

A Community-based Survey to Quantify Risk Factors for Neonatal Tetanus in Rivers State

Nte AR* Ekanem EE** Gbaraba PV+ Oruamabo RS** Odu N*

Summary

Nte AR, Ekanem EE, Gbaraba PV, Oruamabo RS, Odu N. A Community-based Survey to Quantify Risk Factors for Neonatal Tetanus in Rivers State. *Nigerian Journal of Paediatrics* 1996; 23 : 51. A cross-sectional survey, using standard epidemiological methods, was carried out in Yenagoa Local Government Area of Rivers State with the aim of quantifying risk factors for neonatal tetanus (NNT). Twenty-eight of 1,867 children from the 1464 households that were surveyed, satisfied the WHO criteria for the diagnosis of NNT; there was thus an incidence of 15 cases of NNT per 1000 live births. Non-attendance for antenatal care and delivery outside health-care establishments had overriding effects on other risk factors. The other important risk factor was the formal educational level of the mothers. It is suggested that improvement in the educational level of mothers, promotion of health-seeking behaviours and healthy practices among parents and health workers are specific ways of reducing the prevalence of NNT.

Introduction

NEONATAL tetanus (NNT) remains a major cause of morbidity and mortality among babies in the developing world, despite the availability and use of Tetanus Toxoid (TT) vaccine for over 30-years.^{1,3} In Nigeria, reports from some community-based surveys in various parts of the country, estimate the incidence of NNT at 14 to 25 per 1000 live births.^{4,6} Certain behaviour patterns among mothers have been identified with the occurrence of NNT and notable among these are non-attendance for antenatal care during pregnancy,⁷ non-acceptance of TT for whatever reasons,^{8,9} delivery in

University of Port Harcourt Teaching Hospital

Department of Paediatrics

* Lecturer

** Professor

Department of Community Medicine

+ Associate Lecturer

Rivers State Ministry of Health

Research and Statistics Division

* Director

Lagos University Teaching Hospital

Department of Community Health

** Senior Lecturer

Correspondence: RS Oruamabo

the homes of traditional birth attendants (TBAs)⁶ and application of substances other than methylated spirit, to the umbilical stump.⁷ A recent reassessment from Pakistan has identified application of home-made ghee prepared from cow's milk to the umbilical stump as one of several high risk factors.³ Previous studies undertaken here in Nigeria have shown that application of substances such as saliva, sand and cow dung to the umbilical stump, has been associated with tetanus infection in babies.⁷

In the present study, the aim was essentially, to establish the degree of risk for developing NNT among babies who have been exposed to certain risk and harmful factors in a number of communities in the Rivers State with documented high incidence of NNT. The Yenagoa Local Government Area (YELGA) is one of the 24 Local Government Areas (LGAs) in the Rivers State; the area is partly riverine and partly upland, representing the two principal geographical terrains of the state and comprises 28 distinct communities. It was selected for the present study because of the findings in a previous study, that revealed a high incidence of NNT in the area.⁹

Subjects and Methods

The survey was conducted in the first two weeks of January 1995 and the subjects were children born between January 1, 1992 and December 31, 1994 that involved a three-year recall period. Neonatal tetanus was defined, using the following criteria set out by the WHO:¹⁰ a live born infant who established sucking soon after birth, but stopped sucking after 48 hours and subsequently developed stiffness and or convulsion. For each case of NNT, an infant of the same sex who was born

