

STUDY OF INCIDENCE, MORTALITY & CAUSES OF NEONATAL TETANUS AMONG ALL NEONATAL INTENSIVE CARE UNIT [NICU] ADMISSIONS IN TERTIARY HEALTH CARE CENTER OF SBHGMC, DHULENeeta Hatkar¹, Neelam Shah², Syed Imran³, Arjun Jadhao⁴**HOW TO CITE THIS ARTICLE:**

Neeta Hatkar, Neelam Shah, Syed Imran, Arjun Jadhao. "Study of Incidence, Mortality & Causes of Neonatal Tetanus among all Neonatal Intensive Care Unit [NICU] Admissions in Tertiary Health Care Center of SBHGMC, Dhule". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 40, May 18; Page: 6967-6973, DOI: 10.14260/jemds/2015/1012

ABSTRACT: AIM: To find out incidence & mortality due to Neonatal Tetanus and to study its causes among all the admissions in Neonatal Intensive Care Unit [NICU] of tertiary health care center of Shri Bhausaheb Hire Government Medical College, [SBHGMC] Dhule. **OBJECTIVES:** 1] To find out incidence of Neonatal Tetanus in all neonatal admissions. 2] To find out mortality rate among all Neonatal Tetanus cases. 3] To take detailed history to find out causes of Neonatal Tetanus. **MATERIALS & METHODS:** Prospective interventional study was conducted in all neonates admitted in NICU of SBHGMC, a tertiary care center during 1st January 2013 to 31st December 2013. Cases of Neonatal Tetanus were diagnosed by taking detailed history & examination. All cases were treated using standard protocol. Incidence & mortality were calculated and causes noted from data obtained. **RESULTS:** Incidence of Neonatal Tetanus was found to be 2% while mortality was very high i.e. 87.50%. Cause of Neonatal Tetanus in this study were found to be home deliveries, deliveries by untrained person, application of ash on umbilical stump & improper immunization of mother during pregnancy. **CONCLUSION:** Neonatal Tetanus is completely preventable disease. Combination of high levels of tetanus toxoid Vaccination coverage during antenatal period, safe birth practices and care in post-partum period will definitely help to decrease neonatal mortality due to Neonatal Tetanus. **KEYWORDS:** Neonatal Tetanus, clostridium Tetani.

INTRODUCTION: Tetanus is an acute illness caused by organisms "Clostridium Tetani", a spore forming Bacterium. The name "Tetanus" in English and "Dhanur " in Hindi mean "Arching of the body" - due to stiffening which is prominent feature of the disease.¹

Tetanus occurs worldwide and is an important cause of neonatal deaths in developing countries worldwide.² Neonatal Tetanus kills an estimated 500000 neonates each year with about 80% deaths in 12 tropical Asian-African countries alone. Till recently Neonatal tetanus accounted for 6.5% of deaths in infancy in India.³

Causative Organism, clostridium Tetani is Gram positive anaerobic spore forming organism.^{1,4} It forms terminal spores which resembles drumsticks. These spores are resistant to many disinfectants & boiling but can be destroyed by autoclaving. Tetanus bacilli are noninvasive. So the common route of entry of bacterium is through umbilical stump or any injury during birth. They produce 2 types of toxins, Tetanospasmin and Tetanolysin.⁴

Tetanospasmin is a neurotoxin - It is 150 kd simple protein consisting of heavy chain and light joined by single disulfide bond. Tetanus toxin binds at neuromuscular junction and enters motor nerve by endocytes. After which it undergoes retrograde axonal transport to cytoplasm of the alpha motorneurons. The toxin exist the motor neuron in the spinal cord and next enters adjacent

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spinal inhibitory interneurons, where it prevents release of neurotransmitter glycine and GABA [Gammaamino butyric acid]. Tetanus toxin thus blocks the normal inhibition of antagonistic muscles on which voluntary coordinated movements depends. In consequence, affected muscles sustain maximal contraction and cannot relax. The autonomic nervous system is also rendered unstable in tetanus.⁵

