Scientific Research Publishing

Open Journal of Pediatrics, 2026, 16(1), 130-143
https://www.scirp.org/journal/ojped
ISSN Online: 2160-8776
ISSN Print: 2160-8741

Knowledge, Attitudes, and Practices Regarding Neonatal Danger Signs among Mothers in a Tertiary Care Hospital in Senegal

Djibril Boiro[1], Ndeye Fatou Sow[2*], Amadou Sow[1], Aminata Mbaye[3], Anne Marie Halina[1], Ndiogou Seck[4], Aliou Abdoulaye Ndongo[5], Modou Guèye[1], Ousmane Ndiaye[3]

[1]Abass Ndao Hospital of Dakar, Pediatrics Department, Cheikh Anta Diop University, Dakar, Sénégal
[2]Dalal Jamm Hospital of Dakar, Pediatrics Department, Cheikh Anta Diop University, Dakar, Sénégal
[3]Albert Royer Children Hospital of Dakar, Pediatrics Department, Cheikh Anta Diop University, Dakar, Sénégal
[4]Regional Hospital of Saint Louis, Pediatrics Department, Gaston Berger University, Saint Louis, Sénégal
[5]Pikine National Hospital, Pediatrics Department, Cheikh Anta Diop University, Dakar, Sénégal
Email: *ndeyfatsow@hotmail.com

How to cite this paper: Boiro, D., Sow, N.F., Sow, A., Mbaye, A., Halina, A.M., Seck, N., Ndongo, A.A., Guèye, M. and Ndiaye, O. (2026) Knowledge, Attitudes, and Practices Regarding Neonatal Danger Signs among Mothers in a Tertiary Care Hospital in Senegal. *Open Journal of Pediatrics*, **16**, 130-143.
https://doi.org/10.4236/ojped.2026.161014

Received: December 24, 2025
Accepted: January 20, 2026
Published: January 23, 2026

Abstract

Background: Neonatal mortality remains a critical public health challenge in Senegal. The early recognition of danger signs by caregivers is a major determinant of neonatal survival. This study aimed to assess the knowledge, attitudes, and practices (KAP) of mothers regarding neonatal danger signs and to identify factors associated with knowledge levels in a tertiary care hospital in Dakar. **Methods:** We conducted a cross-sectional descriptive and analytical study from September 18, 2023, to March 19, 2024, at the Centre Hospitalier Abass NDAO (Level 3). The study included 200 mothers of neonates aged 0 - 28 days attending postnatal consultations or hospitalization units. Data were collected via structured face-to-face interviews. Knowledge was classified as good, satisfactory, or poor based on WHO criteria. Associations were tested using the Chi-square test with a significance level of $p < 0.05$. **Results:** Of the 200 mothers interviewed, the majority were educated (91%) and had attended more than three antenatal care (ANC) visits (88.5%). However, 63% demonstrated poor knowledge of danger signs. Only 6.4% reported receiving specific information on these signs from healthcare providers. While fever (69%) and refusal to breastfeed (38%) were frequently identified, specific signs such as jaundice, lethargy, and convulsions were poorly recognized. Paradoxically, higher education, age 20 - 30 years, and high ANC attendance were significantly associated with poor knowledge ($p < 0.05$). Despite this, attitudes were positive, with over 80% perceiving signs as serious and prioritizing health facilities for care. **Conclusion:** Despite favorable sociodemographic character-

istics and high healthcare utilization, maternal knowledge of neonatal danger signs remains suboptimal in this setting. These findings highlight a systemic gap between the quantity of care accessed and the quality of health education delivered. Systemic integration of targeted counseling on danger signs into the perinatal continuum of care is imperative to improve early detection and reduce neonatal mortality.

Keywords

Neonatal Danger Signs, Knowledge Attitudes and Practices (KAP), Newborn Health, Maternal Education, Senegal, Tertiary Care

1. Introduction

The neonatal and immediate post-neonatal periods represent the most critical phases of the maternal and child health continuum, accounting for nearly half of global child mortality. In 2022, approximately 2.3 million neonatal deaths were recorded worldwide [1]. In sub-Saharan Africa, neonatal mortality remains among the highest; the region had an estimated rate of 26 deaths per 1000 live births in 2023 [2]. In Senegal, although progress has been made, neonatal mortality remains high [3].

Most of neonatal deaths in Low- and Middle-Income Countries (LMICs) occur at home, in contexts where signs of neonatal illness are not recognized, and newborns are not referred to health facilities [4]. Neonatal danger signs, as defined by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), constitute major warning signals indicating a high risk of neonatal morbidity and mortality, necessitating early therapeutic interventions [5].

