

## Tetanus at Yalgado Ouedraogo University Hospital Center in Ouagadougou from 2000 to 2014

Sondo KA<sup>1,2\*</sup>, Zoungrana J<sup>3</sup>, Savadogo M<sup>1,2</sup>, Hien SJM<sup>1</sup>, Diallo I<sup>2</sup>, Poda A<sup>3</sup>, Ouédraogo AG<sup>1</sup>, Diendéré EA<sup>1</sup>, Sanou AS<sup>4</sup>, Ngaha LA<sup>1</sup>, Kaboré M<sup>1</sup>, Kyelem CG<sup>3</sup>, Ouédraogo MS<sup>3</sup> and Drabo YJ<sup>2</sup>

<sup>1</sup>Department of Infectious Diseases, University Hospital Yalgado Ouedraogo, Ouagadougou, Burkina Faso

<sup>2</sup>Unit of Training and Research in Health Sciences, Ouaga University I-Pr. Joseph Ki-Zerbo, Burkina Faso

<sup>3</sup>Institute of Health Sciences, Polytechnic University of Bobo Dioulasso, Burkina Faso

<sup>4</sup>Department of Global Public Health and Primary Health Care, Center for International Health (CIH), University of Bergen, Bergen, Norway

\*Corresponding author: Sondo KA, Department of Infectious Diseases, University Hospital Yalgado Ouedraogo, 01 Ouagadougou BP 815, Burkina Faso, Tel: 0022670077198; E-mail: sondoapoline@yahoo.fr

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### Abstract

**Introduction/Mission:** In Burkina Faso, tetanus remains a public health problem. The aim of the study was to describe the epidemiological, clinical and evolutionary profile of tetanus at the Yalgado University Hospital Center in Ouagadougou.

**Patients and methods:** We conducted a descriptive cross-sectional study of tetanus cases admitted in the department of infectious diseases from January 2000 to June 2014. The data were collected from the clinical records of hospitalized patients.

**Results:** The frequency of tetanus in the hospital was 2.6% and the average admission was 10.2 cases per year. Of the 92 cases of tetanus reported, the mean age was  $29.2 \pm 18.8$  years. The group age of 15-45 accounted for 62% of the patients. Farmers (36.5%), unemployed (28.5%) and informal sector workers (21.5%) were the most represented occupations. The patients were mostly unvaccinated against tetanus (97.8%). The main points of entry were integumentary (68%) and surgical (16.5%). Complications were mostly infectious (14%) and the lethality was 35.5%.

**Conclusion:** Tetanus is endemic in Burkina Faso and affects the active layer of the population. Sensitization of populations on the interest of anti-tetanus prophylaxis is essential.

**Keywords:** Tetanus; Endemic; Farmers; Complication; Burkina Faso

### Introduction

Tetanus is a toxic-infection caused by a strictly anaerobic gram-positive bacillus (*Nicolaër bacillus*) which belongs to the telluric flora. It is common in the digestive tract of several animal species and persists in animal dung and soil in the form of highly resistant spores.

In developed countries, improvements of hygiene, socio-economic and health status, and above all, routine vaccination have made tetanus rare occurring only in the elderly [1,2]. In developing countries, particularly in Africa, tetanus is still a public health problem because of its frequency and its severity. In the last decade, efforts have been made in Africa to eradicate neonatal tetanus through appropriate vaccination policies for pregnant women and newborns [3]. At the end of 2005, 49 countries, including Burkina Faso, had not reached the goal of eliminating neonatal tetanus. However, in the last five years, the trend has been towards reducing the number of cases in Burkina Faso [4,5]. If the frequency of neonatal tetanus has dropped, what about other age groups? If National Immunization Program vaccine coverage is good at the country level, what about the immunization status of tetanus in children or adults? What is the profile of the people affected and what is the evolution of the disease? So many questions that led us

to carry out this study in order to describe the socio-epidemiological, clinical and evolutionary profile of tetanus cases notified in the Department of Infectious Diseases at Yalgado Ouédraogo University Hospital Center (CHUYO) in Ouagadougou.

