Scientific Research Publishing

Open Journal of Pediatrics, 2025, 15(6), 1142-1151
https://www.scirp.org/journal/ojped
ISSN Online: 2160-8776
ISSN Print: 2160-8741

Morbidity and Mortality Related to Prematurity in the Diourbel Region: A Prospective Study at the Diourbel Regional Hospital in Senegal

Sadio Konate[1*], Aliou Mar Coundoul[2], Ndiogou Seck[1], Papa Moctar Faye[3]

[1]Saint Louis Regional Hospital Center, Saint-Louis, Senegal
[2]Regional Hospital Center of Diourbel, Diourbel, Senegal
[3]Albert Royer National Children's Hospital of Dakar, Dakar, Senegal
Email: *dr.sadio18@gmail.com

How to cite this paper: Konate, S., Coundoul, A.M., Seck, N. and Faye, P.M. (2025) Morbidity and Mortality Related to Prematurity in the Diourbel Region: A Prospective Study at the Diourbel Regional Hospital in Senegal. *Open Journal of Pediatrics*, **15**, 1142-1151.
https://doi.org/10.4236/ojped.2025.156108

Received: October 18, 2025
Accepted: November 15, 2025
Published: November 18, 2025

Abstract

Introduction: Prematurity affects approximately 15 million children worldwide each year, representing 11% of live births. It remains a major concern in developing countries. The objective of our study was to assess the morbidity and mortality associated with prematurity and to identify the various contributing factors. **Materials and Methods**: This was a prospective, descriptive and analytical study of 115 cases of premature infants who were admitted between July 1 and December 31, 2020, to the Pediatrics Department of the Diourbel Regional Hospital Center. We included in our study all newborns born before 37 weeks of gestation who were hospitalized in the pediatric ward. Stillborn and non-hospitalized premature infants were excluded. Data were collected using a pre-established questionnaire, and the analysis was performed using SPSS 24.0 software. **Results:** We had 115 premature infants from 87 pregnancies, representing 50.4% of neonatal hospitalizations. The sex ratio was 1.6, 89.6% of them were admitted on day 0 of life, and the majority of premature infants were born inborn (75.7%). The average term was 28.1 weeks of gestation and the determination of gestational age was made by late ultrasound in 62.6%. Pregnancies that were not monitored or were poorly monitored represented 10% with 0 or only 1 ANC visit. Anemia was found in 61.7%, hypertension and pre-eclampsia in 29.5%. More than a third of births were by cesarean section (31.3%) and their indications were dominated by hypertension and pre-eclampsia. An APGAR score of less than 7 at 5 minutes was found in 60% of cases, and 36.5% were resuscitated in the delivery room; respiratory distress was found in 70.4%. The average weight was 1552.7 grams. Feeding was initiated between day 0 and day 1 of life in 51.3% and was mixed in 80%. Antibiotic therapy was administered in 93% of cases. A complication was pre-

sent in 95.6% of cases. The average length of hospital stay was 19.6 days. The mortality rate was 44.3%. **Conclusion:** Prematurity is a major public health problem. Prevention and management of prematurity require a better understanding of the risk factors.

Keywords

Morbidity, Mortality, Premature Infants

1. Introduction

Prematurity is defined by the World Health Organization (WHO) as the occurrence of a birth before 37 completed weeks of gestation [1] [2]. Its prevalence (relative to all live births) was 9.6% in 2005 and 11.1% in 2010 [3] [4]. Sixty percent of these births occurred in sub-Saharan Africa and South Asia. In Senegal, the rate of preterm births has been estimated at 10% of all births [5].

Prematurity is usually classified as late prematurity (34 to 36 completed weeks of gestation), moderate prematurity (32 to 33 completed weeks of gestation), severe prematurity (28 to 31 completed weeks of gestation), and extreme prematurity (22 to 28 completed weeks of gestation) [6]. Prematurity is the leading cause of neonatal mortality and morbidity, with more than one million deaths annually worldwide. Several etiological factors contribute to its occurrence, requiring their identification for effective prevention [7]. The impact on families is significant. Several strategies, sometimes differing between countries, have been implemented to limit mortality and disabilities [1]. Its management is very complex, requiring appropriate resuscitation measures, and complications during hospitalization are frequent. Mortality rates vary according to the place of residence. The Diourbel region, located 130 km from the capital, is one of the most populated regions in the country but also has a very low socioeconomic level [EDS]. Therefore, we deemed it necessary to conduct this study in this context, with the objectives of evaluating morbidity and mortality related to prematurity and identifying the various contributing factors.