Therefore, their early recognition in newborns by mothers or caregivers constitutes a major determinant of survival, particularly in resource-limited settings where access to specialized care is often delayed. In many African countries, maternal knowledge remains limited due to social, cultural, educational, and economic factors that influence both the identification of danger and the timeliness of healthcare-seeking behavior [4].

In Senegal, few studies have documented the level of maternal knowledge regarding neonatal danger signs and mothers' responses to these symptoms. We conducted this study with the objectives of assessing mothers' level of knowledge and practices regarding neonatal danger signs and determining the role of healthcare workers in providing information on these signs.

2. Methods

2.1. Study Setting

This study was conducted in the Maternity and Pediatrics departments of the Abass NDAO Hospital in Dakar. This is a tertiary referral hospital located in the Southern Health District of the Dakar region.

2.2. Study Design, Period, and Population

We conducted a cross-sectional study over a six-month period from September 18th, 2023, to March 19th 2024. We included all mothers who delivered vaginally or via cesarean section and had a newborn aged less than 28 days, who had been discharged and subsequently returned for a postnatal consultation or for the hospitalization of their newborn.

We excluded mothers hospitalized in the maternity ward, mothers whose newborns were admitted to the neonatology unit, mothers whose newborns had died, and mothers presenting for post-operative care without their newborn.

2.3. Ethical Considerations

Verbal informed consent was obtained individually from each mother during the interview to minimize potential bias and ensure the integrity of the survey. The objectives of the study were clearly explained to the participants.

2.4. Data Collection

Data were collected via face-to-face interviews with mothers and recorded using the KoboToolbox software. The data collected included:

- Sociodemographic, parental, and family characteristics: Maternal age, education level, parental occupation, marital status, and the number of children in the household.
- Obstetric and delivery history: Data regarding the pregnancy and childbirth.
- Neonatal signs at discharge: Breastfeeding, stools, breathing, movements/reflexes, crying patterns, and jaundice.
- Knowledge of danger signs: Including advice received from healthcare personnel and/or prior personal knowledge.
- Maternal attitudes and practices: Reactions and actions taken regarding danger signs.

2.5. Operational Definitions

The neonatal danger signs assessed in the survey included: fever/hyperthermia, respiratory distress/fast breathing, apathy, lethargy, convulsions, refusal to breastfeed, vomiting/abdominal distension, constipation, jaundice, low weight, umbilical redness, and purulent umbilical discharge.

Maternal knowledge was categorized as follows:

- Good knowledge: Identification of at least 7 danger signs.
- Satisfactory knowledge: Identification of 4 to 6 danger signs.
- Poor knowledge: Identification of fewer than 4 danger signs.

Maternal knowledge was categorized based on the WHO guidelines for essential newborn care. Out of the 12 danger signs assessed, the threshold for 'Good knowledge' was set at 7 or more signs (≥58%). This cut-off was selected to ensure that mothers classified as having 'Good knowledge' could identify the majority of critical warning signals requiring immediate referral, distinguishing them from

those with only a fragmented awareness or insufficient knowledge.

2.6. Data Management, Sampling and Statistical Analysis

Data analysis was performed using R (version 4.3.2) and SPSS (version 28.0.1) software. Descriptive analysis was conducted to assess the distribution of study variables. Figures and tables were generated using Microsoft Excel. Qualitative (categorical) variables were expressed as frequencies and percentages. Quantitative (continuous) variables were reported as means, medians, and standard deviations. The Chi-square test was used to assess associations between variables, with statistical significance defined as $p < 0.05$.

The sample size of N = 200 represents a comprehensive capture of eligible mothers attending postnatal consultations or pediatric hospitalization units over the six-month study period (September 2023-March 2024). This duration was selected to account for seasonal variations in hospital admissions. With this sample size, the study achieves a 95% confidence level with a margin of error of approximately 7%, ensuring that the findings are representative of the patient population served by this tertiary referral hospital.

3. Results

3.1. Sociodemographic and Obstetric Characteristics

A total of 200 mothers were interviewed. Among the 200 deliveries, there were 109 female and 91 male newborns (45.5%). The mean maternal age was 27.77 years, with the 20 - 30 age group being the most represented (n = 130; 65%). The majority of mothers had received formal education (91%), with 29% having attained a higher education level. Regarding marital status, 92.5% were married, 6.5% were single, and 1% were widowed. More than half of the mothers (n = 113; 56.5%) lived in extended family homes. Antenatal care (ANC) was provided by a midwife in 63% of cases and by a gynecologist in 37% of cases. Most mothers (88.5%; n = 177) had adequate antenatal care with more than three ANC visits, while 11.5% (n = 23) had inadequate follow-up. Deliveries were attended by a midwife in 52% of cases and by a gynecologist in 48% of cases (Table 1).

