

Community-Based Pregnant Women Initiative to Support Emergency Obstetric Care in Kimpese Health Zone, Province of Kongo Central, the Democratic Republic of the Congo

Lukanu Ngwala Philippe^{1,2,3*} , Nkodila Natuhoyila Aliocha¹, Landu Niati Jean Destin³, Matondo Batomanitu Joél³, Mahema Lutabu Roger⁴, Fina Lubaki Jean Pierre¹

¹Department of Family Medicine & Primary Health Care, School of Medicine, The Protestant University of Congo, Kinshasa, DR Congo

²University of Mwene Ditu, Kasai, DR Congo

³Kimpese Health Zone, Kimpese, DR Congo

⁴Institut Medical Evangelique, Kimpese, DR Congo

Email: *phlukanu@yahoo.fr

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Abstract

Background: Maternal mortality remains high in low- and middle-income countries. Many maternal deaths occur within hospitals often due to a lack of access to basic emergency obstetric care (Emoc). **Aim:** The study aimed to assess the effectiveness of a community-based pregnant women initiative to support emergency obstetric care in a Kimpese Health Zone (HZ). **Setting:** Kimpese Health Zone, Province of Central Kongo, in the South Western of the Democratic Republic of the Congo. **Results:** Four hundred and thirty-five women were received for Emoc between January 2008 and June 2011, 75% were aged between 18 - 34 years old. Mechanical dystocia was the first cause of emergencies (34%). The diagnosis concordance between the transfers and the reasons for the transfer was weak and not statistically significant (Kappa = 0.350, p = 0.405). After the evaluation of the newborns, a favorable outcome was noted after the 10th day of de follow-up (95.4%). In multivariate analysis, the lack of ANC visits, the waiting time > 1 hour before the visit at the referral hospital, and assisted birth were the factors associated with the unfavorable obstetric outcomes. **Conclusion:** Improvement in maternal health involves better preparation of the community and the healthcare system for Emergency Obstetric Care. Research is needed for innovative and effective interventions in resource constraints settings.

Keywords

Emergency Obstetric Care, Maternal, Mortality, Rural, Pregnant Women

1. Introduction

Maternal mortality remains a common public health problem, and progress on reducing the maternal mortality ratio remains low and continues to stagnate in countries where the issues are most acute [1]. An estimated 830 mothers die from preventable causes every day, of which 99% are in the low and middle-income countries (LMIC) [2]. Between 2008 and 2011, worldwide, maternal mortality has reduced worldwide by 44% to 216/per 100,000 live births [3]. Five years after the launch of Sustainable Development Goals (SDGs), maternal mortality remains high in LMIC. A third of all pregnant women have no access to antenatal care (ANC), and deliveries occur outside health facilities. Around 60% of all deliveries are attended by skilled staff [4]. Ensuring births with a skilled attendant and births in secure health facilities has been the critical focus of attempts to reduce maternal mortality in the last two decades [5] [6] [7] [8] [9]. Many women in LMIC live far away or across the rugged landscapes from facilities, especially in rural areas. Transport is not always available or may be difficult or too slow, particularly for women in labor or when complications have developed [4].

In Sub-Saharan Africa (SSA), the maternal mortality rate remains high. Women are still facing very high risks of dying during pregnancy and childbirth, and most of those risks are preventable. Many maternal deaths occur within hospitals, [7] often due to a lack of access to basic emergency obstetric care (EmOC), a significant factor contributing to high maternal mortality [8]. EmOC is a subset of Obstetric Care referring to the care of women and newborns during pregnancy, delivery, and the time after delivery; its main components are: treatment for sepsis, treatment for eclampsia, treatment for prolonged or obstructed labor, post-abortion care (PAC), treatment for incomplete miscarriage, removal of the placenta, assisted delivery using forceps or suction, and also surgery (cesarean section), anesthesia, safe blood transfusion observing universal HIV precautions [9].

