

TETANUS;

Still cannot be prevented, a three year retrospective study in DHQ hospital, Faisalabad

Dr. Muhammad Muazzam, Dr. Shehzad Adil Mansoor, Dr. Sumera Badar, Dr. Asif Nadeem, Dr. Bilal Anwar, Dr. M. Hussain Waseer, Dr. Shoukat Ali

ABSTRACT... Background: Tetanus still remains a major public health problem in Pakistan like in most other developing countries, with a high morbidity and mortality. **Objectives:** To study the demographic profile the clinical profile, the outcome of the tetanus patients and effectiveness of tetanus immunization coverage in district Faisalabad. **Design:** Retrospective record based study. **Place and Duration:** Surgical unit-5 DHQ Hospital, Faisalabad from January 2010 to December 2012. **Subjects and Methods:** All data of 198 patients of tetanus of any age and sex, diagnosed clinically was collected, compiled and analyzed from the Medical Records Department of the Hospital. **Results:** Out of 198 patients of tetanus, 138(69.7%) were males and 60(30.3%) were females. Their ages ranged from 1 to 85 years with a mean and a standard deviation respectively of 29.36 and 17.48 years. 162 (81.8%) were from rural and 36(18.2%) were from urban areas. 47(23.7%) patients were having prior immunization and 151(76.3%) were not immunized. The most common presenting symptoms were trismus (47.5%), body stiffness(24.2%), fits(19.2%) and respiratory distress(9.1%). 23(11.6%) patients were having mild disease, 71(35.9%) patients were having moderate disease, 71(35.9%) patients were having severe disease and 33(16.7%) were having very severe disease. Overall mortality rate was 41.4%. Respiratory failure was the most common cause of death and there was statistically significant association between mortality and increasing grades of disease. **Conclusions:** By making expanded programme of immunization(EPI) more effective and removing flaws from out-dated vaccination through incomplete vaccination. By improving awareness in public and complete vaccination through EPI program, we can reduce the incidence of tetanus.

Key words: Tetanus, Clinical presentation, Treatment outcome, Tetanus Immunization

Article Citation

Muazzam M, Mansoor SA, Badar S, Nadeem A, Anwar B, Waseer MH, Ali S. Tetanus; still can not be prevented, a three year retrospective study in DHQ hospital, Faisalabad. Professional Med J 2013;20(6): 1026-1034.

INTRODUCTION

Tetanus was well known to the ancient physicians of Egypt and Greece but since the advent of active immunization in 1940, it has become an old forgotten disease in the developed countries¹. Tetanus is a non-contagious disease and it is not transmitted from person to person².

The tetanus which is caused by a spore forming bacterium, *Clostridium tetani*, is an acute and often a fatal disease that is characterised by a generalized increased rigidity and convulsive spasms of the skeletal muscles². The *Clostridium tetani* spores are found in soil and in animal, human faeces. Sometimes the injury is so small that people do not even go to a doctor. Injuries that involve dead skin (such as burns, frostbite, gangrene, or crush injuries) are more likely to cause tetanus. The spore germination and the toxin production take place only in the wounds with a low oxygen-reduction potential, such as those with

devitalized tissue, foreign bodies, or active inflammation. The toxin which is released in the wound binds to the peripheral motor neuron terminals, it enters the axon, and it is transported to the nerve-cell body in the brain stem and the spinal cord by a retrograde intraneuronal transport. The toxin then migrates across the synapse to the presynaptic terminals, where it blocks the release of the inhibitory neurotransmitters, glycine and gamma aminobutyric acid (GABA) from the vesicles. The blocking of the neurotransmitter release by tetanospasmin results in a diminished inhibition due to which the resting firing rate of the alpha motor neuron increases thus producing rigidity. The loss of inhibition of the preganglionic sympathetic neurons may produce a sympathetic hyperactivity and high circulating levels of catecholamins³. The muscle tone is increased, thus producing the characteristic trismus, risussardonicus and the opisthotonus. The spasms typically develop one to four days after the initial symptoms. The

wounds do not need to be obviously contaminated for tetanus to develop and in unvaccinated individuals or in people with a waning immunity even minor wounds can cause a fatal disease⁴.

The global incidence of tetanus is estimated to be one million cases annually with a case fatality rate which ranges from 6% to 72% depending on the availability of well equipped intensive care units⁵. People who inject drugs, the very young, and the very old are more likely to die of tetanus.

