

Neonatal Tetanus in Nigeria: One Social Scourge too many!

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Summary

Akani NA, Nte AR, Oruamabo RS. Neonatal Tetanus in Nigeria: One Social Scourge too many! *Nigerian Journal of Paediatrics* 2004;31:1. Neonatal tetanus (NNT) is still a major cause of morbidity and mortality among neonates in Nigeria, and every case is an embarrassment to the health services provided in the country. Nigeria is one of 27 countries that account for 90 percent of the global burden of NNT. Major contributors to the persistently high incidence of NNT in the country include declining tetanus toxoid vaccine coverage rate among pregnant women and delivery by untrained personnel. We believe that the major thrust in preventing NNT should be the improvement in the coverage rate of the five-dose schedule. This could be achieved by incorporating this schedule into the School Health Programme. Its overall elimination in the country requires the concerted efforts of several stakeholders – adolescents and women of childbearing age, including pregnant women, health care providers at all levels, educational and other sectors.

Introduction and aspects of social epidemiology

EVERY case of neonatal tetanus (NNT) in Nigeria is an embarrassment to the health services provided in the country. It is completely preventable by immunizing females before or during pregnancy or by ensuring clean delivery, clean severance of the umbilical cord, and proper care of the cord in the days following birth. The World Health Organization (WHO) estimates that on average, only five percent of NNT cases are actually reported to health services.¹⁻⁴ It is often referred to as the *silent killer*, because it does not occur in epidemics and often kills unnoticed. Elimination of NNT was, by 1995, redefined as less than one case per 1000 live births in every district in every country. However, an estimated 289,000 cases of NNT continue to occur annually, with the case fatality rate averaging 70 percent. Tetanus is responsible for 14 percent of all neonatal deaths globally and is a leading cause of neonatal mortality in the poorest parts of the world.^{1, 5-10} In Nigeria, the incidence of NNT ranges from 14.6 to 20 per 1000 live births and it remains a major contributor to neonatal mortality in the country.¹¹⁻¹⁵

At the University of Port Harcourt Teaching Hospital, we examined cases of neonatal tetanus admitted over an eight-year period, January 1995 to December 2002. The raw data of admissions per year and per month of the period examined are shown in Table I and Fig. 1. The raw monthly data were subsequently plotted on an area chart to observe any seasonal variation. In Figure 1, the highest admission appeared to have occurred between April and July, but the result of subjecting the data in the bottom row of Table I to *Hewitt's Rank-Sum Test* for a seasonal peak,¹⁶ showed a significant six-month peak from February to July, (Rank Sum = 57, $p = 0.013$). This peak period corresponds to that of the rainy season in Rivers State. Therefore, it is possible that the rains could have presented some form of physical barrier, preventing pregnant women from getting to hospital to register for, and receive antenatal care, or to deliver. The babies were thus exposed to all the risks for neonatal tetanus associated with lack of immunization and delivery outside medical establishments. Furthermore, the table shows the values of exponentially weighted moving averages using the best weighting factor of 0.44, in order to reduce the effect of the annual fluctuations to the barest minimum (weighting factors range from 0 to 1 and the lower the weighting factor, the better the smoothing).¹⁷ As shown, the annual admissions were fairly constant, except in the year 2000 when the number was only 16; this was probably due to the nationwide industrial action in the health sector that year.