The causes of maternal mortality and morbidity are evident [10], and effective interventions to combat them are well known. Women's social, political, and economic barriers might have contributed to the persistence of the high maternal mortality rate.

The Democratic Republic of Congo is one of the countries with a high maternal morbidity and mortality rate in SSA, with around 840/100,000 mortality rate [11]. This study aims to assess the effectiveness of a community-based pregnant women initiative to support Emergency obstetrics Care for improving access to obstetric care in Kimpese Health Zone (HZ), Kongo Central Province in DRC. Having access to skilled birth attendants and referral facilities for managing Emoc reduces the maternal mortality rate. However, access to care is fragile, particularly for those living in communities with difficult roads, limited transport options, and resources [12] [13].

2. Methods

2.1. Study Type

This was a cross-sectional and analytical study carried out in the health centers of the Kimpese health zone, Province of Central Kongo, the Democratic Republic of the Congo.

2.2. Study Setting

The Kimpese health zone is one of the 31 HZs in the Kongo Central province, in the southwestern part of the DRC, and one of the health zones with a high maternal mortality rate. Pregnant women attending antenatal care (ANC) were encouraged to establish health insurance to assist pregnant women presenting a complication during pregnancy. All pregnant women who contributed monthly for an equivalent of \$0.25 during the first ANC consultation were included in this study. The funds collected monthly allowed us to buy emergency obstetric care (Emoc) management kits and place these at 3 reference facilities (1 General referral hospital and two referral health Centers). In case of need, the pregnant women would not pay any cost to benefit care services, especially the Cesarean section.

2.3. Study Population

The study population consisted of pregnant women referred Emoc and benefits women's health mutual funds to reduce maternal and perinatal mortality. A total of 435 women were registered for Emoc at the time of the study.

2.4. Data Collection

Data collection was carried out using a pre-tested questionnaire intended for pregnant women with Emoc, who attended the various healthcare facilities organizing ANC consultations in the Kimpese health zone between January 2008 and June 2011. The nurses were trained on the aim and objectives of the study. The information sought from participants was sociodemographic characteristics, obstetric history, labor history, diagnosis at the referring facility, diagnosis at the referral center/hospital, care received, and outcomes of the pregnancy.

2.5. Data Analysis

After encoding and validating the data, they were entered using Microsoft Excel 2010 software. Data analysis was performed with IBM-SPSS 21 software. Quantitative variables were expressed as mean \pm standard deviation if normally distributed and as medians and interquartile range if non-normally distributed, while qualitative variables were expressed as percentages. The Chi-square test was used to compare the proportions. The concordance between the reason for transfer by the primary facility and the diagnosis made at the referral facility was assessed using the Kappa index. We used logistic regression backward stepwise to find out factors associated with unfavorable outcomes. The threshold of statistical significance was set at $p < 0.05$.

2.6. Ethical Considerations

Authorization was obtained from the authorities of Kimpese HZ, through its central office, which involves other referral health facilities that can offer emergency obstetric care and ANC. The study had respected the rules of confidentiality, justice, and women's rights. Participation in the mutual was voluntary, and there were no restrictions on those who could not participate financially or refused to participate.

3. Results

Four hundred and thirty-five women were received for Emoc between January 2008 and June 2011, among which 75% were between 18 - 34 years old. First-time mothers represented 40% of Emoc admissions and, 53% of women seen in obstetric emergencies did not attend ANC visits. Mechanical dystocia was the first cause of emergencies (34%). Most emergencies were received from 4 p.m. to 7 a.m. The interval between arrival and visit by a care provider was ≥ 1 h in 70.8% of cases. At the same time, the effective management period of lifting the emergency was ≤ 1 hour at 27.1% and ≥ 1 hour at 72.9% (**Table 1**).

Table 2 presents the diagnosis at the referring center, the diagnosis at the referral center/Hospital, and the diagnosis concordance. The diagnosis concordance between the referral transfers facility and the primary transfer facility was weak and not statistically significant (Kappa = 0.350, $p = 0.405$).

