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Neonatal Mortality in Rural Area in Senegal

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Abstract

Most newborn deaths occur in two regions of the world, South Asia and sub-Saharan Africa. In Senegal, much progress has been made over the past two decades with a reduction in overall infant mortality by 38%. However, the decline in neonatal mortality has been slower during the same period. The objective of this study is to assess neonatal mortality, to determine the different causes and to make recommendations for improving care in rural areas. This is a retrospective study with a descriptive and analytical aim carried out in the pediatrics department of the Diourbel regional hospital, 130 km from Dakar, the Senegalese capital, over a 12-month period from January 1 to January 31, December 2018. All newborns hospitalized in the pediatric ward during the study period were included. Overall mortality was 30.6%, newborns between 0 and 7 days accounted for 90.6% of deaths, INBORNs accounted for 62.3% of deaths. Newborns whose mother's age was between 20 and 35 years of age accounted for 69.3% of deaths. Newborns of first-time mothers accounted for 40.2% of deaths and those of multiparous mothers 31%. Newborns who did not reach term accounted for 58.9% of deaths. Newborns admitted for respiratory distress represented the majority of deaths 45.5% (n = 93) followed by those with low birth weight 32.5 (n = 65) followed by those with neurological manifestations 30.5 (n = 62). Conclusion: Neonatal mortality is very high in the Diourbel region and the main cause is the lack of human resources and a very insufficient technical platform. The fight against this mortality involves improving the technical platform and recruiting sufficient and well-trained staff.

Keywords

Mortality, Neonatal, Rural Area, Senegal

1. Introduction

Neonatal health is a global priority, especially in underdeveloped countries. Neonatal mortality accounts for 40% of deaths before the age of five. Most of these neonatal deaths occur in two regions: South Asia (39%) and sub-Saharan Africa (38%) [1] [2]. In Senegal, much progress has been made over the past two decades with the reduction in overall infant mortality by 38% [3]. However, the decline in neonatal mortality is slower with 24% during the same period [3]. Mortality levels vary depending on the area of residence. Indeed, whatever the type of mortality considered, the quotient is clearly higher in rural areas. The Diourbel region is one of the regions which recorded the highest probabilities of neonatal mortality (31‰) [3]. This neonatal mortality is higher in hospitals which are the reference centers for peripheral structures. A study on in-hospital mortality in the pediatric department of King Baudouin Hospital in Guédiawaye between May 1, 2013 and April 30, 2016, showed that mortality was higher in newborns (57.5%) [4].

Another study on pediatric mortality at the CHR in Saint Louis carried out in 2015 showed that out of 193 deaths, 13.9% were newborns [5]. The Diourbel region, located 130 km from the capital and is one of the most populous regions of the country but also with a very low socioeconomic level [EDS]. Thus, we deemed it necessary to carry out this study in this context, the objectives of which were to assess neonatal mortality, to determine the various causes and to issue recommendations for the improvement of care.

2. Methodology

This is a retrospective study with a descriptive and analytical aim carried out during the period from January 1 to December 31, 2018 in the pediatric department of the regional hospital of Diourbel which is a level II public health establishment. The pediatric service welcomes newborns coming from the entire Diourbel region but also from border regions. The service is also attached to the largest maternity hospital in the region with more than 3500 deliveries per year. The neonatal unit has 3 nurses with a capacity for 8 newborns. The average annual number of hospitalizations is around 350 newborns.

We included in this study all newborns hospitalized in the pediatric ward during the period from January 01, 2018 to December 31, 2018. Newborns who died on arrival and files with insufficient data were excluded or unusable. Data were received from hospital records based on a pre-established data collection sheet. The epidemiological, socio-demographic, maternal, obstetric, clinical and paraclinical parameters were studied. Data were entered using Microsoft EXCEL 2012 software. Analysis was performed using SPSS 24.0 software. The tables and figures were executed with WORD 2013 EXCEL 2012 software.