The common age of onset of symptoms is 5 to 15 days.⁵ Neonatal tetanus does not manifest during first two days of life and is rare after the age of 2 weeks. Initial symptoms include unexplained crying followed by refusal of feeds. The infant keeps the mouth slightly open due to pull as result of spasm of the muscles of neck, but reflex spasm of masseters is evoked on trying to open the mouth during feeds. Reflex spasm of pharyngeal muscles leads to dysphagia and choking during feeding.⁵

Lock jaw, trismus and spasms of limbs are important clinical feature (fig.1). The usual flexed posture of the baby is replaced by generalized rigidity and opisthotonus in extension. The spasm of larynx and respiratory muscles is associated with apnea and cyanosis. Spasms are characteristically induced by stimuli of touch, noise and bright light. Due to lack of inhibitory impulse from the higher centers in neonates, the anterior horn cells react more violently resulting in more severe spasm. Frequent muscular spasms lead to fever, tachycardia and tachypnea. Umbilical stump does not show any sign of infection.⁶

So in this study we tried to find out incidence & mortality of this easily preventable diseases. We also tried to find out common cause of neonatal tetanus in our area, so that we can work to reduce those causes.



Figure 1 : Baby of neonatal tetanus in active spasms

MATERIAL AND METHODS:

1. Prospective interventional study was conducted in all NICU admissions during 1st January 2013 to 31stDecember 2013 in SBH Government Medical College & hospital, a tertiary care center.
2. Out of all NICU admissions cases of Neonatal tetanus were diagnosed after taking detailed history & examination.

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DIAGNOSTIC CRITERION: The diagnosis of Neonatal tetanus was based on history & clinical presentation. There are no microbiological, chemical, hematological or radiographic studies that provide gold standard for diagnosis. Tissue cultures are positive in < 50% patients, so tissue culture was not used.

Treatment Protocol used was as follows:^{1,3,5}

- Babies were kept in dark & quiet room.
- Kept Nil by mouth.
- Suctioning was done as per needed.
- Intravenous fluids were given in maintenance dose.
- Inj. Human tetanus immunoglobulin was given in a dose of 500 IU within first two hours of admission intramuscularly.
- Inj. CP 1Lack IU/Kg body weight per day in 4 divided doses.
- Inj. diazepam 0.3 mg/kg/ Dose, 6 hourly in 1:1 dilution.
- Inj. phenobarbitone 3 mg/ Kg/ Day, in 2 divided doses.
(As chlorpromazine was not available, we used phenobarbitone.)

Out come after treatment was noted. Data collected was tabulated & analyzed statistically.

RESULTS:

Total Admissions	Neonatal Tetanus
400	8(2%)

Table 1: Incidence of Neonatal Tetanus in Total admissions

Sl. No	Weight (In Kg)	Mean Weight (In Kg)
1	2.24	2.51
2	2.56	
3	2.00	
4	2.77	
5	2.38	
6	2.90	
7	2.56	
8	2.70	

Table 2: Mean Weight of baby

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Sl. No.	Age of presentation (In Days)	Mean Age of presentation (In Days)
1	10	8.13
2	6	
3	5	
4	6	
5	6	
6	7	
7	7	
8	8	

Table 3: Mean Age of Presentation

Registered & immunized	Not registered but immunized	Not registered & not immunized
2(25%)	1(12.5%)	5(62.5%)

Table 4: Registration & Immunization status of Mother

Home	Hospital
7(87.5%)	1(12.5%)

Table 5: Type of delivery

Trained Dai/Person	Untrained Dai
3(37.5%)	5(62.5%)

Table 6: Delivery by

Sterile instrument	Unsterile instrument
3(37.50%)	5(62.5%)

Table 7: Umbilical cord cut with

Seen in	Not seen in
2 Babies (25%)	6 Babies (75%)

Table 8: Application of unusual substance (like Raksha ash) was

Total Mortality	Survival
7(87.50%)	1(12.5%)

Table 9: Outcome in Neonatal Tetanus babies

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6 Babies died within first 24 hours after admission^{1,3} & one died on 4th day. No statistical significance was noted in the outcome with different sex.¹

Presenting Complaints:

- Seen in all babies were^{1,3,5}
 - Inability to open mouth.
 - Refusal of feed.
 - Crying.
 - Stiff body.
- Only 1 Baby had fever.
- 3 baby had respiratory distress.