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Table I

Annual and Monthly Distribution of 308 Cases of Neonatal Tetanus at the University of Port Harcourt Teaching Hospital from January 1995 to December 2002

Year/Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total	Exp*
1995	5	3	3	12	5	8	5	3	2	5	0	3	54	54.0
1996	3	9	5	5	10	8	7	5	3	4	3	2	64	58.4
1997	0	3	0	2	7	4	5	0	3	2	0	1	27	44.6
1998	5	6	4	5	8	5	7	1	2	0	0	1	44	44.3
1999	3	2	4	1	5	1	2	2	2	3	3	0	28	37.1
2000	2	0	2	4	3	0	0	2	2	0	0	1	16	27.8
2001	0	1	4	5	4	6	8	1	2	5	4	1	41	33.6
2002	0	0	8	7	3	4	2	1	5	2	2	0	34	33.8
Total	18	24	30	41	45	36	36	15	21	21	12	9	308	333.6

Exp* = Exponentially weighted moving averages using a best weighting factor of 0.44 (ref. 17)

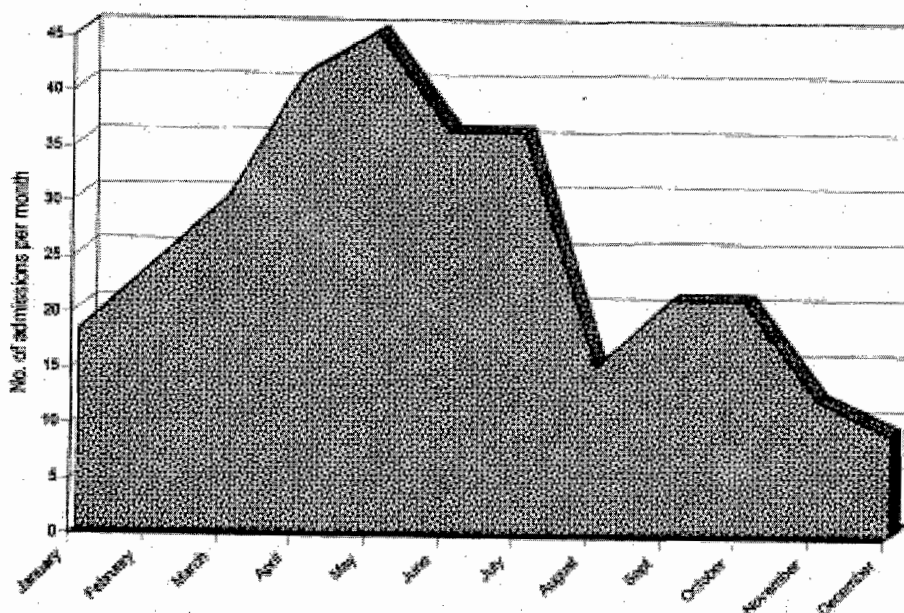


Fig 1: An area chart showing seasonality in admissions of cases of neonatal tetanus (NNT) at the University of Port Harcourt Teaching Hospital (UPTH), 01/01/1995 to 31/12/2002

In Figure 2, each month of the eight-year period was treated as a point, yielding 96 points. The number of admissions per month was then noted. Exponentially weighted moving averages were subsequently computed with a best weighting factor of 0.44 using values in each of the 96 points and finally groups of six consecutive points were combined to reduce the number of observation points from 96 to 16. The values of the moving average in each combined set were then plotted against the 16 observation periods to reveal the trend over the eight-year period. As shown, there was a steady decline in the number of neonatal tetanus cases from the beginning of 1995 to about the middle of 2001; thereafter, there was a sharp increase.

Although a rational explanation for the observed trend is not readily available, we believe that it was probably due to several factors acting in combination. For instance, the tetanus toxoid (TT) vaccine coverage rate [two doses only] of pregnant women in Rivers State in 1999 was four percent, dropping from 80 percent in 1980 through 18 percent in 1997, and 16 percent in 1998 [Source: *Immunisation (Expanded Programme/National Programme) Performance in Rivers State – 1990, 1997 To 1999*]. The reasons for the drop in TT coverage rates in the last few years may not necessarily be unique to Rivers State, but could indeed be nationwide.¹⁸⁻²² It is known that from 1995, the provision of vaccines has not been regular in the country.