3. Results

During the period 962 children were hospitalized in the pediatric department of

CHRHLD, including 382 newborns. This represented an incidence of 39.7% of newborns. Of these 382 newborns admitted, only 200 met our inclusion criteria. The sex ratio was 1.44. Newborns aged 0 - 7 days accounted for 176 newborns (88%). INBORNs represented 107 newborns (53.5%). The mean age of the mothers was 24.23 years [range 15 years and 40 years] with a standard deviation of 6.065. The primigravidae represented 39%. The average number of antenatal consultations was 2.7 [range 1 and 4 ANC]. The standard deviation is 0.982. Male pregnancies followed accounted for 74%. Among the newborns, 155 (77.5%) were born vaginally, including 8 (4%) at home. Prematurity accounted for 48%. The mean birth weight was 2111.68 g [range 500 and 4100 g]. Low birth weights accounted for 111 newborns (55.5%), of which 26 (23%) were under 1500 g. In 29 newborns (14.5%) the Apgar at the 5th minute was less than 7 and 11% of them were resuscitated at birth. The most frequent reasons were respiratory distress noted in 144 newborns (72.0%), prematurity in 83 newborns (41.5%) and neurological signs in 99 (49.5%). Overall mortality was 117 (30.6%), newborns between 0 and 7 days represented (106) 90.6% of deaths, INBORNs represented (73) 62.3% of deaths. Newborns whose mother's age was between 20 and 35 years of age accounted for (81) 69.3% of deaths. Newborns born to mothers who were primiparous represented (47) 40.2% of deaths and those born to multiparous mothers (36) 31%. Newborns who did not reach term accounted for (69) 58.9% of deaths. Newborns with low birth weight accounted for (75) 64% of deaths. Newborns admitted for respiratory distress represented the majority of deaths 45.5% (n = 93) followed by those with low birth weight 32.5 (n = 65) followed by those with neurological manifestations 30.5 (n = 62). The main causes of death were prematurity, neonatal infection and perinatal asphyxia. Factors associated with neonatal death were prematurity, low birth weight of less than 2500 g, the origin geographic, respiratory distress, newborn age (Figure 1 & Figure 2).

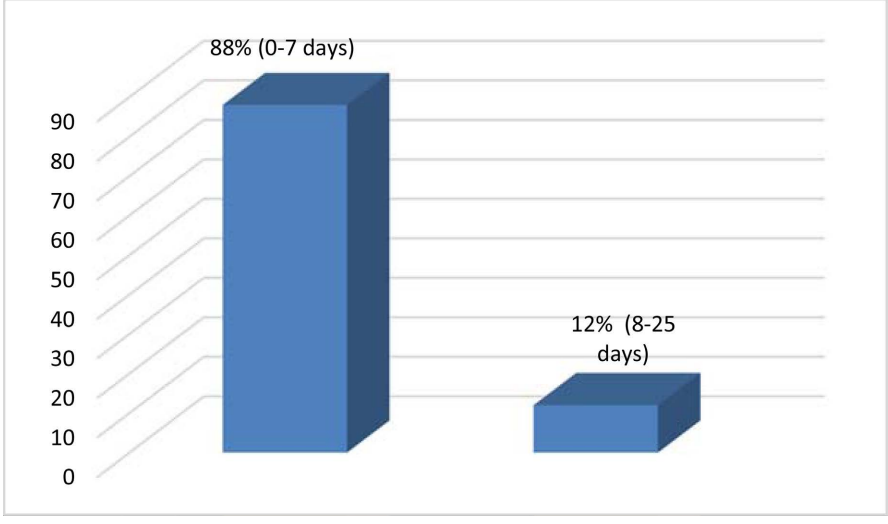

Figure 1. Distribution of newborns according to their age: newborns aged between 0 and 7 days were largely in the majority and represented 88%.

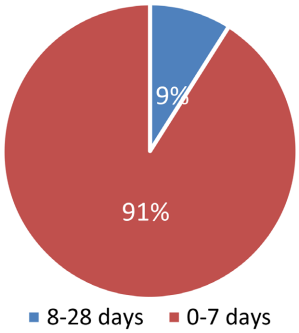

Figure 2. Mortality by age of the newborn: newborns between 0 and 7 days old accounted for 90.6% of deaths.