Table 1. Sociodemographic, obstetrical characteristics, and postnatal information of mothers (N = 200).

Variables	Categories	Count (n)	Percentage (%)
Newborn gender	Female	109	54.5
	Male	91	45.5
Mothers' residence	Urban (Dakar)	128	64
	Outside Dakar	53	26.5
	Peri-urban	19	9.5
Mothers' age	Under 20 years	11	5.5
	20 - 30 years	130	65

Continued

	30 - 40 years	53	26.5
	Over 40 years	6	3
Education level	No schooling	17	9
	Quranic school	26	13
	Primary	19	10
	Secondary	80	41
	Higher education	58	29
Marital status	Married	185	92.5
	Single	13	6.5
	Widow	2	1
Living environment	Family house	113	56.5
	Apartment	87	43.5
Number of children	1 child	99	49.5
	2 - 3 pregnancies	81	40.5
	4 pregnancies	20	10
Pregnancy follow-up	By midwife	126	63
	By gynecologist	74	37
Birth attendant	Midwife	104	52
	Gynecologist	96	48

3.2. Maternal Knowledge of Danger Signs

Of the 200 mothers surveyed, 126 (63%) reported receiving advice from healthcare personnel after delivery, while 37% stated they received no advice. Only 7.5% of mothers had received specific information regarding danger signs (Figure 1).

The danger signs most frequently identified by mothers were fever, refusal to breastfeed, hypothermia (cold body), and abdominal distension (Table 2). Nearly two out of three women (63%) demonstrated poor knowledge of danger signs (Figure 2). However, most danger signs were perceived as serious by more than 80% of mothers (Figure 3).

Table 2. Distribution according to the level of knowledge of danger signs by mothers.

Categories	Count (n)	Percentage (%)
Hot body/Hyperthermia	138	69
Refusal to breastfeed	76	38
Cold body/Hypothermia	70	35
Abdominal distension/bloating	59	29.5
Vomiting	36	18
Apathy	36	18

Continued

Difficulty breathing	31	15.5
Fast breathing	29	14.5
Convulsions/Seizures	20	10
Jaundice	15	7.5
Lethargy	12	6
Base of the cord is red	9	4.5
Purulent discharge from umbilicus	6	3

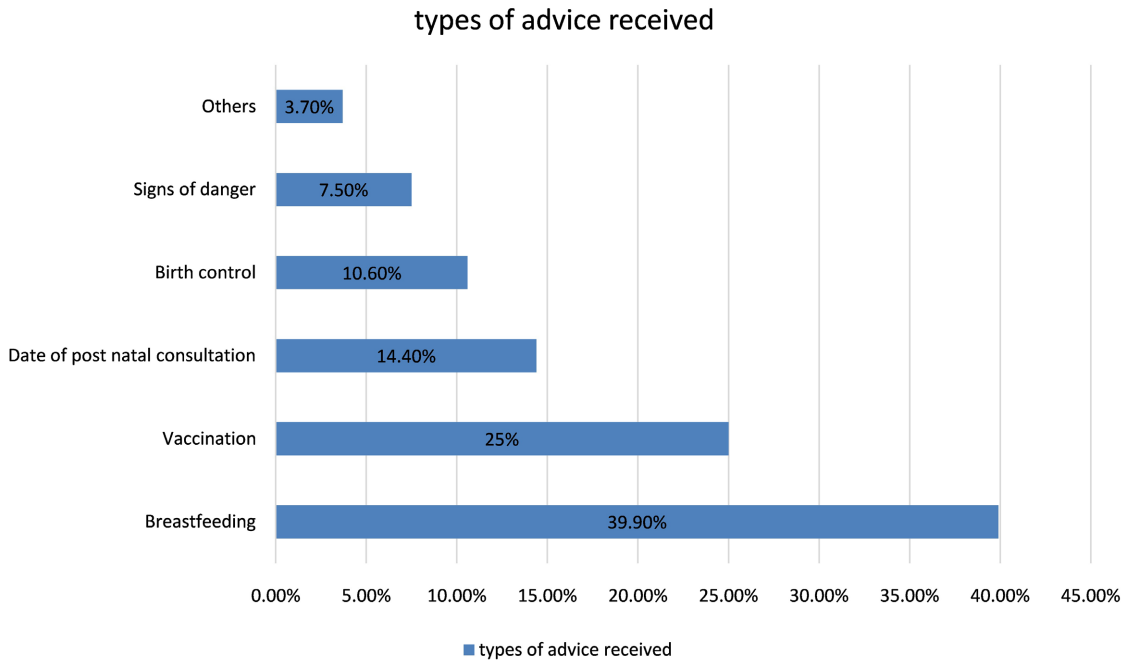

Figure 1. Distribution according to the types of advice received.

