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# A COMPREHENSIVE STUDY ON RISK FACTORS, VACCINATION STATUS AND OUTCOME OF TETANUS IN CHILDREN

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**Abstract:**

***Introduction:*** *Neonatal tetanus (NT) continues to be a major cause of mortality and neurological sequelae for survivors yet it is highly preventable using simple and inexpensive public health interventions.* ***Aims and objectives:*** *The main objective of the study is to analyze the risk factors, vaccination status and outcome of tetanus in children.* ***Material and methods:*** *This descriptive study was conducted in THQ Hospital, Jatoi, Muzaffargarh during April 2018 to November 2018. The data was collected from 100 children of both genders. The diagnosis of tetanus was clinical, based on medical history and examination, determining the presence of at least three of the following clinical findings: severe trismus, refusal to feed, generalized muscle rigidity, opisthotonus or spontaneous tetanic spasms.* ***Results:*** *There were 67(63.5%) males and 33 (36.5%) females. Overall, the mean age was 6.56+3.15 years, and the commonest age group at presentation was 6-10 years with 38(51.4%) cases. 50(67%) were unvaccinated, none (0%) had received booster dose and post-trauma immune prophyl axis. The case fatality was therefore 61.8%, and did not vary significantly over the 14 years (P = 0.536).*

***Conclusion:*** *It is concluded that this study has documented high case fatality rates in Pediatric tetanus in the study area. Closer follow-up of patients to identify the progress of severity assists in identifying cases that require respiratory support and drug escalation.*

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## INTRODUCTION:

Neonatal tetanus (NT) continues to be a major cause of mortality and neurological sequelae for survivors yet it is highly preventable using simple and inexpensive public health interventions. In 2013, NT was estimated to be responsible for 49,000 deaths, mostly in rural areas of developing countries where most births occur at home and are often attended by unskilled persons using unhygienic practices without aseptic postnatal care [1]. NT is estimated to contribute about 2% of neonatal deaths in 2012, a decrease from 7% in 2000, but has a very high case fatality rate.

Tetanus is a neuromuscular disorder characterized by increased muscle tone and spasms. It is caused by tetano-spasmin, a toxin released by clostridium tetani [2]. Clostridium tetani, is a mobile gram-positive spore forming obligate anaerobe with soil or dust as its natural habitat. It occurs worldwide but is endemic in developing countries and has continued to be a significant public health problem in resource-poor nations [3]. Tetanus is a vaccine preventable disease and a significant cause of morbidity and mortality in developing countries. The disease is usually classified into neonatal and post neonatal tetanus in the pediatric age group [4]. The global incidence of tetanus is estimated at one million cases annually with case fatality ranging 20-50%. Worldwide estimated deaths from tetanus were 61000 in children under 5 years of age and neonates. A total of 984 cases of tetanus were reported from Pakistan in 2010 [5].

The World Health Organization (WHO) estimated that tetanus accounts for about 7% of neonatal deaths globally. While majority of tetanus cases are seen in neonatal age group, post neonatal tetanus is also common. Furthermore, there is need to improve routine immunization activities. Children with ear discharge should be taken as a high-risk group for tetanus and be evaluated for immunization at first visit [6].

**Aims and objectives**

The main objective of the study is to analyze the risk factors, vaccination status and outcome of tetanus in children.

## MATERIAL AND METHODS:

This descriptive study was conducted in THQ Hospital, Jatoi, Muzaffargarh during April 2018 to November 2018. The data was collected from 100 children of both genders. The diagnosis of tetanus was clinical, based on medical history and examination, determining the presence of at least three of the following clinical findings: severe trismus, refusal to feed, generalised muscle rigidity, opisthotonus or spontaneous tetanic spasms. A tetanus score based upon the summation of scores on: irritability (0–2), feeding problems (0–2), stiffness (0–3), frequency of spasms (0–3), duration of spasms (0–3), involvement of limbs (0–3), stimulation of spasms (0–3), cyanosis during spasms (0,-2) and apnoea (0–1) was calculated, with higher scores being indicative of more severe disease. Blood samples were taken within one hour of admission. Laboratory measurements included full blood count, electrolytes, creatinine and glucose. All the data were analyzed using SPSS version 21.0.

## RESULTS:

There were 67(63.5%) males and 33 (36.5%) females. Overall, the mean age was 6.56+3.15 years, and the commonest age group at presentation was 6-10 years with 38(51.4%) cases. 50(67%) were unvaccinated, none (0%) had received booster dose and post-trauma immune prophyl axis. The case fatality was therefore 61.8%, and did not vary significantly over the 14 years (P = 0.536). Age at admission, presence of inflamed umbilicus, prostration, number of spams per 5 minutes, NT score and presence of hypoglycaemia were all associated were all significantly associated with death in the uni-variable analysis.

**Table 01:** Analysis of factors of selected patients

| | ***No.*** | ***%*** |
|---|---|---|
| *Age:* | | |
| <2 yrs | 0 | |
| 2-6 yrs | 13 | 56.50 |
| >6 yrs | 10 | 43.47 |
| *Sex:* | | |
| Male | 12 | 52.17 |
| Female | 11 | 47.82 |
| *Vaccination Status:* | | |
| Unvaccinated | 17 | |
| Partially vaccinated | 6 | 73.91 |
| Appropriately | | 26.08 |
| Vaccinated for age | 0 | |

**Table 02:** Mode of infection in tetanus case (n=23).

| | **< 2 years old n=0** | **2-6 years n=13** | **>6 years -12 years (n=10)** |
|---|---|---|---|
| Otogenic | 0 | 5 | 0 |
| Post injury | 0 | 4 | 5 |
| Unknown | 0 | 4 | 5 |

## DISCUSSION:

Tetanus has remained a public health problem in developing countries with high case fatality rates. Efforts of neonatal, childhood and maternal elimination through vaccination have faced challenges in these parts of the world due to low health awareness, shortage of human and material resources and poor health seeking behavior for trauma [7]. Due to the very nature of tetanus, hospital based studies are found to be an effective means for collecting information on the epidemiologic and clinical data on neonatal and childhood tetanus, and also for evaluating the impact of immunization programs [8].

Regarding the portal of entry, Otogenic route was exclusively confined to the 2-6 year age group (n=5, 21.7%) as otitis media is common in this age group. Introduction of unclean fingers and contaminated objects into the ears is also common in this age. Regarding the site of trauma, majority (6 out of 9, 66.66%) had injury to lower limbs (toe, sole, shin) which is also supported by other studies. One of our patient developed tetanus after dog bite [9].

Unlike other diseases, tetanus is entirely preventable by immunization, a five dose regimen of tetanus toxoid provides adequate immunity. Routine tetanus booster vaccination is recommended for adolescents and adults, every 10 years [10].

## CONCLUSION:

It is concluded that this study has documented high case fatality rates in Pediatric tetanus in the study area. Closer follow-up of patients to identify the progress of severity assists in identifying cases that require respiratory support and drug escalation.

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