

A study of clinical profile of childhood tetanus in south Gujarat area

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Abstract

Introduction: Despite the availability of cheap, safe and effective vaccine, tetanus is still a serious health problem worldwide and rural India, and a common cause of death in the new born. Community surveys have shown that only a small proportion of neonatal tetanus (NT) cases are routinely reported and under – reporting is often highest in areas at highest risk of NT. So, the objective of the study was to find out the epidemiological factors, clinical profile and outcome of childhood tetanus. Also to find out the preventable factors and prognostic factors in childhood tetanus. **Methods:** It was a prospective observational study. Legal guardians of all children less than 12 years old including neonates with diagnosis of tetanus admitted in pediatric department were inquired for detailed history regarding the present complaint, history of sources of infection, history of antenatal care, immunization status and detailed labor history. Grading of tetanus was done after detailed general and systemic examination. **Result:** Total 35 cases were included in the study with Male: Female ratio of 1.7:1. Among them 28.57% were neonatal tetanus and 28.57% were traumatic case. Among 10 neonatal tetanus cases 9 mothers were not immunized and among 25 non-neonatal cases 19 were unimmunized. Mortality was 90% in NT cases and 36% in Non-Neonatal Tetanus (NNT) cases. Common complication were septicemia [9 (25.71%)], Disseminated Intravascular Coagulation (DIC) [8 (22.85%)], Hyperpyrexia [7 (17.14%)], Pneumonia [5 (14.28%)], Bed sore [3 (8.5%)], and thrombo phlebitis [1(2.8%)] of cases. **Conclusion:** Although incidence of childhood tetanus has been reduced over the years, but still tetanus is more common in rural population due to illiteracy, poor socioeconomic status, poor vaccination and superstitions. The mortality by tetanus can be reduced by improving routine immunization specifically in rural and low socioeconomic population, by recognition of disease severity and providing proper management with intensive care as early as possible.

Keywords: Neonatal Tetanus, Non-neonatal Tetanus, Pediatric Tetanus

Introduction

Tetanus was a serious disease with high rate of mortality, 80–90%, before specific treatment become available. Even with proper treatment the case fatality rate varies from 15–50%. Tetanus neonatorum and uterine tetanus have very high fatality rates (70-100%), while otogenic tetanus is less serious.

Tetanus is more common in developing countries, where the climate is warm, and in rural areas where the soil is fertile and high cultivated, where human and animal population are substantial and live in close association and where unhygienic practices are more common and medical facilities poor. In rural India, tetanus was a common cause of death, particularly in the new born. But immunization of infants and

expectant mothers has reduced the incidence to large extent. [1] Despite the availability of cheap, safe and effective vaccine, tetanus is still a serious health problem world wide and in many developing countries it is the major cause of death in new born infants [2].

Tetanus is intimately related to poverty, illiteracy, social taboos, unhealthy conditions, lake of education, lake of knowledge of immunization, lake of medical care, ignorance about immunization and hygiene which contribute to a high incidence of tetanus which is preventable but dreadful disease.

Community surveys have shown that only a small proportion of neonatal tetanus (NT) cases are routinely reported to notifiable disease reporting system in most developing countries and under – reporting is often highest in areas at highest risk of NT. In 1989, world

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health assembly aimed to reduce incidence to less than 1 case per 1000 live births for each health block. But in 1996 it was reaffirmed and new target date set for elimination of NT by 2005 [3]. But that is still not achieved and cases are still arises.

The objective of the study was to find out the epidemiological factors, clinical profile and outcome of childhood tetanus. Also to find out the preventable factors and prognostic factors in childhood tetanus.

Methodology

Type of study: A prospective observational study carried out over a period of 21 months by pediatric department, Government Medical College, Surat.

Human research Ethics committee permission was taken before starting the study.

All eligible patients as per inclusion and exclusion criteria were selected for the study.

Inclusion criteria: All children less than 12 years old including neonates with diagnosis of tetanus admitted in pediatric department who presented with spasm suggestive of tetanus and diagnosis confirmed with independent evaluation by atleast two pediatricians were included.

