Prognostic Factors for Obstetrical Emergencies Received at the Regional Hospital of Saint-Louis in Senegal

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Abstract

Introduction: The purpose of this work was to present the epidemiological and clinical profile of women received in emergency at the maternity unit of the regional hospital of Saint-Louis.

Method: The retrospective, cross-sectional and descriptive study was based on the archives for one year (July 1, 2017 - June 30, 2018). The data were entered with Excel software and then analyzed with EPI info 3 and 7. For each quantitative variable, the extremes, the average and its standard deviation were specified. For each qualitative variable, the absolute and relative frequencies were determined with confidence interval. Thus, were filled in: the socio-demographic profile of the woman, the conditions of evacuation, and the care.

Results: Out of 5822 collected files, there were 1364 evacuations (23.43%). The majority of women were under 25 years of age (42.53%), not provided with schooling (60.92%), married (97.73%), low-income (96.68%), first-time pregnant (37.91%), prim parous (38.57%), with a full-term pregnancy (85.28%) and less than 4 prenatal consultations (56.02%).

Evacuations were essentially from health posts (63.73%), decided by a midwife (98.24%), transported by ambulance (59.42%), with a reference bulletin (99.04%) and venous route (53.23%), and accompanied by a trained service provider (59.79%), without prior information of the hospital (98.96%).

The pathologies were predominantly dystocic (20.16%), hypertensive (18.40%), and hemorrhagic (8.65%). Medical treatment (72.87%) was dominated by vascular filling, administration of antibiotics and antihypertensive, blood transfusion and injection of magnesium sulfate. Gynaeco-obstetrical treatment concerned 42 abortions, 834 deliveries and 303 caesareans; for a total of 1179 cases (86.44%). The surgery involved 22 laparotomies (including 7 hysterectomies), 5 perineal recoveries, and 3 others; for a total of 30 cases (2.20%). Hospitalization, on average 2.34 days, resulted in maternal mortality for 14 cases (1.26%) and perinatal mortality for 157 cases (13.81%).

Conclusion: Improving the situation requires a more educated population and a better organized network of "obstetric and neonatal emergency care (SONU)" services (medical transport, sufficient and upgraded staff, better maternity and neonatology, correct filled databases).

Keywords: Emergency; Delivery; Epidemiology; Clinics; Maternal Health

Introduction

Maternal and child survival is an ongoing global concern. Maternal deaths, estimated at more than 500,000 per year, are often correlated with neonatal deaths [1]. 99 % of maternal deaths occur in developing regions due to socio-demographic and economic problems [2,3]. There is a need for early and effective management of obstetric complications [4-6]. This requires services that are equitably distributed and continuously functional, offering a sufficiently comprehensive and accessible range of good quality emergency obstetric and neonatal care (EmONC) [7]. Such a system implies fluid connections for good reference/counter reference within and between countries. In Senegal, from 1992 to 2015, maternal mortality increased from 592 per 100,000 live births (LB) to 139 per 100,000 LB, and neonatal mortality from 35‰ to 12‰. In order

to reduce this mortality, a road map has been drawn up for the achievement of the third Sustainable Development Goal (SDG 3). Three measures have been taken: Emergency Medical Assistance Service (EMS) in 2005; Universal Health Coverage (UHC) in 2013; Policy of Free Childbirth and Caesarean Section (PGAC) in 2015. These initiatives are facing great disparities in the availability of resources between regions [8].

In Saint-Louis, referral should theoretically facilitate access to more efficient care [9]. The lack of previous studies on the management of childbirth-related evacuations justifies this study, whose objective was to identify prognostic factors for obstetrical emergencies received at the Regional Hospital of Saint-Louis.

