

PREVALENCE AND PREDICTORS OF NEONATAL SEPSIS AMONG NEWBORNS ADMITTED TO THE NEONATAL UNIT OF STATE SPECIALIST HOSPITAL, ASUBIARO, OSOGBO, OSUN STATE

By

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Abstract

Neonatal sepsis remains a formidable global health challenge: estimates indicate that in 2022 there were approximately 2.3 million newborn deaths worldwide, with infections, predominantly sepsis, responsible for roughly 20% of these deaths. Despite medical advancements the condition remains a major public health problem, especially in low- and middle-income countries. This study therefore examined the prevalence and predictors of neonatal sepsis among newborns admitted to the neonatal unit of state specialist hospital Asubiaro, Osogbo, Osun State. This study is a seven-month retrospective study conducted to examine the prevalence and predictors of neonatal sepsis. Data was extracted from the medical records of patients and hospital database using PROFORMA and analyzed using descriptive statistics of frequency and percentages while inferential statistics of logical regression was used to establish relationship between the variables. The finding showed that prevalence of neonatal sepsis among newborns was high (100%). Low birth weight (53.1%) and preterm delivery (50.0%) were the strongest predictors of mortality. The study concluded that neonatal sepsis remains highly prevalent. Therefore, government should strengthen maternal and neonatal healthcare services.

Keywords: Prevalence, Predictors, Neonatal sepsis, Newborns, Neonatal unit.

Introduction

Neonatal sepsis continues to be a significant global health concern, contributing substantially to neonatal morbidity and mortality. Each year, an estimated 2.4 million neonatal deaths occur globally, with sepsis accounting for nearly one-third of these deaths (8). Despite medical advancements in neonatal intensive care and antimicrobial therapy, the condition remains a major public health problem, especially in low- and middle-income countries (LMICs) (5). Newborns are particularly vulnerable to infections due to their immature immune systems, and sepsis often presents with non-specific symptoms, making diagnosis and timely intervention difficult (14). The burden of neonatal sepsis is further compounded by the growing challenge of antimicrobial resistance, which undermines treatment outcomes in both developed and developing countries (16).

The global prevalence of neonatal sepsis shows considerable variation across different regions and healthcare settings. In high-income countries where maternal and neonatal care services are well established, the incidence of neonatal sepsis

ranges from 0.5 to 8.1 per 1,000 live births (5). This lower incidence is attributed to improved hygiene during delivery, early screening, effective use of antibiotics, and availability of advanced neonatal care units. However, in many parts of South Asia and sub-Saharan Africa, the prevalence is significantly higher, often ranging between 10 and 50 per 1,000 live births (16). These higher rates reflect systemic challenges including inadequate healthcare infrastructure, low skilled birth attendance, poor antenatal care coverage, and limited awareness about neonatal infections among caregivers (5). In Africa, neonatal sepsis remains one of the leading causes of preventable neonatal deaths. Sub-Saharan Africa alone accounts for roughly 42% of all neonatal deaths globally, with sepsis being a major contributor (15). Studies across different African countries show that the prevalence of neonatal sepsis among hospitalized newborns can range from 20% to as high as 40% (14). This situation is worsened by overcrowded health facilities, lack of trained personnel, poor infection prevention practices, and insufficient access to clean water and sanitation. Moreover, cultural beliefs and practices around childbirth and neonatal care often hinder timely



medical intervention, thereby increasing the risk of adverse outcomes for neonates (15). Various factors contribute to the high incidence and poor outcomes of neonatal sepsis in African settings. These include premature rupture of membranes, prolonged and obstructed labor, delivery in unhygienic conditions, and suboptimal management of maternal infections (8). Furthermore, delays in recognizing the symptoms of sepsis and seeking care, compounded by the lack of diagnostic capacity and appropriate antibiotics, often lead to late initiation of treatment. The lack of national surveillance systems and uniform clinical guidelines for managing neonatal sepsis also makes it difficult to monitor trends and implement effective responses at the regional level (12). Nigeria, as Africa's most populous nation, faces a disproportionately high burden of neonatal mortality. According to recent UNICEF data, Nigeria ranks among the top five countries globally in terms of neonatal deaths, with an estimated neonatal mortality rate of 33 deaths per 1,000 live births (12). Sepsis remains one of the leading causes, responsible for approximately one in every four neonatal deaths (8). Although Nigeria has seen some improvements in maternal and child health indicators, the reduction in sepsis-related neonatal deaths has been minimal due to persistent gaps in the healthcare delivery system, especially at the primary healthcare level (11).

