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Frequency, causes, and factors of maternal mortality in the City of Bunia, North East of the Democratic Republic of the Congo

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ABSTRACT

Introduction

Mortality among pregnant women is a significant public health issue. Every day, approximately 830 women die worldwide due to complications during pregnancy or childbirth.

Objective

This retrospective descriptive study aims to determine the frequency, causes, and associated factors of maternal mortality in the health zone of Bunia in Ituri province.

Materials and Methods

This study employed the documentary method to examine various records, such as delivery registers, laboratory registers, and partographs of women who consulted the health facilities in the Bunia health zone for delivery during a specific period. The sample consisted of 61 maternal death records selected through multi-stage sampling from a total of 54,330 cases in the Bunia health zone, covering the period from January 1st, 2021 to August 31st, 2024. Data were encoded and analyzed using SPSS version 20, with the Chi-square test.

Results

The results show that the frequency of maternal deaths in the health zone was 0.11%. Hemorrhage was the leading cause of maternal death in the Bunia health zone, accounting for 45.95%. Delays in seeking medical care were the most significant factor associated with maternal deaths, representing 22.95%. Insufficient technical facilities were the most significant structural factor, representing 50.82%. Delays in care were the primary factor linked to midwives, at 67.21%.

Conclusion

In light of these results, it is essential to implement new contextual strategies to help combat and reduce maternal mortality rates.

INTRODUCTION

Maternal death is a significant public health issue. Approximately 830 women die worldwide every day due to complications during pregnancy or childbirth. In 2015, 303,000 women lost their lives during or after pregnancy or childbirth, with most of these deaths occurring in low-income countries, though some could be prevented (World Health Organization [WHO], 2022).

The maternal death rate varies between countries. For example, in France, the United States, China, and Australia, the rates are 8/100,000 live births (LB), 14/100,000 LB, 27/100,000 LB, and 6/100,000 LB, respectively (WHO, 2022). Maternal mortality in Africa accounts for 57% of global maternal deaths, with sub-Saharan Africa having the highest rate in the world, at 542 per 100,000 live births (Yaya et al., 2017).

All deaths of pregnant women during childbirth have serious consequences for the family. Therefore, every woman has the right to access appropriate and quality obstetric care during pregnancy, childbirth, and the postpartum period (Diallo, 2014). When a problem is identified, its consequences can often be avoided. Maternal mortality is attributed to both direct and indirect causes. Direct causes account for 80% of maternal deaths and include hemorrhage, infections, complications from high blood pressure, obstructed labor, and clandestine abortions, while indirect causes, often due to pre-existing diseases, account for 20% (Traoré, 2014).

Maternal mortality is not solely caused by medical factors; social factors, which are often preventable, also play a role. A well-established framework identifies three specific delays that contribute to the problem: delays in seeking care, delays in accessing care, and delays in receiving care (Hynes & Sakani, 2013).

Success in reducing maternal mortality is closely linked to the quality of mother-child care, a practice that remains a challenge for low- and middle-income countries. Quality interventions, such as care provided by qualified personnel, are essential in reducing maternal and neonatal mortality (Hatem et al., 2018).

Investigating maternal deaths through methods such as maternal death audits (MDAs) is crucial in understanding the causes and factors. However, MDAs are often poorly perceived by healthcare providers, leading to low adherence and participation in identifying the frequency, causes, and factors associated with maternal mortality (Ouédraogo, 2014).

The Democratic Republic of the Congo (DRC) is one of the Sub-Saharan African countries where maternal deaths remain a significant burden. It is one of the eighteen countries with a high maternal mortality rate, which was 693 per 100,000 live births in 2015 (WHO, 2022). In North Kivu province, determining the responsibility for maternal deaths is challenging, as this mortality is multifactorial. A study noted a slight decrease in the maternal mortality rate in the city of Butembo, where it stands at 146.4/100,000 live births. In this context, the responsibility lies with medical staff, the family, the victim herself, and the public authorities (Philémon et al., 2018).

