

# Effect of the Implementation of Emonc in the Reduction of Maternal Deaths in the Department of Collines from 2018 to 2022

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**How to cite this paper:** Aifa, J., Abraham, F., Klikpezo, R., Ouendo, E.-M. and Aguemon, B. (2024) Effect of the Implementation of Emonc in the Reduction of Maternal Deaths in the Department of Collines from 2018 to 2022. *Open Journal of Obstetrics and Gynecology*, 14, 259-266.  
<https://doi.org/10.4236/ojog.2024.142024>

**Received:** December 9, 2023

**Accepted:** February 25, 2024

**Published:** February 28, 2024

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## Abstract

**Background:** Maternal and neonatal mortality remains a public health problem in Benin. Each year, approximately 1500 maternal deaths and more than 12,000 newborn deaths are recorded there. In order to correct the situation, strategies such as the implementation of Emergency Obstetric and Neonatal Care (EmONC) were initiated. **Objective:** Determine the rates of maternal deaths in EmONC centers in the Collines department from 2018 to 2022. **Framework and Methods:** The study took place in Benin precisely in the Collines department. This was a descriptive cross-sectional study. Data collection was carried out during the first two weeks of January 2023 and covered data from the 09 Basic Emergency Obstetric and Neonatal Care centers (BEMONC) and the Obstetric and Neonatal Care centers of Complete Emergency (CEMOC) of the Collines department from 2018 to 2022. An estimate of the ratios of maternal deaths occurring at the level of the EmONC centers of the Collines department from 2018-2022 was carried out followed by constructive suggestions. **Results:** During the five years (2018 to 2022), the Collines department recorded 42,582 live births with 148 maternal deaths, *i.e.* a ratio of 348 maternal deaths per 100,000 live births. Between 2018 and 2022, the highest maternal death ratio was recorded in 2019, *i.e.* 425 maternal deaths per 100,000 live births for all EmONC centers and 607 maternal deaths per 100,000 live births in EmONC centers. The highest maternal death ratio at the BEmONC center level was recorded in 2020, *i.e.* 129 maternal deaths per 100,000 births. **Conclusion:** These results suggest that despite the imple-

mentation of EmONC in the Collines department, maternal deaths have not decreased. To improve these outcomes for a reduction in maternal deaths, urgent action must be taken.

## Keywords

Effect, BEmONC, CEmONC, Maternal deaths, Department of Collines

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## 1. Introduction

Maternal death is defined as “the death of a woman occurring during pregnancy or within 42 days after its termination, regardless of its duration or location, for any cause determined or aggravated by the pregnancy or the care that she motivated, but neither accidental nor fortuitous [1]. The fight against maternal and neonatal mortality must today be considered a vital social and economic investment, so that pregnancy is a safe and happy event for all women and their families. Globally, more than approximately 830 women die every day from preventable causes related to complications of pregnancy, childbirth and postpartum. Almost all of this number is found in developing countries, and within the latter, enormous disparities exist both between countries and within the same country. Almost all causes of maternal mortality are preventable with affordable means. The main causes of maternal mortality remain hemorrhage, especially postpartum, infections, eclampsia, etc. [2]. In Benin, approximately 1500 maternal deaths and more than 12,000 newborn deaths are recorded each year [3]. Around 90% of maternal deaths occurring at the Lagune Mother and Child University Hospital Center (CHUMEL) from 2015 to 2019 are considered preventable [4]. The majority of recorded maternal deaths could have been avoided if the quality of EmONC had been strengthened [5] [6].

The components of EmONC were described in the 1990s by the World Health Organization (WHO), the United Nations International Children’s Emergency Fund (UNICEF), and the United Nations Population Fund (UNFPA). Its “core functions” are interventions that should be available to all women at the time of childbirth, to address the common but unpredictable causes of maternal and neonatal mortality [7].

Several studies have shown that in the long term, the implementation of EmONC helps reduce maternal mortality. These include Dumont *et al.* [8] in a study carried out in Mali and Senegal proving that the implementation of basic maternal care (EmONC) made it possible to reduce maternal mortality by 15%. We also have Kadek *et al.* in Indonesia [9]. Improving maternal health inevitably involves improving access to health services and the quality of care received when obstetric complications occur.

The objective of this study was to determine the rates of maternal deaths in EmONC centers in the Collines department from 2018 to 2022.