In the developed countries, its incidence has genuinely declined since 1940, mainly due to the wide spread vaccine coverage. In most of the countries, however, no provision exists for vaccinating the people who were born before these programmes were implemented thus providing the boosters which are required for a long term protection or for protecting those who missed the schedules. Even in the countries with good primary immunization programmes, the elderly people may still be vulnerable, either because of the incomplete primary vaccination or because the protective antibody levels decline over time^{6,7}. In Pakistan, like in most of the developing countries in the world, tetanus is endemic and it remains a serious public health problem even today especially among the rural farming folks. Few studies which were done in Pakistan have revealed the prevalence of tetanus and the mortality caused by tetanus to be high¹¹⁻¹⁴. The present study is an attempt in this part of the country to know the socio-demographic characteristics and the clinical profile, as well as the outcome of the tetanus patients admitted to DHQ Hospital, Faisalabad, Pakistan.

MATERIAL AND METHODS

This was a three year retrospective record based study done on patients presented with tetanus to DHQ Hospital, Faisalabad from January 2010 to December 2012. This study included 198 patients of both sexes and of any age diagnosed clinically as having tetanus.

Details of the demographic data, clinical presentations, management and the outcome were obtained from the medical records and they were entered in a questionnaire before their analysis. The statistical analysis was performed by using the SPSS version 17.0

RESULTS

Demographic Profile

Out of 198 patients, 138(69.7%) were males and 60(30.3%) were females. Their ages ranged from 1 to 85 years with a mean and a standard deviation respectively of 29.36 and 17.48 years. 162 (81.8%) were from rural and 36(18.2%) were from urban areas Table-I and II, III.

	n	Min.	Max.	Mean	Std. Deviation
Age	198	1	85	29.36	17.48

	Frequency	%age
Female	60	30.3
Male	138	69.7
Total	198	100.0
Gender		

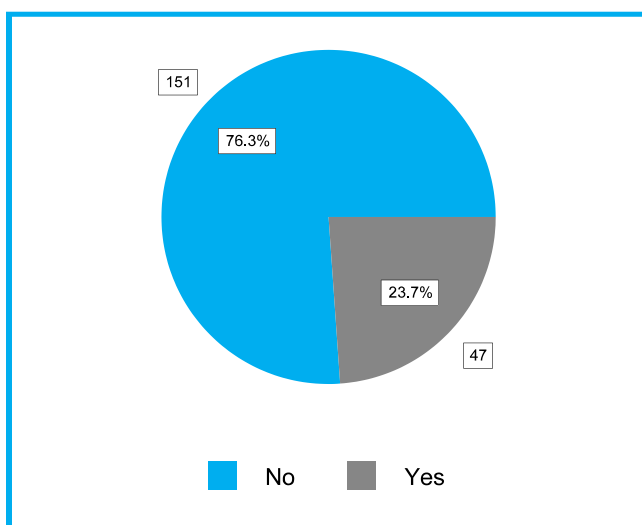
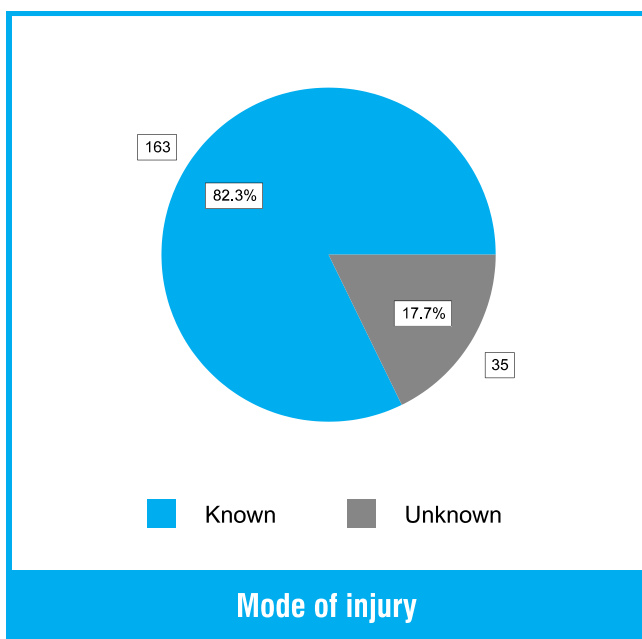
	Frequency	%age
Rural	162	81.8
Urban	36	18.2
Total	198	100.0

Mode of Injury

Mode of injury was known in 163(82.3%) patients and was unknown in 35 (17.7%) patients Fig-1.

Prior Immunization

47(23.7%) patients were having prior immunization and 151(76.3%) were not immunized (Fig-2).



Grade Of Disease

23 (11.6%) patients were having mild disease, 71 (35.9%) patients were having moderate disease, 71 (35.9%) patients were having severe disease and 33 (16.7%) were having very severe disease Tables IV, V.