### Methodology

The study took place in the Department of Infectious Diseases at CHUYO in Ouagadougou. It is one of the three University Hospital Centers in Burkina Faso. It was a descriptive cross-sectional study of tetanus cases admitted in the service from January 2000 to June 2014. All cases diagnosed with tetanus during the study period were included, with an exploitable record.

The diagnosis of tetanus was made in front of the clinical symptomatology (trismus, attitude of opisthotonos, orthotonos, and spontaneous or provoked paroxysm with or without a point of entry). The Mollaret classification was used to assess the severity at admission or during hospitalization, and the Dakar score was used to evaluate the prognosis at admission. The data were collected from clinical records of hospitalized patients. Data entry and data analysis were carried out using Epi-info software version 6.04.

## Results

### Epidemiological profile of tetanus cases

Of 385 patients admitted during the study period, we recorded 148 tetanus cases implying a frequency of 2.6%. The annual average admission of tetanus cases was 10.2 cases. Of these tetanus cases, 92 patients met the inclusion criteria of the study.

The distribution by years shows an increased in year 2000 (19 cases or 20.7%). Annual and monthly distributions of tetanus cases are presented in Figures 1 and 2.

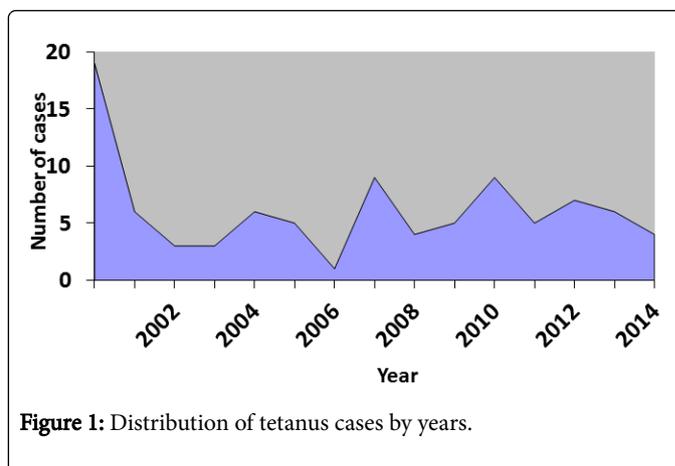


Figure 1: Distribution of tetanus cases by years.