Exclusion criteria: other causes of spasms like meningoenephalitis, hypocalcaemia and others were ruled out with appropriate investigations.

Informed written consent was taken from legal guardian of the patients before inclusion in the study. At the time

Result

Over a period of 21 months among total 9520 admitted patients admitted in pediatric ward, 35 (0.36%) patients were identified as the cases of tetanus. Among them 10 were neonatal tetanus and 9 were in 1month to 3-year group.

Gender wise distribution shows that 62.86% were male with Male: Female ratio of 1.7:1. Epidemiological distribution shows that 22 (62.86%) of patients were from rural area. Socioeconomic distribution shows that 24 (68.6%) patients were from lower socioeconomic status.

Among non-neonatal tetanus, 10 (28.57%) were traumatic and 7 (20%) were otogenic, while others were idiopathic. [Table 1]

Immunization status shows among neonatal tetanus cases one pregnant woman was partially immunized while 9 were not immunized at all.

In non-neonatal cases only one patient was fully immunized, while 5 were partially immunized and 19 were unimmunized. [Figure 1]

of admission detailed history regarding the present complaint, history of sources of infection like trauma, ear discharge, and for neonatal tetanus history of antenatal care, numbers of tetanus toxoid doses, detailed labor history was evaluated.

Detailed general and systemic examination was carried out.

Grading of tetanus was done on admission and severity reassessed if severity increases after admission.

Patients were observed through out the admission for progress of the disease, complication, and disappearance of the symptoms.

Investigations like hemoglobin, total count, differential count, Erythrocyte Sedimentation Rate (ESR), renal function test and chest X-ray were done in all patients.

In patients with chronic ear discharge, X-ray mastoid was done and ear swab were sent for culture.

In neonatal tetanus patients, umbilical cord swab was sent when umbilical discharge was present.

Statistical Methods: Data was analyzed with the help of statistical software Graph pad version 5 demo.

The study variables were analyzed for their association with immediate outcome by applying Fisher's exact test as and when applicable.

All p values were two tailed and $p < 0.05$ was considered statistically significant.

Table-1: Socio-demographic data of tetanus cases.

Parameters		Numbers	Percentages (%)
Age			
<1 month		10	28.57
1 month – 3 years		9	25.71
4 – 6 years		5	14.29
7 – 9 years		6	17.14
10 – 12 years		5	14.29
Total		35	100
Gender			
Male		22	62.86
Female		13	37.14
Total		35	100
M:F Ratio		1.7:1	
Geographic distribution			
Rural		22	62.86
Urban		13	37.14
Total		35	100
Rural:Urban ratio		1.7:1	
Socioeconomic class			
1	Upper	1	2.9
2	Middle	4	28.5
3		6	
4	Lower	11	68.6
5		13	
Total		35	100
Causes of Tetanus			
Neonatal		10	28.57
Non-neonatal	Traumatic	10	28.57
	Otogenic	7	20
	Idiopathic	8	22.86
Total		35	100

