.

During our study we found an obstetric lethality rate equal to 3.9%, about four (4) times higher than acceptable standards (1%). This obstetric mortality rate has gradually increased from 3.1% in 2012 to 4% in 2013, then 4.7% in 2014 and finally 5.2% in 2015 in the UTH-YO maternity ward.

Our results are lower than those of Soma N [18] which found a lethality rate of 5.79% in a study conducted from 2003 to 2005 at the Yalgado Ouédraogo University Hospital Centre.

This decrease in the case-fatality rate can be explained by progress and strengthening in the accessibility of Emergency Obstetric Care and the state's policy of subsidies to reduce care costs. Nevertheless, more needs to be done, as this rate is still high in accordance with the accepted threshold of 1% according to the WHO.

This still high rate could be explained by the socio-cultural gravity marked by a strong attachment to traditional practices with the use of traditional birth attendants who are often poorly qualified. On the other hand, it should be noted that women, especially those living in rural areas, have little decision-making power to attend health facilities. All these factors limit women's access to quality care, thus worsening the prognosis for obstetric complications. To this must be added the inadequacy of the technical platform and the non-functionality of some health centres from which they are very often referred very late.

In addition, our results are close to those of Gbangbade S and al. [6] in a 2006-2015 study conducted in Benin that found an obstetric lethality rate of 3.5%; and higher than those of Mbola Mbassi S and al. [19] in Cameroon in a study from 2004 to 2011 that noted a lethality rate of 2.2%.

In our study, the most lethal causes were: thromboembolic pathologies (27.27%), infections (13%), abortion complications (7.6%), bleeding (5.4%) and hypertensive disorders (4.2%).

Our results could be explained by the fact that thromboembolic pathology is a formidable complication in her breast which, once installed, reveals a poor prognosis in the majority of cases (80%). Also the high cost of treatment is also one of the factors that prevents effective management, hence the high case-fatality rate observed. As for infections, which often occur late, they are dominated by sepsis and septic shock, the prognosis of which is poor and the risk of death is 99% due to the lack of effective resuscitation methods. Abortions, very often performed in secret and under poor hygienic conditions, expose women to the risk of infection and bleeding; most of the time, patients are admitted in an already critical condition, which could explain this high lethality.

Bleeding and hypertensive disorders accounted for the highest number of cases of direct obstetric complications with respectively (2555 cases) and (2034 cases) but had the lowest case-fatality rates (5.4%) and (4.2%). This could be explained by improved management with the availability of blood derivatives, the use of antihypertensive and anticonvulsant drugs, and finally surgical management.

Our results are different from those of Soma N [18] which found the most lethal complications to be: puerperal infections (44.44%), anemia (17.95%), pre ruptures and uterine ruptures (10.57%), preeclampsia and eclampsia (6.02%).

### 4.2. Period of Maternal Deaths

Women who died in the postpartum period accounted for 43%. Our results are lower than those of Abdourhamane [1] in Bamako, who accounted for 64.6% of women who died in the postpartum period; and those of Akpadza and al. [2] in Lomé, which found 59.5%. According to WHO, about 45% of maternal deaths in the postpartum period occur within the first 24 hours, then 2/3 in the first few weeks. A similar finding has been reported by many authors [7, 8, 17, 19]. This finding could be explained by:

- 1) Inadequate postpartum surveillance
- 2) Difficulties in managing complications of childbirth in peripheral and urban maternity hospitals.
- 3) Difficulties in managing intensive care due to the poor condition of evacuated women
- 4) Non-compliance with asepsis rules.

In our series, more than half of maternal deaths, or 63.7% of women, died within the first 24 hours of admission.

Some authors have made the same observation:

- 1) Iloki and al. [10] in Brazzaville, found 57.3% of the women who died in the first few hours after admission.
- 2) Abdourhamane [1] in Bamako, found 71.1%.

3) Lankoandé and al. [11] in Ouagadougou, found 71.5%.

These figures reflect the extreme seriousness of the condition upon admission. The condition of women who died on admission is the result of three fatal delays for the mother and her newborn child. The time to death is also related to the cause. Indeed, the infection is slower to develop, while severe bleeding is quickly fatal before the patient is even evacuated.

#### 4.3. Causes of Maternal Deaths

Direct obstetric causes are the leading cause of maternal mortality in the world. They represent 85.1% of the causes of death in our series; 69% in Abdourhamane's series [1].

