

## Audit of Maternal Deaths in N'Djamena Mother and Child University Hospital (NMCUH)

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### ABSTRACT

**Introduction:** Maternal mortality remains a major public health problem in Africa and in Chad in particular. This study aims to contribute to the reduction of maternal deaths in N'Djamena Mother and Child University hospital (NMCUH).

**Patients and Methods:** This was a retrospective, descriptive and analytical study lasting 18 months from January 2021 to June 2022. All patients who died during pregnancy, delivery, postabortion or postpartum were included. The variables studied were epidemiological, clinical and therapeutic. The data collected were analysed using SPSS 18.0 software. The Chi<sup>2</sup> test was used to compare two variables with a significant threshold  $p$  value  $< 0.05$ .

**Results:** We collected 124 deaths out of 14996 admissions, a frequency of 0.82%. These deaths mainly affected women aged 30-34 years, grand multiparous (79%), married (95.2%), not followed up (58.9%), referred (59.7%). The causes of death were dominated by hemorrhage (42.7%), infection (31.5%) and malaria (55.6%). Deaths were recorded within 24 hours of admission (54.8%) and postpartum (66.1%). The first delay (67.7%), and the delay in consenting to surgery (55.3%) were more common

**Conclusion:** The frequency of maternal deaths remains high at the NMCUH. Enormous efforts remain to be made by acting on the different factors in order to reduce maternal mortality.

### Keywords

Audit, Maternal death, NMCUH, N'Djamena.

### Introduction

Maternal death is "the death of a woman during pregnancy or within 42 days of its termination, regardless of duration or location, from any cause determined or aggravated by the pregnancy or its care but neither accidental nor incidental"[1].

Worldwide, nearly 300,000 women die each year as a result of pregnancy, childbirth or the postpartum period. About 99% of these deaths occur in Africa [2]. The Global Maternal Mortality Ratio in 2017 is estimated to be 211 deaths per 100,000 living

births (LB)[3].

In North America, the maternal mortality rate is 18/100,000 NV. The maternal death rate is 157/100,000 NV in South Asia and 10/100,000 NV in Europe. This rate is 542/100,000 LB in Sub-Saharan Africa [3].

In Chad, according to the 2015 Demographic Health Surveys and Multiple Indicators (DHS-MICS), the maternal mortality ratio was 860/100,000 LB [4].

The main causes of maternal deaths are known and more than 80% of these deaths could be prevented or avoided by actions that have

already proven to be effective and affordable even in the poorest countries of the world [5]. However, in Chad, few studies have been conducted to elucidate the factors that contribute to maternal mortality. It is with this in mind that we conducted this study to determine the risk factors for maternal mortality in Chad.

## Patients and Method

This was a retrospective analytical and descriptive study of 18 months duration, from January 1<sup>st</sup>, 2021 to June 30, 2022, on the analysis of maternal deaths at the University Hospital of Mother and Child of N'Djamena. The study focused on the records of women who died during pregnancy, delivery, post abortum or post-partum in the gynecology-obstetrics department of the NMCUH. The variables studied were: epidemiological, clinical and therapeutic. The data were entered using Word and Excel 2016 software and analyzed using SPSS version 18.0. Statistical analysis was performed using the Chi-square test (Chi<sup>2</sup>) with a significant threshold p less than 0.05.

## Results

### Frequency

During the study period, the gyneco-obstetric emergency department and the maternity hospital recorded 16,829 incoming patients, all pathologies included, of which 14,996 met the inclusion criteria. Among them, we recorded 124 deaths for 8093 live births, i.e., a frequency of 0.82% with a ratio of 1532 per 100,000 live births.

### Age

**Table 1:** Distribution by age group.

Age group	n	%
<15	1	0.8
15-19	20	16.1
20-24	24	19.4
25-29	21	16.9
<b>30-34</b>	<b>36</b>	<b>29</b>
35-39	18	14.5
>39	4	3.2
<b>Total</b>	<b>124</b>	<b>100,0</b>

The age group between 30 and 34 years was the most represented, 29%. The average age was 27.5 years, with extremes ranging from 14 to 40 years.