Despite being a natural and life-giving process, pregnancy and childbirth carry significant risks, sometimes exacerbated by the physiological and environmental factors affecting the pregnant woman. This is especially true in Eastern DRC, in Ituri province, particularly in the city of Bunia. Pregnant women in Bunia face psychological distress due to insecurity caused by armed groups, leading to mass displacement. This situation has plunged Bunia into a humanitarian crisis, with maternal death remaining a priority issue for local authorities and healthcare providers. In addition, factors such as low literacy levels, unemployment, and poverty hinder access to quality care for this vulnerable population. This study is therefore initiated to investigate the frequency, causes, and factors associated with maternal deaths in the health structures of the Bunia health zone in Ituri province, with the goal of developing a new prevention strategy.

METHODS

This study was conducted in the health facilities of the city of Bunia, within the Urban Health Zone of Bunia, in the Commune of Shari, located in Ituri Province, in the northeastern region of the Democratic Republic of Congo. The study was carried out from June 1 to August 31, 2024, spanning a duration of three months. It is a retrospective, descriptive study.

For this study, we used a documentary research method on a sample of 54,330 women who gave birth between January 1, 2022, and August 31, 2024. The final sample consisted of 61 deceased women, selected through multi-stage sampling. This approach was chosen because the study specifically focused on maternal deaths, defined according to established criteria. Initially, three municipalities within the health zone of Bunia were identified. Subsequently, health facilities that had reported

cases of maternal death were selected. Finally, the medical records of pregnant women who died in these health structures were retrieved.

The study included any pregnant woman who died despite receiving consultation and care, and whose file was available in the health facilities of the city of Bunia. The independent variables considered in the study were: age, marital status (single or married), parity, occupation, and residence (within or outside the health zone). The study focused on the frequency of maternal deaths and the factors related to the mother, the health system, and midwives, as well as the causes of maternal deaths.

Data entry and processing were performed using SPSS version 20.0, and statistical analysis was carried out using Chi-square (χ^2) tests.

RESULTS

Table 1:
Frequency of Maternal Mortality in Health Facilities in the City of Bunia

Variables	Terms and conditions	N	Case	%	no case	%
AGE	15-19 years old	7811	3	0.04	7808	99.96
	20-24 years old	15100	9	0.06	15091	99.94
	25-29 years old	13469	16	0.12	13453	99.88
	30-34 years old	7802	12	0.15	7790	99.85
	35-39 years old	5358	16	0.30	5342	99.70
	40-44 years old	2933	4	0.14	2929	99.86
	45-49 years old	1857	1	0.05	1856	99.95
OCCUPATION	Housewife	39430	49	0.12	39381	99.88
	Student	3802	4	0.11	3798	99.89
	Official	11098	8	0.07	11090	99.93
RESIDENCE	HZS	5828	13	0.22	5815	99.78
	ZS	48502	48	0.10	48454	99.90
MARITAL STATUS	Bride	52345	50	0.10	52295	99.90
	Bachelor	1985	11	0.55	1974	99.45
PARITY	1 to 3	22742	29	0.13	22713	99.87
	4 to 6	25809	26	0.10	25783	99.90
	7 to 9	5779	6	0.10	5773	99.90
Total		**54330**	**61**	0.11	**54269**	99.89

Legend: HZS = Outside Health Zone

The frequency of maternal mortality in the health facilities of the Bunia health zone is 0.11%. The most affected age group is 35-39 years (0.30%), followed by housewives (0.12%) and women coming from outside the health zone (HZS) (0.22%). Most of the affected women are single (0.55%), with parity ranging from 1 to 3 children (0.13%) **(Table 1)**.

The most common cause of maternal death was postpartum hemorrhage, accounting for 45.90%, followed by uterine rupture (24.59%), eclampsia (11.90%), and placenta previa (3.28%). This pattern was observed in 100.00% of women aged 45 to 49 years, 50.00% of pupils and students, 52.08% of women from the ZS (health zone), and 50.00% of married women, with parity ranging from 1 to 4 children. The p-values for occupation and marital status were >0.05, while for age, residence, and parity, the p-values were <0.05 **(Table 2)**.

