

Assessment of Obstetric Evacuations: Received during the Year 2020 at the Touba Ndamatou Public Health Hospital Establishment

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Abstract

The counter-referral system is particularly important for care during pregnancy, childbirth and the post-partum period as it facilitates access to emergency obstetric and neonatal care. It allows people to access care that is not likely to be provided at the base and to manage certain complications arising in emergency settings. We therefore looked at the evaluation of obstetric evacuations from the Touba Ndamatou public health. **Methodology:** This was a retrospective study of descriptive and analytical type extending over a period of 12 months from January 1, 2020 to December 31, 2020 at the public hospital health establishment (PHHE) of Touba Ndamatou. **Results:** One thousand five hundred and sixty (1560) patients evacuated for obstetrical reasons were collected out of a total admission of 5560, *i.e.*, a frequency of 28%. The average age of the patients was 25.54 years. The mean gestation was 3.24 pregnancies. The average parity was 3.04 deliveries. Almost all of our patients (99%) were married. Slightly more than one in two women (53.6%) had performed at least 2 or 3 Prenatal consultations. 80% of parturients had traveled a distance of less than 20 km. 623 patients came by their own means (54.6%). Evacuation was provided by an ambulance in 509 patients, *i.e.*, 44.6%. Arterial hypertension and its complications were the frequent reason for evacuations with approximately one in four patients (26.2%). Only 3.6% of patients had qualified personnel on board being evacuated. In our series, 13 deaths were recorded, *i.e.*, 1.1% of cases. The distance traveled seemed not to influence the future of the mother ($p = 0.51$). The non-accompaniment of the patient during the evacuation by a medical staff seemed to influence the prognosis of the mother ($p = 0.031$). Fetal morbidity was higher among evacuees not accompanied by medical personnel. The state of apparent death was observed in the majority of cases in patients received over a distance of more than 20 km. **Conclusion:** Evacuation requires a clear definition of the roles

and responsibilities of each level of the health pyramid, good organization in the health structures as well as within the community, and a good information system.

Keywords

Evacuation, Pregnancy, Senegal

1. Introduction

Evacuation is a transfer of a patient from one health unit to another with a higher medical level and an immediate need for hospitalisation. It is justified when the patient's prognosis is at risk and requires rapid management on a higher level [1]. In poor countries, 99% of maternal deaths are attributable to avoidable or treatable factors [2]. In Senegal, the Statistical Demographic and Health Study shows that the maternal mortality ratio is 392 per 100,000 live births [3]. It would therefore suggest that mismanaged of medical evacuations are responsible for most maternal deaths. Indeed, unsuccessful obstetric evacuations are linked to high maternal and neonatal mortality [4]. It appears that the referral system is crucial for a significant reduction in maternal and neonatal mortality. It allows populations to access care that is not likely to be administered at the basic level and to manage certain complications occurring in emergency contexts [5]. Many studies have been carried out in West African sub-region concerning the problem of a counter-referral system in emergency obstetric care [4] [5]. For this reason, an important place should be given to the problem of referral/evacuation because the prognosis depends on it. This is why we were interested in the evaluation of obstetrical evacuations in the Touba Ndamatou public health and hospital establishment.

2. Methodology

This was a retrospective descriptive and analytical study covering a 12-month period from January 1, 2020 to December 31, 2020. The study was conducted at the public health institution (PHI) of Touba Ndamatou. The city of Touba is located in the western third of Senegal, 193 km from Dakar, 47 km from Diourbel and 7 km from Mbacké. It covers an area of approximately 552.92 km². The population of Touba is estimated at 854,667 inhabitants (official figure obtained from the medical region), although there has been an exponential increase in the population due to migration favored by the religious character of the city and the free availability of plots.