## 2. Study Framework and Methods

### 2.1. Study Framework

The study took place in Benin precisely in the Collines department, limited to the West by Togo, to the East by Nigeria, to the North by the departments of Donga and Borgou, to the South by those of Zou and the Plateau.

### 2.2. Type and Study Population

This was a cross-sectional, descriptive study which took place in the Collines department during the first two weeks of January 2023. The BEmONC centers were the health centers providing basic obstetric and neonatal care and EmONC centers were health centers or hospitals with a full range of obstetric and neonatal care offered.

### 2.3. Sampling

This was an exhaustive sampling taking into account data from the 09 BEmONC and CEmONC centers in the Collines department from 2018 to 2022. All women who gave birth during this period were included and maternal deaths were included and maternal deaths were included.

### 2.4. Collection Technique and Tools

The collection technique used was documentary exploitation. The collection tool used was a counting sheet.

### 2.5. Data Processing and Analysis

The data were analyzed using Microsoft Excel 2016. The variable of interest was the maternal death ratio calculated by relating the number of maternal deaths to the number of live births (number of maternal deaths per 100,000 births alive).

### 2.6. Ethical Considerations

The study protocol was submitted to the national ethics committee for a favorable opinion. The principles of professional secrecy were respected. The necessary authorizations have been taken in order to have access to information relating to maternal deaths in EmONC centers.

## 3. Results

### Description of the study sample

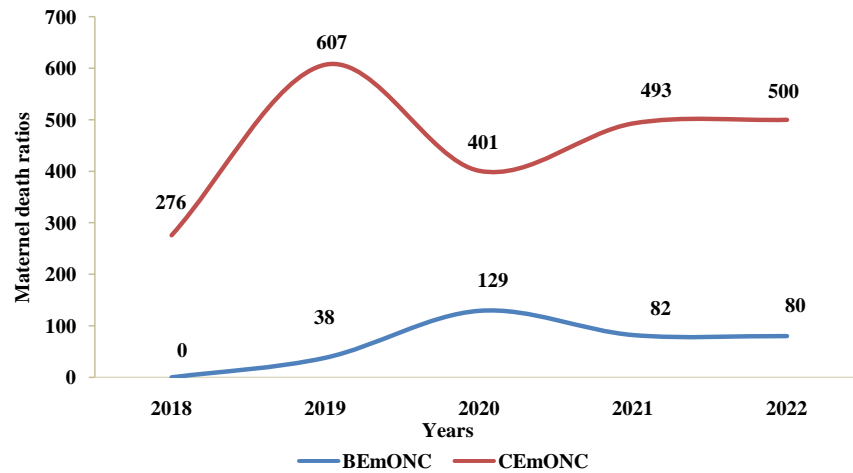
The Collines department had three (03) health zones, namely the Dassa-Glazoue (DAGLA), Save-Ouesse (SAO) and Savalou-Bante (SABA) health zones, which each had three (03) functional EmONC centers like the presents **Table 1**.

### Estimated ratios of maternal deaths occurring in EmONC centers in the Collines department from 2018 to 2022

During the five years (2018 to 2022), the Collines department recorded 42,582

**Table 1.** Distribution of EmONC centers in the health zones of the Collines department in 2022.

Sanitary areas	Number of BEmONC centers	Number of CEmONC centers
Dassa-Glazoue (DAGLA)	01	02
Save-Ouesse (SAO)	01	02
Savalou-Bante (SABA)	02	01



**Figure 1.** Evolution of maternal death ratios in BEmONC and CEmONC of Collines department centers from 2018 to 2022.

live births with 148 maternal deaths, *i.e.* a ratio of 348 maternal deaths per 100,000 live births. Between 2018 and 2022, the highest maternal death ratio was recorded in 2019, *i.e.* 425 maternal deaths per 100,000 live births for all EmONC centers and 607 maternal deaths per 100,000 live births in EmONC centers. The curves in **Figure 1** reflect the evolution of maternal death ratios from 2018 to 2022 in EmONC centers in the Collines department. We note that over the period (2018-2022) the number of deaths in EmONC centers experienced an almost saw-tooth evolution although in the end it did not decrease at all. Concerning the BEmONC centers we note that deaths there have continued to increase. In conclusion, despite the implementation of EmONC in the Collines department, maternal deaths have increased.

**Figure 1** shows the evolution of maternal death ratios in BEmONC and EmONC centers from 2018 to 2022.

Considering the results of the present study, the following suggestions were made:

**To the actors of the Ministry of Health of Benin**

- Strengthen EmONC maternity units with qualified personnel (SFE);
- Provide all EmONC centers with ambulances.