The analysis shows that the most commonly observed factor contributing to maternal death was delayed consultation, accounting for 32.79%, followed by too many pregnancies (22.95%), pregnancies that were too close together, and pregnancies occurring at too early an age (13.11%) with a p-value of >0.05. This trend was more frequently observed among those aged 40-44 years (25%), housewives (34.69%), women from outside the health zone (38.46%), and married women (34%) **(Table 3)**.

The lack of technical capacity within health facilities was the most important structural factor, representing 50.82%, compared to 49.18% for delayed referrals, with a p-value of >0.05. This trend was more prominent among respondents aged 40-44 years (75%), housewives (51.02%), and women from the ZS (52.08%) **(Table 4)**.

The delay in care by midwives accounted for 67.21%, compared to 19.67% for non-recognition of danger signs (p>0.05). This trend was most noticeable among respondents aged 45-49 years (100%), pupils and students (75%), women from outside the health zone (84.62%), married women (70%), and women with parity ranging from 1 to 3 children (72.41%) **(Table 5)**.

Table 2:
Causes of Maternal Mortality in Health Facilities in the City of Bunia

		N	Eclampsia		Hemorrhage		Uterine rupture		Placenta previa		Retro placental hematoma		Anemia		Clandestine abortion		Others, to be specified					
Variables	**Modalités**		**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Chi2 cal**	**Chi2 Obs**	**ddl**	**p=.05**
	15-19 years old	3	0	0,00	1	33,33	0	0,00	0	0,00	0	0,00	0	0,00	2	66,67	0	0,00				
	20-24 years old	9	2	22,22	5	55,56	0	0,00	0	0,00	0	0,00	0	0,00	2	22,22	0	0,00				
	25-29 years old	16	1	6,25	6	37,50	6	37,50	1	6,25	0	0,00	1	6,25	1	6,25	0	0,00				
AGE	30-34 years old	12	3	25,00	3	25,00	4	33,33	0	0,00	1	8,33	0	0,00	1	8,33	0	0,00				
	35-39 years old	16	1	6,25	10	62,50	4	25,00	0	0,00	0	0,00	0	0,00	0	0,00	1	6,25				
	40-44 years old	4	0	0,00	2	50,00	1	25,00	1	25,00	0	0,00	0	0,00	0	0,00	0	0,00				
	45-49 years old	1	0	0,00	1	100,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00				
Total		**61**	**7**	**11,48**	**28**	**45,90**	**15**	**24,59**	**2**	**3,28**	**1**	**1,64**	**1**	**1,64**	**6**	**9,84**	**1**	**1,64**	**43,23**		**42**	**S**
	Housewife	49	5	10,20	24	48,98	13	26,53	2	4,08	0	0,00	1	2,04	4	8,16	0	0,00				
PROFESSION	Student	4	0	0,00	2	50,00	1	25,00	0	0,00	0	0,00	0	0,00	1	25,00	0	0,00				
	Official	8	2	25,00	2	25,00	1	12,50	0	0,00	1	12,50	0	0,00	1	12,50	1	12,50				
Total		**61**	**7**	**11,48**	**28**	**45,90**	**15**	**24,59**	**2**	**3,28**	**1**	**1,64**	**1**	**1,64**	**6**	**9,84**	**1**	**1,64**	**18,34**	**23,68**	**14**	**NS**
RESIDENCE	HZS	13	3	23,08	3	23,08	2	15,38	0	0,00	0	0,00	0	0,00	5	38,46	0	0,00				
	ZS	48	4	8,33	25	52,08	13	27,08	2	4,17	1	2,08	1	2,08	1	2,08	1	2,08				
Total		**61**	**7**	**11,48**	**28**	**45,90**	**15**	**24,59**	**2**	**3,28**	**1**	**1,64**	**1**	**1,64**	**6**	**9,84**	**1**	**1,64**	**19,49**	**14,06**	**7**	**S**
MARITAL STATUS	Bride	50	6	12,00	25	50,00	12	24,00	2	4,00	0	0,00	1	2,00	3	6,00	1	2,00				
	Bachelor	11	1	9,09	3	27,27	3	27,27	0	0,00	1	9,09	0	0,00	3	27,27	0	0,00				
Total		**61**	**7**	**11,48**	**28**	**45,90**	**15**	**24,59**	**2**	**3,28**	**1**	**1,64**	**1**	**1,64**	**6**	**9,84**	**1**	**1,64**	**10,69**	**14,06**	**7**	**NS**
	1-3	29	5	17,24	12	41,38	4	13,79	1	3,45	0	0,00	1	3,45	6	20,69	0	0,00				
PARITY	4-6	26	2	7,69	13	50,00	10	38,46	0	0,00	1	3,85	0	0,00	0	0,00	0	0,00				
	7-9	6	0	0,00	3	50,00	1	16,67	1	16,67	0	0,00	0	0,00	0	0,00	1	16,67				
Total		**61**	**7**	**11,48**	**28**	**45,90**	**15**	**24,59**	**2**	**3,28**	**1**	**1,64**	**1**	**1,64**	**6**	**9,84**	**1**	**1,64**	**28,03**	**23,68**	**14**	**S**