The majority of the newborns had a favorable outcome after five days (94.2%), ten days (93.1%), and after ten days (95.5%), with perinatal hospital mortality of 0.7%, 1.2%, and 2.1% respectively (**Figure 1**).

The lack of antenatal consultations, the waiting time before the consultation by qualified staff, and the waiting time between the consultation and the effective management of the emergency at the hospital level are the determinants of the unfavorable obstetric emergency outcomes in the Kimpese health zone in univariate analysis (**Table 3**).

In multivariate analysis, the lack of ANC visits, the waiting time > 1 hour before the visit at the referral center, and assisted birth were the factors associated with the unfavorable birth outcomes (**Table 4**).

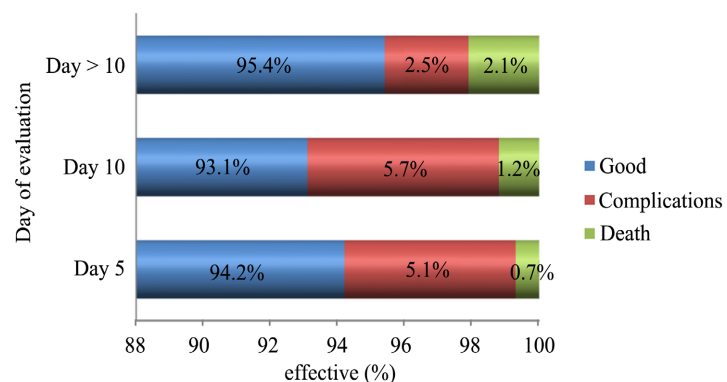


Figure 1. Status of newborns.

Table 1. General characteristics of pregnant women admitted in an emergency to the general referral hospital of the Kimpese health zone, N = 435.

	Frequency (n)	% (IC 95%)
Age		
<18 yrs	37	8.5 (6.0 - 11.3)
18 - 34 yrs	330	75.9 (71.7 - 80.0)
≥35 yrs	68	15.6 (12.2 - 19.3)
Parity		
Primipara	175	40.2 (35.6 - 44.8)
Paucipara	144	
Multipara	116	26.7 (22.5 - 30.8)
Gravidity		
Primigravida	150	34.5 (30.1 - 38.9)
Multigeste	285	65.5 (61.1 - 69.9)
Antenatal care		
Attendance	202	46.4 (41.8 - 51.0)
No attendance	233	53.6 (49.0 - 58.2)
Referral times		
On-call (16 - 7 h)	267	61.4 (57.0 - 65.7)
Day service (7 h - 16 h)	168	38.6 (34.3 - 43.0)
Reasons for referral		
CPD/FD	150	34.5 (30.3 - 38.9)
Better management	116	26.7 (22.8 - 31.0)
Dynamic dystocia	68	15.6 (12.4 - 19.3)
Genital hemorrhage	39	9.0 (6.4 - 11.7)
Preeclampsia	26	6.0 (22.8 - 31.0)
Scarred uterus	15	3.4 (1.8 - 5.3)
labor	12	2.8 (1.4 - 4.4)
Boundary basin	9	2.1 (0.9 - 3.7)
Waiting time before visit		
≤1 hour	308	70.8 (66.4 - 75.2)
>1 hour	127	29.2 (24.8 - 33.6)
Interval time between visit and Emoc		
≤1 hour	118	27.1 (23.2 - 31.3)
>1 hour	285	72.9 (68.7 - 76.8)

Continued

Assisted delivery		
Yes	264	60.7 (56.3 - 65.5)
No	171	39.3 (34.5 - 43.7)
Hospital diagnosis		
CPD/FD	247	56.8 (52.2 - 61.6)
Dynamic dystocia	85	19.5 (15.9 - 23.4)
Preeclampsia	40	9.2 (6.7 - 12.0)
labor	23	5.3 (3.2 - 7.6)
hemorrhage	19	4.4 (2.5 - 6.4)
Boundary basin	7	1.6 (0.7 - 2.8)
Peritonitis	6	1.4 (0.5 - 2.8)
Scarred uterus	6	1.4 (0.5 - 2.5)
labor	2	0.5 (0.0 - 1.1)

Legend: CPD: Cephalo-pelvic disproportion, FD: Fetal distress.

