

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20223116>

Original Research Article

Effects of Ebola epidemic on obstetrical emergencies and outcomes in the region of Kindia, Guinea

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Received: 06 October 2022

Accepted: 01 November 2022

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ABSTRACT

Background: Maternal mortality is still high in Guinea despite a decline from 724 to 550 maternal deaths per 100,000 live births between 2012 and 2018. The proportion of births attended by skilled personnel is estimated at 45%. The objective of this study was to assess the effect of Ebola virus disease (EVD) epidemic on the frequency of absolute maternal indications, as well as the outcomes of these interventions for mother and child in the region of Kindia.

Methods: This was a longitudinal study using 20 months of retrospective data collected in the pre-Ebola (March to December 2012 and March to December 2013) and intra-Ebola (March to December 2014 and March to December 2015) periods. The proportions of maternal health indicators in both study periods were compared using a significance level of 0.05.

Results: A total of 1747 women were included in this study. The proportion of women who received a major obstetric procedure in Kindia regional hospital was 85% in each pre and post Ebola periods. Ebola, however, contributed to a significant increase in maternal deaths.

Conclusions: The Ebola epidemic has contributed to a significant increase in maternal deaths in health facilities. Measures encouraging health workers to manage obstetric emergencies during critical periods would be necessary.

Keywords: Absolute maternal indication, Ebola, Effect, Guinea, Obstetric emergency

INTRODUCTION

Each year, 295,000 women die during pregnancy or as a result of childbirth.¹ Most of these deaths occur in low-income countries, of which sub-Saharan Africa alone accounts for more than half (50.4%) of these deaths from obstetric causes, and 69% of these deaths could be prevented.² Haemorrhage, hypertensive disorders, uterine rupture, abortions, dystocia, ectopic pregnancies and embolism are the main causes of maternal deaths.³ Obstetric emergencies such as fetal pelvic disproportion, uterine rupture, poor presentation etc. are the causes of maternal deaths that constitute absolute maternal

indications requiring emergency obstetric interventions.⁴ Many countries, as in Guinea, have implemented a policy of free obstetric care to help reduce maternal and child mortality and inequalities in access to care.⁵⁻⁷ Despite this intervention, maternal mortality in Guinea remains high, dropping from 724 to 550 maternal deaths per 100,000 live births between 2012 and 2018, with a proportion of hospital deliveries of 53% and an assisted delivery rate of 45%.⁸ In 2014, the Ebola virus disease in Guinea resulted in at least 3,641 confirmed cases and 2,420 deaths (66%) in the health care system.⁹ In addition, 34 of the country's 38 health districts reported Ebola cases.¹⁰ The epidemic affected mainly Guinea, Liberia, and Sierra Leone and

represented a major threat to the lives of mothers and their children, not only because of the high mortality rates among those infected, but also indirectly through the reduction or cessation of emergency obstetric and newborn care services in maternity wards, family planning, and vaccination programs.¹¹ However, studies in Guinea have shown that institutional deliveries declined during the Ebola epidemic and recovered to only 66% in the post-Ebola period.¹¹ The forest region was the most affected by this phenomenon, with 30% of infections among health workers, though this region accounts only 22% of the national population.¹² However, access to emergency obstetric care services remains a major challenge, especially in limited-resource countries.⁹ A study conducted in Guinea between 2014 and 2015 in the Forest Region indicated a decline in the use of maternity services after the outbreak of Ebola.¹³ In 2015, the United Nations Population Fund estimated that 15 percent of the 800,000 women who gave birth over the last 12 months of the Ebola epidemic in Guinea, Liberia, and Sierra Leone would have died from complications due to inadequate emergency obstetric care, and thousands more would have developed devastating maternal morbidities, such as obstetric fistula and fetal growth problems.¹⁴ These conditions have created a psychosis and increased mistrust of health services, and the studies conducted up to now do not allow us to understand the intra-national variations in the effect of Ebola on maternal and child health. Furthermore, the existence of limited data in the literature constitutes particular and important elements justifying the need to carry out this study aimed at analyzing the influence of the Ebola epidemic on access to basic routine health services in the Kindia prefecture, such as emergency obstetric care, in particular absolute maternal indication, and also to understand the influence of epidemic outbreaks on access to emergency obstetric care in a country like Guinea, which is vulnerable to diseases with epidemic potential. This research focuses on Kindia region, one of the most affected by the Ebola virus disease in Guinea.¹⁵ This study will thus better guide health system resilience interventions for maternal and child health.