Legend: ZS = Health Zone

Table 3:
Factors of Contributing to Maternal Mortality in Health Facilities in the City of Bunia

		N	Pregnancy too closer		Pregnancy too early		Too many pregnancies		Pregnancy too late		Deadline for consultation		Deadline to surrender					
Variables	**Modalités**		**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Eff**	**%**	**Chi2 cal**	**Chi2 Obs**	**Ddl**	**p=.05**
	15-19 years old	3	1	33,33	2	66,67	0	0,00	0	0,00	0	0,00	0	0,00				
	20-24 years old	9	2	22,22	1	11,11	0	0,00	0	0,00	4	44,44	2	22,22				
	25-29 years old	16	4	25,00	3	18,75	2	12,50	0	0,00	4	25,00	3	18,75				
AGE	30-34 years old	12	0	0,00	2	16,67	3	25,00	1	8,33	5	41,67	1	8,33				
	35-39 years old	16	1	6,25	0	0,00	6	37,50	2	12,50	6	37,50	1	6,25				
	40-44 years old	4	0	0,00	0	0,00	2	50,00	0	0,00	1	25,00	1	25,00				
	45-49 years old	1	0	0,00	0	0,00	1	100,00	0	0,00	0	0,00	0	0,00				
Total		**61**	**8**	**13,11**	**8**	**13,11**	**14**	**22,95**	**3**	**4,92**	**20**	**32,79**	**8**	**13,11**	**33,67**	**43,77**	**30**	**NS**
	Housewife	49	6	12,24	5	10,20	13	26,53	2	4,08	17	34,69	6	12,24				
PROFESSION	Student	4	2	50,00	1	25,00	0	0,00	0	0,00	1	25,00	0	0,00				
	Official	8	0	0,00	2	25,00	1	12,50	1	12,50	2	25,00	2	25,00				
Total		**61**	**8**	**13,11**	**8**	**13,11**	**14**	**22,95**	**3**	**4,92**	**20**	**32,79**	**8**	**13,11**	**11,3**	**18,30**	**10**	**NS**
RESIDENCE	HZS	13	2	15,38	4	30,77	0	0,00	1	7,69	5	38,46	1	7,69				
	ZS	48	6	12,50	4	8,33	14	29,17	2	4,17	15	31,25	7	14,58				
Total		**61**	**8**	**13,11**	**8**	**13,11**	**14**	**22,95**	**3**	**4,92**	**20**	**32,79**	**8**	**13,11**	**8,86**	**11,07**	**5**	**NS**
MARITAL STATUS	Bride	50	6	12,00	4	8,00	13	26,00	3	6,00	17	34,00	7	14,00				
	Bachelor	11	2	18,18	4	36,36	1	9,09	0	0,00	3	27,27	1	9,09				
Total		**61**	**8**	**13,11**	**8**	**13,11**	**14**	**22,95**	**3**	**4,92**	**20**	**32,79**	**8**	**13,11**	**7,86**	**11,07**	**5**	**NS**
	1-3	29	6	20,69	4	13,79	2	6,90	2	6,90	9	31,03	6	20,69				
PARITY	4-6	26	2	7,69	4	15,38	9	34,62	0	0,00	9	34,62	2	7,69	qu			
	7-9	6	0	0,00	0	0,00	3	50,00	1	16,67	2	33,33	0	0,00				
Total		**61**	**8**	**13,11**	**8**	**13,11**	**14**	**22,95**	**3**	**4,92**	**20**	**32,79**	**8**	**13,11**	**16,13**	**18,30**	**10**	**NS**