Clinical Profile

The most common presenting symptoms were trismus (47.5%), body stiffness (24.2%), fits (19.2%) and respiratory distress (9.1%). Table-VI

	Frequency	%age
Mild	23	11.6
Moderate	71	35.9
Severe	71	35.9
Very Severe	33	16.7
Total	198	100.0

Grade of disease

Grade	Clinical features
I (mild)	Mild trismus, general spasticity, no respiratory embarrassment, no spasms, no dysphagia
II (moderate)	Moderate trismus, rigidity, short spasms, mild dysphagia, moderate respiratory involvement, respiratory rate > 30, mild dysphagia
III (severe)	Severe trismus, generalized spasticity, prolonged spasms, respiratory rate > 40, severe dysphagia, apnoeic spells, pulse > 120
IV (Very severe)	Grade 3 plus severe autonomic disturbances involving the cardiovascular system

ABLETT CLASSIFICATION OF SEVERITY

	Frequency	%age
Body Stiffness	48	24.2
Fits	38	19.2
respiratory distress	18	9.1
Trismus	94	47.5
Total	198	100.0

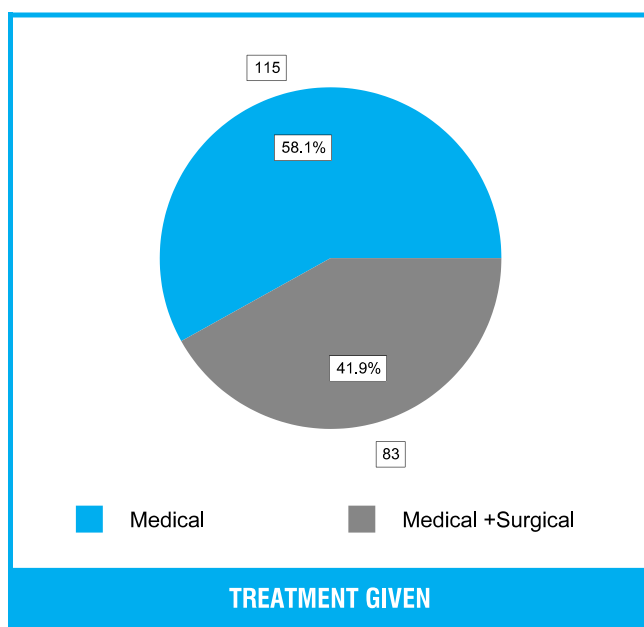
Clinical Presentation

Treatment

Treatment focuses on treating symptoms until they resolve. All the patients were managed with the tetanus toxoid (0.5ml I.M.), human tetanus immunoglobulin (3000IUIM), antibiotic therapy (penicillin and

metronidazole) and muscle relaxants (diazepam, phenobarbitone, Magnesium sulphate MgSo₄), wound care and throat suction. Supportive therapy such as fluids and calorie intake, prevention of gastric ulcers and prevention of bed sores were provided to all the patients. Definitive airway was maintained as needed.

115(58.1%) received medical treatment alone and 83(41.9%) patients received medical plus surgical treatment (Fig-3).



Respiratory Support

No respiratory support needed in 73(36.9%) patients, tracheostomy was done in 82(41.4%) patients, Oxygen inhalation with mask was given in 31(15.7%) patients, Endotracheal tube needed in 10(5.1%) patients Table-VII.

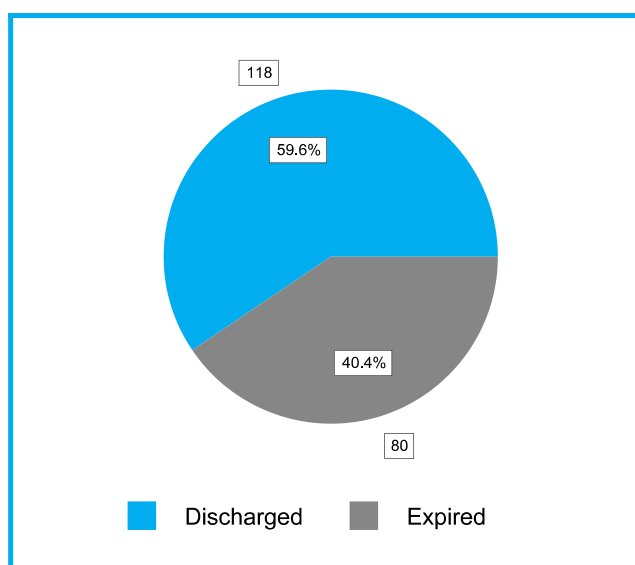
Outcome

Out of 198 patients, 118(59.6%) got discharged and 80(40.4%) got expired Fig-4.