2. Methodology

We conducted a prospective descriptive and analytical study over a 6-month period from July 1, 2020 to December 31, 2020 in the pediatric department of the Diourbel Regional Hospital Center, which is a level II public health establishment.

We included in our study all newborns whose gestational age at birth was less than 37 weeks of amenorrhea and who were hospitalized in the pediatric ward during this period. Premature infants who were stillborn and those not hospitalized were excluded. Data were collected using a pre-established questionnaire and entered using Microsoft Excel 2016. Analysis was performed using SPSS 24.0.

3. Results

3.1. Epidemiological Aspects

During the study period, 115 premature infants were admitted to the neonatal unit at CHRHLD out of 228 newborns, representing 50.4% of neonatal admissions. The sex ratio was 1.6. The vast majority of premature infants (103 cases, or 89.6%) were admitted on day 0 of life. Inborn infants were the most numerous, representing 75.7% (87 cases). Among the 28 premature infants transferred from other facilities, 71.4% were transported by a non-medical ambulance. The mean gestational age was 28.1 weeks.

Very premature infants, born before 32 weeks of gestation, represented 46.1%, or 53 cases. The peak in hospitalizations was in July (30 cases, 26.1%). Nearly three-quarters, or 72.2% (83 cases), of premature infants were admitted during the quarter of July, August, and September.

3.2. Maternal Data

The 18 - 35 age group was more significant with 83.4% or 96 cases.

The pregnancy was singleton in 63 cases (54.8%) and multiple in 26 cases, resulting in 52 premature births (45.2%). Nearly 10% of pregnancies (11 cases) were poorly monitored, with 0 or only 1 prenatal visit. Only 13 mothers (11.3%) had two or more ultrasounds.

Anemia (61.7%, or 71 cases) and high blood pressure (16.5%) were the most frequently observed during pregnancy.

3.3. Neonatal Data

Nearly a third of premature babies (31.3%) were born by cesarean section.

In 60% of premature infants, the Apgar score at 5 minutes was less than 7.

An absence of crying was noted in 20% of premature infants at birth and resuscitation was required for 36.5% of them.

Severe pre-eclampsia and hypertension accounted for 64.3% of the indications for cesarean section.

The average birth weight was 1552.7 g. Seven percent (8 cases) were very low birth weight (less than 1000 g). IUGR was found in 27 premature infants, or 23.5% (Table 1).

Table 1. Distribution according to birth weight.

Weight	Staff	Percentage(%)
700 - 1000 g	8	7.0
1000 - 1500 g	46	40
1500 - 2000 g	51	44.3
2000 g - 2500	10	8.7
Total	115	100

3.4. Clinical Data

Premature newborns had respiratory distress in 70.4% or 81 cases, 41.7% (48 cases) had cyanosis, prolonged capillary refill time (CRT greater than 3 seconds) in 36.5% of cases.

3.5. Therapeutic Data

Feeding was initiated early, between day 0 and day 1, for more than half of the premature infants (51.3%, Figure 1). Premature infants received mixed feeding in 80% of cases. Antibiotic therapy (93%), oxygen therapy (90.4%), phototherapy (33%) were the main therapeutic methods used.

