



Use of Delivery Interventions in Basic Maternity Units in the City of Kindu in the Democratic Republic of Congo: "Major Challenge for Improving the Quality of Intrapartum Care for a Positive Birth Experience".

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ABSTRACT

Childbirth interventions are still common in the basic maternity units of the city of Kindu in the Democratic Republic of Congo. This increasing medicalization of the delivery process tends to diminish the woman's own ability to give birth and to produce negative effects on her health and her delivery experience. The objective of this study was to determine the rate of childbirth interventions in basic maternity hospitals in the city of Kindu and the factors that influence them. This was a descriptive cross-sectional survey of 3004 women registered in all the basic maternity hospitals in the city of Kindu during the year 2019. Information related to age, level of education, occupation or profession, parity, interventions performed at delivery as well as factors related to health care providers were collected from the documentary analysis of the records of the deliveries. The data collected were encoded on Excel sheets and exported to STATA 13 software. The overall rate of delivery interventions in the basic maternity units of the city of Kindu in 2019 was 70.57%. Factors determining delivery interventions were: provider education ($p = 0.000$), provider education ($p = 0.000$), and emergency obstetric and neonatal care training ($p = 0.000$). Delivery interventions are a serious reproductive and perinatal health problem in the basic maternity units of the city of Kindu. This study suggests the need to implement strategies that can reduce the extent of these unhelpful and even dangerous interventions during labor and delivery, including the establishment of a protocol for the reduction of delivery interventions for midwives, the popularization of the World Health Organization's recommendations on intrapartum care for a positive delivery experience, and the sensitization of all health care providers on the observance of evidence-based medicine.

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1. Introduction

Childbirth interventions are procedures performed during labor and eutocic delivery.

Although medical and technological advances in maternity care have improved the care of pregnant women, parturients, and newborns in recent decades, there are still significant problems related to the overuse of obstetric interventions during labor in the world in general, in the Democratic Republic of Congo, and in particular in the city of Kindu.

These interventions (use of oxytocin, artificial rupture of membranes, episiotomy, instrumental extractions, etc.) have become commonplace, if not routine. When used appropriately, they can be life-saving procedures, but when used routinely, without valid indications, these interventions are dangerous and can cause adverse effects on the woman's health and her birthing experience. For this reason, in recent years, some long-accepted practices have come under scrutiny.

Despite their benefits, childbirth interventions no longer need to do without evidence-based medicine. For example, Belghiti *et al* (2011), demonstrated that oxytocin use during labor was associated with an increased risk of postpartum hemorrhage.

The World Health Organization (2018), stated that "childbirth is a natural process and in a normal birth there should be a valid reason to interfere with this natural process" and encouraged evidence-based practices. The practices encouraged were to avoid unnecessary augmentation of labor, to facilitate upright positioning at birth, and to restrict the use of oxytocin and the use of routine episiotomy.

The principle of the clinical practice guidelines is to assist the clinician in banning inappropriate or unnecessary medical practices and to assist the clinician in making a medical decision by providing a synthesis of the existing scientific evidence.

Natural childbirth is a physiologic labor, without anesthesia, that has not been altered by routine interventions

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and ends in a spontaneous vaginal delivery (Gagnon *et al*, 2014). It can proceed without complication for the majority of women and children. If labor progresses normally, if the woman and child are doing well, they need no additional interventions to speed up labor.

Unpredictable moment, we would like it to be as physiological as possible, but often some interventions deemed less necessary and often not consented by parturients are performed.

According to the WHO (2017), the majority of some 140 million births worldwide each year involve women with no risk factors for complications to themselves or their children at the onset and during labor. However, studies have shown that a significant proportion of healthy pregnant women undergo at least one clinical intervention during labor. They are also subjected to unnecessary and punctually dangerous routine interventions (WHO, 2018).

Binfa *et al* (2016), report that 92, 7% of women in Chile had been subjected to obstetric interventions of artificial rupture of membranes, oxytocin and epidural analgesia.

According to Kringeland *et al* (2010), 56.1% of women with vaginal deliveries in Norway had undergone an obstetric intervention.

To accelerate labor and thus reduce its duration, oxytocics and artificial rupture of membranes are frequently used. More than 60% of women receive oxytocin during labor worldwide (Cécile Thibert, 2016).