Several maternal, neonatal, and environmental factors have been identified as significant contributors to the development of neonatal sepsis in Nigeria. Key maternal factors include urinary tract infections during pregnancy, prolonged rupture of membranes, and chorioamnionitis (6). Neonatal risk factors commonly associated with sepsis include prematurity, low birth weight, birth asphyxia, and inadequate thermoregulation. Environmental contributors such as poor cord care practices, birth attended by unskilled personnel, and exposure to contaminated delivery environments are also notable. These risk factors are often interlinked with socio-economic determinants such as poverty, low maternal education, and cultural beliefs, which limit the utilization of skilled healthcare services (9).

The prevalence of neonatal sepsis varies widely across different regions and healthcare settings, reflecting both disparities in healthcare infrastructure and the influence of maternal, neonatal, and environmental factors (2). In North-East Ethiopia, an extremely high prevalence of 79.4% was observed among neonates admitted to specialized hospitals, highlighting a critical burden of infection likely fueled by inadequate antenatal care and unsafe delivery practices (2).

In contrast, a significantly lower prevalence of 36.41% was reported among neonates admitted to a neonatal intensive care unit in a tertiary care center, with early-onset sepsis accounting for 71.01% of the cases and late-onset sepsis for 28.99% (5). The relatively reduced prevalence suggests improvements in antenatal and neonatal care services, which could be mitigating risk exposures. Similarly, a hospital-based study in Eastern Ethiopia identified a prevalence rate of 45.8%, reinforcing the concern that neonatal sepsis remains a

major public health issue in many low-resource settings where early detection and intervention strategies may still be lacking (13).

Further supporting this variability, a prevalence of 49.8% was found among hospitalized newborns in southern Tanzania, where nearly half of the neonates exhibited clinical signs of sepsis (6). The findings emphasized that the burden is often linked to maternal infections and suboptimal healthcare-related practices, suggesting a need for strengthened neonatal surveillance and improved delivery protocols. Similarly, in North West Nigeria, the prevalence was estimated at 37.6%, with *Escherichia coli* emerging as the dominant pathogen, indicating a strong association between microbial exposure and neonatal outcomes (11).

Even lower prevalence rates have been observed in other regions. For example, in Nairobi, Kenya, neonatal sepsis affected 28.6% of admitted neonates, reflecting a relatively better control but still a concerning rate given the preventability of many underlying risk factors (10). These differences point to contextual variables such as access to quality prenatal care, hygiene during delivery, and hospital infection control measures.

Notably, among neonates with a gestational age of 35 weeks or more admitted to a level III unit in Brazil, early-onset neonatal sepsis was reported at only 1.8%, equating to 4 per 1,000 live births, with culture-confirmed cases being as low as 0.3 per 1,000 live births (3). Although complications like shock were frequent (21.7%), the absence of mortality in this group suggests that early identification and effective clinical management can greatly reduce fatality, even when sepsis is present.

At the foundational level, developmental immaturity represents a critical vulnerability. Newborns with preterm birth, very low birth weight (VLBW), and low Apgar scores possess underdeveloped immune and organ systems, making them less capable of mounting effective physiological responses to sepsis. For example, VLBW infants often have compromised skin and mucosal barriers and lower immunoglobulin levels, which heighten susceptibility to infection and associated complications. As one study notes, mortality rates climb dramatically as birth weight decreases, with VLBW infants bearing the highest fatality rates (1).

Biomarkers and early detection indicators such as elevated lactate, C-reactive protein (CRP), procalcitonin, and clinical signs like lethargy, poor feeding, or respiratory distress serve as proximal indicators of clinical deterioration. These markers aid in early risk stratification and can significantly improve predictive accuracy, though general descriptive references were available rather than specific data (1).