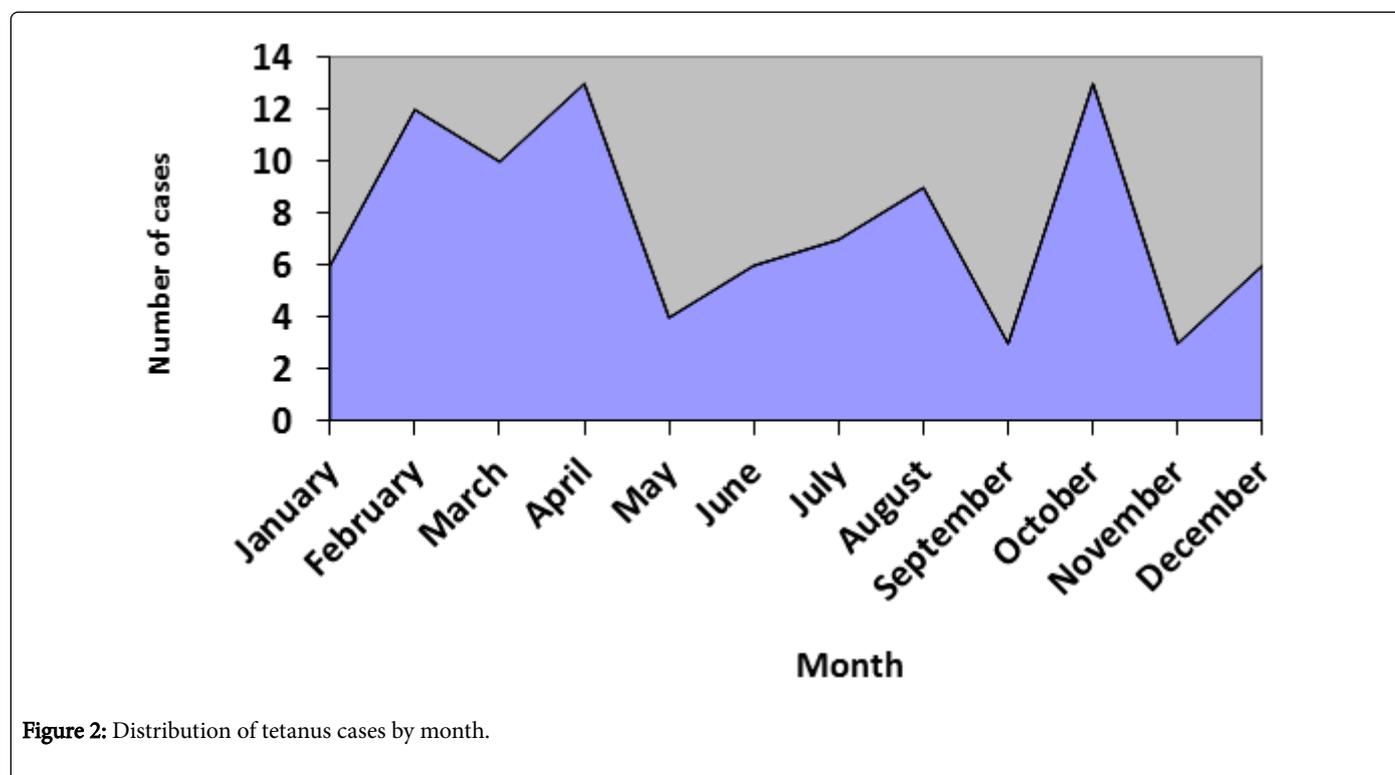


Figure 2: Distribution of tetanus cases by month.

There were 74 male (80.4%) with a sex ratio of 4.1. The mean age without including newborns was  $29.2 \pm 18.8$  years with a range of 3 to 77 years. Three newborns were infected in 2002. The predominant age group was 15-35 years old (42.3 %) and young people from 15-45 years accounted for 62% of the study population. The profession was specified in 71 patients; of these, 26 (36.6%) were farmers, 20 (28.2%)

were unemployed and 15 (21.1%) were informal sector workers. Patients were unvaccinated in 97.8% and two cases of incomplete recalls were noted in children. A significant proportion of patients came from other provinces than Kadiogo in 32.5% of cases. The epidemiological profile of the patients is presented in Table 1.

Variables	Numbers (n)	Percentages (%)
<b>Age (years)</b>		
<15	19	20.7
15-25	27	29.3
25-35	12	13.0

35-45	18	19.6
≥45	16	17.4
<b>Sex</b>		
Female	18	19.6
Male	74	80.4
<b>Immunization status</b>		
Not vaccinated	90	97.8
Vaccinated	0	0
Reminder (incomplete)*	02	02.2
<b>Profession (n=71)</b>		
Farmer	26	36.5
Unemployed**	20	28.5
Informal sector***	15	21.5
Housewife	05	07
Trader	03	04
Official	02	02.5
<b>Origin</b>		
Kadiogo	62	67.5
Passoré	5	05.4
Oubritenga	4	04.3
Zoundwéogo	4	04.3
Other provinces***	17	18.5
* = a booster vaccination dose; ** = preschool, student; *** = shopkeeper, gardener, welder, carpenter, mason; **** = Bam, Bazega, Boulikiembe, Gourma, Kouritenga, Kourwéogo, Mohoun, Nahouri, Seno, Sissili, Soum.		

**Table 1:** Distribution of tetanus cases according to their epidemiological profile.

### Clinical and evolutionary profile of tetanus cases

According to the classification of Mollaret, 62 (67.4%) patients had a tetanus stage II, 23 (25%) a tetanus stage I and 7 (7.6%) a tetanus stage III. According to the Dakar score, tetanus was mild in 35 cases (38%), moderate in 35 cases (38%) and severe in 22 cases (24%). The tetanus point of entry was found in 72 patients (78.2%) and the most frequent were integumentary (68%) and surgical (16.5%). The clinical profile of the cases is presented in Table 2.