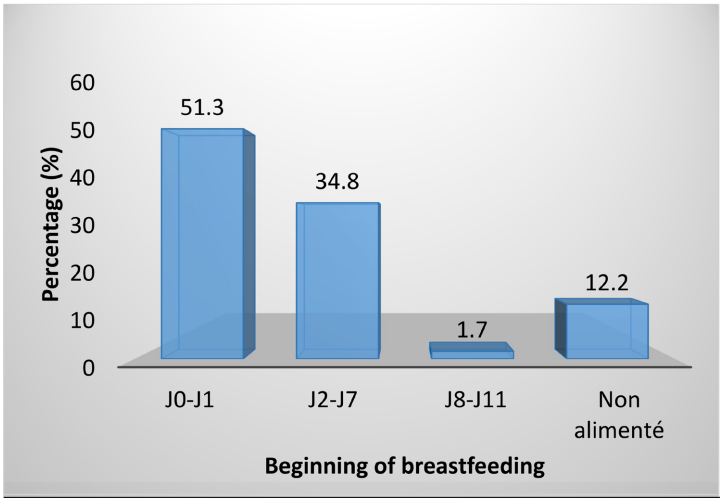

Figure 1. Distribution according to the start of feeding.

3.6. Evolutionary Data and Prognosis

A complication was found in 95.6%: jaundice represented 33%, anemia and neonatal infection (NIN) 11%.

The average length of hospital stay was 19.6 days, extreme (1 to 64 days) (Figure 2).

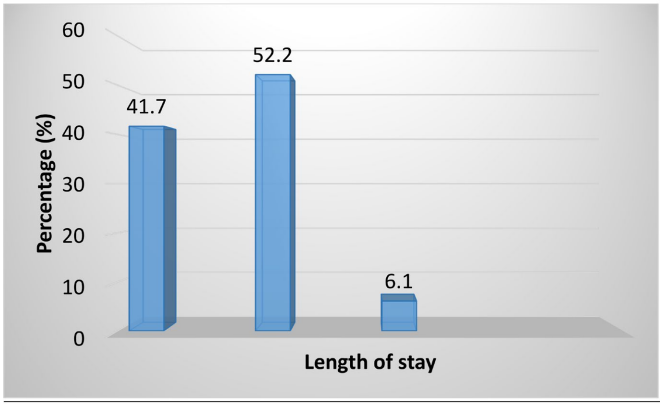

Figure 2. Distribution according to length of hospital stay.

The analytical study:

We used multivariate logistic regression.

By combining mortality and age, origin of premature infants, gestational age, IUGR, these variables had higher mortality rates.

The mortality rate was 44.3% (51 deaths out of 115 premature infants).

More than half, or 30 cases (58.8%), had died between 0 - 7 days.

Premature infants who died from health posts were more numerous, accounting for 11.8% of deaths (OR = 1.83, p-value = 0.681).

Premature infants with a gestational age between 28 weeks and 31 weeks + 6 days had a more representative death rate of 58.8% (OR = 0.18, p-value = 0.00004).

The concept of IUGR was present in 57% of deaths (OR = 0.51, p-value = 0.122).

4. Discussion

4.1. Limitations of the Study

Our study concerns premature infants cared for in the pediatric department of the CHRHLD. Despite the prospective nature of our study, some data concerning delivery and also postnatal data were not always recorded (APGAR score, crying, history of resuscitation, antenatal corticosteroid therapy, appearance of amniotic fluid, duration of labor, labor complications, etc.).

Gestational age determination was mostly done with late ultrasound.

4.2. Epidemiological and Sociodemographic Data

Of the 228 newborns hospitalized during our study semester, 115 were premature out of a total of 480 children admitted to the ward. This represents an incidence of 23.9% for all hospitalized children and 50.4% for newborns. This rate is significantly higher than the SOW study on Prematurity: Epidemiology and Etiological Factors in a Maternity Ward in Dakar (Senegal), which found an incidence of 28.1% [8], and the study by Ndeye Oury THIAW, which found an incidence of 15.5% [9].

The risk of premature births is not the same in all population groups; social inequalities have long been described and are observed in all countries [10].

61.7% of premature infants were male with a sex ratio of 1.6, which is comparable with the SOW study on premature infants which had a sex ratio of 1.07 [8] and the BIENFAIT study which found a male predominance with a sex ratio of 1.1 [11].

Premature babies born in the hospital's maternity ward (INBORN) were the majority, representing 75.7%. This could be explained by the fact that the hospital is the referral center for the Diourbel and Bambey departments, but also, due to its proximity to other border facilities outside of Diourbel, by other reasons.

The average gestational age was 28.1 weeks, lower than that found in the study by Sow and Coll, which found an average gestational age of 34.42 weeks.