Neonatal sepsis has been consistently linked to a variety of maternal, perinatal, and neonatal factors, suggesting the multifaceted nature of its risk profile. Prolonged rupture of membranes, low Apgar scores, prelacteal feeding, vaginal delivery, and the use of mechanical ventilation emerged as significant contributors to neonatal sepsis. These factors

reflect the critical importance of both delivery circumstances and immediate postnatal care in shaping neonatal outcomes (13).

Other studies have reinforced the role of neonatal interventions and conditions in sepsis development. Prematurity, neonatal age beyond one week, intravenous cannulation shortly after birth, and the need for resuscitation using nasal oxygen were all identified as associated factors. These findings emphasize the impact of invasive procedures and postnatal clinical management on sepsis vulnerability (7).

In addition to neonatal characteristics, maternal health indicators remain important predictors. Low Apgar scores, maternal urinary tract infections during pregnancy, and premature rupture of membranes were significantly associated with sepsis. Interestingly, neonates in their first week of life were found to be less likely to develop sepsis compared to older neonates, suggesting that increased postnatal exposure may elevate infection risks (11).

The association between adverse maternal conditions and neonatal sepsis risk was further confirmed through evidence showing increased vulnerability among neonates born to single mothers, those whose mothers had anemia or urinary tract infections, and those experiencing premature rupture of membranes (10). Neonatal factors such as prematurity and low Apgar scores were again implicated, underscoring their persistent significance across different populations (10). Findings also indicate that while complications like shock are common in early-onset sepsis cases among late preterm and term infants, outcomes can be favorable if appropriate management is administered promptly. Despite a high prevalence of risk factors and complications, mortality can be avoided through effective clinical interventions, demonstrating the importance of timely and adequate neonatal care (3). Consistent with earlier evidence, maternal infections, especially urinary tract and sexually transmitted infections, alongside preterm birth, premature rupture of membranes, and neonatal resuscitation, were all found to be critical driver of neonatal sepsis. These associations highlight the continued need for interventions focused on maternal infection control, prevention of preterm labor, and improvement in delivery and resuscitation practices (2).

This research employed the Health Belief Model (HBM) as its theoretical framework.

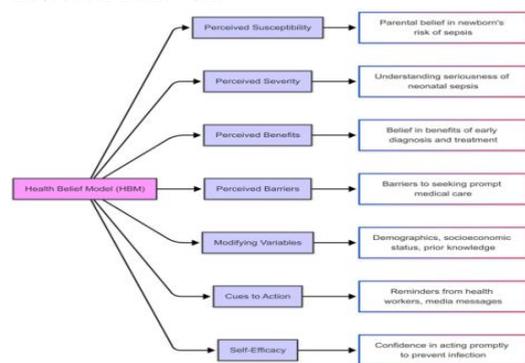


Figure 1: Conceptual framework

Methodology

Study design and setting

This is a seven-month retrospective study conducted in a state specialist hospital in Osogbo, Osun State, Nigeria. The State Specialist Hospital, Asubiaro, Osogbo, is one of the most important government-owned healthcare facilities in Osun State, Nigeria. Located in the state capital, the hospital serves as a referral center for various medical cases from across the state and neighboring regions. The hospital provides a broad range of medical services, including outpatient and inpatient care, maternity and child health services, surgical procedures, laboratory and diagnostic services, and emergency response. It is equipped to handle various medical conditions, with specialized units for pediatrics, internal medicine, ophthalmology, dermatology, and other fields. The maternity unit, in particular, plays a crucial role in ensuring safe childbirth and postnatal care, contributing to reduced maternal and infant mortality rates in the state.

Study Sample

During the study period all newborns (aged 0–28 days) who were admitted to the Neonatal Unit of the State Specialist Hospital, Asubiaro, Osogbo between January 2025 and July 2025. This includes both inborn neonates (delivered within the hospital) and out born neonates (referred from other health facilities or home deliveries) who were being managed at the unit for various medical conditions, including suspected or confirmed sepsis.

Ethical consideration and Informed Consent

Ethical approval was obtained from the Health Planning, Research, and Statistics Department of Ministry of Health, Osun State with reference number OSHREC/PRS/569T/1185. As this was a retrospective study, informed consent was not required.