The population is 96% Wolof, 3.3% Moorish, and other ethnic groups represent 0.7%. The resident populations have a large mobility both within and outside the country. The PHI of Touba Ndamatou is a reference center for a health system composed of 2 health districts (Mbacké and Touba); 3 health centers (Mbacké,

Khelcom and Darou Khoudoss), on which 45 health posts depend; many private health structures; and structures in the surrounding regions. The establishment is a level 2 structure where surgical activities are regularly performed. Emergency obstetrical, neonatal and gynecological care is provided 24 hours a day by teams composed of a senior specialist in obstetrics and gynecology, midwives and nurses. Gynaecology, pre- and post-natal follow-up, family planning and ultrasound consultations are provided daily. Scheduled surgery is performed daily and different approaches are used (abdominal, vaginal and endoscopic). The study population consisted of patients evacuated from health centers to the PHI of Touba Ndamatou. All evacuated patients with obstetrical pathology were included. Patients not included were those who came on their own or were evacuated for gynecological pathologies.

Data were collected using a data collection form (**Appendix**). The documents used were: the records of the evacuated patients; the evacuation bulletins and the evacuation register. The parameters studied for each patient were: sociodemographic, pregnancy follow-up, evacuation characteristics, maternal-fetal prognosis, and length of hospitalisation. Data entry was done after coding on a SPHINX 2 model. Data processing and analysis were performed with this software. For the qualitative variables, we determined the percentages and for the quantitative variables we calculated the position and dispersion parameters. In the analytical part of the results, the qualitative variables were described by proportions in relation to their total share. Obstetrical and neonatal outcomes were compared by the Chi-square test at a significance level of $p = 0.05$.

3. Results

We collected 1560 patients evacuated for obstetrical reasons out of a total of 5560 admissions, *i.e.*, a frequency of 28%. Of the 1560, only 1140 patients were recorded in our study for the following reasons: patients referred without a referral note; referral notes not found secondary to poor archiving of the files; and finally, referral notes incorrectly filled in by the referring staff. The average age of the patients was 25.54 years. The age group 20 - 24 years was the most represented (26.2%) (**Figure 1**).

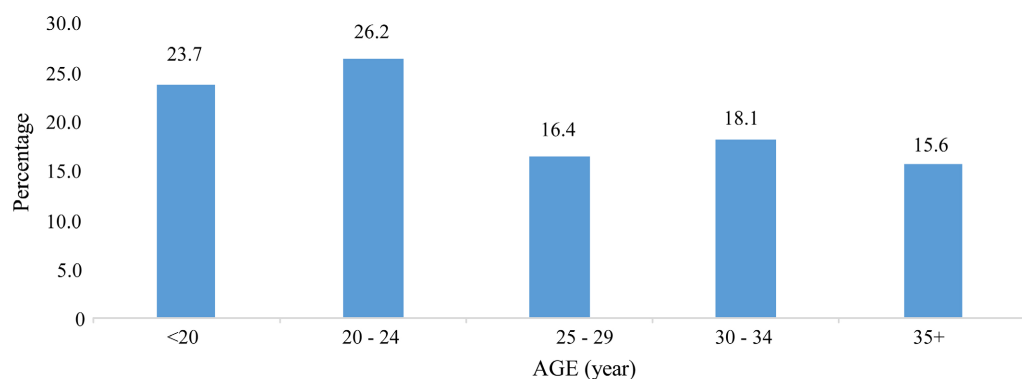


Figure 1. Distribution of patients by age group.

Almost all of our patients (99%) were married. More than 9 out of 10 patients were not in school (93.7%).

The average pregnancy was 3.24 pregnancies. The average parity was 3.04 deliveries. Slightly more than one woman in two (53.6%) had performed at least 2 or 3 ANC. Almost all ANC was performed by midwives (98.8%). 145 patients (12.7%) had a pathology during pregnancy, the main ones being: arterial hypertension 86.9%; diabetes 8.3% and others (urinary tract infection, anemia etc...) about 4.8% (Figure 2).