Extreme prematurity (22 weeks to 28 weeks + 6 days) and extreme prematurity

(29 weeks to 31 weeks + 6 days) were the majority with 46.1% or 53 cases, in the Sow study, the age group between 33 weeks and 36 weeks was more representative (83%) and in the Ndeye Oury Thiaw study mild prematurity was predominant (58.2%) of the cases.

The gestational age at birth was determined by late ultrasound in 62.6% of cases, while early ultrasound was less accurate in 26.1%. The date of the last menstrual period (LMP) was rarely known in 7% of cases, and gestational age determination by maturation scores was 4.3%. This could be explained by a delay in prenatal care.

72.2% of premature infants (*i.e.* 83 cases) were admitted during the July, August and September quarter .

This quarter corresponds to the rural period, the hardship of the work may explain this surge in prematurity at this time.

4.3. Maternal Data

Several recent studies on singleton pregnancies have shown an increased overall risk of prematurity in young women, particularly those under 18 years of age [12]-[14]. This overall risk of prematurity is also significantly elevated among women over 35 years of age, and especially for those over 40 [14]-[16].

In the study, the average age was 27.2 years, with a range from 15 to 42 years. Maternal ages over 35 and under 18 years represented 16.6% of the study participants. Maternal age did not appear to be a determining factor.

Our results are comparable to the study by Ndeye Oury Thiaw, which had a mean age of 27.35 years ± 6.93, with a range of 14 to 48 years , and to the study by Yaya Kane, where 63.5% were between 20 and 34 years old [17], which is lower than our figures. This can be explained by the presence of other factors common in our context in the occurrence of prematurity.

In the study, the maternal pathologies found were anemia (61.7%), hypertension (16.6%), genital infection (3.4%), sickle cell disease (2.6%), severe mitral stenosis at 0.9%.

The most frequently found obstetric pathologies were severe pre-eclampsia 13%, gestational diabetes 4.3%, hydramnios 2.6%, eclampsia and oligohydramnios were each found in 0.9%.

In Yaya Kane's study, hypertension and malaria were the most frequently encountered maternal pathologies, at 67.7% and 16.1%, respectively. The most common obstetric pathologies were vascular anomalies and premature rupture of membranes (PROM), at 49% and 42.8%, respectively [17]. As found in the literature, these maternal pathologies are highly significant factors in the occurrence of prematurity.

Multiple pregnancies are a major risk factor for overall prematurity, whether spontaneous or induced. The overall rate of prematurity is 8 to 12 times higher in multiple pregnancies compared to singleton pregnancies [18]. In the study, multiple pregnancies accounted for 45.2%.

Bienfait, in her study, multiple pregnancies involved 35 children (36%) [11]. In Ndeye Oury Thiaw's study, 28% of premature infants were from multiple pregnancies.

4.4. Neonatal Data

In the study, 59.1% of newborns had an immediate cry at birth, comparable to the figures found in the Bienfait study, which was 56%.

An Apgar score at 5 minutes of life less than 7 was found in 60% of cases and greater than 7 in 13.9% of cases.

Premature infants who were resuscitated at birth represented 36.5% in our study and not reported in 3.5%.

In Bienfait's study, only 21.65% had an Apgar > 7 at the 5th minute of life while 16.49% of newborns had been resuscitated [11]. In Sow's study, 21.7% of premature infants had an APGAR score below 7 [8].

The average weight in the study was 1552.7 g, with a range of 700 g to 2500 g. Premature infants weighing between 1500 g and 2000 g represented 44.3%, those weighing between 1000 g and 1500 g represented 40%, and those weighing less than 1000 g represented 7%.

These results are comparable with those found in other studies:

Ndeye Oury Thiaw, who found an average birth weight (1611.79 ± 400.63 g) and 47.8% of premature babies had a birth weight between 1000 - 1500 gr [9].

The concept of growth retardation was found in 23.5% of cases in the study. Our results are superior to those of Yaya Kane, in whom intrauterine growth retardation was associated with prematurity in 16.4% of cases [17].

In our study, respiratory distress was found in 70.4% or 81 cases, 41.7% (48 cases) had cyanosis, and a prolonged capillary refill time (CRT greater than 3 seconds) was present in 36.5% of cases.