Results

Demographic Information

Variable	Frequency (n)	Percent (%)	
Mother's age	19 – 24	43	33.1
	25 – 30	17	13.1
	31 – 36	37	28.5
	37 – 45	33	25.4
Maternal Marital status	Married	94	72.3
	Single	36	27.7
Maternal	No formal	23	17.7

Educational level	Primary	24	18.5
	Secondary	30	23.1
	Tertiary	53	40.8
Maternal Occupation	Unemployed	20	15.4
	Self-employed	62	47.7
	Formal sector	40	30.8
	Students	8	6.2
Maternal Religion	Christianity	47	36.2
	Islam	50	38.5
	Others	33	25.4
Number of Children (Parity)	Primipara (1)	27	20.8
	Multipara (2-3)	40	30.8
	Grand Multipara (4-6)	63	48.5
Sex of Baby	Female	59	45.4
	Male	71	54.6
Age at Admission (days)	0-6 days	28	21.5
	7-13 days	37	28.5
	14-28 days	65	50.0
Total = 130 (100%)			

Table 1 showed that the mothers were largely within the young adult age categories 19-24 representing 33.1%. Marital status revealed that a considerable majority of the respondents were married, constituting 72.3%. In terms of education, the largest group of mothers had tertiary education, accounting for 40.8%. The occupational distribution indicates that self-employment was the most common source of livelihood, with 47.7% of mothers falling in this category. Religious affiliation showed a fairly balanced spread, with Islam being the most

common at 38.5%, closely followed by Christianity at 36.2%. Parity distribution revealed that nearly half of the respondents, 48.5%, were grand multipara mothers with between four and six children. With regard to the sex of the newborns, males were slightly more than females, making up 54.6%. Age at admission showed that half of the neonates, 50.0%, were admitted between 14 and 28 days of life.

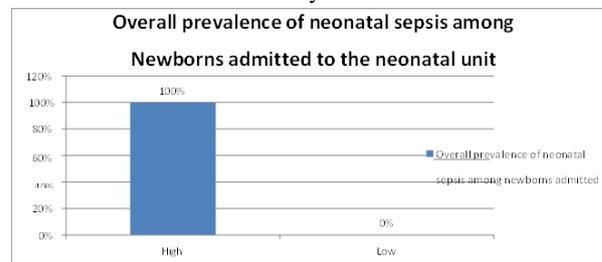


Figure 1: Prevalence of neonatal sepsis

Table 4.2: Prevalence of Neonatal Sepsis among Newborns

Variable		Frequency (n)	Percent (%)
Signs/Symptoms	Apnea	5	3.8
	Cyanosis	12	9.2
	Fever	30	23.1
	Lethargy	25	19.2
	Poor feeding	15	11.5
	Respiratory distress	20	15.4
	Seizures	23	17.7
Diagnosis of Sepsis	Clinical + Laboratory confirmed	66	50.8
	Clinical only	64	49.2
Total = 130 (100%)			

The findings from Table 4.2 show that neonatal sepsis presented with a variety of clinical features among the newborns admitted. Fever was the most common symptom, reported in 23.1% of cases.

With respect to diagnosis, both clinical assessment and laboratory confirmation were utilized.

Among the newborns, 50.8% were diagnosed with sepsis through a combination of clinical features and laboratory confirmation, while 49.2% were diagnosed based on clinical features alone.

Table 3: Predictors of Mortality among Newborns

Variable		Frequency (n)	Percent (%)
Birth Weight (kg)	(<2.5 kg)	69	53.1
	(2.5-2.9 kg)	19	14.6
	(3.0-3.9 kg)	42	32.3

Gestational Age (weeks)	Preterm (28–35 wks)	65	50.0
	Term (36–40 wks)	46	35.4
	Post-term (41–42 wks)	19	14.6
Apgar Score	Severe distress (0–3)	26	20.0
	Moderate distress (4–6)	43	33.1
	Normal (7–10)	61	46.9
Length of Hospital Stay (days)	1–7 days	49	37.7
	8–14 days	59	45.4
	15–21+ days	22	16.9
Outcome of Admission	Died	41	31.5
	Discharged alive	42	32.3
	Referred	47	36.2
Total = 130 (100%)			

Table 4.3 showed important predictors of mortality among newborns admitted. Birth weight was a major factor, with more than half of the neonates, 53.1%, having a low birth weight of less than 2.5 kg. Gestational age also played a crucial role, as half of the newborns, 50.0%, were preterm, and 14.6% were post-term. Almost half of the neonates, 46.9%, had normal Apgar scores of 7 to 10. This shows that a significant proportion of neonates experienced compromised health at birth, with nearly one in five being severely distressed. The length of hospital stay varied, with the largest proportion, 45.4%, admitted for 8 to 14 days. A bit above one third of neonate 36.2% were referred.