Setting, Equipment and Method

Study Framework

Senegal has 15,726,037 inhabitants for 196,712 km2 divided into 14 regions. The region of Saint-Louis (1,036,003 inhabitants / 19,241 km2) has three administrative departments: Dagana, Podor, and Saint-Louis in the far west, which houses the regional hospital. Among the services is the maternity ward which has three sectors: Consultation, Hospitalization, and Operating Room. Activities are carried out by three teams: general service, prenatal consultation - family planning, and day care. The guard receives emergencies not only from the Saint-Louis region, but also from neighbouring regions (Louga and Matam), and from areas bordering Mauritania (Figure 1).
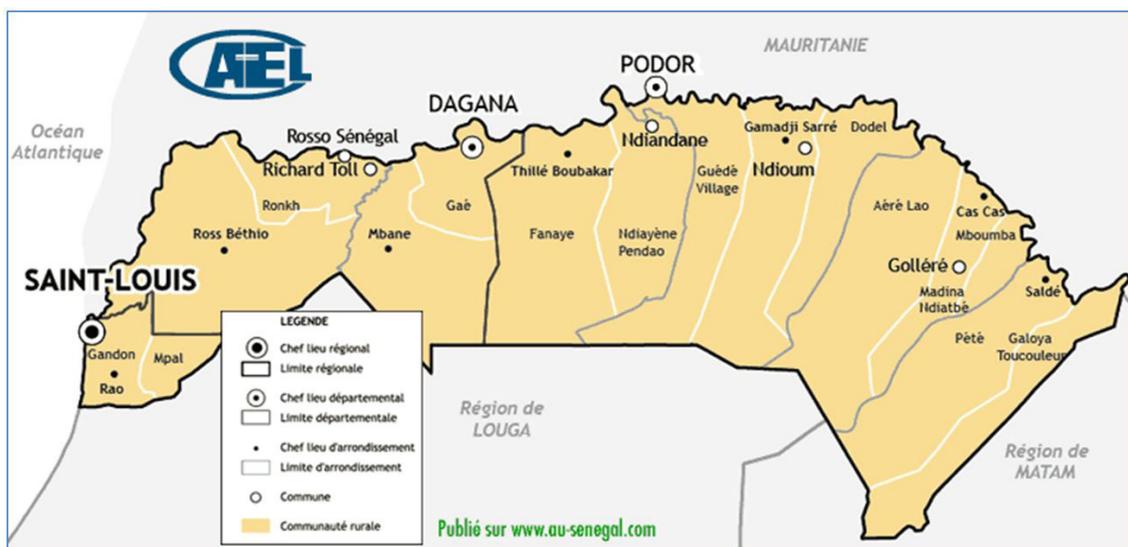

Figure 1: Saint-Louis administrative division

Equipment and Method

The study was a retrospective, cross-sectional, and analytical study of one-year obstetrical records (July 2017 - June 30, 2018) archived in the maternity ward of Saint-Louis Regional Hospital. The study population consisted of all cases of evacuations for problems related to pregnancy and/or childbirth. Non-inclusion cases involved first trimester pregnancies or without maternal and/or neonatal prognosis data. The variables were organized into four entities: parturient profile, evacuation conditions, management, and prognosis. The profile included seven (7) variables: age, schooling, income level, marital status, number of deliveries, type of pregnancy, and prenatal follow-up. The evacuation conditions had seven (7) variables: origin, qualification of the referrer, means of transport, venous route, accompanying person, general state on arrival, prior or otherwise informing the hospital. Management had seven (7) variables: type of labour, uterine rupture (yes/no), hypertension (yes/no), haemorrhage (yes/no), prematurity (yes/no), mode of delivery, length of hospitalisation. The prognosis was good in the absence of loss of life, and poor in the event of maternal and/or perinatal death.

The data, collected with the help of a specially developed model, were entered with Excel software and then analysed using Epi info software. The description was based on the calculation of proportions for all the variables, each reduced to two modalities. The analysis consisted of crossing the only dependent variable "existence or not of poor prognosis (maternal and/or perinatal death)" with each of the other independent variables. Chi-square and Fisher statistical tests were used with their conditions of application. For each statistically significant relationship ($p<0.05$), the strength of the relationship was determined by the Odds Ratio (OR).