These results are higher in our study compared to that of Yaya Kane, who found respiratory distress at birth in 16.42%.

4.5. Therapeutic Data

Antibiotics were used in 93% of cases. This high rate of antibiotic use could be explained by the context of the delivery, sometimes the mother's infection, and the significant number of spontaneous preterm births. Premature delivery represents an infectious risk that may justify the introduction of antibiotic therapy. These results are comparable to other studies, notably that of Ndeye Oury Thiaw, in which antibiotic therapy was initiated in 85.7% of cases [9].

Oxygen therapy was used in 90.4%, which can be explained by the frequency of respiratory distress.

Feeding was initiated early, between day 0 and day 1, for more than half of the premature infants (51.3%). Premature infants received mixed feeding in 80% of cases. Only 6.9% received exclusively breast milk. Ndeye Oury Thiaw, in her study, found that 53.6% of premature infants received mixed feeding consisting

of breast milk and formula [9].

4.6. Evolving Data

The average length of hospital stay was 19.6 days, with extremes of (1 and 64 days).

In Yaya Kane's study, the number of days of hospitalization varied between one and sixteen days with an average of 6.72 days [17] and in Ndeye Oury THIAW's study, the average length of stay was 9 days (between 2 and 43 days) [9].

In the study, a complication was found in 95.6% of cases: jaundice (33%) and anemia/INN (11%). The recovery rate was 41.7%. In the Ndeye Oury Thiaw study, 72.5% of premature infants were discharged alive from the neonatal unit [9], almost double our recovery rate.

In the study, mortality was very high, with 44.3% of premature infants dying. This is comparable to that found in Bienfait's study on premature infants weighing less than 1000 g, which was 55.6% [11].

However, in Sow's study, only 9.22% of premature infants died [8] and in Ndeye Oury THIAW's study, 26.7% of premature infants died [9].

Mortality is higher the earlier the pregnancy and the lower the birth weight. This is compounded by the lack of suitable medical equipment and qualified personnel, the non-availability of surfactant, respirators or continuous positive airway pressure ventilation which are factors that may contribute to the high mortality rate found in our study.

Premature infants with a gestational age between 28 weeks and 31 weeks + 6 days had a more representative death rate of 58.8% (OR = 0.18, p-value = 0.00004).

The death rate of premature infants in multiparous women represents 80.4% (OR = 0.77, p-value = 0.564).

5. Conclusion

Prematurity is a major public health issue. The economic and societal stakes are significant. Preventing and managing prematurity requires a better understanding of the risk factors. Appropriate medical facilities and qualified staff would help reduce this morbidity and mortality.

Conflicts of Interest

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

References

[1] Torchin, H., Ancel, P.-Y., Jarreau, P.-H. and Goffinet, F. (2015) Epidemiology of Prematurity: Prevalence, Evolution, Outcomes for Children. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*, **44**, 723-731. https://doi.org/10.1016/j.jgyn.2015.06.010

[2] Morin, M., Arnaud, C., Germany, L. and Vayssiere, C. (2013) Extreme Prematurity: Evolution from 1994 to 2006. *La Revue Sage-Femme*, **12**, 70-80. https://doi.org/10.1016/j.sagf.2013.01.007

[3] Beck, S., Wojdyla, D., Say, L., Pilar Bertran, A., Meraldi, M., Harris Requejo, J., *et al.*

(2010) The Worldwide Incidence of Preterm Birth: A Systematic Review of Maternal Mortality and Morbidity. *Bulletin of the World Health Organization*, **88**, 31-38. https://doi.org/10.2471/blt.08.062554

[4] Blencowe, H., Cousens, S., Chou, D., Oestergaard, M., Say, L., Moller, A., *et al.* (2013) Born Too Soon: The Global Epidemiology of 15 Million Preterm Births. *Reproductive Health*, **10**, S2. https://doi.org/10.1186/1742-4755-10-s1-s2

[5] (2017) Profile of Preterm and Low Birth Weight Prevention and Care Every Prime Scale. https://reliefweb.int/report/senegal/senegal-profile-preterm-and-low-birth-weight-prevention-and-care

