

NEONATAL TETANUS IN NIGERIA: A call to speed up elimination strategies.

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ABSTRACT

Neonatal tetanus (NNT) is a vaccine preventable disease that is associated with high mortality rate. It is endemic in majority of the developing countries including Nigeria and has since been targeted for elimination by World Health Organization. Hospital based studies have reported varying mortality rates of NNT. For more than two years, no case of NNT was managed in our facility, Lagos University Teaching Hospital (LUTH), Surulere, Lagos. However, within a period of two months, we managed three cases of NNT. We present the three cases of neonatal tetanus, collated the prevailing risk factors for NNT, highlighted challenges in their management and emphasized more efforts to sustain elimination of neonatal tetanus.

INTRODUCTION

Neonatal tetanus (NNT) remains one of the major preventable causes of mortality in the newborn period.^[1] It is a vaccine preventable disease that is endemic in 90% of developing countries and accounts for 5-7% of neonatal deaths globally.^[1,2] The World Health Organization in conjunction with United Nations Children's Fund and United Nations Population Fund^[1] (WHO/UNICEF/UNFPA) in 2005 re-launched the Maternal and Neonatal Elimination Initiative (MNTE) with a new target for elimination of tetanus by year 2015. Elimination was defined as less than 1 case of neonatal tetanus per 1000 live birth in every district. According to WHO MNTE statistics in October 2017, Nigeria is still one of the remaining 16 countries yet to achieve the Maternal and Neonatal Tetanus Elimination goal. Its incidence in Nigeria ranges from 14.6 to 20.0 per 1000 live births^[4] and accounts for 20% of neonatal mortality.^[2] In other parts of Africa, mortality rate varies from 0.3 / 1000 live births in Egypt to 15.0 /

1000 live births in Somalia.^[5,6] Several hospital-based studies have documented differing mortality rates. Fetugaet *al.*^[4] reported a mortality rate of 63.6% while Alhajiet *al.*^[5] in Maiduguri, reported a mortality rate of 66.7% and also noted that 94.1% of deliveries were at home. A previous report from the Lagos University Teaching Hospital (LUTH) showed a mortality rate of 4.9% out of 15 neonatal patients managed in 2001.^[8]

NNT is caused by an obligate, motile gram-positive bacillus, a ubiquitous spore forming, non-encapsulated anaerobe called *Clostridium tetani*. Neonatal infection commonly follows unhygienic delivery practices and poor newborn care practices such as poor cord care. It may also occur from unhygienic circumcision and ear piercing.^[9] NNT is characterized by an acute onset of hypertonia, painful muscular contractions and generalized muscle spasms caused by the neurotoxin.

Table 1: Baseline characteristics of the patients

| Serial No | Patient Initials | Gestational Age (weeks) | Age at Presentation (days) | Sex | Weight at presentation (g) | Cord care | Maternal age (years) | Socio-economic status | Parity | Received antenatal care | Mode of Delivery | Place of Delivery | Maternal Tetanus Immunization status |
|-----------|------------------|-------------------------|----------------------------|--------|----------------------------|---|----------------------|-----------------------|--------|-------------------------|------------------|-------------------|--------------------------------------|
| 1 | Baby M | 38 | 7 days | Male | 2980 | Methylated spirit | 25 | Low | 3 | No | SVD | TBA place | Not immunized |
| 2 | Baby M | 40 | 7 days | Female | 2650 | Hot fermentation and herbal application | 24 | Low | 1 | No | SVD | TBA place | Not immunized |
| 3 | Baby S | 39 | 6 days | Female | 2490 | Application of hot stone | 29 | Low | - | No | SVD | Home | Not immunized |

SVD – spontaneous vaginal delivery; TBA – Traditional birth attendant

All the babies presented within the first week of life, had fever at presentation with evidence of umbilical cord sepsis such as reddish and foul smelling cords; in addition to the muscular spasms (Figure 1). Table 2 shows the clinical features of the babies at presentation and the specific treatment and management outcome of the babies. Two of the cases were successfully managed and discharged home after both mother and babies received tetanus toxoid immunization with follow-up clinic schedule. Major challenges encountered included severe financial constraints in parents, unavailability of mechanical ventilators and Human Tetanus Immunoglobulin when needed.

