

## A Prospective Study of Tetanus Cases among Adults Admitted in Al Gamhouria Teaching Hospital and Private Hospital in Aden City - Yemen

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### Abstract

**Background:** Tetanus is a major health problem in many developing countries, with significant morbidity and mortality due to lack of environmental hygiene and health education, incomplete vaccination, and inadequate intensive care facilities.

**Aim of Study:** To observe the demography, clinical pattern and outcomes of tetanus patients.

**Patients and Methods:** It was a prospective study carried out in Al-Gamhouria teaching hospital and private Hospital in Aden-Yemen over a period of four years, Between September 2017 to September 2021. It included 40 patients >16 years of age presented with moderate to severe tetanus, which diagnosed clinically, particular focus being given for sex, age, rural/urban background, clinical pattern, in addition to outcome.

**Results:** During the study period, 40 patients were enrolled, mean age was (34±10) SD years, (70%) were males and (30%) cases were females, (40%) of patients belonging to the age group of (31-40) years, (60%) of patients enrolled in this study came from rural areas, (80%) of patients gave the history of injury prior to the onset of symptoms, lock jaw was the most common manifestation at time of arrival, it was (95%) follow by spasm of body muscles (85%) dysautonomia (40%) arching of back (15%). (57.5 %) of patients survived while (42.5%) of the subjects died.

**Conclusion:** Tetanus is still a problem in developing countries. It is a potentially fatal disease, without early medical intervention. Primary immunizations and scheduled booster immunizations are important preventive measures that have greatly reduced the incidence of tetanus.

**Key Words:** Tetanus – Lock jaw – Outcome.

### Introduction

**TETANUS**, an infective intoxication of the nervous system by *Clostridium tetani*, is an ancient disease, which is associated with a high mortality rate.

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Despite the widespread availability of a safe and effective vaccine against this disease, it remains a major health problem in developing countries, and also occurs in countries with good standard of medical practice [1].

Transmission is primarily by contaminated wounds (apparent and inapparent). *C. tetani* spores are found in soil and in animal and human faeces [2].

The tetanus bacillus generates tetanospasmin and tetanolysin; the former toxin causes local inflammation by acting on gangliosides within local nerve terminals, resulting in the clinical syndrome [3,4].

### Material and Methods

This was a prospective study carried out in Al Gamhouria Teaching Hospital and Private Hospital in Aden City Southwest of Yemen over a period of four years, Between (September 2017 to September 2021). It included 40 patients with tetanus, The patient was diagnosed to have tetanus on the basis of clinical history and findings on physical examination as the organism is not cultured routinely and also detection of toxin is not carried out commonly.

All patients >16 years of age. Data was collected from patients using a pre-determined questionnaire, particular emphasis being given to, sex, age, rural /urban background, history of injury, symptoms at time of arrival and outcome.

**Inclusion criteria:**

- 1- Generalized form of tetanus.
- 2- Moderate or severe tetanus.
- 3- >16 years old.

4- No coexistence of any comorbidity like (diabetes mellitus, arterial hypertension, ischaemic heart disease, renal failure, liver cirrhosis and recent history of stroke).

Tetanus severity included in this study was moderate or severe, classified according to the criteria reported by Ablett [5].

The following symptoms being focused lock jaw, arching of back, spasm of the muscles of the body either spontaneous or triggered by the movements of the patient or by noise, dysautonomia, The diagnosis of dysautonomia made when two or more of the following were fulfilled. (1) Labile blood pressure. (2) High fever in the absence of infection. (3) Dysrhythmia. (4) Sudden sweating in the absence of fever.

The patients were divided into two groups according to the clinical outcome at the time of hospital discharge, survivors group and dead group, (survived group defined as those patients whose symptoms of tetanus had significantly improved or patient completely cured at time of hospital discharge).

Tetanus patients other than generalized form, <16 years old, mild presentation and coexist comorbidity like (diabetes mellitus, arterial hypertension, ischaemic heart disease, renal failure, liver cirrhosis and recent history of stroke) has been excluded from the study.

The result was calculated manually, and presented as means, percentages and tables as appropriate.

*Ethical consideration:* Verbal informed consent was obtained from all participating subjects; the study design was approved by the research and ethics committee in the Faculty of Medicine, University of Aden.