General setting

This study was carried out in the administrative region of Kindia in the Republic of Guinea.

The Republic of Guinea is a coastal country located in the West African region; It covers 245,857 km² and its population is estimated to be close to 13 million in 2021.¹⁶

According to the 2018 Guinea Demographic and Health Survey (DHS), the number of births was estimated at 435,000 and the Total Fertility Rate at 4.6%.⁸ The Guinean health system's organizational structure is in accordance with the administrative boundaries and comprises eight (8) regions, including Kindia. The health system (operational and pyramidal) includes the primary level with 925 health posts and 410 health centers; the secondary level with 33 prefectural hospitals and 7 regional hospitals where

obstetrical emergencies are performed; the tertiary level with 3 national hospitals.¹⁵

Specific setting

The region of Kindia, located in southwestern Guinea, 135 km from the capital city (Conakry), had nearly 2 million inhabitants in 2021.¹⁶ The health system in this region is based on a referral hospital, which is the regional hospital of Kindia, two prefectural hospitals, eight health centers and thirty-eight health posts. The regional hospital includes a maternity ward, pediatrics, general medicine, emergency, ear, nose and throat service, surgery, occupational medicine, laboratory, dental surgery, radiography, and a pharmacy (drug store). At the time of the study, the maternity ward had a capacity of 26 beds and 5 rooms. It had five permanent doctors, one resident, 12 technical health workers (ATS)/health assistants, and four midwives for 20158 expected births in 2016.¹⁷

The administrative region of Kindia was one of the most affected by the Ebola virus disease in Guinea, with 114 cases including 86 deaths.

METHODS

Type and period of study

This was a cross-sectional study using a 20-month retrospective data collection period (from March to December 2012 and from March to December 2013) and intra-Ebola virus disease period (March to December 2014 and March to December 2015). The same periods of the year were chosen to take into account seasonal contexts in comparing the pre- and intra-Ebola virus disease period. The proportions of maternal health indicators in the two study periods were compared using a significance level of 0.05.

Study population

The study included all women received for major obstetric procedures in the maternity ward of Kindia regional hospital during our study period. All women with incomplete data were drop out from the study.

Sampling

An exhaustive sampling was performed based on data extraction from medical records, delivery logs, and surgical protocols.

Study variables

The following variables were selected for the analysis of the data collected: Socio-demographic variables: the woman's age at the time of admission, the woman's place of residence; obstetrical variables: gestity, parity; absolute maternal indications: fetal-pelvic disproportion, uterine rupture and pre-rupture, placenta previa and placenta

abrutio, malpresentation of the fetus, premature rupture of the membrane, antepartum hemorrhage for placenta previa, antepartum hemorrhage for retro placental hematoma, postpartum hemorrhage; Major obstetric interventions performed: scheduled caesarean section, emergency caesarean section and others (forceps and vacuum); childbirth outcome: discharged alive, deceased; outcome of the intervention for the child: born alive and discharged alive, stillborn or died before discharge.

Data collection

Data were collected from hospital records using a specially designed survey form. They were collected from November 1, 2015, to January 31, 2016.

Analysis of the data

Descriptive data were presented as a percentage. Bimonthly trends in the frequency (percentage) of absolute maternal indications among all maternal indications were then described in the form of an epidemic curve over the pre- and intra- Ebola virus disease ‘period. The characteristics of women, absolute maternal indication, major obstetric interventions for absolute maternal indication and the outcomes of these interventions were also compared as proportions between the pre- and intra-Ebola virus disease ‘period. STATA version 16.0 software was used for the analysis. The significance level was set at 0.05.

RESULTS

A total of 1,747 women were seen for obstetric care in Kindia Regional Hospital between 2012 and 2015, including 661 during the pre-Ebola period and 823 during the intra-Ebola period Table 1 shows that women aged from 15 to 24 years were the most represented with 52.0% and 52.4% in the pre- and intra-Ebola periods respectively. The majority had already had at least one previous birth, but the proportion was significantly higher during the Ebola period (64.5%) than in the pre-Ebola virus disease period. (57.5%; p=0.006). Most of these women lived in rural areas, but with a significantly higher proportion in the pre- Ebola virus disease period. (59.0%) than in the intra-Ebola virus disease period. (53.7%; p=0.04) (Table 1).