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Table 4:
Factors Related to Structures in Health Facilities in the City of Bunia

Variables	Terms and conditions	N	Late reference		Insufficient technical platform		Chi2 cal	Chi2 Obs	Ddl	p=.05
			Eff	%	Eff	%				
AGE	15-19 years old	3	1	33.33	2	66.67				
	20-24 years old	9	6	66.67	3	33.33				
	25-29 years old	16	7	43.75	9	56.25				
	30-34 years old	12	6	50.00	6	50.00				
	35-39 years old	16	8	50.00	8	50.00				
	40-44 years old	4	1	25.00	3	75.00				
	45-49 years old	1	1	100.00	0	0.00				
Total		**61**	**30**	**9, 18**	**31**	**50.82**	**3.56**	**12.59**	**6**	**NS**
OCCUPATION	Housewife	49	24	48.98	25	51.02				
	Student	4	2	50.00	2	50.00				
	Official	8	4	50.00	4	50.00				
Total		**61**	**30**	**49.18**	**31**	**50.82**	**0**	**5.99**	**2**	**NS**
RESIDENCE	HZS	13	7	53.85	6	46.15				
	ZS	48	23	47.92	25	52.08				
Total		**61**	**30**	**49.18**	**31**	**50.82**	**0.14**	**3.84**	**1**	**NS**
MARITAL STATUS	Bride	50	26	52.00	24	48.00				
	Bachelor	11	4	36.36	7	63.64				
Total		**61**	**30**	**49.18**	**31**	**50.82**	**0.88**	**3.84**	**1**	**NS**
PARITY	1-3	29	16	55.17	13	44.83				
	4-6	26	12	46.15	14	53.85				
	7-9	6	2	33.33	4	66.67				
Total		**61**	**30**	**49.18**	**31**	**50.82**	**1.11**	**5.99**	**2**	**NS**

Table 5:
Factors Related to Midwives in Health Facilities in the City of Bunia

Variables	Terms and conditions	N	Failure to recognize danger signs		Delay in support		Insufficient staff		Chi2 cal	Chi2 Obs	ddl	p=.05
			Eff	%	Eff	%	Eff	%				
AGE	15-19 years old	3	1	33.33	2	66.67	0	0.00				
	20-24 years old	9	1	11.11	7	77.78	1	11.1				
	25-29 years old	16	3	18.75	10	62.50	3	18.8				
	30-34 years old	12	2	16.67	7	58.33	3	25				
	35-39 years old	16	4	25.00	11	68.75	1	6.25				
	40-44 years old	4	1	25.00	3	75.00	0	0				
	45-49 years old	1	0	0.00	1	100.00	0	0				
Total		**61**	**12**	**19.67**	**41**	**67.21**	**8**	**13.1**	**5.04**	**21.02**	**12**	**NS**
OCCUPATION	Housewife	49	10	20.41	34	69.39	5	10.2				
	Student	4	1	25.00	3	75.00	0	0				
	Official	8	1	12.50	4	50.00	3	37.5				
Total		**61**	**12**	**19.67**	**41**	**67.21**	**8**	**13.1**	**5.17**	**9.48**	**4**	**NS**
RESIDENCE	HZS	13	1	7.69	11	84.62	1	7.69				
	ZS	48	11	22.92	30	62.50	7	14.6				
Total		**61**	**12**	**19.67**	**41**	**67.21**	**8**	**13.1**	**2.32**	**5.99**	**2**	**NS**
MARITAL STATUS	Bride	50	9	18.00	35	70.00	6	12				
	Bachelor	11	3	27.27	6	54.55	2	18.2				
Total		**61**	**12**	**19.67**	**41**	**67.21**	**8**	**13.1**	**0.97**	**5.99**	**2**	**NS**
PARITY	1-3	29	3	10.34	21	72.41	5	17.2				
	4-6	26	7	26.92	17	65.38	2	7.69				
	7-9	6	2	33.33	3	50.00	1	16.7				
Total		**61**	**12**	**19.67**	**41**	**67.21**	**8**	**13.1**	**3.95**	**9.48**	**4**	**NS**

