

Case Reporting for Neonatal Tetanus Surveillance and Practices Influencing Neonatal Tetanus Incidence in Bayelsa state of Nigeria: a Five-year Review

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Abstract

Background: Neonatal tetanus is a preventable disease that remains a disturbing cause of neonatal morbidity and mortality in low-income countries where maternal and child care is still poor. This study assessed case reporting for neonatal tetanus surveillance and factors influencing disease occurrence in Bayelsa state of Nigeria.

Methods: This was a retrospective review of all cases of neonatal tetanus managed in Niger Delta University Teaching Hospital Okolobiri (NDUTH) and Federal Medical Centre Yenagoa (FMC) over a five-year period. Relevant data were extracted from the case files at the hospitals and the cases were traced within the existing neonatal tetanus surveillance system.

Results: Forty-eight cases were managed in both facilities (36/75.0% in NDUTH and 12/25.0% in FMC) in the period under review but only 13 cases (27.1%) were reported to the office of the State Epidemiologist. The mean age of cases was 8.98 days (SD = 5.1 days); 29 (60.4%) were male while 19 (39.6%) were female. Only 2.1% of the cases were protected at birth and 55.3% of them had their cord treated inappropriately. Most of the mothers (54.2%) had primary education, 8.3% had antenatal care, and all were delivered by traditional birth attendants.

Conclusion: There was an under reporting of cases of neonatal tetanus in the state. Inadequate/lack of immunization of women against tetanus and patronage of unskilled birth attendants seemed to drive the incidence of the disease. There is a need to strengthen neonatal tetanus surveillance, improve tetanus vaccination for women of reproductive age, and encourage skilled birth attendance in Bayelsa state.

KEYWORDS: Bayelsa state, cord care, elimination, neonatal tetanus, neonatal tetanus surveillance

Introduction

Neonatal tetanus (NT) is a preventable disease that has however remained a disturbing cause of neonatal morbidity and mortality, particularly in low-income countries.¹ According to the World Health Organization (WHO), there were 1,803 reported cases of NT globally in 2018 with Africa accounting for 1,130 (62.7%) and Nigeria 130 (7.2% of the global and 11.5% of the African cases).² Neonatal tetanus, which is mostly fatal, is particularly common in resource-poor areas where deliveries take place in an unhygienic environment by untrained attendants without adequate sterile procedures and in places with low immunization coverage of women of reproductive age leaving a large proportion of their newborns without adequate protection at birth.^{1,3,4} Protection at birth (PAB) means receiving at least two doses of tetanus toxoid containing vaccine (TTCV) before or during pregnancy.⁵

Since eliminating NT became a global target in 1989, significant reductions in NT deaths have been reported. The most recent estimates by WHO (2018) put the death of newborns due to NT at 25,000, an 88% reduction from the 2000 figure of 200,000.⁶ Maternal tetanus is assumed to be eliminated once NT elimination is achieved, hence elimination of both conditions is now being pursued under the maternal and neonatal tetanus elimination (MNTE).⁶ Neonatal tetanus elimination is defined as a reduction of NT incidence to below one case per 1000 live births per year in every district.⁵ As at July 2019, only 12 countries, distributed in three WHO regions were yet to eliminate MNT. They are Angola, Central African Republic, Guinea, Mali, Nigeria, and Somalia (WHO-Africa); Afghanistan, Pakistan, Sudan, South Sudan, and Yemen (WHO-Eastern

Mediterranean); and Papua New Guinea (WHO-Western Pacific).⁷ Nigeria has however partially eliminated the disease as two zones – south east and south west-have achieved the goal.⁷

Three strategies are recommended for achieving and sustaining MNTE: optimal immunization coverage of women of reproductive age (WRA) with tetanus toxoid-containing vaccine (TTCV), clean birth and clean cord care practices, and a reliable neonatal tetanus surveillance (NTS) which will include case investigation and response.⁵ For a newborn to be protected at birth, the mother is expected to have received a minimum of two doses of TTCV with the birth occurring within the duration of protection conferred by the last valid dose.⁵ The last two Nigerian demographic and health surveys (NDHS 2013 and 2018) show that PAB coverage nationally was 52.8% and 61.7%; in the south south zone (SSZ) it was 73% and 75.7% and in Bayelsa, it was 63.4% and 52.2% respectively. Bayelsa had the lowest coverage in the SSZ and showed a reduction between 2013 and 2018 contrary to the increase seen nationally and in the zone.^{8,9} Both reports show a wide difference between the number of births protected in the rural and urban areas.