Figure 1 shows the bimonthly trend in the frequency of absolute maternal indication among women who received a major obstetric procedure in Kindia Regional Hospital over the pre- and intra-Ebola virus disease period. In the pre-Ebola virus disease period, this trend increased to a range of 81% to 87% in 2012, then dropped to 79% in March-April 2013, before reaching a peak of 95% in the following two months, and falling back to a low of 76% in November-December. During the intra-Ebola disease period, absolute maternal indication increased in July-August 2014 to 95%, before trending downward to 79% over the remainder of the intra-Ebola disease “period” (through December 2015) (Figure 1).

Table 1: Demographic characteristics of participating women.

Variables	2012-2013		2014-2015		P value
	N	%	N	%	
Age (years)					
15-24	345	52.04	431	52.37	0.344
25-34	236	35.60	270	32.81	
35-44	80	12.07	121	14.70	
≥45	2	0.30	1	0.12	
Gestity					
1-5	569	85.82	731	88.82	0.082
6 or more	94	14.18	92	11.18	
Parity					
0 birth	282	42.53	292	35.48	0.006
1-5 birth	381	57.47	531	64.52	
Residence					
Urban	391	58.97	442	53.71	0.042
Rural	272	41.03	381	46.29	
Total	663	100	823	100	

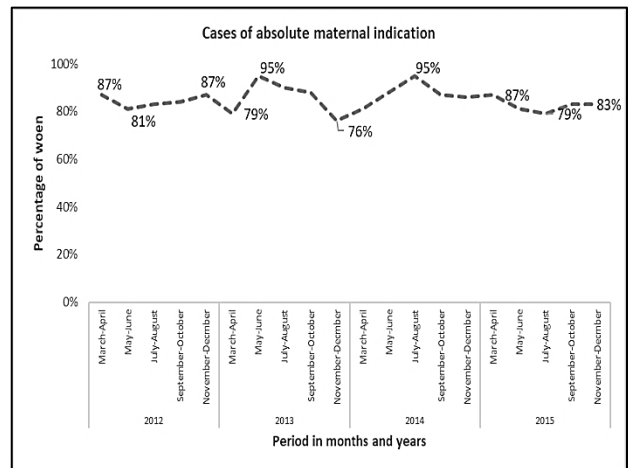


Figure 1: Bimonthly trend in the frequency of absolute maternal indication before and during the Ebola epidemic.

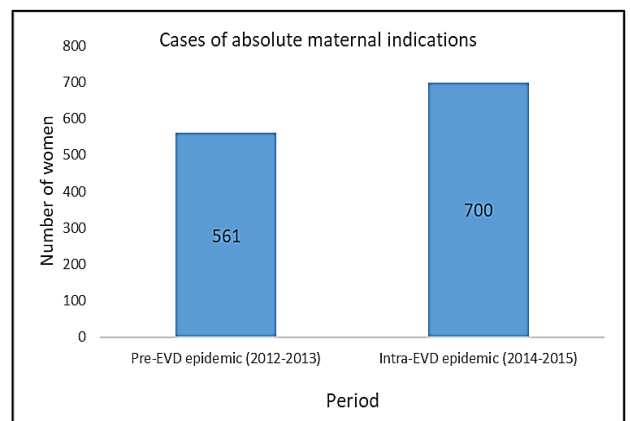


Figure 2: Frequency of absolute maternal indications in the pre and intra Ebola periods.

Table 2: Types of absolute maternal indications and major obstetric interventions before and during the Ebola epidemic.

Variables	2012-2013		2014-2015		P value
	N	%	N	%	
Absolute maternal indications					
Fetal-pelvic disproportion	414	73.80	511	73	0.525
Uterine rupture	15	2.67	32	4.57	
Placenta previa	39	6.95	49	7	
Poor presentation	56	9.98	64	9.14	
Premature limb rupture	0	0	1	0.14	
Antepartum hemorrhage	37	6.60	43	6.14	
Major obstetric procedures					
Planned-caesarean sections	82	14.62	82	11.71	0.294
Emergency caesarean sections	478	85.20	616	88	
Other	1	0.18	2	0.29	
Outcome of the intervention for the mother					
Alive	560	99.82	687	98.89	0.005
Dead	1	0.18	13	1.86	
Outcome of the intervention for the child					
Born alive and discharged alive	509	90.73	656	92.29	0.323
Stillborn or died before discharge	52	9.27	54	7.71	
Total	561	100	700	100	

In Figure 2, the proportion of absolute maternal indication cases among women who received major obstetric interventions did not change (85%) in the pre-Ebola virus disease period compared to the intra-Ebola virus disease period. However, the number of absolute maternal indication cases increased from 561 in the pre-Ebola virus disease period to 700 in the intra-Ebola virus disease period (Figure 2).