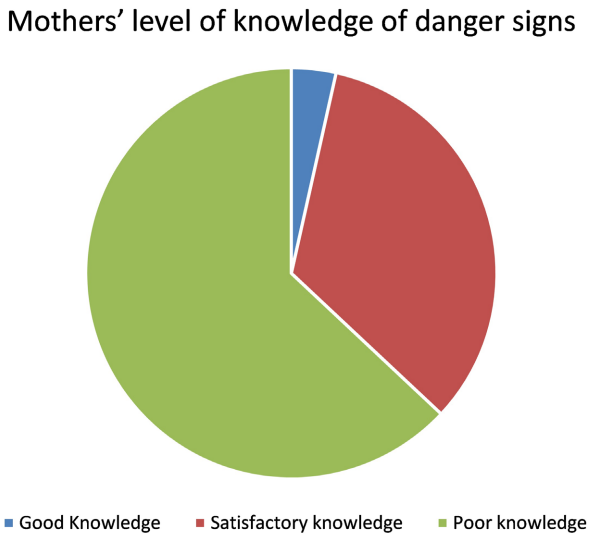

Figure 2. Mothers' level of knowledge of danger signs.

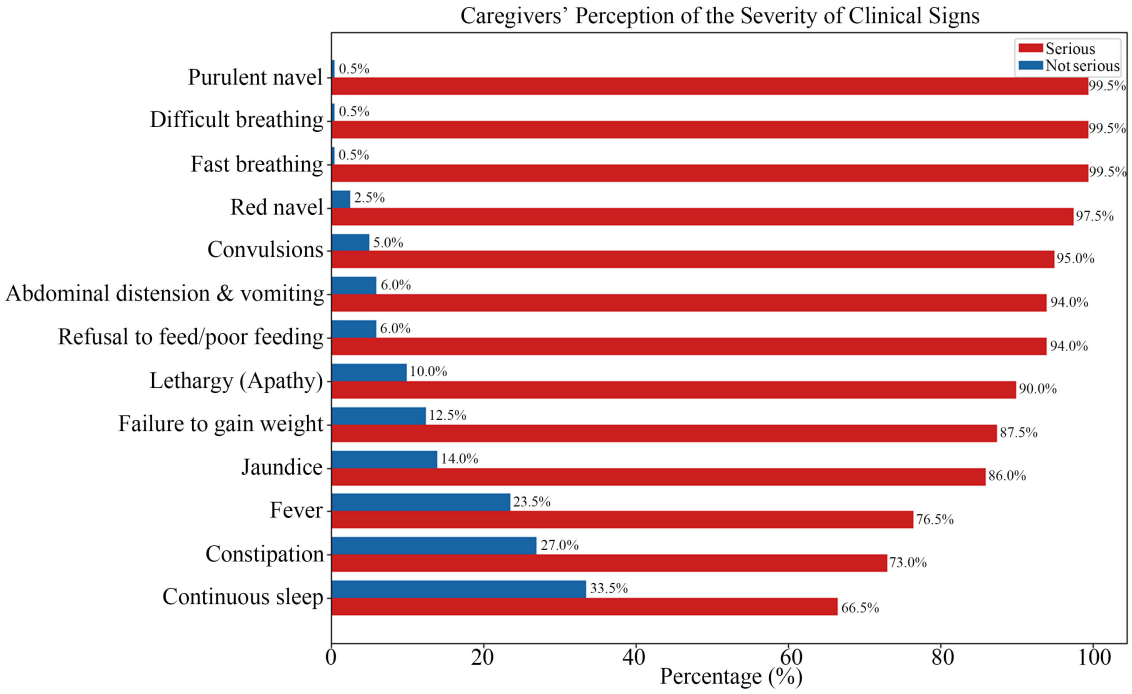

Figure 3. Mothers' attitude towards newborn danger signs.

3.3. Attitudes and Practices

Regarding maternal practices in response to danger signs, the vast majority of mothers indicated they would seek care at health facilities, which constituted the primary point of care for almost all participants. However, practices were more heterogeneous for certain specific signs. Home monitoring was frequently reported, particularly for excessive sleep, constipation, and jaundice (Table 3).

Table 3. Distribution according to mothers' practices regarding signs of danger of the newborn.