Among 198 patients who got discharged 90(78.3%) received medical treatment and 28(33.7%) received medical plus surgical treatment. Among 80 patients who got expired, 25(21.7%) received medical

	Frequency	%age
Endotracheal tube	10	5.1
No respiratory support	73	36.9
Oxygen inhalation	2	1.0
Oxygen inhalation with mass	31	15.7
Tracheostomy	82	41.4
Total	198	100.0

Respiratory support



	Treatment given		Total
	Medical	Medical + Surgical	
Outcome Discharged	90 78.3%	28 33.7%	118
Expired	25 21.7%	55 66.3%	80
Total	115	83	198

treatment and 55(66.3%) received medical plus surgical treatment. Table-8,9

	Value	df	p-value
Pearson Chi-Square	39.691	1	.000

Chi-Square Tests

Patients who got discharged, 23(100%) were with mild disease, 68 (95.8%) with moderate disease, 26 (36.6%) were with severe disease and 1 (3%) with very severe disease. Among expired patients 3(4.2%) were with moderate disease,45(63.4%) were with severe disease and 32(97%) were with very severe disease. Table-X, XI

	Outcome		Total
	Discharged	Expired	
Grade of disease			
Mild	23 100.0%	-	23
Moderate	68 95.8%	3 4.2%	71
Severe	26 36.6%	45 63.4%	71
Very severe	1 3.0%	32 97.0%	33
Total	118	80	198

	Value	df	p-value
Pearson Chi-Square	113.604	3	.000

Chi-Square Tests

Among patients who were not immunized, 53%(80) got discharged and47%(71) got expired

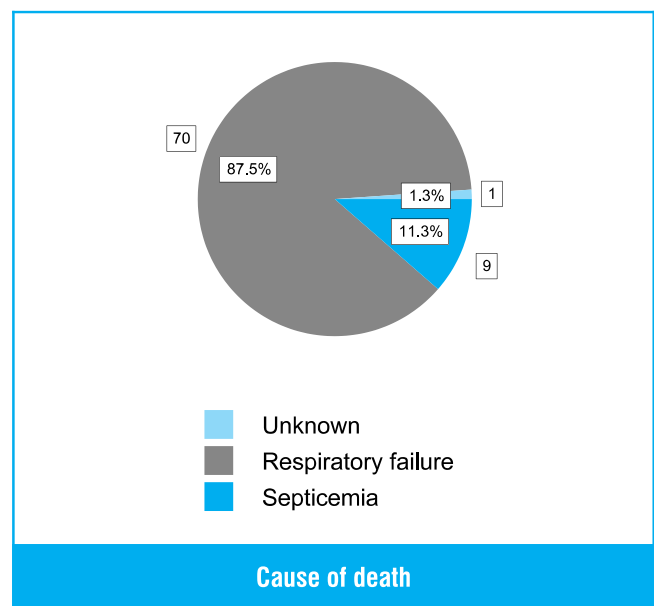
Among patients who were immunized, 80.9%(38) got discharged and 19.1%(9) got expired Table XII, XIII

Respiratory failure was the most common cause of death observed in 70(87.5%) of patients who got expired. Fig-V

		Prior Immunization		Total
		No	Yes	
Outcome	Discharged	80 53.0%	38 80.9%	118 59.6%
	Expired	71 47.0%	9 19.1%	80 40.4%
Total		151	47	198

	Value	df	Asymp. Sig. (2-sided) p-value
Pearson Chi-Square	11.563	1	.001

Chi-Square Tests



DISCUSSION

Tetanus still constitutes a major health challenge and it is an important cause of preventable death in developing countries¹⁹. Because there is essentially no natural immunity to tetanus toxin, the only effective way to prevent tetanus is by prophylactic immunization. It is therefore very important, in order to have protection against tetanus, that all age groups have the universal primary immunization with subsequent maintenance of adequate antitoxin levels

by means of appropriately timed boosters²⁰. This will, in no doubt, prevent people from developing tetanus as well as morbidity and mortality which usually follow it. In some countries with good primary immunization programs, people may still be vulnerable, either because of incomplete primary vaccination, use of poorly preserved vaccines (defective cold chain system) or because protective antibody levels against tetanus in these patients had declined over time. It thus means that tetanus could in theory be eradicated from the world, but realistically this is not going to happen even with an already available successful implementation of the prevention programs especially in developing countries. Tetanus is still endemic in the third world with a significantly high morbidity and mortality, despite the availability of an effective vaccine. Of the total 198 cases which were studied in the 3 years period between 2010 to 2012, 138(69.7%) were males and 60(30.3) were females. The male pre-ponderance in this study was in accordance with the findings of other studies which were done in the developing world²¹⁻²⁵. This can be explained by the fact that men consume more time in farming activities and other field work and that hence they are more likely to be exposed to the *Clostridium tetani* spores which are ubiquitous in the soil and that the females are protected against tetanus by the TT immunization which is given during the antenatal period.