Clean birth and clean cord care practices are another strategy to eliminate MNT. This reduces the chance of exposure to *Clostridium tetani* whose spores are found in soil and gastrointestinal tracts of animals and can easily contaminate the umbilical cord stump.¹ Being delivered in a health facility assures this but unfortunately, a small proportion of deliveries take place in health facilities in Nigeria. According to 2018 NDHS, only 39.4%, 50.2%, and 22.9% of mothers were delivered in a health facility nationally, in the SSZ and Bayelsa state respectively.⁹ Many mothers are still

delivered at home and in places with questionable hygiene where substances with potential for contamination by spores of *Clostridium tetani* like ash, animal dung, and herbal mixtures are commonly used for cord care.^{3,9}

Neonatal tetanus surveillance is part of the Integrated Disease Surveillance and Response (IDSR) strategy which was introduced in 1998 and is currently the strategy for controlling many diseases including NT in the African region.¹⁰ It is the third primary strategy being employed to eliminate the disease.⁵ The recommended types of NTS are conducted to varying degrees in Nigeria and include routine monthly surveillance, zero reporting, active surveillance, and retrospective record review.¹¹ An integral part of NTS is reporting cases from the facilities where the cases were diagnosed and/or managed to the surveillance network thus enabling state surveillance officers to investigate the case and respond appropriately. As a disease slated for elimination, it is investigated case by case, the case definition being "any newborn with a normal ability to suck and cry during the first two days of life, and who, between 3rd and 28th day of age, cannot suck normally, and becomes stiff or has convulsions or both."¹² It is a purely clinical diagnosis and needs no laboratory confirmation. When a case is diagnosed at any facility, the focal point for surveillance at the facility is expected to notify the Disease Surveillance and Notification Officer (DSNO) for the LGA who uses the case investigation form to collect data about the case and reports to the State Epidemiologist for further action.¹²

An earlier study done in the state reviewed cases of NT managed in one of the referral hospitals.¹³ This study however assessed

the performance of NTS in Bayelsa state by reviewing case reporting of the disease from selected facilities to the State Epidemiologist and determined relevant maternal and birth practices facilitating the incidence of NT in the state.

Materials and Methods

Bayelsa State is one of the 36 states in Nigeria and one of the six states that makeup Nigeria's south-south geopolitical zone. The state is divided into three senatorial districts (Bayelsa East, Bayelsa West, and Bayelsa Central) and consists of eight LGAs (Brass, Ekeremor, Kolokuma/Opokuma, Nembe, Ogbia, Sagbama, Southern Ijaw, and Yenagoa) and 105 political wards. The capital city is Yenagoa, in Yenagoa LGA. The state is about 80% riverine and consists of many hard-to-reach communities where formal functional health facilities are few and far between and are in various states of functionality. Health workers are in short supply and funding of health care delivery is poor in the state.¹⁴ The state has poor immunization coverage for all antigens, poor ANC attendance, and low delivery rate in health facilities.⁹

Niger Delta University Teaching Hospital (NDUTH) Okolobiri, Bayelsa State, Nigeria is a 200-bed tertiary hospital owned by Bayelsa State Government. It offers specialized care and is a referral centre for many diseases including neonatal tetanus. Cases of NNT are managed in the Special Care Baby Unit (SCBU) of the Department of Paediatrics. The SCBU had 20 cots with specialized facilities as at the time of this study.

Federal Medical Centre (FMC) Yenagoa, is a tertiary hospital owned and run by the Federal Government.

Similar to NDUTH, it offers specialized care and is another referral centre where complicated diseases including neonatal tetanus are taken for management. Cases of NNT are managed in the Special Care Baby Unit (SCBU) of the Department of Paediatrics. The SCBU had 10 cots with specialized facilities as at the time of this study.

The State Epidemiology unit is located at the State Ministry of Health. The office is headed by the State Epidemiologist and has other staff that oversee disease surveillance and response in the state. The Disease Surveillance and Notification Officers (DSNOs) from the eight Local Government Areas (LGAs) report all notifiable diseases seen in their respective LGAs using the appropriate reporting forms.

This is a retrospective review of cases of NNT managed in NDUTH and FMC Yenagoa from January 2009 to December 2013. The cases were noted and compared with the cases reported to the Epidemiology Division of the State Ministry of Health.

With the help of the Health Management Information System (HMIS) department of the two institutions, the diagnosis registers were examined and all cases diagnosed between January 2009 and December 2013 were identified. The case files were obtained and relevant data were extracted. Data extracted included socio-demographics, pregnancy/antenatal history of the mother, birth history of the case, cord care, and tetanus toxoid immunization of the mother. The cases were traced to the office of the State Epidemiologist, which is expected to have a record of all case-based investigation forms completed for all cases reported and investigated in line with the existing neonatal tetanus surveillance.