Logistic Regression Analysis Summary for the Relationship between Prevalence of neonatal sepsis and associated factors of Neonatal Sepsis among newborns at State Specialist Hospital, Asubiaro

Associated factors	B	Std. Error	Wald	Df	Sig.	Exp(B)	95% CI for Exp(B)
(Constant)	4.542	1.796	6.396	1	.011	93.887	—
Antenatal Care Attendance	-0.471	0.381	1.531	1	.216	0.624	0.296 – 1.317
Prolonged Rupture of Membranes	-0.657	0.391	2.819	1	.093	0.518	0.241 – 1.116
Prolonged/Obstructed Labour	-0.341	0.374	0.830	1	.362	0.711	0.342 – 1.480

Mode of Delivery (Assisted Vaginal)	-0.452	0.468	0.932	1	.334	0.637	0.254 – 1.592
Mode of Delivery (Caesarean)	-0.185	0.472	0.154	1	.695	0.831	0.329 – 2.096
Feeding Pattern (Breastfeeding)	0.172	0.461	0.139	1	.709	1.188	0.481 – 2.931
Feeding Pattern (Formula)	-0.422	0.445	0.899	1	.343	0.656	0.274 – 1.568
Place of Delivery (Hospital)	0.425	1.004	0.179	1	.672	1.529	0.214 – 10.930
Place of Delivery (PHC)	0.082	0.870	0.009	1	.925	1.086	0.197 – 5.979
Skilled Birth Attendant Present	-0.698	0.909	0.590	1	.442	0.497	0.084 – 2.953
Cord Care Practice	-0.562	0.480	1.371	1	.242	0.570	0.223 – 1.461

Dependent Variable: Diagnosis of Sepsis (1 = Clinical + Laboratory confirmed, 0 = Clinical only). **Model Summary:** Omnibus Test of Model Coefficients: $\chi^2(11) = 11.181, p = .428$; Cox & Snell $R^2 = .082$; Nagelkerke $R^2 = .110$; Classification Accuracy = 66.9%.

The logistic regression analysis carried out to determine the relationship between the prevalence of neonatal sepsis and the factors associated with neonatal sepsis among newborns at the State Specialist Hospital, Asubiaro, revealed that none of the predictors showed a statistically significant relationship with sepsis diagnosis. The omnibus test of model coefficients indicated that the overall model was not statistically significant, $\chi^2(11) = 11.181, p = .428$, suggesting that the set of predictors included in the model did not significantly improve the prediction of neonatal sepsis beyond chance. The Cox and Snell R^2 value of .082 and the Nagelkerke R^2 value of .110 further imply that the model accounted for only a small proportion of the variation in neonatal sepsis outcomes. Despite this, the classification accuracy of the model was 66.9%, indicating that about two-thirds of the cases were correctly classified.

Examining individual predictors, antenatal care attendance showed a negative relationship with neonatal sepsis diagnosis, with an odds ratio of 0.624, but this relationship was not statistically significant at $p = .216$. Prolonged rupture of membranes also showed a reduced likelihood of sepsis diagnosis with an odds ratio of 0.518, although this effect approached but did not reach statistical significance ($p = .093$). Similarly, prolonged or obstructed labour yielded an

odds ratio of 0.711, indicating a non-significant protective effect.