Results

Description of the Sample

Of 1364 obstetric evacuations, 119 (8.72%) were in the first trimester and 138 (10.12%) lacked prognostic data. The analysis therefore covered 1107 (81.16%). The majority of women were under 35 years of age (82.76%), not in school (67.32%), with low

income (98.46%), married (97.73%), with less than 4 deliveries (70.98%), carrying a single fetal pregnancy (95.39%), and with less than 4 prenatal consultations (56.12%). Evacuations, mostly from health posts (64.32%), decided by a midwife (99.82%) and carried out by ambulance (60.26%), with a venous route (53.68%), and accompanied by a provider (60.64%), had arrived in good general condition (98.19%) at the hospital without prior warning (99.00%). Labour, abnormal at 72.49%, was mainly marked by hypertensive (18.91%) and haemorrhagic (9.50%) pathology, as well as prematurity (2.81%). More deliveries (72.45%) than Caesarean sections (27.55%) were managed, and hospitalisation exceeded 2 days in 30.06% of cases. The outcome was maternal death in 12 cases (1.08%), perinatal death in 106 cases (9.58%), and mother-child death in 2 cases (0.18%). Overall, a poor prognosis was observed for 120 cases (10.84%) (Table 1).

Study Parameters		Terms and Conditions	
		Yes	No
Socio-demographic profile	Age < 35 years	912 (82.76%)	190 (17.24%)
	Out of school	657 (67.32%)	319 (32.68%)
	Low income level	1022 (98.46%)	17 (1.54%)
	Marital status = married	1086 (97.73%)	31 (2.27%)
	Number of deliveries < 4	785 (70.98%	321 (29.02%)
	Pregnancy my fetus	1056 (95.39%)	51 (4.61%)
	Prenatal consultations < 4	532 (56.12%)	416 (43.88%)
Evacuation conditions	Origin = health post	712 (64.32%)	395 (35.68%)
	Decision made by a midwife	1101 (98.82%)	2 (0.18%)
	Transport by ambulance	661 (60.26%)	436 (39.74%)
	Venous	591 (53.68%)	510 (46.32%)
	Attendant = Trained provider	661 (60.64%)	429 (39.36%)
	Altered general condition on hospital arrival	20 (1.81%)	1087 (98.19%)
	Hospital previously informed	11 (1.00%)	1091 (99.00%)
Hospital care	Anomaly of labour	801 (72.49%)	304 (27.51%)
	Main problems identified — HBP	209 (18.91%)	896 (81.09%)
	Main problems identified — Haemorrhage	105 (9.50%)	1000 90.50
	Main problems identified — Uterine Rupture	11 (1.00%)	1094 (99.00%)
	Main problems identified — Prematurity	31 (2.81%)	1074 (97.19%)
	Caesarean delivery	325 (30.06%)	756 (69.94%)
	Length of hospital stay > 2 jours	325 (30.06%)	756 (69.94%)
Maternal and/or neonatal deaths		120 (10.84%)	987 (89.16%)

Table 1: Summary description of cases studied

Profile of Parturients and Maternal and/or Neonatal Prognosis

Socio-demographic characteristics		Prognosis		Statistical test	
		Bad	Good	p	OR + (IC$_{95\%}$)
Age	≥ 35 years	21	169	0.3	1.05 [0.65-1.7]
	< 35 years	99	813		
Schooling	Yes	47	272	0.05	1.3 [1.4-2.04]
	No	73	584		
Socio-economic level	Low	112	910	0.1	0.6 [0.2-1.3]
	Medium-high	8	40		
Marital status	Single	2	15	0.03	1.08 [1.03-4.7]
	Married	119	967		
Number of deliveries	≥ 4	49	272	0.003	2.02 [1.3-3]
	< 4	64	721		
Type of Pregnancy	Single fetus	113	943	0.07	0.5 [0.2-1.7]
	Twin	9	42		
Number of prenatal visits	< 4	62	470	0.04	1.3 [1.1-2.7]
	≥ 4	39	377		

Table 2: Parturient Profile and Maternal and/or Neonatal Prognosis

The prognosis was statistically significant related to four variables: schooling, marital status, number of births and prenatal follow-up. Poor prognosis was more common among parturients who were attending school, were single, had too many deliveries (≥4), and had an inadequately monitored pregnancy (<4 antenatal visits) (Table 2).

Evacuation Conditions and Maternal and/or Neonatal Prognosis

The prognosis had a statistically significant relationship with three (3) variables: companion, venous route, and general condition at arrival. Poor prognosis was more frequent among evacuations from a health center, accompanied by a provider, with a venous route, and an altered general state on arrival at the hospital (Table 3).