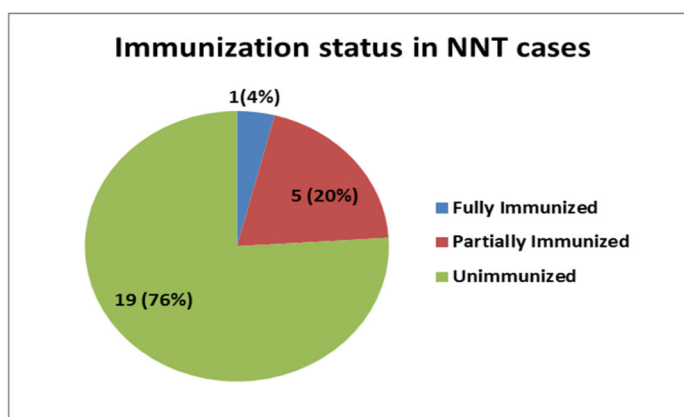


Figure-1: Immunization status in Non Neonatal Tetanus cases

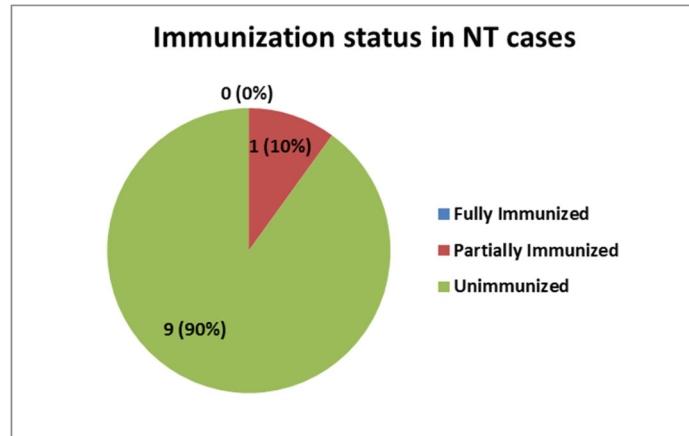


Figure-2: Immunization status in Neonatal Tetanus cases

Clinical presentation showed that all NT cases presented with complaint of not taking feed, excessive crying, spasm and trismus, while fever and opisthotonus seen in 4 cases. In NNT cases trismus, dysphagia and spasm seen in all cases while fever seen in 8 cases while opisthotonus seen in 6 cases. [Figure 2]