Clinical profile of cases	Numbers (Percentage)
Portal of entry (n=72)	
Integument	49 (68)
surgical *	12 (16.5)
Mucosa **	04 (05.5)
umbilical	03 (04)

Intramuscular post	02 (03)
traditional	02 (03)
Dakar Score	
Mild tetanus	35 (38)
Moderate tetanus	35 (38)
Serious tetanus	22 (24)
Mollaret classification	
Stage I tetanus	23 (25)
Stage II tetanus	62 (67.4)
Stage III tetanus	07 (7.6)

**Table 2:** Distribution of Tetanus Cases by Clinical Profile.

More than half of the patients (58.7%) were hospitalized for more than 7 days. Twenty-nine patients had complications (31.5%), and infections represented the most common complications in 14% of cases (mainly pulmonary diseases in 92.5% and bedsore in 7.5%); in addition, metabolic complications including ionic disorders and

dehydration were present in 10% of the cases. In half of the cases (53.3%), the evolution was favorable and without sequelae. Two patients had sequelae which were stiffness of the lower limb and hand. Twenty patients died during hospitalization with a lethality of 35.5%. The evolutionary profile is presented in Table 3.

Variables	Numbers(n)	Percentage(%)
<b>Complications (n=29)</b>		
Infectious	13	14
Metabolic	9	10
Mechanical	7	7.5
<b>Duration of Hospitalization</b>		
<7 days	38	41.3
7-14 days	29	31.5
>14 days	25	27.2
<b>Exit mode</b>		
Healed	49	53.3
Healed with sequelae	02	02.2
Dead	28	30.5
Exit without medical advice	8	08.7
Exit against medical advice	5	5.5
<b>Lethality</b>	28	35.5

**Table 3:** Distribution of tetanus cases according to the evolutionary profile.

## Discussion

### Limits and constraints

The flood that occurred in Ouagadougou on September 1st 2009 led to the loss of numerous patients' files including tetanus at the Department of Infectious Diseases. In addition, some patients went out against and without medical agreement; it was therefore impossible to evaluate all the cases.

### Epidemiological profile of tetanus cases

The frequency of tetanus in the hospital (2.6%) and the average annual admission (10.2 cases) found in the study are similar to other studies in Africa. Tanon in Côte d'Ivoire [6] and Dao in Mali [7], found in their study that the frequency of tetanus was respectively 3% and 5.9%. Okome in Gabon [8], found an average annual admission of 06 cases and Manga in Senegal in her study among reproductive age women found an average of 15 cases per year [9]. Other authors such as Aba [10] and Tanon [6] in Côte d'Ivoire found a higher annual average admission; it was respectively 44.2 and 133. Most of these authors performed their work during the period when maternal and neonatal tetanus were common, explaining the high frequencies of tetanus in their study. In our country, the positive impact of the national immunization policy for reproductive age women in the context of neonatal tetanus elimination could explain the low

frequency as no neonatal cases happened since 2002. Also, most cases were male with a sex ratio to 4. Prevention programs should focus on men especially those with risky professions.

Over the years, there is no downward trend, but a saw tooth evolution of tetanus cases. Added to this, there is the constant monthly distribution of tetanus found in the study. These results show that tetanus is endemic in Burkina Faso. The same observation was made in Côte d'Ivoire [6]. The fact that the population lives in direct contact with animals, explains the persistence of the telluric bacteria in the immediate environment of the man, at domestic or professional level. In our study, about 62% of the cases was mostly young people aged 15 to 45, unvaccinated, male, farmers and informal sector workers. Dao in Mali [7] found 48.2% of peasants and workers; Okome-kouakou in Gabon, reported 44% of farmers [8]. The absence of tetanus prevention and the professional profile of patients increase the risk of tetanus occurrence; Informal workers (craftsmen) and farmers after wintering perform other activities such as gardening and handicrafts. They are then exposed all year because of micro trauma by sharp and soiled equipment and situations where people are not vaccinated; in fact 98% of the cases were not vaccinated in the study. They developed tetanus due to incomplete or absence of immunization. Soumaré [11,12] and Tanon [6] in Africa and Lombard [11] and Pedalino [13] in Europe also found a lack of tetanus immunization in their studies. In the context of the Expanded Program on Immunization (EPI), infant immunization is complete with good immunization coverage. However, boosters are not always done by mothers, and vaccine