Evacuation conditions		Pronogsis		Statistical Test	
		Mauvais	Bon	p	OR + (IC$_{95\%}$)
Origin of evacuation	Health centre	49	346	0.01	1.2 [1.1-1.8]
	Health station	73	639		
Referring Personnel	Qualified	120	981	0.3	1 [0.03-1.7]
	Unqualified	0	2		
Means of transport	Ambulance	80	581	0.08	1.3 [0.8-1.9]
	Other	41	395		
Attendant = trained provider	Yes	78	583	0.01	1.2 [1.2-1.8]
	No	41	388		
Venous	Yes	76	515	0.01	1.5 [1.03-2.25]
	No	45	465		
Hospital notified before evacuation	No	121	970	0.1	1.3 [0.3-1.4]
	Yes	0	11		
General condition on arrival	Poor + Fair	10	10	0.00004	8.7 [3.5-21.3]
	Good + Fairly Good	112	975		

Table 3: Evacuation Conditions and Maternal and/or Neonatal Prognosis

Maternal and/or Neonatal Management and Prognosis

A statistically significant relationship was found between prognosis and five variables: labour, uterine rupture, hemorrhage, prematurity and hospital stay. Poor prognosis was more common among cases with abnormal labour, uterine rupture, hemorrhage, prematurity, and hospitalization longer than 2 days (Table 4).

Diagnostic and therapeutic aspects		Prognosis		Statistical test	
		Bad	Good	p	OR + (IC$_{95\%}$)
Abnormal labour	Yes	111	690	0.0000	5.2 [2.63-10.5]
	No	9	295		
Uterine rupture	Yes	8	3	0.0000	23.38 [6.11-89.4]
	No	112	982		
Hemorrhage	Yes	43	62	0.0000	8.3 [5.2-13.07]
	No	77	923		
HBP and complications	Yes	25	184	0.2	1.1 [0.7-1.8]
	No	95	801		
Premature	Yes	11	20	0.0001	1.1 [0.7-1.8]
	No	109	965		
Mode of delivery	Caesarean	32	265	0.2	1.1 [0.7-1.7]
	Vaginal	75	706		
Length of hospital stay	> 2 days	70	255	0.000	4.9 [3.2-7.4]
	≤ 2 days	40	716		

Table 4: Maternal and/or Neonatal Management and Prognosis

Discussion

Limitations of the Study

The main problem was the retrospective nature, as some of the information in the database was incomplete. As a result, the frequency totals changed from one variable to another. In addition, the Apgar score could not be taken into account. Similarly, the

exact age of pregnancy and the distance travelled were not specified. Nevertheless, the size of our sample allowed us to identify a number of poor prognostic factors (maternal and/or neonatal death).

Poor Prognosis (Maternal and/or Neonatal Death)

Mortality would result from three "delays": Decision to consult (socioeconomic environment), Arrival at the health facility (roads and means of transport), and Management (waiting time). Maternal mortality is high for our series (1.26%), as it is higher than the 1% set by the WHO. It occurs at the hospital for serious cases that are late or poorly treated. According to the "close to the client" approach: the first level should provide basic emergency obstetric and neonatal care (BEONC), and access to comprehensive emergency obstetric and neonatal care (CEONC) should be universal when necessary [1,10]. Neonatal mortality is less frequent for us (7.92%) than for Thiam (18.8%) [9], Cissé (25.8%) [11], and Tshabu Aguémon (15.40%) [12]. The causes, both direct and indirect, are linked to the profile of the parturient, the evacuation conditions and hospital care.

Profile of Parturients and Maternal and/or Neonatal Prognosis

Of the seven variables studied, four had a statistically significant relationship with prognosis: education, parity, marital status, number of prenatal visits. Schooling is a poor prognostic factor, in contrast to the Diallo result (0.4% of maternal deaths in secondary level patients and 0% in tertiary level patients) [13]. This may be the result of more late marriages and primiparities among educated women, warranting a case-control study. Indeed, low education, which limits the perception of the effect of certain cultural practices on health, is less common among single women.

