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Maternal Mortality : Epidemiological Aspects And Etiological Factors At The Zinder Mother And Child Health Center (Mchc) From 2020 To 2024 In Niger

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Introduction : Maternal mortality has remained a serious concern for decades, particularly in developing countries. In Niger, despite strategies developed to reduce maternal mortality, progress in the Zinder region remains slow. The objective is to describe the epidemiological aspects and etiological factors of maternal deaths in the Zinder region from 2020 to 2024. **Methodology:** This was a retrospective descriptive cross-sectional study. All maternal death records from 2020 to 2024 at the Zinder Community Health Center (CSME) were included. **Results :** A total of 678 maternal deaths were recorded over the five-year period, out of 25,123 admissions and 13,423 live births. The mortality rate was 2.69%, and the maternal mortality ratio (MMR) was 52,051.03 per 100,000 live births. Women under the age of 25 who died represented 45.6% (n=309). 96.02% (n=651) were housewives, and 54% (n=366) died before childbirth. 84.66% (n=574) lived in rural areas, and 51.6% (n=350) had not received prenatal care. 77.28% (n=524) had been referred for medical reasons. Home births accounted for 31.41% of all births. Severe anemia during pregnancy was the primary cause of

death in 52.21% of cases. Death occurred in the third trimester in 53.2% of cases. Hemorrhagic causes accounted for 17.7% (n=120), hypertensive disorders such as pre-eclampsia and eclampsia for 18.28% (n=124), and infectious causes for 14.1% (n=96). The majority of deaths, 75.36% (n=511), occurred within the first 24 hours following admission.

Conclusion : Maternal mortality in Niger remains a concern, as most deaths occurred antepartum due to preventable causes such as anemia. This is far from achieving the Sustainable Development Goals (SDGs) by 2030.

Keywords : Maternal mortality, CSME, Zinder, etiological factor

INTRODUCTION :

Maternal mortality has reached unacceptable levels. Approximately 260,000 women died during or after pregnancy or childbirth in 2023. 92% of all maternal deaths occurred in low-income or lower-middleincome countries in 2023, and most could have been prevented. It is estimated that in 2023, approximately 87% (225,000) of maternal deaths worldwide occurred in sub-Saharan Africa and South Asia. Approximately 70% of maternal deaths (182,000) occurred in sub-Saharan Africa, while approximately 17% (43,000) occurred in South Asia. [1] Niger's maternal mortality ratio (MMR) in 2024 was 448 maternal deaths per 100,000 live births (LB), according to data from the Yearbook of Statistics and Social Data [2]. The Zinder region is the most populated region of Niger, with an MMR of 5,219.56 deaths per 100,000 LB in 2019 [3]. These statistics highlight the urgent need to identify the determinants of maternal mortality in order to implement effective interventions to reduce it. Despite Niger's efforts to improve maternal health, maternal mortality remains high. The main causes of maternal death are anemia, pregnancy and postpartum hemorrhage, infections, and preeclampsia/eclampsia. These complications are often preventable when appropriate care is available, but delays in seeking healthcare impact the occurrence of maternal deaths [4]. Despite the maternal mortality reduction strategies implemented in Niger, the improvement in the maternal mortality ratio (MMR) is slow, contrasting with the pace of progress towards Sustainable Development Goal 3 (SDG 3), particularly target 1, which aims to reduce the MMR to less than 70 deaths per 100,000 live births, with no country exceeding twice this rate. The objective of our study was to describe the epidemiological aspects and etiological factors of maternal mortality at the Zinder Community Health Center (CSME) from 2020 to 2024.

METHODOLOGY :

This was a descriptive, retrospective cross-sectional study conducted over a 5-year period, from January 1, 2020, to December 31, 2024, at the Zinder Maternal and Child Health Center (CSME). Included in our study were all pregnant women who died at the CSME during pregnancy, labor, or the postpartum period (i.e., within 42 days of delivery), regardless of the cause of death, but determined or aggravated by the pregnancy or the care it necessitated, regardless of the gestational age or location. Excluded from this study were all pregnant women who died outside the CSME (death

confirmed upon arrival), all women who died after 42 days postpartum or post-abortion, and all non-pregnant women who died at the CSME. Data collection was carried out using a survey form. Data extraction was performed using audit forms, obstetric records, delivery registers, surgical reports, and death registers. Data entry was performed using Microsoft Office Word 2010. Statistical data processing and analysis were performed using SPSS 20.0.