Smoothed profile of admissions of cases of neonatal tetanus at the University of Port Harcourt Teaching Hospital from 01/01/1995 to 31/12/2002. Exponentially weighted moving averages are plotted against time

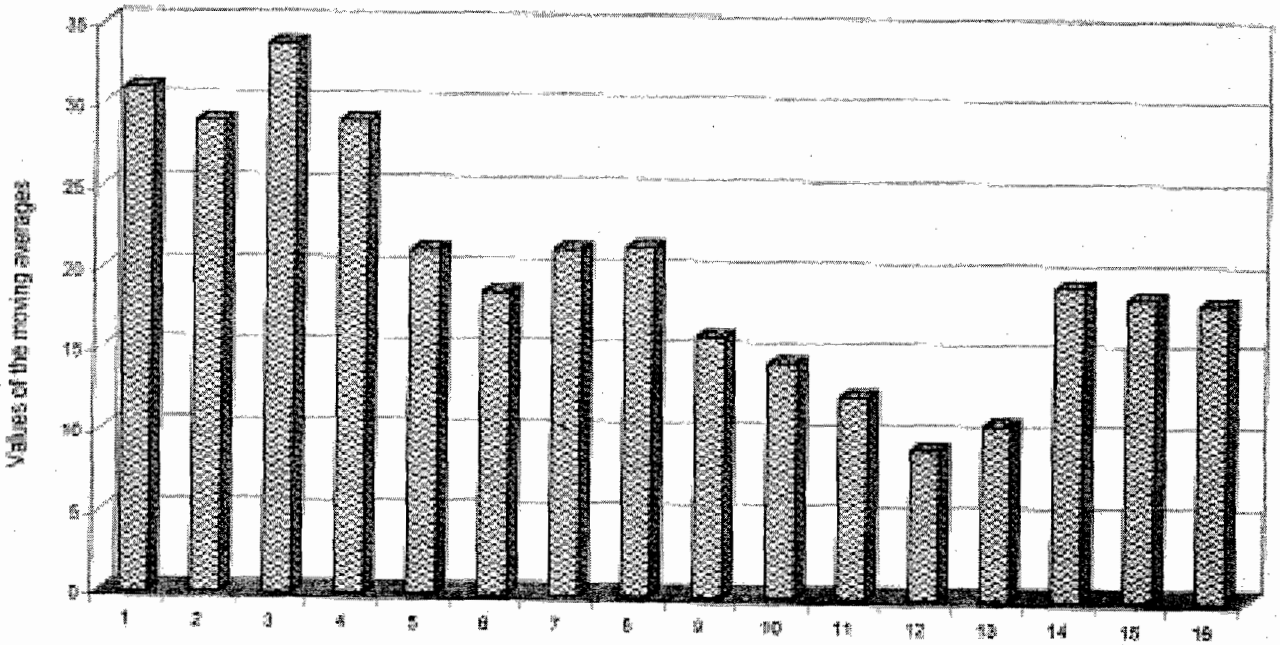


Fig 2 Every 6 of the 96 successive moving averages are combined to obtain 16 observation points.

The emphasis in this review will be on those measures that in our opinion, could be introduced to effectively prevent and subsequently eliminate the disease in Nigeria. In some sections of the article, comparisons have been made with situations in Cuba, since both countries belong to the group usually referred to as developing nations.

The clinical picture

The clinical manifestations of neonatal tetanus are too well known to be discussed here. Such information could be readily obtained from standard paediatric textbooks.²³⁻²⁵ However, in Fig. 3 is shown a neonate with severe tetanus, demonstrating one of the hallmarks of the disease – marked body stiffness.