In France, for example, 64% of women received oxytocin during labor and artificial rupture of membranes in 51% of women in spontaneous labor. (Belghiti *et al*, 2010).

The rates of oxytocin use during labor and artificial rupture of membranes in Brazil were 59.5% and 74.4%, respectively (Vogt *et al*, 2011)

Regarding assisted delivery, the average rate of instrumental extraction in France is 16.5% (Mangin *et al*, 2010).

According to Le Ray *et al* (2014), performing an episiotomy is not recommended to reduce the risk of obstetric anal sphincter injuries. However, this practice remains common in many countries around the world.

The episiotomy rate in Brazil is 54.9% in standard maternity hospitals (Vogt *et al*, 2011). It is 69% in Mexico for primiparous women, 68% for primiparous women in France, and around 12% in the United States, (<http://www.docteur benchimol.com>).

In Africa, it is 27% in Zimbabwe and 55% in Nigeria (Beverley Beech, 2014).

In the Democratic Republic of Congo, 338,829 women received oxytocin during labor between January and October 2019, with 50,746 women having episiotomies during delivery and 2,973 cases of vacuum-assisted deliveries reported during the same period (DRC Ministry of Health, 2019).

The major problem in the DRC concerns the low qualification of health personnel. The proportion of health facilities with qualified reproductive health personnel is low. Only 27% of health facilities have staff trained in basic obstetric care (Ministry of Health DRC, 2017).

The results of surveys conducted in 2011 by the Ministry of Higher Education and Universities of the DRC and the United Nations Population Fund on the status of the training of midwives in the 38 Higher Technical Institutes organizing midwifery orientation in the country showed a number of graduated midwives far below the World Health Organization standards of one midwife per 5,000 inhabitants.

This situation was confirmed by the DRC's 2013-2014 Demographic and Health Survey report, which revealed that only 38% of deliveries were attended by a midwife in the five years prior to the survey. (DHS-DRC II, 2013-2014, p8).

In Maniema Province, 9059 women in labor received oxytocin for 76,990 parturients and 3,124 received episiotomy for 76,990 parturients during the period January to October 2019. The Kindu health zone alone recorded 2,228 cases of episiotomies (Maniema Provincial Health Division, 2019).

No study has been initiated to date on childbirth interventions in the Democratic Republic of Congo in general and in Maniema Province in particular, yet the situation remains alarming in basic maternity facilities, where many women in labor are subjected to unnecessary and occasionally dangerous routine interventions.

We estimated that there is a hypermedicalization of the delivery process in the basic maternity hospitals of the city of Kindu due to the lack of qualified personnel in reproductive health. In reality, it is the nurses and other health professionals, the majority of whom have no real midwifery skills, who assist in childbirth in the basic maternity hospitals of the city of Kindu.

Thus, we proposed to carry out this study in the basic maternity hospitals of the city of Kindu in order to reassure ourselves if deliveries are systematically performed by competent health personnel. Indeed, the question at the center of this study is whether the high rate of delivery interventions in the basic maternity units of the city of Kindu is associated with the training of health care providers.

The objective of this study was to determine the rate of childbirth interventions in the basic maternity units of the city of Kindu and the factors that influence them.

2. Methods

This is a descriptive cross-sectional survey that attempted to describe delivery interventions in basic maternity hospitals in the city of Kindu and the factors that influence them.

2.1. Population and sample

The study population consisted of all women who delivered in all basic maternity hospitals in the city of Kindu during the year 2019. For this purpose, we used the records of the deliveries. Given that the number of deliveries remains low in the basic maternity hospitals of the city of Kindu, the sample includes all deliveries registered in these hospitals in 2019 (n = 3004). Our sample was therefore exhaustive.

2.2 Data collection

Information related to age, education level, parity, interventions performed at delivery, and provider factors was collected from the literature review of the birth records.