Eighty percent (80%) of parturients had traveled less than 20 km. However, nearly one patient in ten (7.7%) had traveled more than 50 km to reach the referral center. Six hundred and twenty-three patients (54.6%) came by their own means. An ambulance was used for 509 patients (44.6%). Only 3.6% of patients had qualified personnel on board during evacuation. 1097 patients had delivered, or 96.2%. Hypertension and its complications were the most common reason for evacuation, with approximately one in four patients (26.2%) (Table 1).

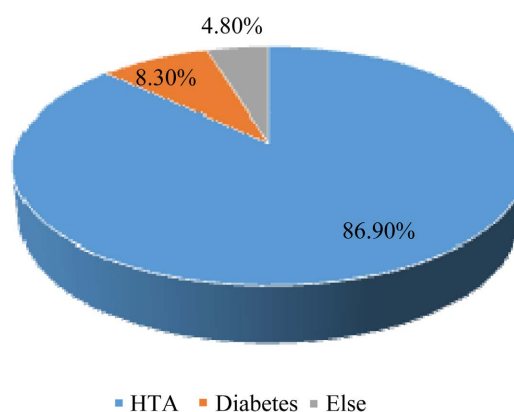


Figure 2. Distribution of patients according to pathology during pregnancy.

Table 1. Distribution of patients evacuated according to reasons.

Reason of evacuation	Effectives (n)	Percentage (%)
HTA and its complications	299	26.2
Hemorrhage	148	13
Dystocia	222	19.5
Excessive Uterine Height	132	11.6
Premature rupture of membranes	126	11.1
Excessive Term	70	6.1
Threat of premature delivery	58	5.1
Other	85	7.4
Total	1140	100.0

Regarding obstetrical outcome, about three out of four parturient had a normal delivery (68.6%) and the caesarean rate was 24.2%. Regarding the outcome of the newborns, 86.5% had an Apgar score at the fifth minute greater than 5. Thirty newborns (2.7%) required reanimation and 120 newborns (10.8%) were in an apparent death state. Regarding maternal complications, forty-three (43) parturient (3.8%) had a complication such as postpartum hemorrhage as shown in **Table 2**. One hundred and sixty-eight (168) patients (14.7%) had anemia. Twelve patients (12) or 1.1% had developed renal failure. Thirteen deaths were recorded, *i.e.*, 1.1% of cases (**Table 3**).

Table 2. Distribution of parturient according to complications.

Complications maternelles	Effectifs (n)		Percentage (%)
	Oui	Non	
PPH	43	1097	3.8
Anemia	168	972	14.7
Renal failure	12	1128	1.1

Table 3. Distribution of some maternal prognostic factors.

Maternal prognostic factors	Maternal Death		TOTAL	p
	YES	NO		
Age				
<30 years	6	750	756	0.022*
≥30 years	7	377	344	
ANC				
<4 ANC	5	726	731	0.035*
≥4 ANC	8	401	409	
Distance traveled				
<20 km	11	901	912	0.51
≥20 km	2	226	228	
Accompanying personnel				
Qualified	2	40	42	0.031*
Unqualified	3	302	305	
Unaccompanied	8	785	793	
Parity				
Primiparous	5	401	731	0.052*
Multiparous.	8		409	

p: p value.

Maternal death was higher in patients who were 30 years and older ($p = 0.022$). The risk of maternal death was higher in patients who had less than four ANC ($p = 0.035$). Maternal death was higher in multiparous evacuees ($p = 0.052$). The distance traveled did not seem to influence the outcome of the mother ($p = 0.51$). In our series, there were more maternal deaths (8 cases, 61.5%) when the evacuee was not accompanied by medical personnel ($p = 0.031$). Fetal morbidity was higher in evacuees not accompanied by medical personnel. Apparent death of the child was found in the majority of cases in patients received over 20 km of travel (Table 4).

