

# AN ANALYSIS OF TETANUS DEATHS IN LAGOS

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**Between 1974 and 1984, 418 patients with tetanus, aged 10 years and older, represented 64.8% of all admissions to the intensive care unit of the Lagos University Teaching Hospital.**

**Students accounted for the largest single group with tetanus, which mainly occurred during the dry season. There was a male preponderance (1.4 to 1), but no appreciable sex influence on mortality rates (46.1% for men; 44.6% for women).**

**The mean mortality rate was 45.5%, with the highest mortality occurring in the elderly. Other high risk factors identified were neck and head injuries, post abortal or post partum states, hyperpyrexia, and tachycardia.**

**Key words • tetanus • Lagos**

Today, tetanus remains an uncommon disease in most developed countries.<sup>1-3</sup> In developing countries, such as Nigeria, however, it remains a major cause of high mortality, particularly among neonates.<sup>4-6</sup> Consequently, many hospitals in these areas are faced with having to treat many cases of tetanus. Although the mortality rate remains high, some very severe cases are known to survive the illness. The aim of this paper is to review our

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experience with cases of patients aged 10 years and older, admitted to the adult medical wards in our hospital, with a view toward determining the prognostic factors and suggesting guidelines for optimal management of these cases under the conditions assumed to be prevalent in most hospitals in developing countries.

## PATIENTS AND METHODS

On diagnosis, all adult patients with tetanus are admitted to the intensive care unit (ICU) of our hospital. There was a total of 418 patients aged  $\geq 10$  admitted to the ICU during the 11 year period of 1974-1984. Details of their age, sex, management, duration of hospitalization, complications, and survival were recorded and analyzed, retrospectively.

The ICU consists of a four bed bay of a general male medical ward, staffed by a team of nurses and headed by a dedicated nursing sister. Management is carried out under the supervision of a consultant physician in collaboration with consultant anesthetists and otorlaryngologists.

## RESULTS

### Mortality Rate

There were 190 deaths, representing a mortality rate of 45.5%. The age distribution of patients is shown in Table 1. Ages ranged from 10 to 78 years, with a mean age of 20.8 years. The lowest mortality occurred in the age group 20-39, where it varied between 30.9% and 35.9%. The highest mortality was seen in the age group of  $\geq 60$  years, where a 85.7% mortality rate was recorded. There were 243 men and 175 women, giving

**TABLE 1. THE AGE DISTRIBUTION OF ADMISSIONS AND DEATHS OF TETANUS CASES**

Age Group	Total Number	(%)	Number Dead	(%)
10-19	135	32.3	63	46.6
20-29	106	25.4	38	35.8
30-39	55	13.2	17	30.9
40-49	32	7.7	14	43.6
50-59	24	5.7	16	66.7
60-78	21	5.0	18	85.7
Not stated	45	10.8	24	53.3
Total	418	100	190	45.5

**TABLE 2. OCCUPATION OF TETANUS PATIENTS STUDIED**

Occupation	No. of Patients	(%)
Students	122	29.2
Housewives	60	14.4
Artisans	47	11.2
Petty traders	43	10.2
Unemployed	40	9.6
Labourers	33	7.9
Farmers	24	5.7
Clerical workers	21	5.0
Professional	9	2.1
Unknown	19	4.5

a male/female ratio of 1.4 to 1. The mortality rates in men (46.1%) and in women (44.6%) were similar.

### Seasonal Incidence

Two hundred and seventy cases (64.6%) occurred in the dry season while 148 (35.4%) occurred in the rainy season months (May to October). The occupational distribution of patients is shown in Table 2.

### Duration of Admission

The mean duration of hospitalization was 27.8 days with a range of less than 1 to 176 days.

### Length of Stay in Hospital

Seventy percent of the patients who died had stayed in the ICU for less than 1 week, while 85% of those who survived had stayed for more than 3 weeks. Thus, the longer a tetanus patient stayed in the ICU, the greater the likelihood of survival.