The most common interventions performed in basic maternity hospitals were studied in this study. These were:

- Interventions to accelerate labor (use of oxytocin, premature rupture of membranes);
 - Techniques to prevent perineal injury (episiotomies); and
 - Instrumental extractions (forceps and vacuum);
- All in all, the following data were retained:
- Age (under 15 years, 16-39 years, and 40-49 years);
 - Educational level (None, primary, secondary and higher/university);
 - Occupation (no occupation, farmer, civil servant, businesswoman, student, other)
 - Parity (primiparous, pauperous, multiparous and large multiparous);
 - Types of interventions. These are the interventions most commonly performed in basic maternity wards: those aimed

at accelerating labor (the use of oxytocin and techniques for preventing perineal injuries, episiotomies);

Regarding the factors related to the care providers, the literature review allowed us to know:

- The provider's educational background (Midwife, hospital, pediatrics, Gyneco-Obstetrics, medicine, other to be specified)

- The provider's level of education (Matron, A3 graduate, A2 graduate, graduate or A1, bachelor, medical doctor)

- Training in emergency obstetric and neonatal care (yes or no)

2.3. Data analysis

The collected data were encoded on Excel sheets and exported to STATA 13 software.

To describe the qualitative variables in our sample, we calculated the frequency and percentage, and for the quantitative variables, we calculated the means and their standard deviations. To investigate the relationship between delivery interventions and provider factors, we calculated the contingency chi-square. We considered the difference significant when $p < 0.05$.

This study was conducted with respect for the law and the human person. Authorizations were requested and obtained at both the provincial and local levels from the Maniema Provincial Ministry of Public Health, and the identity of the persons subjected to the study was protected.

3. Results

A. Socio-demographic characteristics of the deliveries

Table 1. Distribution of women who gave birth (n = 3004) by age group.

Variable	f	%	Average \pm DS	Min	Max
Age groups			26.8 \pm 7.7years	14	45
<15 years old	117	3.89			
16-39 years old	2685	89.38			
40-49 years old	202	6.72			

The most represented age group was between 16 and 39 years (89.38%) and their average age was 26.8 \pm 7.7 years with a standard deviation of 7.7 years with extremes at 14 and 45 years

Table 2. Distribution of women giving birth (n = 3004) by marital status, education, occupation, and parity

Variable	n (3004)	%
Marital status		
Single	320	10.65
Married	2455	81.72
Other (Divorced & widowed)	229	7.63
Level of education		
None	308	10.25
Primary	795	26.46
Secondary	1521	53.96
Higher and University	380	9.33
Occupancy		
No	1096	36.48
Farmer	807	26.86
Shopkeeper	518	17.24
Civil servant	390	12.98
Student/Pupil	13	0.43
Other	180	6.01
Parity		
Paucipare	643	21.4
Primiparous	770	25.63
Multiparous	1052	35.02
Large multiparous	539	17.94

The vast majority of women who gave birth were married (81.72%), but single women and divorcees were represented by small proportions (10.65% and 7.63% respectively).

As for the level of education, the majority of the women had secondary education (53.96%) and 26.46% had primary education. As for occupation, 36.48% of the birth attendants had no occupation, followed respectively by farmers, traders, civil servants and other unspecified 26.86%, 17.24%, 12.98% and 6.01%.

Table 3. Individual characteristics of the providers

Variables	n(3004)	%	Average \pm DS	Min	Max
Seniority in the profession			8.7 \pm 2.4 years	2	16
Length of service					
1 to 5 years	333				
11.09					
6 à 10 years	1237				
41.18					
11 à 16 years	1434				
47.74					
Level of education					
Matron	560	18.64			
A3	231	7.69			
A2	707	23.54			
A1	1256	41.81			
A0	206	6.86			
Doctor of Medicine	44	1.46			
Training in SONU					
Yes	1589	52.9			
No	1415	47.1			
Branch					
Midwife	615	20.47			
hospital	1608	53.53			
Gyneco-Obstetrics	103	1.43			
Pediatrics	58	1.93			
General medicine	40	1.33			
Others	580	19.3			

The results in the table below show that 47.74% of the providers had a seniority of between 11 and 16 years and 41.18% had a seniority of between 6 and 10 years. The average seniority was 8.7 \pm 2.4 years with a standard deviation of 2.4 years, with extremes at 2 and 16 years.

Regarding the level of education, 41.81% were graduates or A1, followed respectively by A2 equivalent of state graduates (23.54%), matrons (18.64%), A3 or auxiliaries (7.69%), bachelors or A0 (6.86%) and finally doctors of medicine (1.4%)

As for training in emergency obstetric and neonatal care, the majority of providers were trained (52.9%) and finally, regarding the pathway followed by the providers, the majority of providers had followed the hospital pathway (53.53%) as opposed to only 20.47% of midwives (birth attendants).