Among the direct causes, bleeding accounts for 33.5% and was the leading cause of death in our study, followed by abortion complications 24% and hypertensive disorders 21.1%, infections 17.2%. According to WHO, between 11% and 17% of hemorrhage deaths occur during childbirth and 50 to 71% during the postpartum period [16]. Abdourhamane [1] in a study conducted at the University Hospital of Bamako in 2008 found in variable proportions 25.3% of causes by haemorrhages; 17.1% by hypertensive disorders; 10% for infections; 7.6% for abortion complications

Leke [12] at Yaoundé Central Hospital in 2004 found 25% of the causes of death by hemorrhage; 15% by infection; 13% by abortion complications and 12% by hypertensive disorders. Iloki and al. [10] at Brazzaville University Hospital in 1997 found 40.5% of the causes of death from hemorrhage; 31.5% from infections; 23.7 from complications of abortion and 12.6% from hypertensive disorders.

Better coverage of the availability of blood and these derivatives would significantly reduce deaths from bleeding.

The high prevalence of infection (17.2%) could be explained by:

- 1) Poor hygiene in most parturient women
- 2) Weak asepsis in delivery rooms
- 3) Dystocic and/or induced childbirth.

Improving infection control in our clinical practices would significantly reduce the occurrence of infections in patients.

The morality rate related to complications of clandestine abortions (24%) could be explained by under-use of contraceptive methods, lack of sexual education for adolescent girls and very restrictive legal provisions on the voluntary termination of pregnancies. Our results are essentially identical to those of the 1999 Demographic Health Survey, which estimated that 22.1% of deaths are related to abortion complications [5] and would therefore reflect an improvement in contraceptive prevalence. Further reduction in deaths should guide policies towards improving health coverage to avoid unwanted pregnancies and complications of clandestine induced abortion.

Hypertensive disorders with 21.1% were favoured not only by the low socio-economic level of women, which would explain the absence or poor quality of prenatal care, but also by the delay in obstetric evacuation.

Improving the quality of ANC's with early detection of related danger signs would improve the prognosis for pregnancy-related hypertension.

Indirect obstetric causes accounted for 14.9% in our study.

Malaria is the second most frequent indirect cause. This is a reminder of the importance of anti-malarial chemoprophylaxis, the use of treated mosquito nets and proper management of malaria cases during pregnancy in our endemic context.

Pregnancy in sickle cell disease is possible but must be planned because it is at risk. The latter can be a risk factor for severe maternal and fetal complications even when appropriate preventive measures are used. Complications are frequent at the end of pregnancy, and are aggravated by the existence of an associated pathology. The management of these patients must be multidisciplinary.

#### 4.4. Contributing Factors to Maternal Deaths

Factors contributing to maternal deaths were mainly delay in evacuation, delay in consultation, delay in care, lack of transfusion products, lack of financial resources. Financial problems were identified in 23.3% of cases among the associated factors. The results are significantly lower than those of Bohoussou and al. [4] who estimated that in 42% of cases, the financial responsibility of the woman and her family is involved in the delay in care. This difference could be explained by the implementation of the emergency obstetric care in second and third level hospitals, which have a positive impact on this contributing factor. The lack of transfusion products has been identified in 27.2% of cases and often makes it impossible to provide adequate treatment for certain diseases, so that health personnel are powerless to assist in the tragedy at hand. Leké [12] in a study conducted by Yaoundé Central Hospital found 7.69% of the factors associated with the lack of blood products.

The notion of the three delays was rediscovered for the:

- 1) First delay, which is the delay in consultation of 30.8% and could be explained by the persistence of harmful socio-cultural constraints, misperception of risks and lack of awareness of danger signs.
- 2) second delay which is the delay in evacuation 32.7% and would result from the geographical inaccessibility of health services, insufficient financial means to pay for transport costs, insufficient adequate means of transport sometimes non-existent.
- 3) third delay which is the delay in treatment 31.4% and could be explained by the insufficiency of the technical platform, the lack of transfusion products, the insufficiency of competent personnel in emergency obstetric care at all levels of the system

In our series, 60% of patients received surgical management after more than an hour of waiting. For Bohoussou and al. [4], this delay ranged from 5 hours to 10 hours 27 minutes, Soma N [18] in the same department noted that 48.9% of women who had to undergo surgery had to wait more than one hour.

Indeed, this long wait is due to:

- 1) the inadequacy and availability of the operating room
- 2) Insufficient human resources
- 3) The lack of care materials (cesarean section kits often

incomplete or out of stock).

## 5. Conclusion

Based on our results, it appears that direct obstetric complications remain the main causes of death among women in labour. The main direct obstetric complications implicated were: haemorrhages, abortion complications, hypertensive disorders, infections, dystocias and thromboembolic pathologies. Overall lethality during the study period was 4 times higher than the desired standards (1%). This study also allowed us to identify multiple difficulties encountered in the health system of our country. It is therefore imperative for us, health actors and the community to work to strengthen our efforts to eradicate this scourge, which can only be solved through participation and collective effort.

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