immunity is either lost or incomplete as the child grows [14]. In the study, about 20.7% were children under 15 and only two children had had a booster; this was even incomplete. In a study where 631 children aged 1 to 14 were surveyed, Kaba [14] found a post-EPI coverage of 11.6% mainly for meningitis in mass campaigns organized by the Ministry of Health; also the immunization coverage against tetanus was 0.3% in that study. Recalls are essential for the continuity of EPI vaccines, and parents should be aware of the necessity of their achievements.

A significant proportion of patients (32.5%) were referred from provinces out of Kadiogo to the department of infectious diseases. These provinces are often 100 km away, 200 km or more, from the city of Ouagadougou. Tetanus is a medical emergency and must be treated early in a quiet room with an absence of noise to not provoke paroxysms. However, the poor condition of the roads strewn with holes called "potholes" are responsible of many shocks; the shocks are likely to cause paroxysms that can lead to complications that are life threatening. It would be useful to refer patients to regional health centers, which are much closer to the population and have appropriate infrastructures and human resources trained in case management.

The integumentary point of entry was frequently found in 68% of the total cases. Most authors in Senegal [9], Togo [15], Mali [7] and Tunisia [16] found the same result except in India where Sunit [17] and Geeta [18] noted a predominance of the otogenic point of entry. The aetiologies of integumentary point of entry found in the study reflect the injuries associated with the daily activities of the patients. Tetanus onset is then a possibility as sores are often soiled and neglected without any anti-tetanus prophylaxis after a trauma.

There is a need to increase public awareness of tetanus risk after a trauma and the availability of effective immunization. It is therefore necessary to strengthen the awareness of the population not only on the importance of preventive vaccination but also on the importance of visiting a health center after the injury. For sensitization, available channels are media (radio, television), conduct health awareness sessions in the community, awareness in schools and information in leaflets. Mothers will also need to be aware of the importance of their children's tetanus vaccine booster. For this, physicians must promote the availability and the benefits of vaccines for adults.

### Evolutionary profile of tetanus cases

The severity of tetanus was moderate or mild in most cases but severe tetanus cases were 24%. Our results are similar to the results of Tanon in Ivory Coast [6] and Soumaré in Senegal [12], who found a high frequency of mild tetanus. However, Wateba in Togo [15] found a predominance of severe tetanus.

More than half of the patients were hospitalised for more than 7 days; this is an economic loss for the country as most of the cases are farmers.

In 31.5% of the cases, patients had mostly infectious complications-pneumonitis during their hospitalization. Tanon [6] found lower frequencies for infectious complications (4.5%). The long stay in hospitals associated with defective personal hygiene could explain the infections in our study. The false roads when eating and the occurrence of bedsores could explain the frequency of infectious complications.

In our study, the lethality was 35.5%; some authors, such as Lombard [11] in France, Sunit in India [17] and Tanon in Côte d'Ivoire [6], found relatively lower lethality rates of respectively 24%, 33.3%, 31.9%,

and 31.0%. However, Okome-kouakou in Gabon [8] reported a higher lethality of 74%. In our context, the care precariousness such as the lack of intensive care unit, the conditions of isolation that are not always respected by the family, the transportation of patients from very long distances and the bad roads, could explain the high frequency of complications and the heavy lethality in our study. The complications and high lethality observed in the study can serve as a tool for raising awareness among the population to prevent the onset of tetanus. Health workers must also promote the use of vaccines to control vaccine-preventable diseases such as tetanus. The state of Burkina Faso should subsidize the tetanus vaccine to make it accessible to all Burkinabes. (A vaccine would cost 3500 FCFA which is 6 euros).

### Conclusion

Tetanus remains relevant and is endemic in Burkina Faso. It is relatively infrequent in children, but handicaps the active and productive layer of the country. Awareness campaigns on the importance of tetanus vaccination, especially in high-risk professions through Medias and community health workers would be necessary to protect the population and avoid the heavy lethality noted in the study.

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