4. Discussion

➤ Frequency

The frequency of obstetrical evacuations was 28%. This rate is below the 31.2% reported by Diop [6] at the Ndioum Regional Hospital and Wardini [7] who reported a frequency of 31.5% at the Pikine University Hospital, and is well below the 66.2% reported by Konaté [8] at the Ourosogui Regional Hospital, the 46.7% reported by Cissé [9] at the Kolda Regional Hospital. In the sub-region, Coulibaly found a rate much lower than ours with 10.4% at the reference health center of the commune V of Bamako (Mali) [10]; as well as Diarra in Côte d'Ivoire, who reported a frequency of evacuated patients of 7.9% [2]. The PHI of Touba Ndamatou is comparable to that of the Matlaboul Fawzaini Hospital in Touba, which is the reference hospital in the area. This partly explains the high rate of referrals.

➤ Socio-demographic factors

• Age

The average age of the women evacuated was 25.54 years. The age group between 20 and 24 years was the most represented (26.20%). This average age was reported by Sylla [11] who found an average age of 25.3 years. On the other hand, Cissé in the Kolda region found an average age of 23.5 years [9] as did

Table 4. Distribution of some neonatal prognostic factors.

Neonatal prognostic factors	Maternal Death		TOTAL	p
	YES	NO		
Distance traveled				
<20 km	59	824	883	0.54
≥20 km	64	164	228	
Accompanying personnel				
Qualified	6	31	37	0.030*
Unqualified	31	258	289	
Unaccompanied	86	699	785	

p: p value.

Konate [8] who found an average age of 24.8 years. Diop [6] and Wardini [7] found an average age of 26.6 and 27.9 years respectively, which was higher than ours. In the sub-region, notably in Burkina Faso, Ouattara et al found an average age of 26.1 years [12] and in Mali, Dolo [13] found an average age of 29 years. In our study, parturients under 20 years of age represented 23.7% and patients over 35 years of age represented 15.6%. Age is a factor related to obstetric evacuation, especially for adolescents in whom physical immaturity increases the risk of dystocia, especially mechanical dystocia, and for women over 34 years of age who have a higher risk of complications [14].

- **Marital status**

Most of our patients were married (99%). Wardini [7] found in his study 85.1% versus 14.9%. Similarly, Konaté [8] reported 97.7% married versus 1.4%.

Cissé [15] found 96.7% married. Married status gives the patient financial security for a better experience of pregnancy, because the spouse is supposed to be able to provide for the family [7].

- **Level of education**

Almost all of our patients (93.3%) had no schooling. Literacy among young people plays an essential role in the reduction of maternal mortality in Africa, as attested by the studies carried out in Guinea by Diallo [16] who found 0.4% of maternal deaths among patients who had reached secondary school and 0% for those with a higher education.

- **Parity**

The average parity was 3.04 deliveries. According to Bohoussou and colleagues, the incidence of maternal mortality increases as one moves from pauciparity to multiparity, and from multiparity to high multiparity [17]. This hypothesis is confirmed in our study, where the number of maternal deaths was higher in evacuated multiparous women.

- **Pregnancy follow-up**

Pregnancy was monitored almost exclusively (98.8%) by midwives. In our study, 34.7% of patients had at least the 4 prenatal consultations recommended by the Ministry of Health and Social Action. However, 2.5% of parturients had never been to the clinic, while 9.2% had only been to the clinic once. These values are comparable to those of Thiam [5] in Ndioum who found that 33.3% of patients had more than 4 ANC visits while in the study of Wardini [7] 51.5% of parturients had performed at least 4 ANC visits. This high rate of non-compliance with the number of prenatal consultations established by the WHO shows the lack of awareness of the value of ANC during pregnancy, especially in peripheral areas. This partly explains the high number of women in our series who did not have a prenatal biological check-up (687 parturients, *i.e.*, 60.3%) and women who never had an ultrasound during pregnancy (263 women, *i.e.*, 23.1%).

In a health system, prenatal care aims to prevent, detect and manage maternal-fetal complications, and to support women and their families during pregnancy. They also aim to refer so-called “high-risk” pregnancies whose management or delivery can only be carried out in well-equipped referral centers [4].