About 162 (81.8%) were from rural and 36(18.2%) were from urban areas which is due to the fact that Pakistan is an agricultural country and majority of population is related to this occupation exposing them to spores of *Clostridium tetani* and making them at risk population.

All the 198 cases were of generalized tetanus in the present study. The most common presenting symptoms were trismus(47.5%), body stiffness(24.2%), fits(19.2%) and respiratory distress(9.1%). Thus, a high amount of clinical

suspicion is necessary whenever the patients present with the above symptoms, as tetanus is mainly diagnosed clinically and as the laboratory tests and cultures are of little diagnostic value^{26,27}.

47(23.7%) patients were having prior immunization and 151(76.3%) were not immunized

This predominance of unvaccinated rural population reflect poor vaccination coverage in these areas where more than 60% population of Pakistan reside and social norms and misinterpreted religious beliefs are also responsible for this fact. This finding is consistent with that of study conducted in Ethiopia²⁸.

Out of 198 cases of tetanus, 71(35.9%) patients were having severe disease and 33(16.7%) were having very severe disease.45 (63.4%) severe cases and 32(97%) very severe cases got expired. This shows that mortality increases with increasing grades of disease.

Among patients who were not immunized,53%(80) got discharged and47%(71) got expired.

Among patients who were immunized, 80.9%(38) got discharged and 19.1%(9) got expired

It shows that mortality is less in immunized people^{T-13}.

Respiratory failure was the most common cause of death seen in 70(87.5%) patients who got expired. This necessitates need for well-equipped ICU in the management of tetanus patients²⁹.

A varied prognosis of the patients with tetanus has been reported from different studies, which was found to range from 10%-60%. In this study, the mortality was found to be 44.1% which was comparable with the observations reported by Mohammed et al³⁰, whereas Mchembe & Mwafongo³¹ in Tanzania and Zziwa³² in Uganda have reported higher mortality rate

of 72.7% and 47% respectively. The high mortality rate could be due to the gross inadequacy of human and material resources to manage severe tetanus in the intensive care unit, typical of developing countries like Pakistan³³.

The limitations of the present study were, the fact that we could not group the patients based on the portal of injury, complications of tracheostomy and that the information about some patients was incomplete in view of the retrospective nature of the study, which may have introduced some bias into our findings

CONCLUSIONS

Out of 198 cases of tetanus, majority of unvaccinated population shows drawbacks in expanded programme of immunization(EPI), with low level of awareness and absence of intensive care facilities responsible for presentation during later stages of disease and high mortality respectively. The study recommends a need to intensify efforts at preventive tetanus immunization at every level, to educate individuals at risk to recognise symptoms early and seek medical care and to install facilities for intensive care to combat this fatal disease.

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AUTHOR(S):

1. **DR. MUHAMMAD MUAZZAM**
Assistant Professor Surgery
Surgical unit-5, DHQ Hospital
Faisalabad, Pakistan
2. **DR SHEHZAD ADIL MANSOOR**
Senior Registrar
Surgical Unit-5, DHQ Hospital
Faisalabad, Pakistan
3. **DR. SUMERA BADAR**
M. O Department of Medical Education
Punjab Medical College, Faisalabad
4. **Dr. Asif Nadeem**
Resident Medical Officer
Surgical Unit-5, DHQ Hospital,
Faisalabad, Pakistan
5. **Dr. Bilal Anwar**
Resident Medical Officer
Surgical unit-5, DHQ Hospital
Faisalabad, Pakistan
6. **Dr. M. Hussain Waseer**
District Surgeon
Surgical unit-5, DHQ Hospital
Faisalabad, Pakistan
7. **Dr. Shoukat Ali**
Senior Registrar
Surgical Unit-5, DHQ Hospital
Faisalabad, Pakistan

Correspondence Address:

Dr. Muhammad Muazzam
49-B, Peoples Colony No.1, Faisalabad
moazzammanzur@hotmail.com


Dr. Shehzad Adil Mansoor
1085/33, Samanabad, Faisalabad.
doc.mansoorhashmi@yahoo.com

Article received on: 22/04/2013
Accepted for Publication: 15/09/2013
Received after proof reading: 03/12/2013

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A leader is one who sees more than others see,
who sees farther than others see,
and who sees before others see.

Leroy Eimes