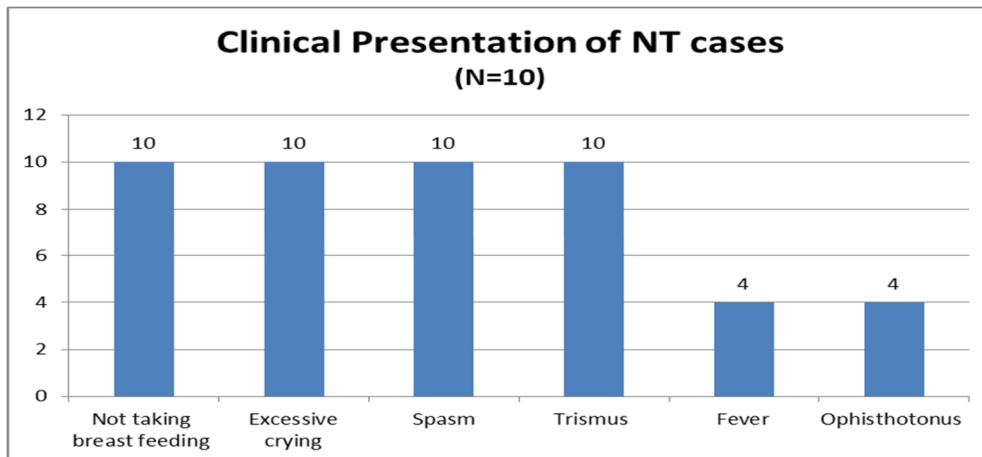


Figure-3: Clinical presentation of NT cases

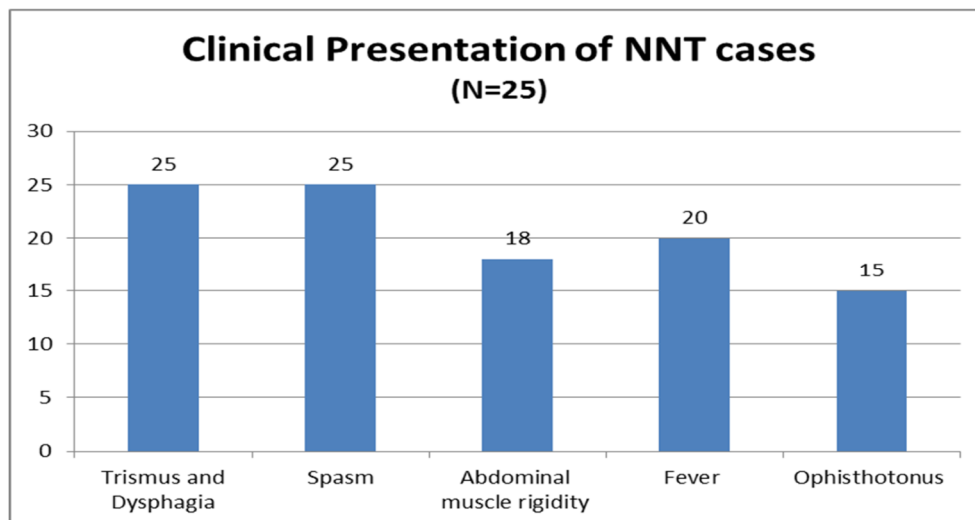


Figure-4: Clinical presentation of NNT cases

Table 2 shows the mortality review of all neonatal and non-neonatal case of tetanus. It shows that 9 (90%) of neonatal tetanus patients were died and in that cases the mother were totally unimmunized. While among non-neonatal cases mortality was 36% i.e. (9 out of 25) with commonest mortality was in 10 – 12 years of age group i.e. 3 out of 5 (60%) were died. Period of onset is defined as the time interval between first symptom of disease and onset of spasm. As seen in table in present study 80% mortality in cases with period of onset <24 hrs. Among non-neonatal cases the mortality was commonly seen in traumatic cases. Severity wise grading shows that 100% mortality seen in patients with grade 5 severity.

Table-2: Mortality review in NT and NNT cases

Age group		No. of patients	Mortality (%)
Neonatal (n=10)	<1 month	10	9 (90%)
Non-neonatal (n=25)	1 month – 3 years	9	2 (22.22%)
	4 – 6 years	5	1 (20%)
	7 – 9 years	6	3 (50%)
	10 – 12 years	5	3 (60%)
	Total (NNT)	25	9 (36%)
Total		35	18 (51.43%)
Period of onset			
< 24 hours		10	8 (80%)
24-48 hours		11	7 (63.60%)
> 48 hours		14	3 (28.50%)
Total		35	18 (51.43%)
Cause of tetanus			
Neonatal		10	9 (90%)
Non-neonatal	Traumatic	10	4 (40%)
	Otogenic	7	2 (28.57%)
	Idiopathic	8	3 (37.5%)
Total		35	18 (51.43%)
Grade of tetanus			
1		6	0
2		6	0
3		8	4 (40%)
4		5	4 (80%)
5		10	10 (100%)

The most common complication seen was septicemia in 9 (25.71%) of cases, followed by DIC in 8 (22.85%), Hyperpyrexia in 7 (17.14%), Pneumonia in 5 (14.28%), Bed sore in 3 (8.5%), and thrombophlebitis in 1 (2.8%) of cases [Table 3].

Table-3: Complications associated with tetanus

Complications	No. of cases	Percentages (%)
Septicemia	9	25.71
DIC	8	22.85
Hyperpyrexia	7	17.14
Pneumonia	5	14.28
Bedsore	3	8.5
Thrombophlebitis	1	2.8

Discussion

In present study over a period of 21 months total 35 cases of tetanus were identified among 9520 cases admitted in pediatric ward. That shows incidence was 0.36%. which was quite low as compared to observation by Milind et al. [4], P Poudel et al., [5], Sanjeev Chetry et al. [6]. in which 0.73%, 0.9% and 1.5% respectively. It might be attributed to the fact that the incidence of tetanus has actually decreased or due to improvement in vaccination coverage under universal immunization program. The neonatal tetanus incidence was 0.105% in this study which is less as compared to other study like G J Bhat et al., [7] in which it is 1.9%. It might be because of improvement in coverage of maternal TT immunization and proper umbilical cord care in newborns and institutional deliveries.