### Origin

Three fifths of the patients were from the urban area (59.7%). Referred patients represented 59.7%.

### Parity

Large multiparous women represented 28.2% (n=35) followed by nulliparous and multiparous women with respectively 18.5% (n=25) and 16.9% (n=21)

### Antenatal cares

Nearly 3/5 of the patients had not had any contact. More than 1/4 had (n=32) had between 1 and 3 contacts.

## Reason for admission

**Table 2:** Distribution according to the reason for admission or referral.

Admission reason	n	%
Severe anemia	8	6.5
<b>Hémorragy</b>	<b>28</b>	<b>22.6</b>
Coma	6	4.8
Dystocia	12	9.7
Eclampsia	16	12.9
Convulsions	15	12.1
Headache	3	2.4
Infection	15	12.1
Palpitation	4	3.2
Delivery	11	8.9
Dyspnea	4	3.2
Agitation	2	1.6
<b>Total</b>	<b>124</b>	<b>100,0</b>

Hemorrhage was the most noted reason for admission with 22.6%. Time from onset of symptoms to consultation

**Table 3:** Distribution according to the time between the onset of symptoms and the consultation.

Duration (h)	n	%
< 24	8	6.5
24 to 48	23	18.5
48 to 72	40	32.3
> 72	53	42.7
<b>Total</b>	<b>124</b>	<b>100,0</b>

Four out of 10 patients were admitted 72 hours after the onset of symptoms

### Route of delivery

More than 1/3 of the patients had been delivered by the vaginal route.

## Diagnosis of entry

### Direct causes

**Table 4:** Distribution according to direct causes.

Cause	n	%
<b>Hemorrhage</b>	<b>53</b>	<b>42.7</b>
Uterine rupture	15	12.1
Clos disorder	5	4,0
Abruptio placenta	9	7.3
Praevia placenta	2	1.6
<b>Post partum Hemorrhage</b>	<b>17</b>	<b>13.7</b>
HPPL	1	0.8
post-abortum Hemorrhage	4	3.2
<b>Hypertension</b>	<b>27</b>	<b>21.8</b>
Prééclampsia	11	8.9
Eclampsia	16	12.9
<b>Infections</b>	<b>39</b>	<b>31.5</b>
Endométritis	18	14.5
Chorioamnionite	12	9.7
Septic abortion	1	0.8
Septicémie	8	6.4
<b>Dystocia</b>	<b>5</b>	<b>4,0</b>
Mecanic	4	3.2
Dynamic	1	0.8
<b>Total</b>	<b>124</b>	<b>100,0</b>

Direct causes were dominated by hemorrhage with 42.7%.

## Management

The majority of patients had received medical management (69.4%).

Delays in management and others

- 1st : delay in decision making by the family: n=84 (67.7%)
- 2nd: delay in access to health facilities: n=14 (11.3%)
- 3rd: delay in access to care: n=26 (21%)

## Consent for surgery

More than half (55.3%) of the parents did not consent in time.

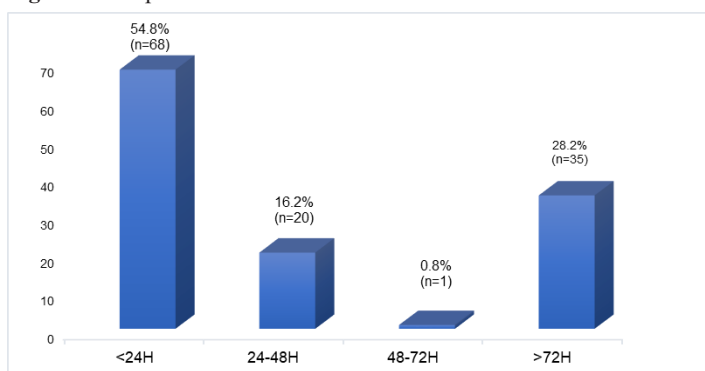
## Time of Death

Deaths occurred mostly postpartum (66.1%), with antepartum and postabortion deaths accounting for 31.5% (n=39) and 2.4% (n=3) respectively.