Data were entered and analysed using Epi Info version 3.5.4. Descriptive statistics were generated and presented using tables and charts. Ethical approval for the study was obtained from the Research and Ethics Committee of NDUTH and permission was given by the two hospitals to access the case files. The State Epidemiologist also granted access to their records.

Results

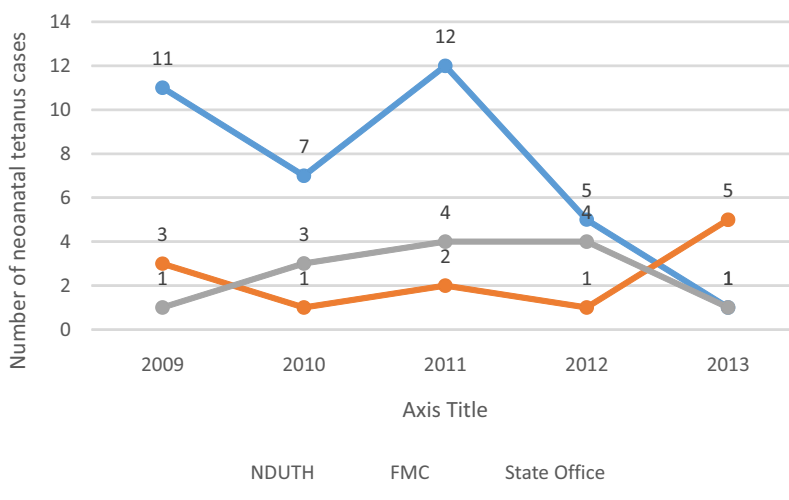


Figure 1: Number of cases of neonatal tetanus seen at the facilities and reported to the office of the State Epidemiologist by year of review

Figure 1 shows that 48 cases were managed in both facilities (36/75.0% in NDUTH and 12/25.0% in FMC) in the period under review but only 13 cases (27.1%) were reported to the office of the State Epidemiologist.

Table 1: Characteristics of neonatal tetanus cases reviewed

Variables	Frequency (n=48)	Percentage (%)
State of Origin of cases		
Bayelsa	42	87.5
Rivers	3	6.3
Delta	2	4.2
AkwaiBom	1	2.1
LGA of Birth/Residence of Cases of Bayelsa State origin		
Yenagoa	21	50.0
Sagbama	5	11.9
Ogbia	4	9.5
Kolokuma/Opokuma	4	9.5
Brass	4	9.5
Southern Ijaw	3	7.1
Ekeremor	1	2.4
Sex of cases		
Male	29	60.4
Female	19	39.6
Education of Mothers		
Primary	26	54.2
Secondary	22	45.8

The majority of cases (42/87.5%) were of Bayelsa origin, and half of them were born in Yenagoa LGA. The mean age of cases was 8.98 ± 5.1 days and 29 (60.4%) were male. Primary school was the highest level of education of the majority (54.2%) of mothers of cases (Table 1).

Table 2: Maternal characteristics of neonatal tetanus cases.

Variables	Frequency (n=48)	Percentage (%)
Booking status		
Booked	4	8.3
Unbooked	44	91.7
*TT Vaccination status		
None	32	66.7
One dose	6	12.5
At least 2 doses	1	2.1
Unknown	9	18.8
Vaccination Card		
Seen	4	8.3
Not seen	44	91.7
Place of delivery		
Traditional Birth Attendants	48	100.0
Instrument used for cutting the cord		
New blade	34	70.8
Old blade	5	10.4
Unknown	9	18.8
Cord care		
Methylated spirit	21	44.7
Native concoction	16	34.0
Alligator pepper	6	12.8
Water	4	8.5
Unknown	1	2.1

*TT tetanus toxoid

Table 2 shows that only four (8.3%) mothers reported going for antenatal care; only one mother (2.1%) had a history of receiving at least two doses of tetanus toxoid during pregnancy. All the mothers were delivered by traditional birth attendants. Most of the neonates (34, 70.8%) had their umbilical cord cut with a new blade; and 21 (43.8%) had their cord treated with methylated spirit, others were treated with just water or some herbal preparation.

Discussion

This study reviewed case reporting which is an essential component of neonatal surveillance, an important strategy in the effort to eliminate neonatal tetanus. We also examined some factors enhancing the incidence of cases of the disease in Bayelsa state.