**To the actors of the DDS Collines**

- Strengthen the number of nursing staff in the CEmONC centers in the Collines department;

- Provide the BEMONC centers in the Collines department with laboratories and make them functional;
- Make emergency kits available in all CEmONC centers in the Collines department.

#### **Towards EEZS members**

- Strengthen the practice of mentoring/tutoring in all maternity wards in the health zones of the department.

## **4. Discussion**

In this study, it is noted that the maternal mortality ratio in EmONC centers from 2018 to 2022 was 348 maternal deaths per 100,000 live births. This ratio is similar to that recorded nationally in Benin in 2014 by the MICS surveys which were 347 maternal deaths per 100,000 live births. On the other hand, according to data from the World Bank in 2020, this ratio was much lower than that obtained in 2020, in Benin, which was 523 maternal deaths per 100,000 live births [10].

Likewise, this ratio was lower than that obtained in Cameroon where the mortality rate was very high, reaching the record figure of 745 deaths per 100,000 live births before the implementation of a specific intervention [11]. It is also lower than that obtained in Niger in 2012 [12] and in Haiti in 2021 respectively 535 deaths per 100,000 live births and 630 deaths per 100,000 live births [13]. This difference could be explained by the evolution of health care policies and systems as well as the difference between the health systems of these countries.

It can be seen from this study that despite the implementation of EmONC, maternal deaths have not been reduced. This result is contrary to that of the White Ribbon alliance in Tanzania [14] in 2016 having succeeded, thanks to the implementation of Emergency Obstetric and Neonatal Care, in preventing 75% of deaths due to pregnancy and 25% of maternal deaths due to childbirth. The study by Bosomprah *et al.* (2016) [15], shows that the maternal mortality rate in Ghana decreased from 760 in 1990 to 380 in 2013 (a decrease of approximately 49%) with an average annual decline of 2.9%, the achievement of which comes from the quality role of the Centers CEmONC especially. Results of a study carried out in southwest Ethiopia by Lindtjorn *et al.* (2017) [16], showed that the increase in institutional work was highest in districts with EmONC services, which helped prevent common causes of maternal death such as hemorrhage.

Our conclusions are also different from those of Dumont *et al.* [8] as well as Kadek *et al.* [9] who also noted an improvement in the maternal death ratio following the implementation of EmONC. These differences would likely be due to poor performance of EmONC centers in our context. It is therefore necessary to conduct a study on the performance of EmONC centers in order to identify strong points and areas for improvement.

In addition, it should be noted that the main limitation of this study lies in

the comparison of the data collected with those before the implementation of EmONC. Indeed, the data management system before the implementation of EmONC was not based on valid collection tools and was therefore not reliable. Improving the health data collection and management system is one of the measures accompanying the installation of EmONC. However, although this comparison was not possible, the fact of having an increase in maternal deaths despite the implementation of EmONC demonstrates certain still significant weaknesses in the healthcare system which will need to be corrected.