## Results

A total of (40) subjects were included in this study All the patients had generalized tetanus, their age range from 17 to 63 with a mean value (34±10) SD years.

The sex distribution in Table (1) showed a prominence of male gender (70%) versus (30%) being female. a male-to-female ratio of 2.3:1.

Table (2) showed maximum of patients belonging to the age group of (31-40) years (40%).

Table (3) revealed that (60%) of patients enrolled in this study came from rural areas.

Table (4) revealed that (80%) of patients gave the history of injury prior to the onset of symptoms whereas (20%) patients were unable to recall any history of injury.

Table (5) demonstrated the Clinical pattern of tetanus and showed lock jaw was the most common manifestation at time of arrival, it was (95%) followed by spasm of body muscles (85%) dysautonomia (40%) arching of back (15%).

More than one clinical manifestation was presented in each patient.

Table (6) revealed the outcome of subjects enrolled in this study (42.5%) of the subjects died, while (57.5%) of patients survived.

Table (1): Distribution of patients according sex.

Sex	Number (%)
Male	28 (70%)
Female	12 (30%)

Table (2): Distribution of patients according age.

Age group (years)	Number (%)
<30	14 (35%)
31-40	16 (40%)
41-50	5 (12.5%)
51-60	3 (7.5%)
>61	2 (5%)

Table (3): Distribution of patients according residency.

Sex	Number (%)
Rural area	24 (60%)
Urban area	16 (40%)

Table (4): Distribution of patients according to history of injury.

History of injury	Number (%)
Known history of injury	32 (80%)
Unknown history of injury	8 (20%)

Table (5): Clinical pattern of tetanus at time of arrival.

Clinical pattern of tetanus at time of arrival	Number (%)
Lock jaw	38 (95%)
Spasm of body muscles	34 (85%)
Dysautonomia	16 (40%)
Arching of back	6 (15%)

More than one clinical manifestation was presented in one patient.

Table (6): Distribution of patients according outcome.

Outcome	Number (%)
Survived	23 (57.5%)
Died	17 (42.5%)

### Discussion

Tetanus has not been adequately reported in Yemen. There are few studies available regarding the pattern and burden of this disease in Yemen. The diagnosis of tetanus is made clinically as there is no specific laboratory test available.

In 1990 the Centers for Disease Control adopted a clinical case definition for public health surveillance of tetanus which is the acute onset of hyper-tonia or painful muscle contraction (usually the jaw and neck muscle) and generalized muscle spasms without other apparent medical causes [6].

Pain and stiffness of the back and neck is the most common presenting symptoms followed by trismus and dysphagia. Spasm may be precipitated by simple stimuli such as noise, light, or touch and may last for seconds to minutes. These may be very dangerous causing apnea or severe rhabdomyolysis. There are four types of tetanus: Neonatal, localized, cephalic, and generalized [7].

The majority of subjects in our study were male (70%). This preponderance of male over females may be due to Males often do outdoor jobs, such as farming or skilled jobs that have an increased probability of injuries and Females may have a low incidence of tetanus because of immunization during pregnancy, this study result was close with results found in Fan et al., study [8] conducted in Dalian Medical University in china were males percentage was (70.6%), different results obtained from Chukwubike and God'spower study [9] conducted in a Nigerian tertiary hospital which reported 58.1% males and 41.9% females.

The majority of patients were related to the age group of 31-40 years (40%) Approximately near the result mentioned by Ezzouine et al., [10] in her study carried out in Ibn Rushd university teaching hospital in Casablanca in Morocco where 41.9% of tetanus cases were in the age group 31-40 years, The mean age was  $34 \pm 10$  years close to the The mean age of the patients in Owolabi et al., [11] study which published in World Journal of Pharmacy and Pharmaceutical Sciences which was  $35.2 \pm 1.3$  years.

Our study observed that the majority of patients came from rural areas, it composed (60%) while

those came from urban areas were composing (40%), these results coincide with Derby et al., [12] retrospective cross sectional study which conducted at Felege Hiwot Referral Hospital, Northwest Ethiopia, while result from Dalanao EG et al., study [13] conducted in Philippine was higher, in which patients who came from rural areas were (88.66%).