Table 2 shows that fetal-pelvic disproportion was the most frequent absolute maternal indication in the pre- and intra-Ebola virus disease period with 74% and 73% respectively ($p=0.525$). Major interventions for this absolute maternal indication were predominantly emergency caesarean sections case in both periods (85% and 88% respectively; $p=0.294$).

Among women managed for absolute maternal indication, one maternal death was recorded following the intervention (0.2%) in the pre-Ebola virus disease period compared to sixteen (2%; $p=0.005$) in the intra-Ebola virus disease period. As for the outcome of the intervention for the child, 52 (9%) neonatal deaths were recorded before hospital discharge in the pre-Ebola disease period, compared with 54 (8%; $p=0.323$) in the intra-Ebola disease period.

DISCUSSION

The results of this study show that Ebola virus disease did not have a statistically significant impact on the frequency of absolute maternal indications, nor did it have a statistically significant impact on the types of major

obstetric interventions for these absolute maternal indications; however, it did contribute to a significant increase in maternal deaths.

Our results are contrary to those found in another study in Guinea that maternal deaths remained similar during the three periods (Pre, intra and post Ebola).¹¹ Furthermore, others authors found similar results to ours in Sierra Leone, reporting that the high number of deaths of health workers during the Ebola virus disease negatively impacted maternal mortality.¹⁸ The high number of maternal deaths reported in our study could be attributable to the poor quality of management of the absolute maternal indication in health facilities, due to the fear of health workers who may restrict practices for fear of being infected. Indeed, signs such as bleeding and handling of body fluids, which are common in the management of absolute maternal indication, could lead to inadequate protective equipment for health workers to provide quality management of absolute maternal indication. In addition, it is possible that more serious cases of absolute maternal indication finally arrive at the hospital, after having tried in vain to find solutions elsewhere. In these cases, the prognosis for death is high. It is relevant to note that reported deaths are lower than actual cases in the sense that many cases of absolute maternal indication were not treated due to community members' fear of going to health facilities for care.

Our results also indicate that the Ebola virus disease did not influence the frequency of absolute maternal indication. These results strengthen the existing literature that Ebola virus disease did not influence the frequency of obstetric emergencies.

Indeed, the availability of antibiotics, oxytocin, anticonvulsants, complete manual removal of the placenta, blood transfusion and caesarean section were not affected by the Ebola virus epidemic, according to results reported in a study in Sierra Leone.¹⁹ In addition, another study conducted in 2016 in the same country concluded that a nationwide decrease in the number of hospital childbirths and caesarean sections by more than 20% during the Ebola virus disease (EVD).²⁰

This could be related to community outreach interventions on health service utilization and quality of care improvements during and after Ebola (2014 and 2015), which may have helped encourage clients to use maternal health services. However, measures to ensure adequate management of obstetric emergencies by health workers during critical periods would need to be implemented.

Our study also found that women who had at least one previous delivery visited the hospital for an absolute maternal indication more often during Ebola than those who did not have a previous delivery. This could probably be explained by the habit, confidence, and experience of some multiparous women in previous deliveries that lead them to go to health facilities for care in a health emergency. This indicates that efforts should be made through community awareness campaigns and the media (radio and television) to ensure coverage of emergency obstetric needs among young, sexually active women who need it most.

CONCLUSION

The results of this study have shown that the Ebola epidemic did not have a significant impact on the frequency of absolute maternal indications or on the types of major obstetric interventions. However, it has contributed to a significant increase in maternal and neonatal deaths. It would be very wise to implement measures to motivate health workers to effectively manage obstetrical emergencies during critical periods. In addition, all the health facilities must have the ability to provide quality care to women and children in case of a health emergency.

ACKNOWLEDGMENTS

The authors would like to thank the participants in this study and all the staff of the maternity ward of the Kindia regional hospital. They would also like to thank the teaching researchers of the chair of public health at the Gamal Abdel Nasser University in Conakry, Guinea.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Camara S, Balde MD, Camara BS, Diallo A, Diallo R, Toure AO, et al. Effects of Ebola epidemic on obstetrical emergencies and outcomes in the region of Kindia, Guinea. *Int J Reprod Contracept Obstet Gynecol* 2022;11:3254-9.