DISCUSSION:

- Out of total 400 NICU admissions, 8 babies had Neonatal Tetanus, incidence being 2% in this tertiary Health Care Centre. The study was conducted in tertiary Health Care Centre, so actual incidence in the area might be high as, not all the babies reach tertiary Health Care Centre for treatment.
- Out of 8 babies 5 babies mother had not received 2 doses of Inj. T. T. antenatally, only 3 babies mother had received 2 doses of Inj. T. T. Occurrence of Neonatal Tetanus even after mother had received Inj.T.T.2 doses might be due to,^{2,7}:
 - a) Inappropriate cold chain maintenance of Vaccine, which may inactivate vaccine.
 - b) Vaccine might not be received at appropriate time.
 - c) Efficacy of vaccine is 60 to 80%, so chances are there that even after vaccination immunity was not developed.
- 87.5% of these babies were delivered at home, in home delivery chances of development of Neonatal Tetanus is more this might be due to:⁵
 - a) Delivery by untrained person, in this study 62.5% deliveries were conducted by untrained person.
 - b) Contamination of umbilical stump at the time of cutting of Cord.
 - c) Use of unclean sharp weapon to cut the umbilical cord. In all deliveries by untrained person, cord was cut by unsterile instrument.
 - d) In two cases they even applied cow-dung with the mistaken belief of its purifying properties.
- Dhule being remote and tribal area, literacy rate is low. Adiwasi population is high in numbers and communication gap is big. So high incidence of home delivery, not acceptance of tetanus toxoid injection are common occurrences.
- So this highlights the importance of need of better awareness programmes to educate mother and families. Motivate them for ANC check-up and encouraging them for hospital deliveries.
- Mortality was almost 87.5% causes found were:⁸
 - An Unimmunized Mother.
 - Delivery at home by untrained persons conducted unhygienically.
 - Delay in seeking treatments, as all babies were presented after development of full blown disease.

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- Prognosis is worst, if onset of symptoms within first week of life, 50% cases were presented in first week of life. Overall mortality is 50 to 75% but those who survive do not manifest any mental sequel.
- Overall prognosis is worst in following situation.^{2,3,5}
 - Onset of symptoms within first week of life.
 - Interval between lock jaw and onset of spasms of less than 48 hours.
 - Presence and intensity of fever.
 - Tachycardia.
 - High frequency and greater severity and duration of muscular spasms especially of larynx.
 - Frequent and prolong duration of apneic episodes.

PREVENTION & CONTROL: Two prongs approach for Neonatal Tetanus elimination consist of a promotion of routine immunization of:

1. Pregnant women with tetanus toxoid.⁹
2. Promotion of clean deliveries by trained person.⁹

This highlights the importance of universal protection to bring down neonatal tetanus mortality. However as with any vaccine, some seroconversion failures are to be expected, even when it is administered at appropriate intervals.¹⁰

Thus case report of Neonatal Tetanus among infants born to vaccinated women do not necessarily imply that TT is not effective, but Neonatal Tetanus occurs mainly due to lack of primary immunization in childhood & during antenatal period.

KEYMESSAGES: Neonatal Tetanus is completely preventable disease through immunization of mother during pregnancy and hygienic birth practices. Tetanus Toxoid is a safe, highly effective and in expensive vaccine that can save thousands of lives each year. Poverty, Poor hygiene & limited access to health service increase the risk of Neonatal Tetanus.¹¹

Two or more properly timed doses of Tetanus toxoid immunization given to pregnant woman or woman of child bearing age will reduce Neonatal Tetanus mortality by 94%.¹²

Tetanus immunoglobulins are actively transported through the placenta from an immunized mother to her foetus, providing passive protection against Tetanus during Neonatal period & following month or two of life.¹²

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