RESULTS :

At the Zinder Maternal and Child Health Center (CSME), we recorded 25,123 admissions during the study period, including 678 maternal deaths (2.69%) and 13,423 live births. The maternal mortality ratio was 5,051.03 per 100,000 live births.

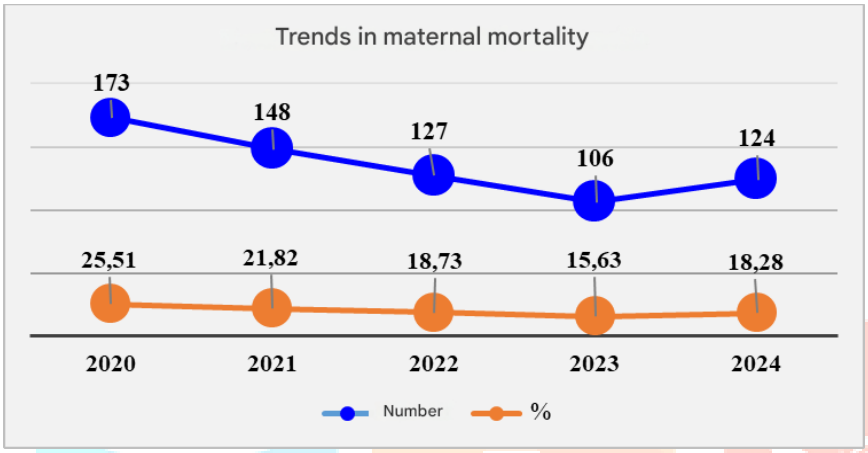

Figure1 : Distribution of deceased patients by year

Table1 : Distribution of maternal deaths by month of the year

Month	N	%
January	55	8,1
February	43	6,3
March	57	8,4
April	62	9,1
May	64	9,4
June	55	8,1
July	68	10
August	57	8,4
September	49	7,2
October	47	6,9
November	63	9,2
December	58	8,5

Total	**678**	**100**

The average number of deaths was 11.3 per month.

Table No. 2 : Distribution of deceased women according to sociodemographic characteristics

Characteristics	n	%
Age		
14-19	224	33,04
20-24	125	18,44
25-29	85	12,52
30-34	118	17,40
35 years and over	126	18,60
Total	**678**	**100**
Education Level		
Primary	44	6,49
Secondary	37	5,46
Higher Education	1	0,15
Not in School	596	87,90
Total	**678**	**100**
Occupation		
Homemaker	651	96,02
Civil Servant	17	2,50
Student	5	0,74
Professional	5	0,74
Total	**678**	**100**
Parity		
First-time mother (1)	199	29,4
Pauciparous (2 à 3)	137	20,2
Multiparous (4 à 5)	118	17,4
Grand multiparous (6 a plus)	224	33
Total	**678**	**100**
Place of residence		
Rural	574	84,66
Urbain	104	15,34
Total	**678**	**100**

In our study, 92.6% of deceased patients had no prior medical history; 51.6% had not received prenatal care; and 77.28% were evacuated, 59.5% of whom were transported by ambulance.

The deceased patients resided within a 0-50 km radius.