The highest numbers of cases in present study seen were in patients less than 1 months of age. While the study by Sanjeev Chetry et al., [6] and Mondal et al., [8] shows highest numbers of cases in 4 - 6 years of age i.e. 27.1% and 45.45% respectively. The male: female ratio in present study is 1.7:1. Which is comparable to other studies like P. Poudel et al., [5] and Sanjeev Chetry et al., [6] in which it is 1.4:1 and 2:1 respectively. It might be because of neglect of female child and not brought to the health services. Rural preponderance seen in present study similar to other studies like Sanjeev Chetry et al., [6] and Hatkar N et al., [9]. This might be due to illiteracy, poor socioeconomic status, poor vaccination and superstition. Also, the incidence is more in lower economic class in present study. Similarly, study by Aggarwal et al, [10] have 85.7% of patients from lower socioeconomic group.

Clinical presentation in neonatal cases the present study and the study by Sanjeev Chetry et al., [6] is similar with common complaint like not taking breast feeding, spasm, trismus and dysphagia which are seen in all cases. While in non-neonatal cases trismus and abdominal muscle rigidity was common presentation in both studies.

Immunization status also shows that similar to present study other studies also observed highest numbers of patients were unimmunized [6,8]. Thus improvement in awareness and coverage of immunization can reduce tetanus. The common causes of tetanus in present study are neonatal and traumatic. And most of the other Indian studies found traumatic to be most common cause [6]. The reason may be children are more prone to injuries and they are more neglected specifically in rural

and lower socioeconomic class. Fatality rate in neonatal cases is 90% in present study, which is similar to other studies like Sanjeev Chetry et al., [6] Hatkar Net al., [9] Patel J C et al., [11] who had 80%, 87.5% and 86.38% respectively. While in non-neonatal cases one third of the cases died in all these studies. Age wise mortality in non-neonatal cases was different in different studies. In present studies 33.33% each in 7-9 years and 10-12 years of age. The commonest cause of death in present study was spasm (50%), while others were DIC (22.22%), Cardiac arrest (16.66%) and pneumonia (11.11%). The study done by Hatkar Net al., [9] and P Poudel et al., [5] also shows spasm as most common cause of death. Tracheostomy was performed in 50% of cases with Grade 5 tetanus in present study to relieve respiratory difficulty due to severe laryngospasm.

Traumatic type tetanus has highest mortality in NNT cases in present study. As compare to study by A T Pathak et al., [12] shows highest mortality in idiopathic cases (31.9%). It was found that 80% of mortality was in cases with period of onset of <24 hours. Patel & J C [11] also observed the same. This shows that as the period of onset decreases the mortality increases and the prognosis is grave. The correlation was also significant with p value of 0.0001.

Correlation of temperature and mortality shows that cases with axillary temperature $\geq 102^{\circ}\text{F}$ had higher mortality (90%). Similar finding was seen observed (95.7%) in case of A T Pathak et al., study [12]. Thus pyrexia adversely affects the prognosis. Cases with grade 5 severity had 100% mortality in present study. None of grade 1 and 2 patients were died.

In present study most common complication is septicemia followed by DIC and hyperpyrexia. While study by Milind et al., [4] had commonest complication were pneumonia and DIC, while M G Geeta et al., [13] had thrombophlebitis commonest complication.

Conclusion

Although incidence of childhood tetanus has been reduced over the years of probably due to improvement of coverage and awareness regarding routine immunization under Universal Immunization Program, but still tetanus is more common in rural population due to illiteracy, poor socioeconomic status, poor vaccination and superstitions. Mortality is decreased as the incubation period and period of onset increased, however it increased with temperature and grade of

tetanus. So, the mortality can be reduced by improving routine immunization specifically in rural and low socioeconomic population, by recognition of disease severity and providing proper management with intensive care as early as possible.

This study gives area specific prevalence of NT and NNT cases and mortality among them. That will help to compare it with country wise data and help in planning the intervention to decrease the prevalence.

What this study add to existing knowledge?

This study shows that NNT cases are predominant in rural areas. So, improvement in immunization in rural and low socioeconomic area will reduce the NNT cases.

Author contribution:

All authors have equally contributed in study process and manuscript formation.

Abbreviations

DIC- Disseminated Intravascular Coagulation, **ESR-** Erythrocyte Sedimentation Rate, **NT**–Neonatal Tetanus, **NNT**–Non-Neonatal Tetanus, **TT**-Tetanus Toxoid

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