Fig. 1: Muscular rigidity/ spasms in a neonate



Table 2: Clinical features at presentation, treatment and outcome

| Characteristic | Patient 1 | Patient 2 | Patient 3 |
|--|---|---|---|
| | Baby M | BM | Baby S |
| Age at presentation (days) | 7 | 7 | 6 |
| Period of onset (in hours) | <24 | 48 | 24 |
| Frequency of spasms | Intermittent | Persistent | Intermittent |
| Fever (°C) | 38.8 | 40.3 | 38.7 |
| Difficult breathing | Yes | Yes | Yes |
| Recurrent apneic episodes | No | Yes | No |
| Heart rate (beats/min) | 154 | 50 | 148 |
| Pneumonia | No | Suspected | No |
| Hendrickse ⁽²⁾ tetanus score (maximum score ≥ 15) | 8 | 7 | 9 |
| Complete blood count on admission | Not suggestive of sepsis | Suggestive of sepsis | Not suggestive of sepsis |
| E/U/Cr | Within normal values | Within normal values | Showed derangement with Na-133mmol/L, K-3.4mmol/L, Cl-103mmol/L, HCO ₃ -16mmol/L |
| Medications given | Intravenous Diazepam, Phenobarbitone and Chlopromazine. Also intravenous Metronidazole and Cefotaxime | Intravenous Diazepam, Phenobarbitone and Chlopromazine. Also intravenous Metronidazole and Cefotaxime | Intravenous Diazepam, Phenobarbitone and Chlopromazine. Also intravenous Metronidazole and Cefotaxime |
| Tetanus Ig / ATS given | 3000IU of anti-tetanus serum | 3000IU of anti-tetanus serum | 3000IU of anti-tetanus serum |
| Required respiratory support | Yes | Yes | Yes |
| Duration of hospital stay (in days) | 20 | 3 | 16 |
| Outcome | Discharged | Died | Discharged |

DISCUSSION

Neonatal tetanus is a common preventable cause of neonatal mortality.^[9] It has neither sex nor racial predilection, though some studies in Nigeria have reported male predominance.^[6,7] Neonatal tetanus remains a disease of low socioeconomic class as reported in other literature.^[2-8] The three cases reported here were all from low socio-economic background and low level of education. A rise in poverty level, poor immunization coverage in Nigeria and a strong sociocultural belief in traditional birth attendants still make the disease highly prevalent in our society.^[2-9] The global coverage of NNT with at least two doses of tetanus toxoid vaccine was reported to be 69% in 2015

compared to previous 44% in 2000.^[10] The Nigerian national maternal tetanus toxoid vaccination coverage is documented to be 45% with regional variations (southwest 81.3%, northwest 20%).^[11] The cases in this report were similar; all the mothers had no antenatal care, no tetanus toxoid immunizations, were of low socioeconomic status, unhygienic deliveries and practiced poor cord care. It also highlights the difficulty in management of the complicated disease in a resource challenged health care facility with lack of pediatric ventilators. The risk factors noted are similar to Aliyuet *al*^[6] who documented a case fatality of 56.7% with majority of pregnant mothers having home deliveries and no maternal immunization.

Neonatal tetanus typically presents with inability to suck, spasms and associated difficulty with breathing, fever or respiratory complications. Symptoms also vary from autonomic complications, laryngeal spasms, and hypoglycemia to renal complications and death. Diagnosis of neonatal tetanus is essentially clinical and principles of management include; neutralization of circulating toxins with Human Tetanus immunoglobulin, Anti-tetanus serum, control of spasms and continued sedation once the tetanospasmin is bound to the nerve terminals. Other measures include-elimination of residual Clostridial infection with cord care and use of antibiotics, general supportive care and adequate fluid and caloric intake. Critical care with use of mechanical ventilation is crucial for survival in babies with uncontrollable spasms as mechanical ventilation helps to control respiratory muscle spasm and prevents respiratory failure.

In the study center, some of the challenges encountered in the care of the babies were unavailability of neonatal ventilator, which was required for respiratory failure experienced by the second case presented and financial constraints, as caregivers were unable to procure human tetanus immunoglobulin that is more potent in neutralizing circulating toxins. It is pertinent to note that the current economic downturn in Nigeria, lack of health insurance for the mothers and their newborns, high out of pocket fees for mother and child health, and increased hospital delivery fees have further increased the number of women that resort to the use of TBAs, faith based birthing and home deliveries.

^[12] All these would further jeopardize the country's efforts towards achieving the Sustainable Development Goals (SDGs) and the 2015 Maternal and Neonatal Elimination goal by WHO/UNICEF/UNFPA.

CONCLUSION

Lack of maternal immunization during pregnancy coupled with unhygienic delivery practices were factors associated with NNT.

We advocate more community awareness on the importance of good ante-natal care and deliveries, strengthening of the routine immunization for pregnant women and women of child bearing age and replacement of traditional birth attendants with midwives who are well trained on recognizing high risk pregnancies and referral of all mothers to get immunized in health centers. We further recommend wider dissemination of effective newborn care practices and education of mothers on avoidance of harmful neonatal practices at every opportunity:-

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