Table 2. Diagnosis concordance between the reasons for transfer and the diagnosis at the hospital level.

Diagnosis at the referral center	Reason for referral								Total
	Boundary basin	CPD/FD	Dynamic dystocia	hemorrhage	labor	Better management	Preeclampsia	Scarred uterus	
Boundary basin	0	5	0	0	0	1	1	0	7
CPD/FD	5	85	44	23	7	58	17	8	247
Dynamic Dystocia	2	27	16	7	1	26	1	5	85
Hemorrhage	1	10	3	1	1	1	1	1	19
The threat of premature birth	0	0	1	1	0	0	0	0	2
Peritonitis	0	3	0	2	0	1	0	0	6
Preeclampsia	1	12	3	4	1	15	3	1	40
Scarred uterus	0	1	1	0	1	2	1	0	6
Labor	0	7	0	1	1	12	2	0	23
Total	9	150	68	39	12	116	26	15	435

Legend: CPD: Cephalo-pelvic disproportion, FD: Fetal distress.

Table 3. General outcomes characteristics of the patients.

	Unfavorable outcome N (%)	Favorable outcome N (%)	P
Age			0.248
<18 years	0 (0.0)	37 (8.9)	
18 - 34 years	17 (85.0)	313 (75.4)	
≥35 years	3 (15.0)	65 (15.7)	
Parity			0.568
Primipara	6 (30.0)	169 (40.7)	
Paucipara	7 (35.0)	137 (33.0)	
Multipara	7 (35.0)	109 (26.3)	
Number of pregnancies			0.255
Primigravida	5 (25.0)	145 (34.9)	
Multigeste	15 (75.0)	270 (65.1)	
Referral time			0.201
On-call (16 - 7 h)	10 (50.0)	157 (61.9)	
Day (7 h - 16 h)	10 (50.0)	158 (38.1)	
Antenatal care			<0.001
Attendance	2 (10.0)	200 (48.2)	
No attendance	18 (90.0)	215 (51.8)	
Waiting time before visit			<0.001
≤1 hour	4 (20.0)	304 (73.3)	
>1 hour	16 (80.0)	111 (26.7)	
Waiting time before appropriate care			0.008
≤1 hour	1 (5.0)	117 (28.2)	
>1 hour	19 (95.0)	298 (71.8)	
Assisted birth			<0.001
Yes	3 (15.0)	262 (63.1)	
No	17 (85.0)	153 (36.9)	

Table 4. Associated factors with the unfavorable obstetrical emergency outcomes at a referral hospital in Kimpese Health Zone.

Variables	Univariate analysis		Multivariate analysis	
	p	OR (IC 95%)	p	ORa (IC 95%)
Antenatal care				
Followed		1		1
Not adequately followed	0.005	8.37 (1.92 - 36.5)	0.018	6.87 (1.40 - 33.82)

Continued

Waiting time for consultation				
≤1 hour		1		1
>1 hour	<0.001	10.96 (3.59 - 33.48)	0.005	6.99 (1.78 - 27.53)
Waiting time before appropriate care				
≤1 hour		1		1
>1 hour	0.021	5.96 (1.31 - 27.09)	0.099	3.88 (0.77 - 9.47)
Assisted births				
Yes		1		1
No	<0.001	9.70 (2.80 - 33.65)	0.003	10.93 (2.25 - 16.85)

4. Discussion

Our study found that the majority of pregnant referred for Emoc were young and were received in the first hour of hospital admission. The highest diagnosis concordance was for mechanical obstructed labor. There were favorable outcomes in most of the cases.

Seventy-five percent of pregnant women referred for Emoc were between 18 and 34 years old. Our findings corroborated those of other studies which also find that young pregnant women are more concerned [13] [14].