Signs	Advice from relative	Pharmacy	Health facility	Monitoring	Remedy	Traditional healer
Fever	0.5%	2.5%	73.5%	0%	0%	0%
Difficulty breathing	2%	0.5%	97%	0%	0%	0%
Fast breathing	0%	0.5%	99%	0.5%	0%	0%
Apathy	1%	2%	87%	9%	1%	0%
Sleeps continuously	2%	0%	63.5%	32.5%	1%	1%
Convulsions	1%	0%	93%	5%	0%	1%
Jaundice	1%	0%	85%	13.5%	0.5%	0%
Tense abdomen/vomiting	1%	0.5%	92.5%	5%	1%	0%
Refusal to breastfeed or not feeding well	1%	1.5%	92.5%	4.5%	1.5%	0%
Constipation	0.5%	2.5%	70%	19.5%	7.5%	0%
Not gaining weight	1.5%	2%	84%	7%	5.5%	0%
Redness of umbilicus	0.5%	7.5%	89.5%	1.5%	1%	0%
Purulent discharge from umbilicus	0%	3.5%	96%	0.5%	0%	0%

3.4. Factors Associated with Knowledge Levels

A statistically significant association was found between poor knowledge of danger signs and the following factors: age group 20 - 30 years, higher education level, living in an extended family home, and being married (Table 4).

Furthermore, having more than three ANC visits, receiving antenatal care from a midwife, and initiating breastfeeding between 1 and 12 hours after birth were significantly associated with poor knowledge of neonatal danger signs (Table 5).

Table 4. Sociodemographic factors associated with knowledge of danger signs.

		Poor knowledge		Satisfactory knowledge		Good knowledge		P-value
		n	%	n	%	n	%	
Mothers' age	<20 years	8	4%	3	1.5%	0	0%	**0.000**
	20 - 30 years	82	41%	43	21.5%	5	2.5%	
	30 - 40 years	33	16.5%	18	9%	2	1%	
	Over 40 years	3	1.5%	3	1.5%	0	0%	
Education level	No schooling	13	6.5%	3	1.5%	1	0.5%	**0.000**
	Quranic school	14	7%	12	6%	0	0%	
	Primary	13	6.5%	6	3%	0	0%	
	Middle school	24	12%	16	8%	1	0.5%	
	Secondary school	24	12%	14	7%	1	0.5%	
	Higher education	38	19%	16	8%	4	2%	
Mothers' origin	Urban	74	37%	48	24%	6	3%	0.2014
	Peri-urban	12	6%	7	3.5%	0	0%	
	Outside Dakar	40	20%	12	6%	1	0.5%	
Mothers' occupation	Unemployed	73	36.5%	35	17.5%	2	1%	0.4245
	Informal sector	32	16.0%	23	11.5%	3	1.5%	
	Formal sector	21	10.5%	9	4.5%	2	1%	
Housing type	Family house	66	33%	42	21%	5	2.5%	**0.000**
	Apartment	60	30%	23	11.50%	2	1%	
	Others	0	0%	2	1%	0	0%	
Marital status	Single	10	5%	3	1.50%	0	0%	**0.000**
	Married	115	57.5%	64	32%	6	3%	
	Widows	2	1%	0	0%	0	0%	
Type of marriage	Monogamy	5	2.50%	66	33%	40	20%	**0.000**
	Polygamy	2	1%	49	24.50%	24	12%	
	Others	0	0%	11	5.50%	3	1.50%	

Table 5. Pregnancy follow-up and delivery factors associated with knowledge of danger signs.

		Poor knowledge		Satisfactory knowledge		Good knowledge		P-value
		n	%	n	%	n	%	
ANC (Visits)	1	2	1%	0	0%	0	0%	**0.000**
	2	3	1.5%	3	1.5%	0	0%	
	3	10	5%	5	2.5%	0	0%	
	>3	111	55.5%	59	29.5%	7	3.5%	
Healthcare provider	Gynecologist	39	19.5%	31	15.5%	4	2%	**0.000236**
	Midwife	87	43.5%	36	18%	3	1.5%	
Place of delivery	Health center	4	2%	1	0.5%	1	0.5%	0.3707
	Clinic	2	1%	5	2.5%	0	0%	
	Hospital	118	59%	60	30%	7	3.5%	
	Health post	2	1%	0	0%	0	0%	
Time spent in hospital	1 to 10 days	126	63%	63	31.5%	7	3.5%	0.679
	11 to 20 days	0	0%	2	1%	0	0%	
	>20 days	0	0%	2	1%	0	0%	
Advice received	Breastfeeding	57	28.5%	19	9.5%	34	17%	0.402
	Vaccination	42	21%	9	4.5%	37	18.5%	
	PNC date	55	27.5%	12	6%	0	0%	
	Birth control	10	5%	15	7.5%	2	1%	
	Danger signs	10	5%	3	1.5%	2	1%	
	Others	5	2.5%	2	1%	1	0.5%	
Parity	1 child	69	34.5%	26	13%	4	2%	0.3165
	2 - 3 children	46	23%	32	16%	3	1.5%	
	>=4	11	5.5%	8	4%	1	0.5%	
Time to breastfeeding	1 h - 12 h	70	35%	21	10.5%	2	1%	**0.0002473**
	13 h - 24 h	18	9%	9	4.5%	1	0.5%	
	25 h - 36 h	1	0.5%	0	0%	0	0%	
	37 h - 48 h	16	8%	12	6%	2	1%	
	>48 h	21	10.5%	25	12.5%	2	1%	

PNC: post natal consultation.