DISCUSSION

Frequency of Maternal Mortality in Health Facilities

The frequency of maternal mortality in the health structures of the Bunia health zone is 0.11%. The most affected age group is 35-39 years (0.30%), followed by housewives (0.12%) and women coming from outside the health zone (HZS) (0.22%). Most of the affected women are single (0.55%), with parity ranging from 1 to 3 children (0.13%).

A study conducted by Moussa (2008) on maternal mortality in the obstetrics and gynecology department of the Gabriel Touré University Hospital reported a frequency of 2,581.65 deaths per 100,000 live births. Similarly, according to the sixth Demographic and Health Survey (EDS-M) in Mali (2018), the maternal mortality rate was estimated at 325 per 100,000 live births over the last seven years.

Our result could be explained by a lack of knowledge of the danger signs, neglect of prenatal consultations by many women, and the financial constraints that some individuals face when attempting to visit health facilities. Additionally, the socio-cultural context in certain localities may influence prenatal consultations.

Causes of Maternal Mortality in Health Facilities

The most frequent cause of maternal death was postpartum hemorrhage (45.90%), followed by uterine rupture (24.59%), eclampsia (11.90%), and placenta previa (3.28%). This pattern was observed in 100.00% of women aged 45-49 years, 50.00% of pupils and students, 52.08% of women from the ZS (health zone), and 50.00% of married women, with parity ranging from 1 to 4 children. The p-values for occupation and marital status were >0.05, while for age, residence, and parity, the p-values were <0.05.

This situation was also observed in a study by Djémili et al. (2015), which found that 39% of maternal deaths were directly linked to the fragility of women due to numerous closely spaced pregnancies. This condition, which is scientifically linked to postpartum hemorrhage, is similar to our findings, although our result (45.90%) was higher.

Say et al. (2014) reported that nearly 73% of maternal deaths between 2003 and 2009 were due to direct obstetric causes, with obstetric hemorrhage being the leading cause

(27.1%), followed by hypertension (14%), infections (10.7%), abortions (7.9%), embolism, and other direct causes (12.8%).

Our result is also consistent with the findings of Bullough (2017), who stated that maternal death was caused by hemorrhages from a non-tonic uterus in 63.4% of cases. This proportion is higher than our result, which may be attributed to the fact that midwives working in private health facilities in the Bunia health zone might not benefit from continuous training in SONUB, unlike those working in state structures.

Factors of Maternal Mortality Linked to the Mother in Health Structures

The analysis shows that the delay in seeking medical consultation was the most common factor leading to maternal death (32.79%), followed by too many pregnancies (22.95%), closely spaced pregnancies, and early pregnancies (13.11%) with a p-value of >0.05. This trend was more frequently observed among women aged 40-44 years (25%), housewives (34.69%), those from outside the health zone (38.46%), and married women (34%).

In light of our results and according to the World Health Organization (WHO, 2022), women from the poorest backgrounds or those living in rural areas in Africa, and within the same country, are the most vulnerable. Pregnancies among teenage girls under 15 years of age present the most serious risks.

Furthermore, in low-income countries, only one in three pregnant women receives the recommended four medical visits during pregnancy, reflecting the delay in consultation times. More than half of these women give birth without the presence of a midwife, doctor, or skilled nurse. In this regard, most maternal deaths could be avoided if all women had access to medical support and emergency care (WHO, 2019).

A survey conducted at the maternity ward of Kananga Provincial Hospital revealed that the most vulnerable groups had started prenatal consultations very late. These included pregnant women under 20 years of age (52.8%), those with no education (44.4%), and primiparous women (61.1%) (Bullough, 2017).