Single women, fewer in our series (1.54%) than in Thiam's (4.4%) [9] and Ouattara's (10.2%) [14], may have more unmet need for family planning and would therefore be more exposed to multiparity perspectives. Multiparity, the result of pregnancies that are too early, too many, too close together, and/or too late, exposes women to an accumulation of pathological antecedents and obstetric complications [15,16]; it is of particular concern if the pregnancy is poorly monitored. Antenatal visits allow identification of high-risk pregnancies [4,15]. They are unfortunately insufficient because, according to local beliefs, the pregnant woman, who is very vulnerable in the first trimester, needs discretion to protect herself from the evil spirits that can be used by co-wives in polygamous environments [15,16]. Three other variables were independent of prognosis: age, income, and type of pregnancy. Advanced age was a poor prognostic factor for us, as it was for Thiam [9]. Low income altered the prognosis for Thiam [9] and Sépou [17], by limiting the use of maternity services because of lack of financial autonomy. Twin pregnancy is more at risk of mortality for some authors because of problems requiring evacuation.

Evacuation Conditions and Maternal and/or Neonatal Prognosis

Of the seven variables studied, four had a statistically significant relationship with prognosis: origin, venous route, companion, and general condition. The majority (64.32%) of our emergencies was evacuated by health posts where there is no doctor, and the maternity sector is best managed by a midwife who, in principle, must know how to install a venous line. The venous line is less often installed for our evacuees (53.23%) than for those of Thiam (59%) [8] and Thera (86.70%) [18], and therefore needs monitoring, and therefore accompaniment.

Accompaniment by a trained service provider, more frequent for us (60.26%) than for Tshabu Aguémon in Benin (27.59%) [12], seeks to preserve the general state of health up to the destination. The poor general condition on admission, linked to more fatal outcomes as found by Thiam in northern Senegal (2%) [8], could result from the long distances for those in the eastern part of the region. Three other variables were independent of the prognosis: qualification of the referent means of transport, and information from the hospital. Qualified personnel, predominantly midwives [9,11,17], seem to refer the least serious cases not requiring medical transport. The ambulances, used more often in our series (58.72%) than in those of Therai (50.60%) [18], Millogo-Traoré (26.4%) [7] and Diarra (25.9%) [19], confirm the efforts made in terms of equipment and materials. The hospital was notified more rarely for us (1.54%) than for Thiam (26.7%) [9], probably due to the unavailability of resources, which hinders the preparation of treatment.

Maternal and/or Neonatal Management and Prognosis

Of the seven variables studied, five had a statistically significant relationship with prognosis: type of labor, uterine rupture, hemorrhage, prematurity, and length of hospital stay.

Abnormal labour, an expression of a problem related to the delivery process, may be dystociic, hypertensive, and/or hemorrhagic [19]. Dystocia is usually recognized as a risk factor because poorly or late management can lead to uterine rupture [4,11]. Uterine rupture, the most feared complication of dystocia, is responsible for high maternal and perinatal mortality due to hemorrhage. Obstetric hemorrhage, which is usually abrupt, can rapidly progress to shock, requiring transfusion, which is often impossible due to a lack of blood; it can lead to premature delivery [10,12]. Premature delivery, which is known to be detrimental to the survival of the newborn, can also affect the maternal prognosis depending on the underlying pathology that determines the length of hospitalization.

The long length of hospitalisation, both in peripheral facilities and at the referral hospital, is detrimental to the prognosis because it concerns the most serious complications that often require major operations that can lead to more fatal outcomes [17]. Two variables were independent of the prognosis: arterial hypertension and mode of delivery. Hypertension can, however, lead to a

uteroplacental accident such as a retroplacental hematoma, which requires emergency intervention. Caesarean section has a much higher frequency for us (30.06%) than for most developing countries (often less than 5%) [8,20,21], and for six African countries (Burkina Faso, Chad, Ethiopia, Madagascar, Mali and Niger) where it is less than 1% for 80% of the population [22].

Conclusion

In the maternity ward Saint-Louis regional hospital, 10.84% of evacuations had a poor prognosis (maternal and/or neonatal death). This poor prognosis was linked to the profile of the parturient, the conditions of evacuation, and hospital management. Improving the situation requires three actions: Improving the accessibility of prenatal consultation services for married women and family planning services for unmarried women; paying attention to evacuations accompanied by a provider, with a venous route and/or an altered general state on arrival; Reinforcing the monitoring of cases with labor abnormalities, uterine rupture, hemorrhage, prematurity and/or prolonged hospitalization.

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