[6] Blencowe, H., Cousens, S., Oestergaard, M.Z., Chou, D., Moller, A., Narwal, R., *et al.* (2012) National, Regional, and Worldwide Estimates of Preterm Birth Rates in the Year 2010 with Time Trends since 1990 for Selected Countries: A Systematic Analysis and Implications. *The Lancet*, **379**, 2162-2172. https://doi.org/10.1016/s0140-6736(12)60820-4

[7] Weymuller, V., Diguistoa, C., Guellier, C. and Perrotin, F. (2015) Induced Prematurity in a Type 3 Maternity Unit: A Study of Practices. *Journal de Gynécologie, Obstétrique et Biologie de la Reproduction*, **1266**, 7.

[8] Sow, A., Gueye, M., Boiro, D., Ndongo, A.A., Coundoul, A.M., Diouf, S., *et al.* (2018) Prematurity: Epidemiology and Etiological Factors in a Maternity Ward in Dakar (Senegal). *Clinics in Mother and Child Health*, **15**, Article ID: 1000288. https://doi.org/10.4172/2090-7214.1000288

[9] Oury, T.N. (2019) Management of Premature Infants Weighing over 1000 Grams: A Study of 502 Cases Collected in the Neonatology Department of the Albert Royer National Children's Hospital. Medical Thesis, Cheikh Anta Diop University, No. 9.

[10] Saurel-Cubizolles, M.-J., Torchin, H. and Ancel, P.-Y. (2016) Social Inequalities of Prematurity: What Evidence? Elsevier Masson SAS.

[11] Bienfait, M.M. (2019) Prematurity of Less than 1000 Grams: Epidemiological, Diagnostic and Prognostic Aspects. Medical Thesis, Cheikh Anta Diop University, No. 132.

[12] Blomberg, M., Birch Tyrberg, R. and Kjølhede, P. (2014) Impact of Maternal Age on Obstetric and Neonatal Outcome with Emphasis on Primiparous Adolescents and Older Women: A Swedish Medical Birth Register Study. *BMJ Open*, **4**, e005840. https://doi.org/10.1136/bmjopen-2014-005840

[13] Chen, X.K., Wen, S.W., Fleming, N., Demissie, K., Rhoads, G.G. and Walker, M. (2007) Teenage Pregnancy and Adverse Birth Outcomes: A Large Population Based Retrospective Cohort Study. *International Journal of Epidemiology*, **36**, 368-373. https://doi.org/10.1093/ije/dyl284

[14] Khashan, A.S., Baker, P.N. and Kenny, L.C. (2010) Preterm Birth and Reduced Birthweight in First and Second Teenage Pregnancies: A Register-Based Cohort Study. *BMC Pregnancy and Childbirth*, **10**, Article No. 36. https://doi.org/10.1186/1471-2393-10-36

[15] Carolan, M. and Frankowska, D. (2011) Advanced Maternal Age and Adverse Perinatal Outcome: A Review of the Evidence. *Midwifery*, **27**, 793-801. https://doi.org/10.1016/j.midw.2010.07.006

[16] Laopaiboon, M., Lumbiganon, P., Intarut, N., Mori, R., Ganchimeg, T., Vogel, J., *et al.* (2014) Advanced Maternal Age and Pregnancy Outcomes: A Multicountry Assessment. *BJOG: An International Journal of Obstetrics & Gynaecology*, **121**, 49-56.

https://doi.org/10.1111/1471-0528.12659

[17] Kane, Y. (2017) Evaluation of Prematurity Greater than or Equal to 32 Weeks Amenorrhea at the Ziguinchor Regional Hospital in Southern Senegal (West Africa). *European Scientific Journal*, **13**, 325-339.

[18] Yoneyama, K., Kimura, A., Kogo, M., Kiuchi, Y., Morimoto, T. and Okai, T. (2009) Clinical Predictive Factors for Preterm Birth in Women with Threatened Preterm Labour or Preterm Premature Ruptured Membranes? *Australian and New Zealand Journal of Obstetrics and Gynaecology*, **49**, 16-21. https://doi.org/10.1111/j.1479-828x.2008.00930.x