Consistent with our findings, which emphasize too many pregnancies, pregnancies at too early an age, pregnancies that are too close together, and those that occur too late, the four "too many" factors contribute to an increased maternal mortality rate. This could be explained by various factors. In polygamous marriages, co-wives often compete to have the greatest number of children, aiming for the husband's inheritance. In other cases, the societal preference for male children forces some women to have closely spaced pregnancies. This behavior is encouraged and reinforced by social structures that restrict girls' inheritance rights (Bekara, 2012).

Our result aligns with those of these authors and could be explained by the negligence of pregnant women in seeking timely medical consultations, as well as a lack of awareness regarding family planning services.

Factors of Maternal Mortality Linked to Health Facilities

The lack of technical capacity within health facilities was the most significant structural factor, representing 50.82%, compared to 49.18% for delayed referrals, with $p > 0.05$. This trend was more prominent among respondents aged 40-44 years (75%), housewives (51.02%), and those from outside the health zone (52.08%).

This result is higher than that found by Boloko (2017) in a study on the causes and factors contributing to maternal mortality in Lubumbashi. The results showed that 10% of the factors could be categorized into two main groups: the first concerns the availability of human resources, medications, materials, equipment, infrastructure, and geographical location, while the second group focuses on resource management.

Additional factors associated with maternal death were identified in Congo by Clotilde Magne (2012). These included the victim's age, multiparity, lack of prenatal consultations, and the mode of admission. The factors linked to maternal death were also related to limited clinical management skills of healthcare providers in obstetric emergencies (Mveba et al., 2018).

We believe that this result can be explained by the organizational management challenges, particularly financial constraints, which may hinder the recruitment of new staff and the commitment to improving services.

Factors of Maternal Mortality Linked to Midwives in Health Structures

The delay in care by midwives accounted for 67.21%, compared to 19.67% for the non-recognition of danger signs ($p > 0.05$). This trend was more frequently observed among respondents aged 45-49 years (100%), pupils and students (75%), those from outside the health zone (84.62%), married women (70%), and those with a parity of 1-3 children (72.41%).

These results are consistent with those found in a study on obstetric risk factors in the monitoring of 365 primiparous adolescent pregnancies, which indicated that 42.6% of maternal deaths were due to the attitudes of healthcare workers (32.3%), specifically their delayed decision-making (Boloko, 2017).

On the other hand, our result is lower than that of Dujardin (2007), who found that 48% of maternal deaths occurred due to delays in therapeutic decision-making, while 10% were attributed to poor management.

However, our result aligns with that of Traore et al. (2014), who conducted a study on the explanatory factors of maternal deaths in hospitals in Côte d'Ivoire. They highlighted that delays in care within the health facilities were due to the time providers took to intervene in obstetric emergencies (40.6%).

We believe that this result is justified by poor management and a lack of monitoring of personnel within the service.

Limitations of the Study

We conducted a retrospective descriptive study that did not allow us to explore certain aspects, such as families' perceptions of maternal death. Future studies may use a prospective qualitative approach for this purpose.

CONCLUSION AND SUGESTIONS

This study is a retrospective descriptive analysis aimed at determining the frequency, causes, and factors associated with maternal mortality in the health facilities of the Bunia health zone over the period from January 1, 2022, to August 31, 2024.

We used the documentary method on a population of 54,330 women who gave birth in the selected health facilities. The sampling was multi-stage: we first identified the three municipalities covering the Bunia health zone and then selected the health facilities that had recorded maternal deaths in both state and non-state structures. The sample consisted of 61 maternal death records. Data were encoded using SPSS 20 and analyzed using the Fisher exact test, then transferred to Excel software for formatting.

The following results were obtained:

- The frequency of maternal deaths in the health zone was 0.11%.
- Hemorrhage was the leading cause of maternal death in the Bunia health zone, accounting for 45.95%.
- Delay in seeking care was the factor most associated with the mother, at 22.95%.
- Lack of technical support was the factor linked to the health facilities, representing 50.82%.
- Delay in care by midwives was the factor related to midwives in 67.21% of cases.

In light of these results, it is crucial to revisit the maternal death review process in order to adopt new strategies, such as informing the community about available health services and strengthening the capacity of healthcare providers.

Conflicts of Interest: None declared.

ORCID iDs:

Ngavele, I.:	Nil identified
Mukandu, B.:	Nil identified
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