Possible Contributors to the Persistently High Incidence of Neonatal Tetanus in the Country

1. Declining TT vaccine coverage rate

The TT2 vaccine coverage rates in Nigeria, and for comparison, those for Cuba, are shown in Fig. 4. The values for Nigeria are from 1981 to 1999 while those for Cuba are from 1990 to 1999. As shown, the highest coverage rate for Nigeria of 50 percent was from 1985 to 1990. Thereafter, the figure hovered around 30 percent, and in some instances dropped as low as 20 percent.^{19-22 26-34} By contrast, coverage rates for Cuba

had remained consistently above 60 percent during the ten-year period covered. There are several reasons for this trend in coverage rates in Nigeria. By far the strongest reason is lack of proper information among the population in Nigeria. For instance in a community-based study carried out in Rivers State in 1993, the reasons for the generally low level of TT coverage of pregnant women in the State were as follows:³⁵

♦ **Lack of information**

- Lack of awareness of the need for immunization, the place and time of immunization, and the need to return for the second and third doses
- Fear of reactions to the vaccine
- Wrong ideas about contraindications

♦ **Lack of motivation**

- Postponed until another time
- No faith in immunization
- Rumours

♦ **Presence of obstacles**

- Place of immunization too far
- Time of immunization inconvenient
- Vaccinator absent
- Vaccine not available
- Mother too busy
- Family problem including illness of mother; other children's ill health



Fig 3: Neonate with severe tetanus

- Mother came but was not given the vaccine
- Long waiting time,
- Lack of transport.

More detailed analysis of the responses revealed the following: out of 2201 responses, 366 [16.6 percent] gave as their reason, "no faith in immunization", 339 [15.4 percent], "fear of reactions" and 173 [7.9 percent], "place and/or time of immunization unknown". Interestingly, on further analysis of the data, the authors found that the highest tetanus toxoid vaccine coverage rate appeared to be among women with tertiary education, as has been documented previously.^{9, 36}

2. The place of attendance for antenatal care and delivery

Figure 5 compares the proportion of deliveries attended by trained attendants in Nigeria and Cuba from 1983 to 2001. As shown, the figures in Nigeria had over the years, varied between 30 percent and 45 percent, whereas those from Cuba approximated 100 percent.³⁷⁻⁴⁹ Experience from some studies in Rivers State appears to indicate that an important determinant of the persistently high incidence of neonatal tetanus in the state, is confinement outside medical establishments and particularly in homes of traditional birth attendants [TBAs], a practice that may not be unique to the state.^{45, 9, 35, 36, 50}

Table II shows the high level of patronage of homes of traditional birth attendants among rural communities in Rivers State. As can be seen, even among those who registered for orthodox antenatal care, approximately 20 percent still had their babies in homes of traditional birth attendants. Other places

where mothers of tetanus babies have delivered include their homes and religious settings such as prayer houses and churches. Delivery by traditional birth attendants or other caregivers was most likely to be associated with unclean delivery practices and cutting of the cord with unsterile instruments; these usually contribute to the contamination of the cord and increased risk of tetanus.

3. Ignorance of the Disease

During community surveys and interviews of parents of cases of NNT, ignorance of the disease and circumstances surrounding its occurrence and outcome, were noted to be some of the greatest impediments to prevention.⁵¹

SUGGESTIONS ON POSSIBLE SOLUTIONS

Introduction of a school-based immunization programme

The fact that neonatal tetanus still occurs in Nigeria is a major source of embarrassment to the Health Care Delivery System in the country. In this review, we have highlighted some of the reasons that in our opinion, contribute to the persistently high incidence of the disease in the country. We believe the major thrust should be towards improving the coverage rate of tetanus toxoid, particularly the five-dose schedule, among women of childbearing age. This could be achieved by incorporating this schedule into the School Health Programme. This would mean starting the School Health Programme in those parts of the country where it does not exist and strengthening it in those areas where it does. Furthermore, by making

Table II

Place of confinement of 1707 pregnant women from rural communities in Rivers State of Nigeria: those who registered for orthodox antenatal care versus those who did not register.