Seventy-three percent of pregnant women who received emergency obstetric care were received in the first hour of hospital admission, 27.1% received appropriate care within 1 hour after the consultation, and 72.8% received proper care in delay > one hour. The waiting time seems to be reduced compared to the study in Benin [15]. The interval time between diagnosis and intervention was <1 hour in 5% of cases and >1 hour in 95%. A study, in the Gambia [16], noted that estimated time intervals between diagnosis and initiation of definitive treatment varied by condition or management. Women who received blood transfusions, Magnesium Sulphate (MgSO₄), or had a cesarean section were associated with considerably longer delays with a reported average time of 48 hours (ranged 5 - 72 hrs), 12 hrs (ranged 4 - 48 hrs), and 24 hrs (ranged 2 - 72 hrs) respectively. The time interval in our study seems to be reduced for the simple reason that the pregnant women insurance/mutual contributed to the availability of emergency kits, reducing preparation time for action.

The delay in care was observed in 71.8% of pregnant women referred for emergency obstetric care at the referral hospital. Care time is essential to improve maternal and child survival in the management of Emoc [17]. This trend was also observed in other studies assessing the accessibility of obstetric care [18], but higher than that found in a similar study in Bangladesh [18]. This difference can be explained by the poor integration of universal health coverage. It is essential to act on the delays in access to quality care as one of the critical de-

terminants of preventable maternal death [19] [20] in Emoc cases because even in the presence of adequate antenatal care, it is established that childbirth can be complicated, and the delay of care is essential to save the life of mother and child [21].

The mechanical obstructed labor was the major reason for our study. Mechanical dystocia was also found to be the most reason for referral in a study in Burkina Faso [22]. Our findings were different from Prathiba [23], in India, and Guindo [23], in Mali. Prathiba *et al.* [23], in India, noted that premature rupture of membranes (12.6%), oligohydramnios (8.7%), and pregnancy-induced hypertension (7.3%) were the most reasons for the referral. Guindo [24], in Mali, found that the most reasons for referral were Cephalo Pelvic Disproportion, anemia, infection, and extrauterine pregnancy. The different contexts of care and health system development can explain the difference. In India, primary health care can dispose of minimum equipment to monitor pregnancy and fetal growth.

The highest diagnosis concordance in our study was for mechanical obstructed labor with 56.6%. Guindo [24], in Mali, found that 42.57% of diagnoses were concordant between referring center and the Sikasso Hospital. Sonnier *et al.* [25], found that 38.24% of referral ultrasounds for twin-to-twin transfusion syndrome and ultrasound findings on arrival at the tertiary center were correctly assessed.

In our study, multivariate analysis found that lack of antenatal care, long time to reach before the visit, and a long time to access appropriate emergency obstetric care were predictors of unfavorable obstetric outcomes. Our findings were retrieved in several studies [26].

Strengths and limitations

The limited data collection in a single health zone, therefore, does not allow the results to be generalized throughout the province of Kongo Central. The study being cross-sectional does not allow us to establish the causal link. Despite the limitations, this study provides important cross-sectional data on the time to the management of obstetric emergencies in the Kimpese health zone. Further longitudinal studies should be conducted to confirm the findings and formulate guidelines for urgent management of obstetric emergencies in the country.

5. Conclusion

Improvement in maternal health involves better preparation of the community and the healthcare system for Emergency Obstetric Care. Research is needed for innovative and effective interventions in resource constraints settings.

Author Contributions

LNP initiated the concept, chose the study design and setting, contributed significantly to the proposal, participated in data collection, data analysis, interpretation, and drafted the paper and manuscript.

NNA, NNJ, MBJ, MLR, and FLJ gave comments on the proposal development, involved data analysis and interpretation of the findings, took part in drafting

the paper, and prepared the final manuscript. All the authors read and approved the final manuscript sent for publication.

Conflicts of Interest

No potential conflict of interest was reported by the authors.

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