According to Vidal, the high rate of obstetric evacuations is partly linked to the lack of awareness of the signs of gravity by pregnant women requiring access to care centers. This lack of knowledge of the danger signs (signs that should have been taught to them during ANC) will lead these women to seek care only in a state of extreme gravity.

➤ **Evacuation Characteristics**

• **Means of evacuation and accompanying personnel**

More than half of the patients (54.6%) of the cases evacuated came by their own means, comparable to the study carried out in Côte d'Ivoire [2] where public transport was the most common means of evacuation (58.9%). However, ambulance was the means of transport used in 44.6% of cases, which is lower than the percentage reported by Diop [6] who found 69.2%. In Guinea Conakry, Baldé and colleagues [18] found 79.54% of patients transferred by taxicab. In Benin, Tchaou and colleagues [19] identified 78.9% of patients who used public transport while only 2.2% of patients received medical transport. It should be noted that in 69.7% of cases the patient was not accompanied by medical personnel, and the rest were accompanied by unqualified personnel in 26.7% of cases and qualified personnel only in 3.6% of cases. The absence of accompanying personnel during the evacuation had a strong influence on the outcome of the mother and child. There were 8 cases of maternal death, *i.e.*, 61.5% of deaths when the evacuated patient was not accompanied by qualified medical personnel. In Senegal, some health posts are not yet equipped with an ambulance and the lack of personnel can explain these figures.

• **Distance traveled and evacuation time**

4 out of 5 patients (80%) had traveled less than 20 km. And 7.7% had traveled more than 50 km. This ratio can be explained in part by the central geographical location of the health center in relation to the various referring health centers. The greater the distance, the higher the risk of fetal morbidity.

The average evacuation time was estimated at 77 minutes with extremes of 15 minutes and 360 minutes. This result is comparable to that of Kane [21] who found an average duration of 1 hour 25 minutes (85 minutes). Maternal death was observed in the majority of cases in patients whose evacuation time was more than 30 minutes.

• **Reasons for evacuation**

The reasons for evacuation were most often related to obstetrical emergencies. In Africa, these emergencies are dominated by dystocia, hemorrhage and infections [20]. In Senegal, Cissé and colleagues found a predominance of dystocia (37.2%), followed by hemorrhage (32.2%) and finally hypertension and its complications (12.7%) [9]. In our study, this trend seems to be respected with a predominance of hypertension and its complications. Two hundred and ninety-nine of our patients were evacuated for hypertension and/or its complications, *i.e.* 26.2%. Wardini [7] reported in his study that the main diagnoses retained during evacuation were dominated by vascular-renal syndromes and their complications (22.1%). Thiam and colleagues [5] reported a rate of 14.2% at the

Ndioum Hospital. In the Benin sub-region, Tchaou and colleagues [19] found a rate of 16.4% for hypertensive emergencies. This high rate can be explained by the fact that Touba is among the cities with the highest prevalence of hypertension in Senegal. Abdoul Kane estimates that more than 40% of the adult population has hypertension [21].

Dystocia was the reason for 19.5% of evacuee referrals. Wardini found a proportion (8.9%) much lower than ours. On the other hand, Thiam and colleagues [5] reported 37.4% of dystocia at the Ndioum Hospital and a rate of 48.64% at the Principal Hospital of Dakar in 2003 [22]. In Mali, Sidibé found a prevalence of dystocia of 35.7% [23] and Diarra in Côte d'Ivoire reported a rate of 53.6% [2]. One hundred and forty-eight of our patients were evacuated for hemorrhage, *i.e.* 13%. This rate is lower than that found by Imbert (19.4%) in cesarean patients at the Dakar main hospital [22]. Diop found a rate of 32.3% at the Ndioum hospital [6]. In the sub-region, Coulibaly found a rate of 23.5% among women evacuated for obstetrical emergencies in Mali [10] and Diarra in Côte d'Ivoire found a rate of 20.4% among cases of obstetrical transfers [2].