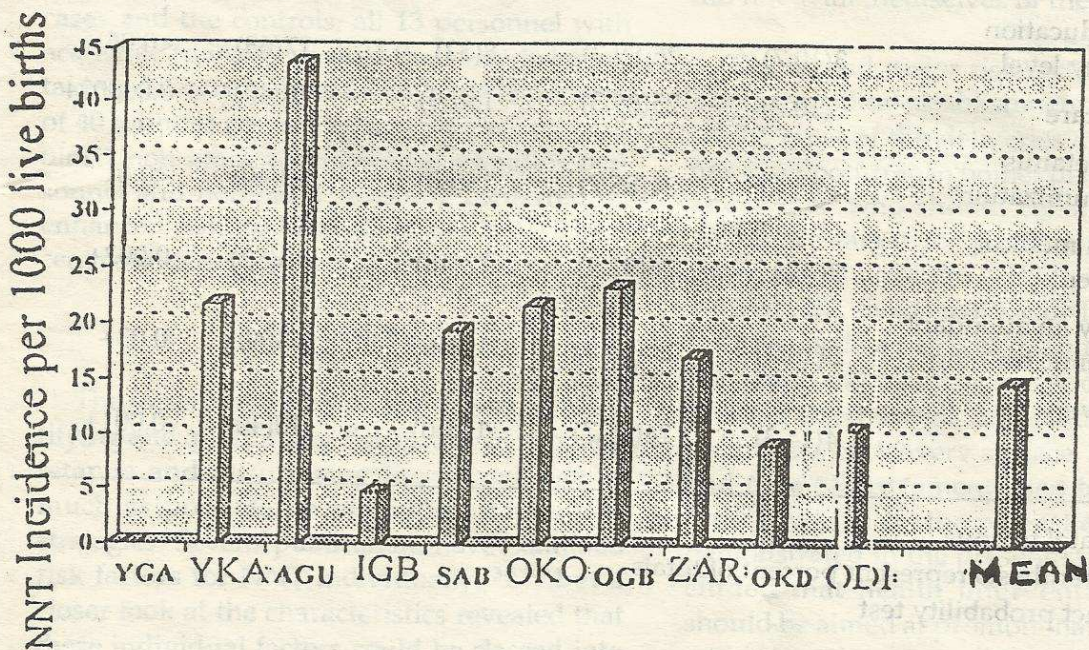
within three months of the birth of the index child and residing within the same community, but did not develop NNT, was selected as a control. Ten of the 28 communities were selected for the survey, using a simple random process. Sample size estimation, selection of interviewers and supervisors, their training and the conduct of the survey, were carried out using standard epidemiological methods. The instrument for the survey was adapted from the WHO "Guidelines for investigating suspected cases of neonatal tetanus".¹⁰ For the purpose of the survey, medical establishments that were used included either government-owned or privately owned hospitals, clinics and maternities with trained personnel. All others, including churches, homes of untrained TBAs and private homes, were regarded as non-medical establishments. Attending personnel with academic training included physicians, nurses, midwives with formal training and community health workers with formal training. A household was defined as a mother/caretaker and her children in a polygamous setting and a father/mother/caretaker and the children in a monogamous home.

The data were arranged in cells made of the ten communities selected for the survey and the incidence of NNT was calculated for each cell. Neonatal tetanus cases were then compared with the controls, using ten social variables. Standard chi-square and Fisher's tests, where relevant, were used to test significance of differences between the cases and controls. Mantel-Haenszel test was employed to test the effect of combining several variables on the level of risk. The study was approved by the Ethical Committee of the University of Port Harcourt Teaching Hospital.

Results

One thousand, eight hundred and sixty seven children comprising 955 (51.2 percent) males and 912 (48.8 percent) females from 1464 households were surveyed. Three hundred and fourteen (16.8 percent) of the 1867 children were neonates at the time of the survey.

Twenty-eight (15 per 1000 live births) of the children satisfied the WHO diagnostic criteria for NNT. The incidence of NNT in the different communities ranged from zero per 1000 live births in Yenagoa to 43.7 per live births in Agudama, with a mean of 15 per 1000 live births (Fig).



Names of Community

NNT=Neonatal Tetanus; YGA=Yenagoa; YKA=Yenaka, AGU=Agudama-Epic; IGB=Igbogene; SAB=Sagbagreia; OKO=Okotiamia; OGB=Ogboloma; ZAR=Zarama; OKD=Okorc ia; ODI=Odi

Fig Histogram illustrating the incidence of neonatal tetanus per 1000 live births for the 10 communities. Note the zero incidence for Yenagoa (YGA) and the highest of 43.7 for Agudama (AGU)

The characteristics of the 38 cases of NNT and of the 25 controls are compared in the table.