## Duration of Hospitalization

Deaths were recorded within 24 hours of hospitalization with a rate of 54.8%.

Figure 1: Hospitalization duration.



## Age and Gravida

Table 5: Distribution according to age and gravida.

Age	Gravida				Total	p
	Primigravida	Paucigravida	Multigravida	Grand multigravida		
<15	1	0	0	0	1	0.000
15-19	14	1	2	3	20	0.000
20-24	9	6	4	5	24	0.048
25-29	1	5	5	10	21	0.000
30-34	6	7	10	13	36	0.225
35-39	1	2	4	11	18	0.000
>39	0	0	0	4	4	0.000
<b>Total</b>	<b>32</b>	<b>21</b>	<b>25</b>	<b>46</b>	<b>124</b>	

Age over 35 is highly significant for grand multigravida (p=0.000)

## Delay and Origin

Table 6: Distribution according to delay and origin.

delay	Origine			p
	urban	rural	Total	
first	51	33	84	0.657
2nd	4	10	14	0.0013
3rd	19	7	26	0.034
<b>Total</b>	<b>74</b>	<b>50</b>	<b>124</b>	

The 3rd delay is significant for women from the urban area (p=0.034). While the 2nd delay is highly significant for rural women (p=0.0013)

## Discussion

The frequency of maternal death in this study was 0.82% with a ratio of 1532 per 100,000 living births. This result is higher than those of Foumsou et al. in 2018 in N'Djamena, Chad [5], Djongali et al. in 2017 in N'Djamena, Chad [6] and Thiam et al. in 2017 in Thiès, Senegal [7] who reported a ratio between 653 and 840.8 per 100000 living births. It is lower than that of Baldé et al. in 2020 in Guinea [8], which records 1962 per 100000 living births. This difference can be explained by the status of the NMCUH, which is the reference hospital for reproductive health in Chad. Because of its status, this facility receives obstetrical complications from the country's hospitals and health care facilities. This influx of patients with severe morbidities justifies this high rate of maternal death.

Concerning the age of the patients, the age group between 30 and 34 years was the most affected, that is 29%. The average age was 27.5 years with extremes ranging from 14 to 40 years. This result is superimposed on those of Foumsou et al. in 2018 in N'Djamena, Chad [5] and Gueye et al. in 2020 in Zinguinchor, Senegal [1] who reported 25.8 and 28.09 years respectively.

From the point of view of the area of origin, most of the deceased patients came from an urban area (59.7%). This would reflect the strong agglomeration in the major centers.

In terms of parity, large multiparous women were in the majority (28.2%). This result is lower than that of Baldé et al. in 2020 in Labé, Guinea [8], who found 87.47% of large multiparous women, but contrary to those of Gueye et al. in 2020 in Senegal [1] and Diallo F et al. in 2022. In Abidjan, Côte d'Ivoire [9], which found 57.8% of primiparous and 65.8% of nulliparous women.

Regarding the prenatal cares, 58.9% of patients had not had any prenatal cares. This result is similar to that of Atade et al. in 2021 in Tanguieta, Benin [10], who obtained 55.9%, but higher than that of Gueye et al. in 2020 in Zinguinchor, Senegal [1], who found 16.7%. These data reveal that there are still many problems concerning awareness of the value of prenatal monitoring and understanding of warning signs during pregnancy. Even if prenatal consultation does not allow for the prevention of all risks, well done ANC allows for the identification of women with major histories for their timely referral to a referral facility.