➤ **Maternal et fetal Pronostic**

In our study, 13 maternal deaths (1.1%) were recorded. This result is similar to the 1.4% found by Konaté [8]. Diop [6] found 2% maternal deaths, while Wardini [7] found a rate of 0.4% at the National Hospital Center of Pikine. Multiparity, high maternal age, neglect of ANC by parturients, and especially the absence of medical personnel accompanying the patient during evacuation were the determining factors in maternal mortality. This can also be explained by the absence of a reanimation service worthy of the name, but also by the availability of blood products and emergency kits.

Statistically, there is a link between the distance traveled and the fetal prognosis. The longer the distance traveled, the worse the fetal prognosis. Distance is a factor of poor prognosis. In addition, neonatology departments are under-equipped in terms of equipment and qualified personnel.

➤ **Strengths and limitations**

The strength of this study was the sample size of 48,535 deliveries. The study was also conducted in a reference maternity hospital.

However, it was a retrospective study that exposed incomplete data that could be the source of a bias in the recording of certain obstetrical complications.

5. Conclusion

The obstetric evacuation system, an essential link in the reduction of maternal-fetal mortality, still has many problems in its implementation despite the efforts made. It is necessary to raise the awareness of all the actors in order to improve the maternal-fetal prognosis.

Conflicts of Interest

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

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Appendix: Data Collection

A) CIVIL STATUS

1. AGE

2. ADDRESS

1. 20 KM 2. 20 to 50 KM 3. More than 50 KM

3. MARITAL STATUS

1. Married 2. Single

4. EDUCATIONAL LEVEL

1. None 2. Primary 3. Secondary 4. University

B) ANTECEDANTS

1. OBSTETRICALS

a. Gestité

b. Parity

c. Abortion

2. MEDICAL

1. Diabetes 2. Hypertension 3. Sickle cell disease

4. Anaemia 5. Other 6. None

3. SURGICAL

1. Yes 2. No

C) EVACUATION

1. EVACUATION MEANS

1. Ambulance 2. Private individual

2. ACCOMPANYING PERSONNEL

1. Qualified 2. Unqualified 3. Unaccompanied

3. INTERVAL EVACUATION TIME—ARRIVAL TIME

4. REASON FOR EVACUATION

1. Bleeding 2. HTA and its complications 3. Dystocia

4. Infections 5. MAP 6. Other

D) HISTORY OF PREGNANCY

1. NUMBER OF ANCS

1. 0 ANC 2. 1 ANC 3. 2 or 3 ANC 4. 4 or more ANC

2. STAFF WHO HAVE PERFORMED NPCS

1. Midwife 2. State nurse 3. General practitioner 4. Gynaecologist

3. PATHOLOGY DURING PREGNANCY

1. None 2. Hypertension 3. Diabetes

4. Malaria 5. Urinary tract infection 6. Other

4. NUMBER OF ULTRASOUND EXAMINATIONS

1. None 2. 1 echo 3. 2 ultrasound

4. 3 ultrasound 5. More than 3 echoes

5. BIOLOGICAL ASSESSMENT

1. Yes 2. No

6. TERM OF PREGNANCY

1. Full-term pregnancy 2. Non-term pregnancy 3. Post-term pregnancy

E) CLINICAL DATA

1. STATE OF AWARENESS

1. Clear 2. Altered

2. BLOOD PRESSURE

1. Normal 2. High 3. Collapse and shock

3. BDC

1. Present 2. Absent

4. LABOUR

1. Yes 2. No

5. STAGE OF LABOUR

1. Latency 2. Active 3. Expulsive

F) DELIVERY

1. MODE OF DELIVERY

1. Natural 2. Instrumental 3. Caesarean section

2. NEWBORN

1. APGAR M1

2. APGAR M2

G) COMPLICATIONS

1. POST PARTUM HEMORRHAGE

1. Yes 2. No

2. ANEMIA

1. Yes 2. No

3. RENAL FAILURE

1. Yes 2. No