TABLE

Characteristics of 28 Cases of Neonatal Tetanus and 25 Controls

Characteristic	NNT		Controls		P Value
	Yes	No	Yes	No	
Mother's education to secondary level	3(10.7)	25(89.3)	8(32)	17(68)	<0.05
Antenatal care	3(10.7)	25(89.3)	15(60)	10(40)	0.00002+
Complete tetanus toxoid immunization	4(14.3)	24(85.7)	15(60)	10(40)	<0.01
Delivery in medical establishment	2(7.1)	26(92.9)	12(48)	13(52)	0.002+
Delivery by an attendant with academic training	3(10.7)	25(89.3)	10(40)	15(60)	0.03+
Clean delivery surface	4(14.3)	24(85.7)	15(60)	10(40)	0.001+

NNT = Neonatal tetanus

Figures in parenthesis represent percent of totals.

+ Fisher's exact probability test

Although the parents of the subjects and controls resided under similar social and environmental circumstances, the two groups of mothers differed in their levels of educational attainment. For instance, three (10.7 percent) of the 28 mothers of NNT cases were educated to the secondary school level, compared with eight (32.0 percent) of the 25 mothers of the controls ($\chi^2 = 5.0477$; $df = 1$, $P < 0.05$). Similarly, there were significant differences in the two groups of mothers regarding their attendance or otherwise, for antenatal care and their

subsequent places of delivery. When these two variables were considered together, the result was even more revealing. Among both NNT mothers and controls, 12 (66.7 percent) of the 18 who received antenatal care (ANC) delivered in medical establishments, while none of the 35 mothers (25 NNT cases and 10 controls) who did not receive ANC, did so. This difference was highly significant ($\chi^2 = 26.48$; $df = 1$, $P < 0.001$). Employing the Mantel-Haenszel test, non-attendance for ANC and delivery outside medical establishments together, conferred an

enhanced risk of NNT (O.R. = 1.38; 95 percent confidence interval, 0.568 to 3.330).

Other factors (Table) namely: academic training of attending personnel, cleanliness of delivery environment, hand-washing before carrying out the delivery, nature of instrument used for severing the cord and cord toilet with spirit, were all largely dependent on the place of delivery. For example, both among the NNT cases and the controls; all 13 personnel with academic training washed their hands before taking delivery compared with 14 (35 percent) of 40 without academic training. When combined, non-academic training of attending personnel and non-hand washing conferred an enhanced risk for NNT (O.R. = 1.350, 95 percent confidence interval, 0.03 to 6.535).

Discussion

The focus of the present study was on identifying and quantifying risk factors in neonatal tetanus and on utilizing the knowledge as much as possible, in planning intervention strategies. Several publications have examined risk factors for NNT individually,^{3-5,7-9} but a closer look at the characteristics revealed that these individual factors could be classed into two major sub-groups. The emphasis is on groups of factors that deter health-seeking behaviour, first, among the primary target group namely: parents and particularly mothers and the secondary target group i.e. health workers. Among the former, the focus was on non-attendance at antenatal care during the current pregnancy. This major non-health-seeking behaviour was denominated on non-attainment of formal education beyond the primary school level among the NNT mothers and strongly influenced the mother's place of con-

finement. It could also be inferred that those mothers who received antenatal care were more likely to accept tetanus toxoid vaccination. It should be noted that the LGA where the survey took place, was adequately covered by health facilities. It has three general hospitals, 14 Primary Health Centres manned by Community Health Workers and eight Health Clinics. Unfortunately, many of the mothers did not avail themselves of these facilities.

The second major risk factor was delivery in a non-medical establishment. In the present study, most of the deliveries among the tetanus cases occurred in homes of traditional birth attendants, who should constitute the main secondary target for positive health-seeking promotional activities. The interrelationship between the major risk factor for NNT of delivery outside a medical establishment on the one hand and other factors such as academic training or otherwise, of attending personnel, cleanliness of delivery surface, hand-washing and type of instrument used in severing the umbilical cord on the other, has been clearly demonstrated in the present study. It is concluded that health intervention strategies should be aimed at promotional activities that will bring about a health-seeking behaviour among the primary target audience and health-seeking behaviour practices among the secondary target audience.

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