Regarding delivery methods, assisted vaginal delivery (OR = 0.637, $p = .334$) and caesarean delivery (OR = 0.831, $p = .695$) both demonstrated non-significant relationship with sepsis diagnosis. Feeding pattern was not significantly related to neonatal sepsis, as breastfeeding was associated with slightly higher odds (OR = 1.188, $p = .709$), while formula feeding suggested a reduced likelihood (OR = 0.656, $p = .343$), though neither effect was significant. Place of delivery also did not yield significant relationship. Deliveries that took place in hospitals showed increased odds of sepsis diagnosis (OR = 1.529, $p = .672$), while primary health center deliveries showed slightly higher odds (OR = 1.086, $p = .925$), though both effects lacked statistical significance. Similarly, the presence of a skilled birth attendant during delivery indicated a reduced likelihood of sepsis (OR = 0.497, $p = .442$), but the result was not statistically meaningful. Finally, cord care practice also did not emerge as a significant predictor, with an odds ratio of 0.570 ($p = .242$), suggesting a potential but non-significant protective effect. Overall, the findings indicate that while several maternal and neonatal factors showed directional trends toward influencing neonatal sepsis diagnosis, none of them reached statistical significance, and the overall explanatory power of the model was limited. This suggests that other unmeasured factors may play a more critical role in predicting neonatal sepsis within this population.

Discussion

It was discovered in this study that, the prevalence of neonatal sepsis among newborns admitted to the neonatal unit of State Specialist Hospital, Asubiaro, is high, with fever, lethargy, and seizures emerging as the most frequent clinical manifestations. Diagnostic assessment further revealed that slightly more than half of the cases were confirmed through a combination of clinical features and laboratory findings, while just under half were diagnosed based on clinical features alone. The finding of this study aligns with another study conducted by Birrie et al. (2022), where 79.4% of neonates admitted to Woldia and Dessie Comprehensive Specialized Hospitals in North-East Ethiopia also had neonatal sepsis. The result also corroborates with the findings of Kiwone et al. (2020), who reported that 49.8% of hospitalized newborns in southern Tanzania had clinical signs of sepsis. In addition, this is equally in line with Roble et al. (2022), because they equally found that 45.8% of neonates in Eastern Ethiopia developed sepsis. Based on some results of this study, some authors equally disagree with the findings of this study that the prevalence is very high, as Camargo et al. (2022) reported a much lower prevalence of early neonatal sepsis at 1.8% among late preterm and term infants. Another study by Okube and Komen (2020) also negates this finding, reporting a prevalence of 28.6% in Nairobi, Kenya. However, the findings go on the contrary of Devkota et al. (2024) and Olorukooba et al. (2020), who reported moderate prevalence rates of 36.41% and 37.6%, respectively.

It was revealed that, the predictors of mortality among

newborns with neonatal sepsis admitted at the State Specialist Hospital, Asubiaro are primarily low birth weight and preterm delivery, both of which significantly increased the risk of adverse outcomes. While Apgar scores at birth and the length of hospital stay reflected the severity of illness, they were less consistent as independent predictors of mortality compared to birth weight and gestational age. The finding of this study aligns with another study conducted by Bekele et al. (2022), where prematurity and low birth weight were identified as the strongest predictors of neonatal sepsis mortality. The result also corroborates the findings of the prospective cohort study in northwest Ethiopia (2023), which similarly found that prematurity and low birth weight significantly increased the risk of adverse neonatal outcomes. In addition, this is equally in line with Kiwone et al. (2020), because they also found that prematurity and early neonatal age were major risk factors for sepsis-related complications. Based on some results of this study, some authors equally disagree with the findings of this study that Apgar scores at birth are inconsistent predictors of mortality, as Roble et al. (2022) and Olorukooba et al. (2020) reported strong associations between low Apgar scores and increased sepsis risk. Another study by Camargo et al. (2022) also negates the severity of mortality risk in late preterm and term infants, suggesting favorable outcomes despite complications. However, the findings go on the contrary to Liang et al. (2023), whose predictive model emphasized biochemical and clinical markers beyond gestational age and birth weight as key mortality predictors.

In conclusion, low birth weight and preterm delivery are the primary predictors of mortality among neonates with sepsis in this study population.

Implication to research and practice

It was discovered in this study that, the prevalence of neonatal sepsis among newborns admitted to the neonatal unit of State Specialist Hospital, Asubiaro, is high with low birth weight and preterm delivery serving as the most significant predictors of mortality among newborns with neonatal sepsis.