### Year of Admission and Mortality

The highest mortality rate of 62.5% was recorded in the period 1983-1984, while the lowest rate, 33.9%, was during 1977-1978 (see Table 3).

**TABLE 3. ANALYSIS OF TETANUS ADMISSIONS TO THE INTENSIVE CARE UNIT 1974-1984**

Year	Total Number Admitted	No. of Deaths (%)
1974-1975	40	17 (42.5)
1975-1976	41	17 (41.5)
1976-1977	35	15 (42.9)
1977-1978	39	13 (33.3)
1978-1979	42	15 (35.7)
1979-1980	45	20 (44.4)
1980-1981	47	23 (48.9)
1981-1982	45	23 (50.0)
1982-1983	44	22 (50.0)
1983-1984	40	25 (62.5)
Total	418	190 (45.5)

### Period of Onset and Mortality

The mortality rate was 55.2% in the 54.1% of patients whose periods of onset were <48 hours and 33.5% in the 31.9% whose periods of onset were >48 hours. The difference is highly significant ( $x = 18.4$ ;  $P < .001$ ). The periods of onset were not known in 14.2% of the patients in whom the mortality rate was 30.8%.

### Assisted Respiration

Of a total of 156 tracheostomies carried out during the period of study, tetanus accounted for 132 or 84.6%. Tetanus, however, accounted for nearly 20 endotracheal intubations.

### Complications

Seventy-five percent of the patients with severe spasms died, while only 30% with mild to moderate spasms died. Sixty-five percent of the patients who died had either hyperpyrexia or tachycardia, eg, axillary temperature >40°C or pulse rate >120 per minute. Respiratory infections, mainly aspiration pneumoniae and anemia, were diagnosed in 35.2% and 28.7%, respectively. In the recovery phase, a psychosis, manifesting principally as garrulousness, was recorded in 14.8% of the patients. Other complications noted were urinary tract infection (10.3%), hyperpyrexia or tachycardia (25.9%), laceration of the tongue (2.5%), septicemia (2.5%), and gastrointestinal hemorrhage (0.2%).

### Management

1. Excision and care of wounds including debridement, if necessary.
2. Anti-tetanus serum (ATS) which was given intrave-

- nously in dosages of 20 000 to 50 000 units.
3. Sedation and muscle relaxants which involved giving diazepam intravenously and intramuscularly in varying doses every 4 to 6 hours, depending on the frequency of spasms. Occasionally chlorpromazine or phenobarbitone was used.
  4. Adequate nutrition either by intravenous infusion or nasogastric tube.
  5. Antibiotics usually administered parenterally in the form of crystalline penicillin in high doses.
  6. Intensive nursing care, including regular suction of mucosal secretions.
  7. Tracheostomy was performed in patients found to be in severe respiratory distress.
  8. Should the severity of the tetanus worsen despite the above measures, curarization of patients and intermittent positive pressure ventilation (IPPV) were administered.

## DISCUSSION

It is regrettable that tetanus, a highly preventable disease, accounted for such a consistently high mortality rate over the past decade. The mortality rate of 45.9% in our series is similar to the experience of other workers in Nigeria.<sup>4-7</sup>

Experience from centers outside Nigeria show varying results. A series from Leeds in England and Edmondson<sup>8</sup> had a mortality rate of 10%, while in the United States, Buchanan et al<sup>9</sup> reported a mortality rate of 61.3%. The latter series, however, included neonates which probably accounted for the higher mortality. Koplan, Lewis, and Ali<sup>10</sup> reported a mortality rate of 30% in Trinidad. The varying results might also be a reflection of varying infrastructural amenities available at the time and place.

When one looks at the mortality year by year, it is remarkable that the rates in the years 1977-1979 were appreciably lower than for the ensuing years. This might be related to the fact that during the period 1977-1979, the physician in charge of the ICU was particularly interested in tetanus research, and was always available to monitor the management of the patients. Secondly, the period following that coincides with the beginning of underfunding which led to serious shortages in materials, particularly drugs.