4. Discussion

The neonatal population in 2018 was 382 newborns. The majority (88%) were admitted during the early neonatal period. These results are comparable with many studies carried out in Senegal and in Africa in general. Respectively 83.9% and 59.1% in the study of Ndiaye in 2012 in Pikine [1] [6] and that of Thiéllo in 2013 at CHNEAR. In Mali in Konaté's 2017 study, 90% of newborns were admitted during the early neonatal period [7]. The male predominance (59%) detected during our study is found by most of the authors. During the study period of 382 admissions, 117 had died or 30.6%. This result is superior to that found in other studies in Senegal by Thiéllo in 2015 (27.7%) and Ndiaye in Pikine (15.15%) [1] [6]. This is due to the fact that mortality is higher in rural areas. The Diourbel region is one of the regions which recorded the highest probabilities of neonatal mortality (31‰) [3]. It should be noted that neonatal mortality is higher in hospitals which are the reference centers for peripheral structures (**Table 1**). A study on in-hospital mortality in the pediatric department of King Baudouin Hospital in Guédiawaye between May 1, 2013 and April 30, 2016, showed that mortality was higher in newborns (57.5%) [4]. Another study on pediatric mortality at the CHR of Saint Louis carried out in 2015 showed that out of 193 deaths, 13.9% were newborns [5]. Other African studies have shown similar and sometimes even higher percentages [8] [9] [10] [11]. In our study, the majority of deceased newborns were born to mothers between the ages of 20 and 35 (69.3%). These results are comparable with those found in Algeria in 2013 by Triqui Mohammed Racim and Lazouni Mohammed Ridha [12]. But in the literature this mortality is described at extreme ages as shown by the results of B. Serengbe in the Central African Republic [10]. In the majority of deceased newborns (58.9%; n = 69), gestational age was less than 37 weeks with a p = 0.0002. This means that prematurity is a risk factor for neonatal death. This same observation was made in other studies [1] [13]. Concerning the deceased newborns 64% had a low birth weight with a p = 0.0000. Other studies have also shown that there is a strong relationship between low birth weight and neonatal mortality: in that of Aurelle MENSAH made at CHNEAR in 2018 39.5% of deceased newborns had a low birth weight with a p = 0.003 [14]. These results are comparable with those

Table 1. Study of factors linked to neonatal mortality. The main factors associated with the occurrence of neonatal deaths were: origin of the newborn, term, low birth weight (<2500 g), age at death, respiratory distress.

Risk factors		Evolution		p
		Survival	death	
Sex	Male	48 (40.2%)	70 (59.8%)	0.777
	Feminine	35 (42.6%)	47 (57.4%)	
origin	Inborn	34 (31.7%)	73 (68.2%)	0.003
	Outborn	49 (52.7%)	44 (47.3%)	
Maternal age	≤35 ans	76 (40.4%)	112 (59.6%)	0.283
	Sup à 35 ans	7 (58.3%)	5 (41.7%)	
Asphyxia	Yes	13 (44.8%)	16 (55.2%)	0.966
	No	22 (52.4%)	20 (47.6%)	
Parity	Primiparous	31 (39.7%)	47 (60.2%)	0.687
	Pauciparous	23 (40.3%)	34 (59.6%)	
	Multiparous	29 (44.6%)	36 (55.3%)	
Terme	Yes	56 (53.8%)	48 (46.2%)	0.000226
	No	27 (28%)	69 (72%)	
Birth weight	<2500 g	36 (50.4%)	75 (49.6%)	0.000056
	>2500 g	43 (63.2%)	25 (36.8%)	
Time to onset	0 à 7 days	38	82	0.001
	7 - 28 days	45	35	
Respiratory distress	Yes	51	93	0.005
	No	32	24	

of Thiéllo in 2013 [6]. In the study by Moulkhaloua Newel *et al.* in Algeria in 2016, 79% of deceased newborns had low birth weight [2]. In our series, the majority of neonatal deaths (90.6%) occurred in the first week of life. A similar result was found in Togo in 2010 [15]. In Congo, according to Kanteng 98% of neonatal deaths occurred during the first week of life [16]. The main cause of death found in our study was prematurity. Next came neonatal infection and then perinatal asphyxia. These main causes of death are those found in virtually all studies carried out in sub-Saharan Africa. It is only the provision that changes. Thiéllo had found the same causes with low birth weight 39.2%, neonatal infection 23.7% and perinatal asphyxia 18.8%. In Ndiaye's study the main cause of death was neonatal infection followed by prematurity and then perinatal asphyxia [1]. In Mali, in the Kamaté study, prematurity was the main risk factor for death followed by neonatal infection [10]. In Congo Kanteng had the following results: prematurity (59.5%), neonatal infections (18.1%), Perinatal asphyxia (8.6%) [16].

5. Conclusion

Neonatal mortality is very high in the Diourbel region and the main cause is the lack of human resources and a very insufficient technical platform. The fight against this mortality involves improving the technical platform and recruiting sufficient and well-trained staff.

Conflicts of Interest

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

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