The findings of this study have significant implications for research; there is need for targeted studies on Nigerian populations to identify specific risk factors and develop specific intervention. More research on prevention strategies and effective treatments for neonatal sepsis in resource-limited settings. For nursing and midwifery practice the high prevalence of neonatal sepsis, coupled with the identification of low birth weight and preterm delivery as major predictors of mortality, underscores the critical need for targeted interventions by healthcare professionals. Nurses and midwives must prioritize the monitoring and care of high-risk newborns, ensuring timely identification and management of sepsis symptoms. The study also highlights the importance of addressing factors such as prolonged rupture of membranes, unsafe delivery environments, and the absence of skilled birth attendants, which necessitates rigorous adherence to infection prevention protocols during labor and delivery. Furthermore, proper cord care practices, including the use of chlorhexidine over spirit, should be emphasized through continuous education and supervision to reduce infection risks. Promotion

of exclusive breastfeeding, safe feeding practices and careful management of assisted deliveries are also essential components of comprehensive neonatal care, enabling nurses and midwives to minimize the incidence and severity of neonatal sepsis and improve overall newborn outcomes.

Conclusion

It was discovered in this study that, the prevalence of neonatal sepsis among newborns admitted to the neonatal unit of State Specialist Hospital, Asubiaro, is high with low birth weight and preterm delivery serving as the most significant predictors of mortality among newborns with neonatal sepsis.

Future research

Based on the study's findings, several recommendations can be made for different stakeholders:

Government: The government should prioritize strengthening maternal and neonatal healthcare policies to reduce the prevalence of neonatal sepsis. This can be achieved by ensuring universal access to skilled birth attendants, enforcing safe delivery protocols, and providing adequate funding for neonatal care units. Policies that promote the availability of essential supplies, including chlorhexidine for cord care and equipment for assisted deliveries, should be enforced. Additionally, public health campaigns to educate communities about the risks of prolonged rupture of membranes and unsafe delivery environments can help prevent infection-related complications in newborns.

Nurses and Health Professionals: Healthcare professionals should adhere strictly to infection prevention protocols during labor, delivery, and postnatal care. They must ensure proper cord care by using recommended antiseptics such as chlorhexidine instead of spirit and provide guidance to mothers on safe feeding practices, discouraging mixed feeding that can increase infection risk. Continuous professional development and training on neonatal sepsis recognition and management are essential, enabling early detection and prompt intervention to reduce mortality. Health workers should also actively educate mothers about the signs of neonatal infection and the importance of seeking timely medical attention.

Health Institutions: Hospitals and other health institutions should strengthen neonatal units to effectively manage sepsis cases. This includes ensuring availability of necessary equipment, medications, and trained staff to handle high-risk newborns, particularly preterm and low birth weight infants. Institutions should implement standard operating procedures for infection prevention, safe deliveries, and postnatal care, including strict adherence to hygiene and sanitation practices. Monitoring and evaluation mechanisms should be put in place to track sepsis cases and outcomes, allowing for continual improvement of neonatal care services. Community and Individuals

Communities and individuals: should be educated on the importance of safe delivery practices and early prenatal care. Pregnant women should be encouraged to attend antenatal clinics regularly and to seek skilled birth attendants during delivery. Families should be made aware of proper cord care

practices, exclusive breastfeeding, and hygiene practices to minimize infection risk in newborns. Community health programs can also facilitate access to information on identifying early signs of neonatal sepsis and the urgency of seeking medical care, thereby reducing delays that contribute to mortality.

AUTHOR CONTRIBUTIONS

- **Daramola L. Chinonye:** Manuscript writing and developing, data collection and planning
- **Onisile Deborah F.:** Manuscript writing, manuscript editing and supervision
- **Bassey Pamela:** Manuscript supervision, data collection and planning
- **Ajisola H. Aderonke:** Manuscript editing
- **Ashaolu Titilayo:** Manuscript editing

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Patient consent statement: As this was a retrospective study and data was collected from patient medical records, no informed consent was required.

Data availability statement: The data that supports the findings of this study is available from the corresponding author upon reasonable request.

Permission to reproduce material from other sources: No permission was required for this study.

Clinical trial registration: No registration was required, as this was not a clinical trial.

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