We found a big gap in case reporting from the hospitals to the State Epidemiologist's office as only just about a quarter of cases managed at the two hospitals got captured in the surveillance system. Under-reporting of neonatal tetanus cases in Nigeria is a common phenomenon that has been reported in other studies.^{15,16} This impairs investigation and elimination efforts as the surveillance team will not have complete and timely information needed to mount targeted intervention. For example, even though immunization coverage is low statewide, knowledge of LGAs/communities where cases reside would help to further investigate local factors that may be responsible for the low coverage. The difference between the number of cases managed and the number reported suggests active case search was either not done at all or was not thoroughly done by the responsible surveillance officer(s). For a disease targeted for elimination, an active case search is needed to supplement passive surveillance as this would ensure cases missed in the normal passive reporting route are identified.¹¹ Achieving elimination demands that all methods of NT surveillance need to be fully activated to ensure no case is missed and all reported cases are investigated.

A negligible proportion of mothers of cases attended antenatal clinic (ANC) and so missed out on the opportunity to receive tetanus toxoid. This is evident in the poor vaccination status of mothers of cases leading to just about a case being protected

at birth. This agrees with similar studies where low attendance of ANC and inadequate immunization were reported in mothers of NT cases.^{3,4,17} ANC attendance is still very low nationwide and Bayelsa has one of the lowest in the country.⁹ Most of the mothers did not have vaccination card and this casts doubt on the true vaccination status of the mothers. There is a great need to improve on ANC attendance by pregnant women to avail them of all the opportunities ANC offers including tetanus immunization.

All the mothers of cases in this study were delivered by TBAs. This compares to findings of other studies where mothers were either delivered by TBAs or by other unskilled attendants at home in an unhygienic environment that makes susceptibility to NNT very high.^{3,4,17,18} Delivery practices in this study as shown by the instrument used for cutting the umbilical cord and the items used for cord care could not guarantee infection prevention. Delivery by a skilled birth attendant (SBA) in a health facility where good infection control measures are expected to be practised offers a mother and her baby a good chance of survival. According to the 2018 NDHS, even though 51.4% and 1.0% of pregnant women received ANC from a skilled provider and TBA respectively, 71.4% of deliveries were assisted by TBAs and 27% by a skilled provider. Factors which make women to prefer TBAs or home delivery to skilled providers or institutional delivery include nearness/easy accessibility of TBAs, cheaper service fee, more friendly and respectful treatment by TBAs, cultural and social acceptability, and shortage of skilled birth attendants.¹⁹⁻²² It is difficult to stop home delivery or delivery by TBAs at the present state of our health system, however,

concerted efforts are needed to ensure delivery takes place in hygienic conditions. The TBAs can be trained, provided with delivery kits, and supervised by local health authorities to ensure their “delivery room” and practices comply with minimum standards to be set and enforced by the state.^{23,24} A simple prototype kit was recommended long ago and can be upgraded according to current practice.²⁵ The staff of the health facility closest to the TBAs can work with the TBAs and encourage them to refer pregnant women that attend ANC sessions with them for tetanus immunization and educate them (the TBAs) on safe cutting and care of the cord. Community engagement is important to educate families about pregnancy care and specifically about the cause and prevention of neonatal tetanus. This will enable women to make a choice for safe delivery that will guarantee a desirable outcome for their pregnancy.

Our study is limited in some ways. Only two “big” hospitals were examined, there may be cases that presented and were referred from other facilities especially those in rural areas or LGAs that are far from Yenagoa LGA that never reported to the referral hospitals. There are also a few private hospitals that may manage the disease without reporting to the surveillance authority. This is suggestive of more cases occurring in the state than the number reported thus further highlighting under reporting. This study assessed case reporting for neonatal surveillance in Bayelsa State from 2009 to 2013 and may not reflect the current situation of NTS in the state. However, the findings are still relevant given that the south south zone of the country where Bayelsa belongs is yet to achieve MNTE.⁷ Besides, there is persistence of factors favourable to the occurrence of the disease such as low ANC

attendance, low tetanus immunization coverage, and high rate of delivery outside health facilities.⁹

Conclusions

This study revealed gaps in neonatal tetanus surveillance in Bayelsa state with only about a quarter of the cases managed at the study hospitals reported to the surveillance network. The majority of mothers did not attend antenatal clinic nor receive TTCV and their newborns were not protected against tetanus. There was universal patronage of TBA for delivery by the mothers and the TBAs did not use appropriate substances for cord care. There is a need to strengthen case reporting and ensure that all places where delivery and newborns are cared for are included in the surveillance system. Antenatal care and routine immunization need significant improvement for the protection of all WRA against tetanus and strategies that will enhance delivery in hygienic conditions with appropriate cord care need to be promoted in the state. A more comprehensive review is desirable to know the current state of NTS in the state.

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