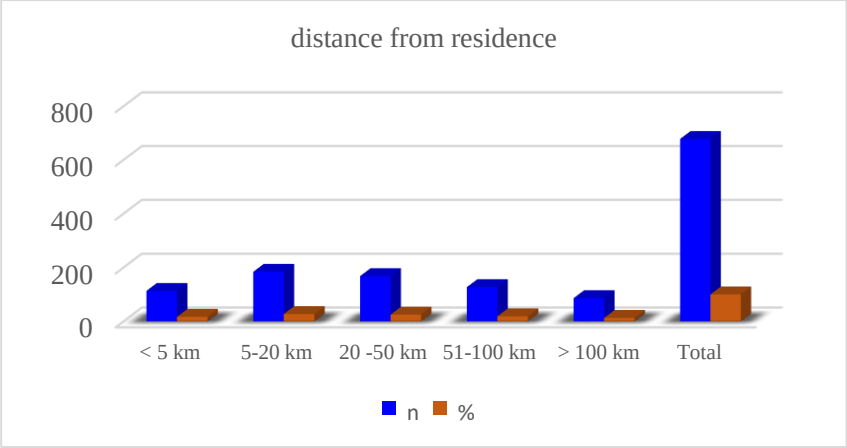

Figure 2 : Distribution of deceased patients according to distance from place of residence and (MCHC)

Deceased patients were admitted antepartum represented 54%.

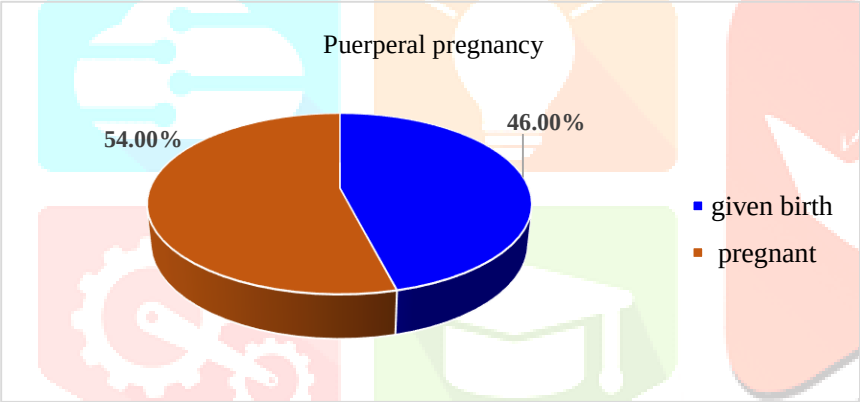

Figure 3 : Distribution of deceased patients according to the puerperal-pregnancy situation Death occurred in the third trimester of pregnancy in 53.20% of patients

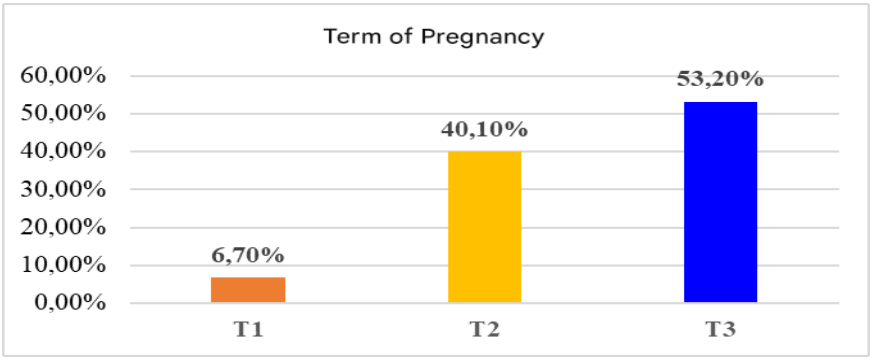

Figure 4 : Distribution of deceased patients according to gestational age

Table 3 : Distribution of deceased patients according to cause of death

Diagnosis	**n**	**%**
Severe anemia during pregnancy	354	52,21
Hemorrhage	142	20,94
Preeclampsia/Eclampsia	124	18,28
Infection	46	6,79
Other indirect causes	12	1,78
Total	**678**	**100**

Severe anemia during pregnancy was the leading cause of death in 52.21%.

Other indirect causes included: diabetes, heart disease, sickle cell disease, hepatitis, and cancer.

Table 4 : Distribution of patients according to cause of hemorrhage

Type of hemorrhage	**n**	**%**
Tear	1	0,70
PPH	89	62,67
HRP	22	15,49
Placenta Prævia	14	9,87
Uterine Rupture	16	11,27
Total	**142**	**100**

Postpartum hemorrhage accounted for 62.67% of hemorrhagic causes.