4. Discussion

In our study, the most represented age group was 20 - 30 years, accounting for 65% of the sample. This proportion is slightly higher than that reported by Okawa *et al.* in Ghana in 2015 (50.5%) [6]. This finding can be explained by the predominantly young population in Senegal, where this age group corresponds to the peak childbearing age [3].

Our cohort is characterized by a high level of schooling, a profile generally more favorable than those observed in many studies across sub-Saharan Africa [7]. However, despite the majority of mothers having a good level of education, nearly two-thirds (63%) demonstrated insufficient knowledge. These results corroborate data reported in several resource-limited settings, where maternal knowledge of danger signs remains low despite high utilization of health services. In Ethiopia, studies conducted between 2020 and 2023 showed that the percentage of mothers with good knowledge ranged from 20% to 40%, depending on education levels and access to care [8]. In Nigeria, Ekwochi *et al.* reported that knowledge of three or more of the nine WHO-recognized signs was very low (0 - 30.3%) across the studied communities [9]. Similarly, in an Ethiopian study, only 36.5% of mothers had "good" knowledge of neonatal danger signs, and correct recognition was associated with education, media exposure, birth preparedness, and delivery in a health facility [10] [11].

In our study, the analysis of associated factors showed that higher education and the 20 - 30 age group were significantly associated with poor knowledge ($p = 0.000$). This suggests that, even in an urban and educated setting, formal academic instruction does not substitute for targeted health education.

Indeed, although adherence to the health system is strong—with 88.5% of mothers attending more than three Antenatal Care (ANC) visits and 99% delivering in a formal facility (attended by a midwife or gynecologist)—the communication process appears to be deficient. Only 7.5% of mothers stated they had received specific information regarding danger signs. Furthermore, the statistically significant association between having attended more than three ANC visits or having been followed by a midwife and possessing poor knowledge of neonatal danger signs ($p = 0.000$ and $p = 0.000236$, respectively) highlights a systemic gap in the quality and content of prenatal and postnatal education in Senegal. The majority of mothers in resource-limited countries are insufficiently prepared to identify neonatal complications, contributing to the persistence of high neonatal mortality despite the availability of care. This contrasts with WHO protocols for essential newborn care, which mandate that counseling on danger signs be a systematic component of both prenatal and postpartum management [12]. The counter-intuitive negative correlation between higher maternal education, frequent ANC attendance, and knowledge levels points to a specific "competence assumption" bias in provider-patient interactions. Healthcare professionals may inadvertently assume that educated mothers are already health-literate, leading them to omit basic counseling on danger signs. Conversely, the high frequency of ANC visits among mothers with poor knowledge suggests a 'ritualization' of care, where the focus remains strictly on obstetric monitoring (e.g., pre-eclampsia screening) at the expense of anticipatory neonatal guidance. This indicates that without a structured, mandatory educational curriculum embedded into prenatal visits, high healthcare utilization does not translate into improved neonatal health literacy

Insufficient knowledge of neonatal signs remains a critical issue, as early detec-

tion is key to reducing neonatal morbidity and mortality. In our series, recognition was better for the most overt signs: fever/hyperthermia (69%) and refusal to breastfeed (38%). This hierarchy of recognition, where visible signs are better known, is a trend observed in comparative studies conducted in other resource-limited settings. In Kenya, a study reported that fever was the most frequently identified sign in newborns (~73.9%) [13]. Similarly, in a study at a tertiary hospital in Uganda, only 14.0% of mothers had satisfactory knowledge (≥3 signs spontaneously recognized) at discharge; fever (73.6%) and refusal to breastfeed (38.8%) were among the most cited [14].

Conversely, knowledge of more insidious signs or those specific to severe infections—such as jaundice, convulsions, lethargy, or purulent umbilical discharge—was low in our study. In a survey in eastern Ethiopia, authors reported that specific signs like lethargy or convulsions remain poorly recognized [15]. In Saudi Arabia, a qualitative study focused on knowledge reported major difficulties for mothers in identifying enough signs, particularly those that are less obvious (lethargy, convulsions, jaundice, etc.) [16].