## 5. Conclusion

The results of the present study show that despite the implementation of EmONC in the Collines department, maternal deaths have not decreased. To improve these outcomes for a reduction in maternal deaths, urgent action must be taken.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] WHO (2010) Definition of Maternal Mortality. <https://objectifs-du-millenaire.blogspot.com/2010/02/definition-de-la-mortalite-maternelle.html>
- [2] United Nations Population Fund U (2016) EmONC: Guide to Conducting Rapid Surveys. Regional Office for West and Central Africa-UNFPA, 88 p. [https://www.unfpa.org/sites/default/files/pub-pdf/2023%20FR\\_EmONC\\_web.pdf](https://www.unfpa.org/sites/default/files/pub-pdf/2023%20FR_EmONC_web.pdf)
- [3] Ministry of Health (2018) Operational Plan to Reduce Maternal and Neonatal Mortality in Benin 2018-2022. <https://www.prb.org/wp-content/uploads/2020/06/Benin-Plan-Operationnel-de-Reduction-de-la-Mortalite-Maternelle-et-Neonatale-au-Benin.pdf>
- [4] Aboubakar, M., Akodjenou, J., Echoudina, C., Ahounou, E., Biaou, C.O.A. and Zoumenou, E. (2021) Maternal Mortality at the Teaching Hospital of Mother and Child Lagoon (CHU-MEL) in Benin: A Preventable Drama? *OJOG*, **11**, 315-325. <https://doi.org/10.4236/ojog.2021.113032>
- [5] Kayongo, M., Rubardt, M., Butera, J., Abdullah, M., Mboninyibuka, D. and Madili, M. (2006) Making EmOC a Reality—CARE's Experiences in Areas of High Maternal Mortality in Africa. *International Journal of Gynecology & Obstetrics*, **92**, 308-319. <https://doi.org/10.1016/j.ijgo.2005.12.003>
- [6] Kayongo, M., Butera, J., Mboninyibuka, D. and Mukangamuje, V. (2006) Improving Availability of EmOC Services in Rwanda—CARE's Experiences and Lessons Learned at Kabgayi Referral Hospital. *International Journal of Gynecology & Obstetrics*, **92**, 291-298. <https://doi.org/10.1016/j.ijgo.2005.10.030>
- [7] Blami, D., Bluestone, J. and Carr, C. (2010) Guidelines for Continuing Education in Basic and Comprehensive Emergency Obstetric and Neonatal Care.
- [8] Dumont, A. (2017) Reducing Maternal Mortality in Developing Countries: What Are the Effective Interventions? *Journal of Perinatal Medicine*, **9**, 7-14.
- [9] Widyantari, K.Y.S. (2019) The Effectiveness of Cemonc on Maternal Mortality: Sys-

- tematic Literature Review. *Proceeding International Conference*, Indonésia, 19 November 2019, 169-182.
- [10] World Bank Group (2021) World Bank Open Data. <https://data.worldbank.org>
- [11] Mbola Mbassi, S. (2014) Emergency Obstetric Care and Maternal Mortality in Third-Level Maternity Hospitals in Cameroon: Evaluative Approach to an Intervention Aimed at Improving Obstetric Transfer and Management of Maternal Complications. Ph.D. Thesis, Pierre and Marie Curie University, Paris. <https://tel.archives-ouvertes.fr/tel-01223003>
- [12] National Institute of Statistics (INS) (2013) Demographic and Health Survey and Multiple Indicators. INS and ICF International, Calverton.
- [13] Hennion, M., Phanord, K., Lys, J.D. and Mathieu, M. (2021) Evaluation of the 6th UNFPA Program in Assistance to the Government of the Republic of Haiti (2017-2021). <https://www.unfpa.org/evaluation-du-6eme-programme-de-lunfpa-en-assistance-a-u-gouvernement-de-la-republique-dhaiti-2017>
- [14] White Ribbon Alliance (2016) Comprehensive Emergency Obstetric and Newborn Care: The Proven Approach in Tanzania. <https://wraglobal.medium.com/comprehensive-emergency-obstetric-and-newborn-care-the-proven-approach-in-tanzania-4d7bb4542e3b>
- [15] Bosomprah, S., Tatem, A.J., Dotse-Gborgbortsi, W., Aboagye, P. and Matthews, Z. (2016) Spatial Distribution of Emergency Obstetric and Newborn Care Services in Ghana: Using the Evidence to Plan Interventions. *International Journal of Gynecology & Obstetrics*, **132**, 130-134. <https://doi.org/10.1016/j.ijgo.2015.11.004>
- [16] Kea, A.Z., Lindtjorn, B., Gebretsadik, A. and Hinderaker, S.G. (2022) Variation in Maternal Mortality in Sidama Regional State, Southern Ethiopia: A Population Based Cross Sectional Household Survey. <https://doi.org/10.1101/2022.07.14.22277635>  
<https://www.medrxiv.org/content/10.1101/2022.07.14.22277635v1>

### Annex (Counting Sheet)

	Death	Live Births
<b>2018</b>		
BEmONC	0	2321
CEmONC	14	5065
BEmONC + CEmONC	14	7386
<b>2019</b>		
BEmONC	1	2624
CEmONC	34	5603
BEmONC + CEmONC	35	8227
<b>2020</b>		
BEmONC	3	2318
CEmONC	25	6232
BEmONC + CEmONC	28	8550
<b>2021</b>		
BEmONC	2	2444
CEmONC	32	6490
BEmONC + CEmONC	34	8934
<b>2022</b>		
BEmONC	2	2485
CEmONC	35	7000
BEmONC + CEmONC	37	9485
<b>2018-2022</b>		
BEmONC	8	12,192
CEmONC	140	30,390
BEmONC + CEmONC	148	42,582