Table 5 : Distribution of women who died according to hemoglobin level

Hemoglobin level	**n**	**%**
1-3,99g/dl	201	29,6

4-6,99g/dl	153	22,6
11g/dl and above	125	18,4
7-8,99g/dl	89	13,1
9-10,99g/dl	110	16,2
Total	**678**	**100**

Patients who died and were admitted with a hemoglobin level below 4 g/dl represented 29.6%.

Table 6 : Distribution of patients according to admission time (time elapsed between the referral decision and admission to the CSME).

Admission time	**n**	**%**
< 60mn	201	38,36
61mn-2h	138	26,34
2h01-3h	121	23,09
3h01 min and over	64	12,21
Total	**524**	**100**

Table 7 : Distribution of patients according to length of stay

Length of stay	**n**	**%**
< 2h	140	20,6
2h-6h	178	26,3
6h01mn-24h	193	28,5
Over 24h	167	24,6
Total	**678**	**100**

Patients who died within 24 hours of admission represented 75.4%

DISCUSSION

During the period of our study, 25,123 admissions were recorded, including 678 maternal deaths, representing 2.69%. Live births totaled 14,869, resulting in a maternal mortality ratio of 4,559 per 100,000 live births at the Zinder Community Health Center (MCHC). Nationally, Niger's maternal mortality ratio (MMR), which was 648 in 2006, is projected to reach 441 per 100,000 live births in 2024. This reflects progress, albeit slow, over the past two decades in Niger. The mortality rate was 25.51% in 2020, 21.82% in 2021, 18.73% in 2022, 15.63% in 2023, and 18.28% in 2024. This downward trend in 2020, 2021, and 2022 could be explained by the functionality of the operating theaters at two district hospitals in the region, which are referred to the Zinder Community Health Center (MCHC). The annual maternal mortality rate remained relatively stable over the five years. The maternal mortality ratio in our study was 4,559 maternal deaths per 100,000 live births. Maternal mortality rates vary across studies and countries. Alkassoum reported a rate of 2,512 deaths per 100,000 live births in the Maradi region of Niger in 2018 [5], while Sètondji in Benin reported 2,039 maternal deaths per 100,000 live births in 2026 [6], and Tanguiéta in Benin reported 1,173 deaths per 100,000 live births from 2015 to 2019, according to Aboubakar et al. [7]. Mortality is endemic in our study, with an average of 11 deaths per month and little variation throughout the year. This situation could be related to the high fertility rate in Niger, which reflects the frequency of pregnancy and childbirth. The average age of our deceased patients was 26 years, with a range from 14 to 47 years. Magagi in Niger found the same average age of 26 years in 2021 in this service, with those under 25 years old representing 45.6%. The young age found in our study could reflect the marriage of young girls in the region, but it is also an age of full reproductive activity. Women of this age are the most vulnerable because, lacking purchasing power and decision-making authority over their health, they are exposed to the occurrence of fatal complications. 87.90% of them were uneducated. Sètondji found that 27.90% of the deceased patients were uneducated [6]. Our result is related to the low school enrollment rate in the Zinder region. The high level of education is a an indicator of good maternal and child health. We recorded more than two-thirds of women who had given birth more than twice a year (33%), followed by primiparous women. In contrast, primiparous and pauciparous women represented 56.7% of cases in Hien's study in Burkina Faso in 2025 [7]. These extreme ages in our study expose women to the risks of related obstetric complications. In Niger, anemia during pregnancy and preeclampsia affect primiparous women, while hemorrhagic disorders affect women who have given birth more than once. The incidence of maternal mortality increases with parity. 84.66% of the deceased patients resided in rural areas. Hien found that 57.9% of deceased women resided in rural areas [8], and Baldé reported a rural origin of 66.7%. The high frequency of rural origin could be explained by poor healthcare coverage and insufficient technical facilities. Numerous authors have reported that difficulties in accessing health services, their availability, geographical accessibility, and low health coverage are key factors contributing to increased maternal mortality [10]. In our study, 51.6% of deceased patients had not received antenatal care (ANC), a rate similar to that reported by Diassana, with 54.8% of deceased