The poor recognition of jaundice and neurological signs is concerning, as it may delay the diagnosis and treatment of severe pathologies, which are direct causes of preventable sequelae and death in Low- and Middle-Income Countries (LMICs). In developed countries, public health campaigns focus on the early recognition of these subtle signs through systematic prenatal and postnatal education programs, easy access to information (internet, media, prenatal classes), and strong involvement of healthcare professionals in parental counseling to prevent irreversible complications [17].

Maternal attitudes were generally very positive, as more than 80% considered neonatal danger signs to be serious. Regarding practices, health facilities were the primary point of care for almost all mothers, which constitutes a major asset of the Senegalese system. In Ghana, Gyaase's study reported that 77.2% of mothers stated they would go to the hospital as soon as a neonatal danger sign was identified [18].

However, recourse to the advice of family members, *marabouts* (traditional healers), or the use of traditional remedies, although present in small proportions in our study, is nonetheless responsible for delays in management. Moreover, poor knowledge of danger signs was associated with living in an extended family home and being married, indicating that these mothers rely more on advice from their social circle than on structured medical information.

Furthermore, the persistence of home monitoring ("watchful waiting") observed for certain signs (excessive sleep, constipation, and jaundice) remains worrisome. This waiting period observed in maternal practices is a key determinant of neonatal survival, as studies show that delays in care-seeking significantly increase the risk of infant mortality [19].

The significant association between polygamy and maternal knowledge observed in our study ($p < 0.05$) likely mirrors the dynamics seen in extended family

households. In polygamous settings, the hierarchy of care often shifts from the biological mother to older co-wives or the paternal grandmother, who act as the primary decision-makers regarding newborn health. This 'collective mothering' structure can dilute the impact of hospital-based education, as traditional beliefs held by senior household members—such as home monitoring for jaundice or using traditional remedies—often supersede the medical advice given to the young mother. Consequently, even if a mother attends antenatal care, her ability to implement that knowledge is constrained by the domestic power dynamic, reinforcing the need for inclusive health education strategies that target the entire family unit rather than the mother in isolation.

Our results argue for the systematic integration of a module on neonatal danger signs into prenatal care programs, birth preparedness sessions, and postnatal visits in Senegal. Additionally, training midwives and community health workers in parental education is essential, as they are best positioned to reach mothers in the immediate postpartum period. Experience from other resource-limited countries demonstrates that such simple but systematic interventions can significantly improve maternal knowledge and reduce consultation delays [10].

Finally, our study has limitations: it relies on a self-reported questionnaire, which may introduce social desirability bias, and does not directly assess the quality of practices (actual consultation times, real-world behavior in case of danger, neonatal outcomes). These limitations do not detract from the value of the findings but should encourage further research, such as clinical practice audits, interventional studies (impact of an education program), and longitudinal follow-up of newborns.

5. Conclusions

In Senegal, despite high healthcare utilization and favorable sociodemographics, maternal knowledge of neonatal danger signs remains suboptimal, notwithstanding a high perception of severity. This underscores a significant discrepancy between the quantity of maternal care accessed and the quality of health education delivered.

Improving early detection of neonatal illnesses and reducing mortality requires immediate action: the integration of systematic maternal education into the entire perinatal continuum of care is imperative. This must be supported by adapted educational tools and reinforced training for healthcare providers.

Conflicts of Interest

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

References

[1] United Nations Children's Fund (UNICEF) (2025) Neonatal Mortality. UNICEF Data. https://data.unicef.org/topic/child-survival/neonatal-mortality/

[2] World Health Organization (2024) Newborn Mortality. World Health Organization.

https://www.who.int/news-room/fact-sheets/detail/newborn-mortality

[3] Agence Nationale de la Statistique et de la Démographie (ANSD) [Senegal] and ICF (2025) Senegal Continuous Demographic and Health Survey 2023: Key Indicators Report. ANSD and ICF. https://www.ansd.sn/sites/default/files/2023-12/Final%20Senegal%20DHS%20-%20KIR%202023.pdf

[4] Lawn, J.E., Kerber, K., Enweronu-Laryea, C. and Cousens, S. (2010) 3.6 Million Neonatal Deaths—What Is Progressing and What Is Not? *Seminars in Perinatology*, **34**, 371-386. https://doi.org/10.1053/j.semperi.2010.09.011

[5] Guta, A., Sema, A., Amsalu, B. and Sintayehu, Y. (2020) Knowledge of Neonatal Danger Signs and Associated Factors among Mothers of < 6 Months Old Child in Dire Dawa, Ethiopia: A Community Based Cross-Sectional Study. *International Journal of Women's Health*, **12**, 539-548. https://doi.org/10.2147/ijwh.s263016