Place of confinement	Those who registered for orthodox antenatal care (%) n = 1093	Those who did not register (%) n = 614	Total = 1707
Homes of traditional birth attendants (TBAs)	248 (22.7)	513 (83.6)	761
Primary Health Care Centres	335 (30.6)	9 (1.5)	344
Private Hospitals	172 (15.7)	7 (1.1)	179
Maternity Homes	128 (11.7)	9 (1.5)	137
General Hospitals	121 (11.1)	5 (0.8)	126
Home	48 (4.4)	68 (11.1)	116
Teaching Hospital	34 (3.1)	1 (0.2)	35
Others	7 (0.6)	2 (0.3)	9
All women	1093 (100.0)	614 (100.0)	1707

Source: Nte AR, Oruamabo RS and Briggs ND. Ethno-Cultural Imperatives and Breast-feeding Information Packaging: A Community-based Study. Paper presented at the 23rd International Congress of Pediatrics, September 9–14, 2001, Beijing, China. Abstract No. 2P-F2-6 page 181

vaccination a component of the School Health Programme, the acceptance level and hence, the coverage rate could improve considerably. The 6-3-3-4 System of education in Nigeria implies that most pupils should commence secondary school education about the age of 11 or 12 years. The five-dose schedule spans a period of three years to complete. Therefore, if the programme were commenced in the first year in the secondary school, by the end of the third year [JSS 3], the pupils would have completed the schedule and hence be protected against tetanus for life. Such a programme would, in addition, provide coverage for the few who may drop out at this level and possibly get pregnant. Both boys and girls should be vaccinated in order to forestall potential misinformation about the vaccination programme. However, since the current primary school enrolment in Nigeria is approximately 56 percent,⁵² targeting secondary school children alone may not produce the desired effect. Consequently, the last two years of primary school when the children will be aged about 10 years or more, could be used in addition.

Supplementary immunization of women of childbearing age

The immunization coverage for women of childbearing age can be improved through strengthening of routine immunization services at all health facilities. Furthermore, outreach programmes

can be used to reach women who may fail to attend for routine immunization. Such outreaches can be carried out through special immunization days, screening of women of childbearing age for their immunization status and offering the services. There is a need to improve immunization services at health facilities so that the services are available on 24-hour basis and all days of the week. This will reduce missed opportunities for immunization. Tetanus toxoid immunization services could also be tagged on to other coverage activities such as National Immunization Days for *The Polio Eradication Initiative*.

Increasing community awareness about Tetanus and Immunization

As indicated earlier, ignorance of the disease and the means of its prevention constitute some of the major factors in its high prevalence.⁹ Therefore, we recommend health education campaigns and community mobilization efforts to increase awareness of the disease. Neonatal tetanus should be included in antenatal clinic discussions for women at all levels of care, irrespective of their education and social class. Flyers and other educational materials in local languages should be produced.

Retraining of Traditional Birth Attendants and other alternative care providers.