patients not receiving ANC [11]. However, Vodouhè, in his study, reported that pregnancies were poorly monitored in 88.04% of deceased women [12]. Quality antenatal care allows for the detection of pregnancy risk factors and the implementation of a monitoring plan, the administration of preventive and health-promoting care, birth planning, early screening and diagnosis of obstetric complications, and their management [13,14]. Death occurred in the third trimester in 53.2% of cases and in the second trimester in 40.10%. In our study, the majority of deaths in the second trimester were due to anemia and pregnancy. Anemia and pregnancy is a public health problem in Niger, particularly in the Zinder region, where it is the leading cause of maternal death. In our study, severe anemia with a hemoglobin level below 6 g/dL was found in 52.2% of cases. Severe anemia is a consequence of the unfavorable socioeconomic conditions of pregnant women and their inability to seek early medical care. Direct obstetric causes were responsible for the deaths of 312 patients, representing 46.01% of all deaths, while indirect causes accounted for 53.99%. Hemorrhage (20.94%) was the leading direct obstetric cause, followed by preeclampsia and eclampsia and its complications (18.28%), and infections (6.79%). Hemorrhage was reported as the main direct cause in Salifou's study in Benin, accounting for 50% [15]. Immediate postpartum hemorrhage remains the leading cause of maternal death worldwide and is one of the World Health Organization's priority objectives for reducing maternal morbidity and mortality [16]. We recorded that 75.22% of the deceased patients resided within a 0-50 km radius of the CSME (Community Health Center), and the admission time was less than one hour in 38.36% of cases, while 75% of patients resided within 0-50 km. This reflects a significant delay in consultation and evacuation, as the majority of deceased patients were admitted more than two hours later. This can have a negative impact on urgent medical conditions. The delay in our setting could be due to low rates of prenatal care (PNC4) among patients (29.8% for the Zinder region), as PNC allows for the timely detection of risk factors [17]. Delays also arise from resource mobilization, decision-making processes, the region's low health coverage (45% for the Zinder region), and the fact that the majority of women attempt home births, which also contributes to delays (the rate of births attended by skilled personnel is 37.61% in the Zinder region) [17]. An Ethiopian study on hemorrhage reported a lengthening of the delay in this context, likely due to the need to mobilize additional resources [18]. Patients who died within 24 hours of admission represented 75.4%. Our results show that the patients were admitted in a state of multi-organ failure induced by obstetric emergencies, but also by decompensated anemia.

Conclusion :

This study identified the epidemiological aspects and etiologies of maternal deaths at the Zinder Community Health Center (CSME), a public health problem in Niger. We identified a wide range of preventable causes in this study, namely anemia and pregnancy. Deaths occurred primarily among young women, often housewives, residing in rural areas. They were referred with prolonged admission delays for shorter distances, highlighting the delays in access to care and the socio-economic vulnerability of this population. This resulted in fatal complications, with a significant

number of deaths occurring within 24 hours.

Bibliographical References:

1. World Health Organization. Maternal Mortality. 2023. Available from:
https://www.who.int/fr/news-room/fact-sheets/detail/maternalmortality. Accessed March 3, 2024.

2. Agballa G, Sossa C, Aguémon B, Damien G, Boyi Hounsou C, Agossou C, et al.
Factors associated with maternal deaths in hospitals in Cotonou, Benin. J Maternal and child health. 2023;08(06):735-743

3. Magagi Amadou, Boukari Mb, Maikassoua M, Oumarou GS, Oumarou M, Nayama M.
Etiologies of Maternal Mortality at the Mother and Child Health Center in the Zinder Region. EAS J Anesthesiol Crit Care; Vol-3, Iss-5 (Sept-Oct, 2021): 79-85

4. Elie Wabukani Ntangu, Josué Onoya Wedi, Bernard Ntoto Kunzi, Emery Kafinga Luzolo
Determinants of maternal mortality in the Kikongo health zone, Kwilu Province, DR Congo Revue des Sciences de la Santé (Rev. Sci. Sant.) Volume-4 Issue-1, 2025

5. Alkassoum, I., Djibo, I., Hama, Y., Abdoulwahabou, A. M., & Amadou, O. (2018).
Risk factors for in-hospital maternal mortality in the region of Maradi, Niger (2008-2010): A retrospective study of 7 regional maternity units. Médecine et Santé Tropicales, 28 (1), 86–91

6. Sètondji Géraud Roméo Padonou, Généreuse Beheton, Jennifer Olofindji, Christiane Tshabu Aguemon, and Badirou Aguemon.
Maternal mortality: epidemiology of the third delayed pregnancy among pregnant women referred to two hospitals in Cotonou (Benin) between 2017 and 2021. African Journal of Social Sciences and Public Health, 8 (1), 72-86.