[6] Okawa, S., Ansah, E.K., Nanishi, K., Enuameh, Y., Shibanuma, A., Kikuchi, K., *et al.* (2015) High Incidence of Neonatal Danger Signs and Its Implications for Postnatal Care in Ghana: A Cross-Sectional Study. *PLOS ONE*, **10**, e0130712. https://doi.org/10.1371/journal.pone.0130712

[7] Kangulu, I.B., Ngoy, E.K., Nzaji, M.K. and Kalenga Mwenze, P. (2014) Facteurs de risque de faible poids de naissance en milieu semi-rural de Kamina, République Démocratique du Congo. *Pan African Medical Journal*, **17**, Article 220. https://doi.org/10.11604/pamj.2014.17.220.2366

[8] Mose, A., Abebe, H., Shitu, S. and Shimels, H. (2021) Determinants of Maternal Knowledge of Neonatal Danger Signs among Postpartum Mothers in Southern Ethiopia: Institutional-Based Cross-Sectional Study. *BMJ Open*, **11**, e048888. https://doi.org/10.1136/bmjopen-2021-048888

[9] Ekwochi, U., Ndu, I.K., Osuorah, C.D., Amadi, O.F., Okeke, I.B., Obuoha, E., *et al.* (2015) Knowledge of Danger Signs in Newborns and Health Seeking Practices of Mothers and Care Givers in Enugu State, South-East Nigeria. *Italian Journal of Pediatrics*, **41**, Article No. 18. https://doi.org/10.1186/s13052-015-0127-5

[10] Kebede, A.A., Cherkos, E.A. and Taye, E.B. (2020) Mother'S Knowledge of Neonatal Danger Signs and Health-Seeking Practices and Associated Factors in Debretabor, Northwest Ethiopia: A Community-Based Cross-Sectional Study. *Research and Reports in Neonatology*, **10**, 47-58. https://doi.org/10.2147/rrn.s257768

[11] Hunde, G.A., Kelkay, M.M. and Yimer, B. (2023) What Mothers Know about Neonatal Danger Signs: A Case of Ethiopia. *Iranian Journal of Neonatology*, **14**, 36-43.

[12] Mali. Ministry of Health and Social Development (2023) Manuel de référence: Soins essentiels au nouveau-né. Ministry of Health and Social Development. https://files.aho.afro.who.int/afahobckpcontainer/production/files/MANUEL_R%C3%89F%C3%89RENCE_Soins_essentiels_au_nouveau-n%C3%A9.pdf

[13] Kibaru, E.G. and Otara, A.M. (2016) Knowledge of Neonatal Danger Signs among Mothers Attending Well Baby Clinic in Nakuru Central District, Kenya: Cross Sectional Descriptive Study. *BMC Research Notes*, **9**, Article No. 481. https://doi.org/10.1186/s13104-016-2272-3

[14] Alinaitwe, B., Nkunzimaana, F., Kato, C., Uwimbabazi, R., Nakamya, P., McCoy, M., *et al.* (2025) Maternal Awareness of Newborn Danger Signs before Discharge: A Secondary Analysis of Baseline Data from a Quasi-Experimental Study in Uganda. *Maternal Health, Neonatology and Perinatology*, **11**, Article No. 17. https://doi.org/10.1186/s40748-025-00214-x

[15] Getachew, T., Assebe Yadeta, T., Gereziher, T., Eyeberu, A. and Dheresa, M. (2021)

Determinants of Maternal Knowledge on Neonatal Danger Signs and Care-Seeking Practices in a Rural Area of Southeastern Ethiopia. *International Health*, **14**, 610-618. https://doi.org/10.1093/inthealth/ihab084

[16] Abu-Shaheen, A., AlFayyad, I., Riaz, M., Nofal, A., AlMatary, A., Khan, A., *et al.* (2019) Mothers' and Caregivers' Knowledge and Experience of Neonatal Danger Signs: A Cross-Sectional Survey in Saudi Arabia. *BioMed Research International*, **2019**, Article ID: 1750240. https://doi.org/10.1155/2019/1750240

[17] IndiKit (2025) Knowledge of Neonatal Danger Signs. People in Need. https://fr.indikit.net/indicator/262-knowledge-of-neonatal-danger-signs

[18] Gyaase, P., Aduse-Poku, E., Lanquaye, M.O., Acheampong, E.B. and Sampson, D.B. (2024) Health Seeking Behaviour and Knowledge on Neonatal Danger Signs among Neonatal Caregivers in Upper Denkyira East Municipality, Ghana. *BMC Pediatrics*, **24**, Article No. 27. https://doi.org/10.1186/s12887-023-04430-2

[19] Prual, A. (2020) Le nouveau-né en Afrique de l'Ouest et du Centre: Comprendre pour agir. *Santé Publique*, **1**, 7-15. https://doi.org/10.3917/spub.200.0007