(80%) of patients gave the history of injury prior to the onset of symptoms whereas (20%) patients were unable to recall any history of injury, this results were in agreement with results obtained by Nadeem Javeed et al., [14]. Thirty-six (81.81%) patients gave the history of injury prior to onset of the symptoms, whereas eight (18.18%) patients were unable to recall any history of injury.

The most common presenting Clinical pattern of tetanus was trismus (95%) close to the result of (95.7%) made by Vamadeva Giriapura Marulappa et al., [15] in his Retrospective Study of Adult Tetanus patients admitted at the Epidemic Disease (ED) Hospital in Southern India.

This study reported that spasm of body muscles constitute (85%) while arching of back was (15%) close to the results mentioned by Omejua et al., study [16] conducted at a Tertiary Hospital in South East Nigeria Which reported (84.2%), (15.8%) respectively.

Among the 40 cases enrolled in this study dysautonomia have been observed in (40%) which was approximately near the percentage (46.5%) reached by with Kole et al., study [17] carried out in infectious diseases hospital in Kolkata and published in WHO South-East Asia Journal of Public Health.

In this study, the mortality was found to be (42.5%) which was comparable with the observations which were reported by Chalya et al., [18], in his study which carried in Bugando Medical Centre from Tanzania, where (43.1%) patients died.

Whereas Mchembe & Mwafongo [19] in Tanzania and Zziwa [20] in Uganda have reported higher mortality rate of (72.7%) and (47%) respectively.

**Recommendations:** Tetanus is a potentially preventable disease. However, it remains a frequent cause of hospitalization and may lead to death in developing countries. Early diagnosis and proper ICU management using the guidelines for treatment will reduce mortality significantly; an effective immunization program and proper wound management of the patients can reduce the incidence of tetanus significantly.

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## دراسة مستقبلية لحالات الكزاز بين البالغين المودعين في مستشفى الجمهورية التعليمي ومستشفى خاص في مدينة عدن اليمن

المقدمة: يعتبر الكزاز مشكلة صحية رئيسية في عدد من الدول النامية مع معدل عالي للمراضة والوفيات نتيجة لنقص النظافة البيئية والتلقيح الصحي والتطعيم الغير مكتمل وخدمات الرعاية المكثفة الغير مكتملة.

الأهداف: مراقبة ديموجرافيا والصورة النمطية السريرية وحصيلة المخرجات لمرضى الكزاز.

الأساليب: دراسة مستقبلية أجريت في مستشفى الجمهورية التعليمي وإحدى المستشفيات الخاصة في مدينة عدن خلال أربع سنوات من سبتمبر ٢٠١٧ إلى سبتمبر ٢٠٢١ شملت أربعون مريض كزاز بين متوسط إلى شديد، تجاوزت أعمارهم ١٦ عام، تم التشخيص عبر الفحص السريري مع التركيز على جنس وعمر المريض والخلفية الحضرية/الريفية والأعراض السريرية النمطية بالإضافة إلى حصيلة المخرجات.

النتائج: شملت الدراسة ٤٠ مريض وكان متوسط العمر (٢٤±١٠) ٪٧٠ من المرضى كانوا ذكور ٪٣٠ من المرضى كانوا أناث، ٪٤٠ من المرضى ينتمون الفئة العمرية ٣١-٤٠ عام، ٪٦٠ من المرضى أتوا من مناطق ريفية، ٪٨٠ من المرضى ذكروا وجود أصابة قبل ظهور الأعراض، شكل الفك المقفول أكثر الأعراض السريرية النمطية شيوعاً في وقت الوصول ٪٩٥ يليه تشنجات عضلات الجسم ٪٨٥ اضطراب الجهاز العصبي اللاارادى ٪٤٠ تقوص الظهر ٪١٥ عدد المرضى الذين نجوا ٥٧.٥٪ والذين توفوا ٤٢.٥٪.

الخلاصة: يظل الكزاز مشكلة في الدول النامية، كونه مرض مميت من دون تدخل طبي مبكر، تعتبر التحصينات الأولية والتحصينات الداعمة المقررة، إجراءات وقائية مهمة، تخفض بشكل كبير حدوث الكزاز.