7. Aboubakar M, Akodjenou J, Echoudina C, Ahounou E, Biaou C, Zoumenou E.
Maternal Mortality at the Teaching Hospital of Mother and Child Lagoon (CHU-MEL) in Benin: A Preventable Drama? Open Journal of Obstetrics and Gynecology. 2021; 11:315-325.

8. D. Hien, K.S. N. Bognini, Ouédraogo, A.M.A. Koumbem, D.P.L. Kain, A. Ouédraogo.
Maternal mortality in the obstetrics and gynecology departments of public health facilities in the Central Region of Burkina Faso from January 1, 2022 to December 31, 2022. Journal de la SAGO, 2025, vol. 26, no. 2.

9. Baldé O, Sory BI, Hady DM, Ibrahim S, Bamba DF, Bademba D.
Maternal deaths at the maternity ward of the Labé Regional Hospital (Guinea). Rev int sc méd Abj - ISSN 1817 - 5503 RISM. 2020; 22 (1): 34-37.

10. Berthé M, Diallo AT, Kokaina C, Traoré T, Soumaré BO.
Study of factors related to maternal deaths using the audit method at Nianankoro Fomba Hospital in Ségou. Mali Médical. 2021, 36 (4): 54-58

11. Diassana M, Macalou B, Dembélé S, Sidibe A, Balde M, Bocoum A, Fane S, Traoré Y

Maternal mortality among adolescent girls at Fousseyni Daou Hospital in Kayes over a decade, Annales de la SOGGO No. 34 Vol. 15 (2020)

12. Vodouhè TYS, Dangbemey P, Aboubakar M, Olowo, Orékan J, Kogui N'douro A, Tshabu Guénon C, Dénakpo JL.

In-hospital Maternal Death: Epidemiological, Clinical, and Therapeutic Aspects in Two District Hospitals of the Atlantique Department from 2019 to 2022. Benin Medical Journal, 2026; No. 073: 1726.

13. Atadé SR, Hounkponou Ahouingnan FMN, Obossou AAA, Gabkika BM, Doha SMI, Sidi RI, et al.

Factors Associated with Maternal Deaths at the Saint Jean de Dieu District Hospital of Tanguiéta from 2015 to 2019. European Scientific Journal. 2021;17(29):93-105.

14. Agballa G, Sossa C, Aguémon B, Damien G, Boyi Hounsou C, Agossou C et al.

Factors associated with maternal deaths in hospitals in Cotonou, Benin. J Maternal and Child Health. 2023;08 (06):735-743.

15. Salifou, B., Atade, S. R., Sidi, I. R., Awede, O. A., Ernest, S., & Salifou, K. (2021).

Factors Associated with Maternal Mortality at Gynecology and Obstetrics Department in Department University Hospital Center of Borgou. Open Journal of Obstetrics and Gynecology, 11(8), 1026–1036.

16. Say, L., Chou, D., Gemmill, A., Tunçalp, Ö., Moller, A.-B., Daniels, J., Gülmezoglu, A. M., Temmerman, M., & Alkema, L.

Global causes of maternal death: A WHO systematic analysis. The Lancet Global Health, 2(6), 323-333Say (2014).

17. Ministry of Health and Public Hygiene of Niger

Yearbook of Health and Social Statistics, Directorate of Statistics Niger 2024,

18. Kebede, G, Takele, H., & Hailu, D.

Third delay and associated factors among women who gave birth at public health facilities of Gurage zone, southern Ethiopia: A cross-sectional study.

BMC Pregnancy and Childbirth, 23(1), Article 466. (2023).