B. Results related to delivery interventions

Table 4. Overall rate of delivery interventions in the basic maternity hospitals of the city of Kindu

Number of deliveries in 2019	(n = 3004)	%
Intervention at delivery	2120	70.57
Delivery without intervention	884	29.43

The overall rate of interventions during childbirth in the basic maternity hospitals of the city of Kindu is 70.57%.

Table 5. Distribution of cases by type of intervention during delivery

Types of intervention	n(3004)	%
Oxytocin	1073	35,72
Episiotomy	752	25,03
Artificial rupture of the membranes	273	9,09
Forceps and vacuum	22	0,73
Without interventions	884	29,43

The use of oxytocin to accelerate labor is the most observed intervention with 35.72% of cases, however 25.03% of the deliveries underwent episiotomy, artificial rupture of membranes was performed in 9.09% of women in spontaneous labor, 0.73% of instrumental extraction (forceps and suction cup) and 29.43 of women underwent no intervention.

Table 6. Relationship between length of service of health care providers and use of delivery interventions

Seniority	Intervention at delivery (n=3004)		P
	Oui	Non	
1 to 5 years	333(11,09%)	87 (2,90%)	0,633
6 to 10 years old	848(28,23%)	309(10,27%)	
More than 10 years	939(31,26%)	488(16,25%)	

We note that there was no relationship between provider time in practice or seniority and use of delivery interventions (p-value = 0.633).

Table 7. Relationship between provider training in emergency obstetric and neonatal care and use of delivery interventions

Variables	Intervention at delivery (n=3004)		p
	Oui	Non	
Emergency Obstetrical and Neonatal Care (EmONC) Training	1589(52,90%)	1415(47,10%)	0.000

We note that providers' training in emergency obstetric and neonatal care has a significant influence on delivery interventions (p-value = 0.000).

Table 8. Relationship between providers' level of education and use of delivery interventions

Niveau d'instruction	Intervention at delivery (n=3004)		P
	Oui	Non	
Matron	365(12,15%)	195(6,49%)	0,000
A3 (Auxiliary)	189(6,29%)	42(1,40%)	
A2 (State graduate)	525(17,48%)	182(6,06%)	
A1(Graduate)	884(29,43%)	372(12,38%)	
A0(Licensed)	164(5,46%)	42(1,40%)	
Doctor of Medicine	32(1,06%)	12(0,40%)	

We find that providers' education level significantly influences the use of delivery interventions (p-value = 0.000).

Table 9. Relationship between provider education and use of delivery interventions

Field of study	Intervention at delivery (n=3004)		p
	Oui	Non	
Midwife hospital	261(8,69%)	354(11,78%)	0,000
Gyneco-Obstetrics	1343(44,71%)	265(8,82%)	
Pediatrics	85(2,83%)	18(0,60%)	
General medicine	42(1,40%)	16(0,53%)	
Others	27(0,90%)	13(0,43%)	
	362(12,05%)	218(7,26%)	

It is observed that the provider's educational pathway significantly influences the use of delivery interventions (p-value = 0.000)

4. Discussion

The women included in this study were relatively young, with an average age of 26.8 ± 7.7 years, mostly married, housewives and multiparous. The vast majority of them had a secondary school education. Clearly, these women were removed from the educational system at an early age to take care of household tasks.

Concerning the profile of the health care providers, only 20.47% of the women were assisted by a midwife (birth attendant), whereas the majority of the health care providers who conducted deliveries in the basic maternity centers of the city of Kindu had followed the hospital pathway (general care), had been trained in emergency obstetrical and neonatal care (EmONC), and had a degree (A1) with an average of 8.7 ± 2.4 years of service.

This rate is similar to that found in the DRC Demographic and Health Survey Report (DHS-RDC II, 2013-2014), according to which only 38% of deliveries were attended by a midwife in the last five years preceding the survey.

In addition, the results of surveys conducted in 2011 by the Ministry of Higher Education and Universities of the DRC and the United Nations Population Fund on the status of training of midwives in the 38 Higher Technical Institutes organizing the midwifery sector in the country showed a number of graduated midwives far below the World Health Organization standards of one midwife per 5,000 inhabitants.

The report by Jim Campbell *et al* (2011) on midwifery around the world, states that a health care system that relies on unqualified health care professionals to care for mothers and newborns would be dangerous to women, newborns, families, and the population.