As for the mode of admission, referrals were the most common in 59.7% of cases. This rate is lower than those of Atade et al. in 2021 in Tanguieta, Benin [10] and Diassana et al. in 2020 in Kayes, Mali [11] who reported 64% and 70% respectively. This rate could be explained by the lack of qualified personnel in the peripheral structures and by the fact that late referral is a significant risk factor for maternal mortality. From the point of view of the reason for admission or referral, hemorrhage was the most common reason for admission (22.6%).

The majority of patients were admitted 72 hours after the onset of symptoms (42.7%). This can be explained by the fact that there was a delay in seeking care due to a lack of knowledge of the danger signs and a lack of resources.

As for the delivery route, 36.3% of the patients had given birth by vaginal delivery. This result corroborates that of Thiam et al. in 2017 in Thiès, Senegal [7], who obtained 36.8%, but is lower than that of Diallo F et al. in 2022 in Abidjan, Côte d'Ivoire [9], who reported 78.4% in their series. Parturient women and their parents are much more likely to request vaginal delivery despite the indication of an emergency cesarean section to prevent or compensate for complications of vaginal delivery.

Direct causes were dominated by hemorrhage in 42.7% of cases. This rate is similar to that of Fousou L et al. in 2018 in N'Djamena, Chad [5] who found 40.9%. However, it is higher than that of Alkassoum et al. in 2018 in Maradi, Niger [12], who reported 25.5%, but lower than that of Gueye et al. in 2020 in Ziguinchor, Senegal [1], who found 55.5%. This would translate into the fact that hemorrhage is an emergency that requires immediate and appropriate intervention. It often requires coordinated actions for early, methodical and appropriate management, and therefore an efficient and permanent organization of the health system. This implies immediately accessible material resources, available blood products, and competent and dynamic personnel, as any delay or improvisation could contribute to a worsening of the maternal prognosis. From the point of view of management, 69.4% of patients had received medical management. This result could be justified by the parents' fear of surgery and their hesitation in deciding to consent to surgery.

Deaths were recorded within 24 hours of hospitalization with a rate of 54.8%. This rate corroborates those of Atade et al. in 2021 in Benin [10] and Diallo F et al. in 2022 in Abidjan, Côte d'Ivoire [9] who obtained respectively 54.9% and 52.6%. This rate can be explained by the fact that patients who were received with a delay in the facility died of direct obstetrical causes, thus posing the problem of the management of parturition in this series, as reported in the literature in most developing countries [7,13,14].

Considering the delay in management, the first delay dominated our series, i.e. 67.7%. This result is contrary to those of Baldé et al. in 2020 in Labé, Guinea [8] and Atade et al. in 2021 in Benin [10] who found the 3rd delay in respectively 79.4% and 33.3%. This could be justified by the delay between the onset of the symptomatology and the consultation of the deceased, which was at least 3 days after the onset of the symptomatology.

Among the patients requiring surgery, 55.3% of the parents had not consented in time. This would reflect the fact that the population is less educated and that surgery is still considered inevitable in our context.

During this study, the postpartum period was the source of death with a rate of 66.1%. This finding is superimposed on that of

Thiam in 2017 in Senegal [ ] who detect 70%. The age above 35 is very significant for grand multigravida ( $p=0.000$ ). The 3rd delay is significant for women from the urban area ( $p=0.034$ ). While the 2nd delay is highly significant for rural women ( $p=0.0013$ ). This result can be explained by the fact that in our context, patients consult most of the time late and some parents delay making decisions despite the extreme urgency of the situation and that the second delay is related to the difficulty of access to care for rural women.

## Conclusion

Maternal death is an unacceptable social injustice in the world. It remains a real public health problem in developing countries and in Chad in particular. The frequency of maternal mortality is still very high at the CHU-ME despite the efforts made.

In our series, the patients who died were young, married, multiparous and referred. The main etiologies of maternal deaths are known. These are hemorrhage, infection, and hypertension and its complications.

Among the indirect causes incriminated, malaria is the most represented.

In order to reduce the frequency of maternal mortality, it is essential to raise awareness among the population in general and pregnant women in particular about the danger signs. Good quality ANC practices and improved access to care are essential.

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