The relationship between age and mortality rates in this study is similar to that in previous reports.<sup>5-7</sup> However, the comparatively lower mortality observed in the age group 20-39 is difficult to explain. Poor prognostic factors identified from the study include severe spasms, a shortened period of onset, hyperpy-

**TABLE 4. DISTRIBUTION OF PORTALS OF ENTRY IN RELATION TO MORTALITY RATE**

Portals of Entry	No. of Patients	%	Mortality Rate (%)
Foot and leg wounds and abscesses	174	41.7	33.2
Unknown	84	20.1	27.4
Post abortal and post partum	54	12.8	69.8
Road traffic accidents with multiple injuries and wounds	45	10.7	67.2
Head and neck wounds	28	6.7	88.1
Miscellaneous	33	8.1	41.5

rexia, tachycardia, head and neck injuries, post abortal and post partum states (Table 4), and age of  $\geq 50$ . Although Cole and Youngman<sup>13</sup> suggested that early use of tracheostomy and IPPV with curarisation could reduce considerably the mortality rate of severe cases of tetanus, Adams et al,<sup>14</sup> in an earlier controlled trial, found that these procedures were only useful in tetanus neonatorum. They found no difference between conservative treatment and tracheostomy with IPPV in adult patients with tetanus.

In the present study 52.5% of patients who had tracheostomy and IPPV still died.

A critical look at our records revealed that most of the patients were admitted extremely late, by which time they had developed very severe spasms. By the time tracheostomy and IPPV were introduced, the tetanus had so worsened that no further difference was made by the mode of management. There is a need for prospective studies to identify patients who should have elective tracheostomy early on in the course of the disease. Patients that are likely to benefit from early tracheostomy should include those with the designated high risk factors.

The seasonal increase in the number of patients seen in the dry season agrees with the experience of other workers in the tropics,<sup>4,5,7,15</sup> but is in contrast to the observation of Bytchenko,<sup>16</sup> Pobe,<sup>17</sup> and Vakil et al.<sup>18</sup> Some of the reasons suggested for the reduced incidence during the rainy season include: reduced outdoor activity, increased wearing of shoes, and the washing away of animal waste that sometimes litters the street.

The highest number of cases occurred in students, perhaps because they engage in outdoor activities often

with bare feet. Housewives, who form the next largest group of patients, are particularly prone to tetanus from post partum injuries, and sometimes following abortions, which are often performed in many developing countries with unsterile instruments and by unqualified persons. It is also remarkable that laborers constitute only 8.2% and farmers only 5.6% of the patients. Although the latter is understandable, as farmers constitute only a small proportion of the population of urban Lagos. These observations are similar to those of Daramola in 1968.<sup>6</sup> The preponderance of young students may also be related to the pyramidal structure of our population, where the very young outnumber the wage earners. The laborers may also be more careful than young students in avoiding or attending to minor injuries.

It is impossible to be certain that the anemia seen in 28.7% of our cases was due to tetanus. The etiology of the psychosis seen in the recovery phase is also controversial, as it is not clear whether it is a late manifestation of tetanus, or a consequence of the high doses of diazepam used in its management.

So far, the picture painted of tetanus in Lagos has been very gloomy. What prospects, if any, exist for reduction in mortality? First, there must be increased immunization. The expanded program on immunization (EPI) recently embarked upon by both the Federal Government of Nigeria and the United Nations Children's Fund (UNICEF) is a step in the right direction. This, however, needs to be backed up by a massive educational campaign about the dangers of tetanus, as well as its prevention. This should involve the use of all available mass media in a deliberate attempt to impress the majority of the populace with the importance of tetanus control. As was rightly observed by Odusote,<sup>7</sup> more Nigerians know about small pox, which has hardly claimed a life in Nigeria for years, yet, are completely ignorant about a condition which claims several lives daily.

Secondly, patients with tetanus need intense nursing care and management. There is a need to ensure that tetanus patients are cared for in dedicated intensive care units provided with appropriate man power and material resources.

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