In our study, the overall rate of delivery interventions in the basic maternity units of the city of Kindu was 70.57%. This high rate constitutes a serious reproductive and perinatal health problem, because these interventions are used routinely, without valid indications, they become dangerous and can cause adverse effects on the health of the woman and her childbirth experience.

This rate is lower than the 92.7% found by Binfa *et al*, (2016) in their study on the evaluation of the implementation of the Integrated and Humanized Midwifery Service Model in Chile. This is significantly higher than that found in Norway by Kringeland *et al* (2010) of 56.1%.

Regarding the types of interventions recorded, the results of this study reveal that the use of oxytocin to accelerate labor and episiotomy to prevent perineal lesions were the types of interventions widely used by providers in the basic maternity hospitals of the city of Kindu in the order of 35.72% and 25.03% respectively.

According to Cécile Thibert, (2016) more than 60% of women receive oxytocin during labor worldwide. This oxytocin use rate of 29.46% is lower than the 43% found by the national perinatal survey in France (2010),

Other authors had found higher rates than ours. This is the case of Vogt *et al*, (2011) in Brazil who found the rate of oxytocin use of 59.5% and the rate of episiotomy of 54.9%. In Nigeria, Beverley Beech, (2014), had found an episiotomy rate of 55%.

We believe that the difference in rates between our study and the studies cited above, particularly those conducted in Brazil and Nigeria, is due to the lack of traceability of

information related to delivery interventions in the patient's medical records. In fact, delivery interventions have never been the subject of any notification in the DRC's health information system and consequently they go unnoticed, regardless of the harmful consequences they have on the health of mothers and newborns.

According to Le Ray *et al* (2014), the practice of episiotomy is not recommended to reduce the risk of obstetric anal sphincter injuries. However, this practice, although considered obstetric violence, remains commonplace in several basic maternity hospitals in the city of Kindu.

A study by Belghiti *et al* in France (2013) demonstrated that the use of oxytocin during labor was associated with an increased risk of postpartum hemorrhage with a dose-dependent effect and an increased risk of severe postpartum hemorrhage even with moderate doses of oxytocin.

Satin *et al* (2012) demonstrated that oxytocin use appears to increase the risk of uterine hyperstimulation, putting the mother and fetus at risk for hypoxia and cesarean section during labor.

In this study, we found that there was a significant association between delivery interventions and the provider's course of study (p-value = 0.000). Indeed, the provider's educational pathway significantly influenced the use of delivery interventions. In other words, the providers who followed the other educational pathway had more recourse to delivery interventions in the basic maternity units in the city of Kindu.

Thus, we agree with Jim Campbell *et al* (2011) that the diversity of tracks explains many of the problems that arise with respect to the quality of intrapartum care. For one possible indicator for examining the provision of care is the proportion of women who are assisted by skilled personnel during labor and delivery.

The quality of intrapartum care is not only a function of the availability of services and care, but more importantly, the availability of skilled and competent personnel to ensure that women and newborns are not exposed to the adverse effects of unnecessary and dangerous interventions (Jim Campbell *et al* 2011).

The education level of the provider significantly influenced the use of delivery interventions (p-value = 0.000). This shows that there is a relationship between provider education level and use of delivery interventions. In other words, the more educated the provider is, the more informed they become about the topic and the more their behavior changes on the topic.

Emergency obstetric and neonatal care (EmONC) provider training significantly influenced the use of delivery interventions (p-value = 0.000). This means that the more trained the provider is in emergency obstetric and neonatal care, the less they use delivery interventions. Finally, provider seniority did not significantly influence the use of delivery interventions (p-value = 0.633). In other words, there was no relationship between provider tenure or practice and delivery interventions.

Conclusion

Delivery interventions are a serious reproductive and perinatal health problem in the basic maternity units of the city of Kindu.

This study suggests the implementation of strategies that could reduce the extent of these dangerous interventions during labor and delivery, including additional training of midwives on the rational use of oxytocin, popularization of the World Health Organization's recommendations on

intrapartum care for a positive birth experience, and sensitization of all health care providers on compliance with evidence-based medicine.

Author Contributions

Bakangana Mungu, principal investigator designed and prepared the first draft of the study, Ambambula Yalala read and edited the first draft, Rosebella Onyango read and corrected the final manuscript, and Olela Loseke collected the data. Data analysis was conducted by Assani Wakenge in collaboration with Tagoto Tepungipame. All authors read and approved the final manuscript.

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