As has been shown, untrained health personnel,

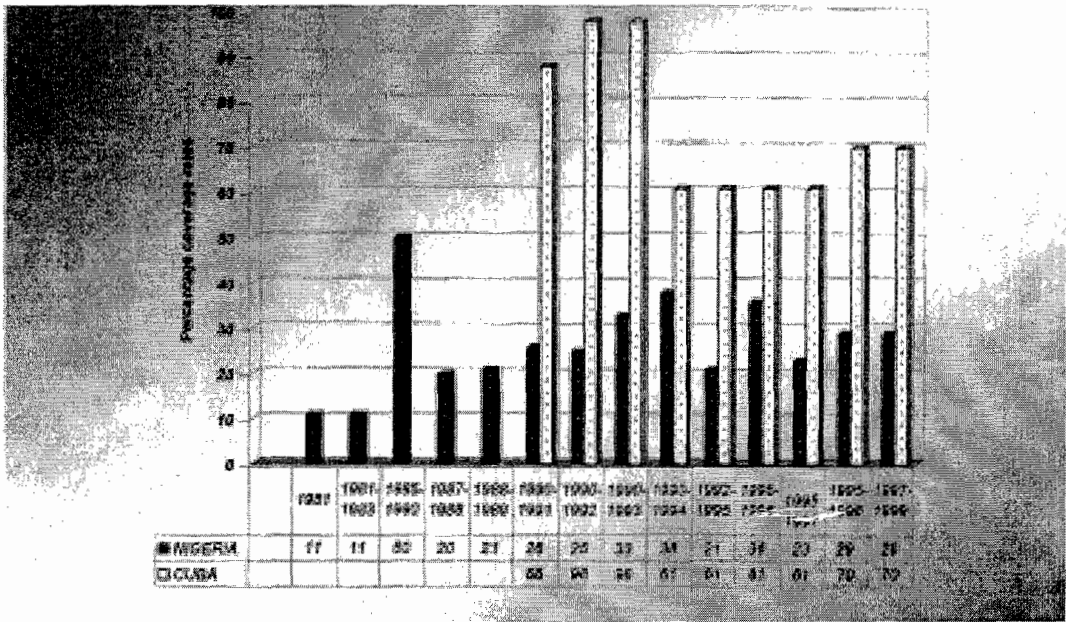


Fig 4: Bar chart showing tetanus toxoid vaccine coverage (TT2) rates among pregnant women in Nigeria and Cuba from 1981 to 1999 (References 18-22, 26-34)

including TBAs, attend over fifty percent of deliveries in Nigeria; the training of these caregivers has been suggested as a means of improving the quality of care they render to pregnant and parturient women. While controversies over retraining of TBAs go on, it is necessary to point out that it would be unwise to ignore a group of persons who attend to over fifty percent of Nigerian deliveries. Therefore, we strongly advocate the retraining of TBAs and other alternative care providers. The packaging of any such training programme should be simple. Emphasis should be on observing simple cleanliness at childbirth, the need to observe the rules of hand washing before taking

deliveries and hygienic cord care. One such training programme for TBAs has been organized in Port Harcourt for TBAs from the 23 Local Government Council areas of Rivers State by *The Adolescent Project (TAP) Nigeria*, a non governmental organization. It is packaged as a sensitization workshop on safe motherhood for TBAs and safe motherhood monitors. As part of the programme content of the workshop, care of the newborn – including care of the cord – and immunization, are extensively discussed and practical sessions held. This is because in the various local government areas, TBAs still use unacceptable methods of cord care such as ground periwinkle shells,

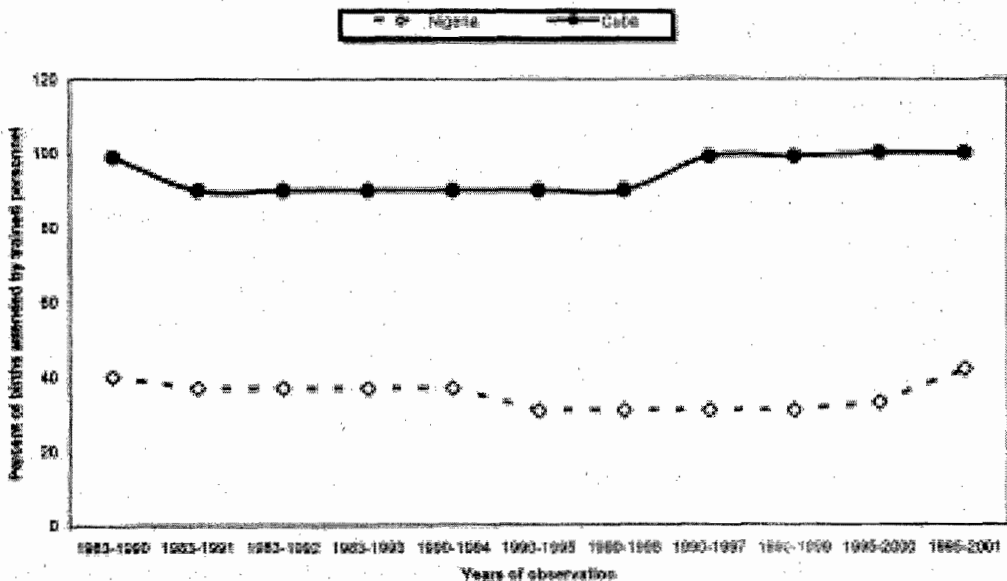


Fig 5: Comparison of proportion of births attended by trained health personnel in Cuba and Nigeria. Pooled data from 1983 to 2001 (references 37-49).

red mud, alligator pepper, and herbs, among others. Furthermore, many of them are ignorant of the causes and prevention of tetanus. (*Source: The Adolescent Project (TAP) Nigeria*). To ensure that the messages they receive on cord care are actually practised, the selected safe motherhood monitors also attend the workshops with the TBAs and on return, visit them to assess their practices, assist them with linkages to the nearest skilled health personnel/facility and with referrals. The monitors submit quarterly reports and hold meetings with the organizers for a review of the situation in their respective communities. At the end of each sensitization workshop, each monitor is provided with a notebook for record keeping and each TBA is equipped with a delivery kit with contents as listed below:

Contents of TBA delivery kit

- ♦ Gloves
- ♦ Cord clamps (plastics and disposable)
- ♦ Green/blue cotton material to receive baby
- ♦ Mackintosh
- ♦ Cotton wool
- ♦ Methylated spirit
- ♦ Disinfectant – such as *Dettol* or *Izal* (*Dettol* is preferred because it is milder)
- ♦ Bleach (because of HIV/AIDS)
- ♦ Kidney dishes (three sizes – large, medium and small)
- ♦ Forceps for clamping cord
- ♦ A pair of scissors

This model can be replicated in other parts of the country but emphasis should be placed on a close monitoring of the trained TBAs. Some TBA training programmes have failed in the past because they were neither monitored nor followed up over the years and so they lapsed after a while. It must be reiterated that no matter the amount of training a TBA receives, he/she is not considered a skilled care giver; on this ground, their training should be regarded as sensitization on safe motherhood as is the case in *The Adolescent Project*. The idea is to make them realize their limits. Traditional Birth Attendants can also be trained to screen for tetanus toxoid immunization status so that they can refer the women for immunization. An innovation in the immunization programme is teaching other care providers such as TBAs to immunize mothers.¹ This may become applicable when the vaccine that can withstand temperature variations and safer injection techniques are fully developed. Care providers at religious and other settings should also be identified and trained so as to improve the quality of their services. Like the TBAs, they need to be closely monitored to ascertain the quality of their practice.

Improving access to Health Services

Access to health facilities will not only increase the immunization coverage rates but also the proportion of women who deliver in such facilities.^{9, 52} Health services, based on the principle of equity, adopted by the Primary Health Care Development Agency seeks to ensure that health services are available, affordable and accessible to all in the community. All communities are expected to have access to functional health facilities within five km distance or 30 minutes walking distance. • The cost recovery system (Revolving Fund Scheme) being implemented in many health facilities has made the cost of care unaffordable to women. This is because most of the mothers of children afflicted with the disease are low-income earners. In addition, the negative attitudes of health care staff serve as impediments to illiterate women who need the services most. Thus, the recently introduced *Women and Children Friendly Health Services Initiative*, which aims at ensuring that health care services are accessible, affordable and acceptable to the clients, may be a way out. The government should however, be prepared to finance health care and reduce the cost to levels where patronage will improve.⁵³

Conclusion

Neonatal tetanus remains a major cause of morbidity and mortality among neonates in Nigeria. Its elimination in the country will depend on a concerted effort from several stakeholders - adolescents and women of childbearing age, pregnant women, traditional birth attendants, the health and education sectors, religious and other social sectors and other caregivers.

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