

Survey of Uncontrolled Slaughter in the Central Market of Yakoma City (Nord-Ubangi Province, Democratic Republic of the Congo): The Case of Beefs

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Abstract

The danger of uncontrolled slaughter of animals delivered to the market was the subject of a study conducted in the City of Yakoma, in the province of Nord Ubangi in the Democratic Republic of Congo, on its border with the Central African Republic. The aim of this investigation was to provide the population of the city of Yakoma with knowledge on the danger that they are facing due to the negligence of the Veterinary Inspection Service, and to popularize the consequences. Experiments by participatory assistance were carried out on 14 cattle of two different breeds (Zebu and Taurine) for three months with two observations per month. Three samples showed seizure (partial and total), resulting in a prevalence rate of 21.4%. Older cattle had more identification than younger cattle. Several public health contamination hazards are permanent due to the absence of slaughter structures and the unwillingness of the meat inspection service to simply collect taxes instead of controlling the circulation of meat.

Keywords

Veterinary inspection;
zoonosis risk; cattle; meat;
Democratic Republic of
the Congo



I. Introduction

For man to grow and develop normally, he needs to eat. Meat remains one of the most important foodstuffs in view of the multiple proteins it contains. This meat, however, appreciated by the populations of the planet, could carry zoonotic diseases that humans can contract. The slaughterhouse, a strategic intervention point for the protection of human and animal health, is the sector where the sanitary inspection of meat was born. The obligatory passage of animals through the slaughterhouse and their systematic sanitary inspection have been decisive in the fight against the major animal diseases transmissible to humans, such as tuberculosis or brucellosis, which have marked the history of public health in France. More recently, the fight against bovine spongiform encephalopathy has relied heavily on health inspection services in slaughterhouses, both for the detection of suspect animals before slaughter and for the prevention of contamination from meat. The health inspection system in slaughterhouses consists of the inspection of each animal, before and after its slaughter. Carcass inspection includes visual examinations, palpations and

mandatory incisions of certain organs in order to remove from consumption meat that would present a danger to human consumption (MINEPIA, 2011).

The inspection system in slaughterhouses has changed little since the beginning of the century in its conception, although the sanitary and scientific context is in strong evolution. From a sanitary point of view, prophylaxis in livestock farms and inspection in slaughterhouses have made it possible to virtually eradicate the major animal diseases transmissible to humans (tuberculosis, brucellosis). Seizure rates of tuberculous bovine carcasses at the slaughterhouse are now 0.05% and the number of pig tuberculosis lesions detected at the slaughterhouse has decreased significantly. However, a number of microbial hazards (including *Salmonella*, *Escherichia coli* O157H7, *Campylobacter*, *Listeria monocytogenes*) or chemical hazards that are identified in animals and humans may not be detected by slaughterhouse inspection because they do not translate into symptoms in live animals or abnormal macroscopic characteristics of carcasses. Conversely, certain abnormal characteristics leading to the veterinary seizure of carcasses, if they are commercially penalizing in terms of meat appearance, do not constitute a specific danger to human health. Traditional inspection must therefore be complemented by other means of detection to increase its performance. Knowledge of certain parameters in the farm, such as hygiene, feeding, traceability, occurrence of diseases, and administration of medication are relevant elements to better assess risks and adapt inspection methods (Awa et al., 2008).

The city of Yakoma does not have a decent slaughterhouse where all the veterinary inspection operations can take place. Slaughtering is not structured, one can slaughter at home, under the mango trees without resorting to the appropriate veterinary inspection. This situation exposes consumers to several sanitary and hygienic dangers, which leads us to believe that some uneaten meat (dog meat) could be mixed with other meat sold because the veterinary services in the area are content to collect the fees instead of inspecting the meat. For this reason, we conducted a study on this type of slaughter to verify the quality of the meat delivered to the population of the City of Yakoma, in order to know if the meat sold on the market and those sold in the city could be contaminated and be subject to partial and/or total seizures. Similarly, Besbes et al. (2003), in their study on clandestine slaughter, which aimed to analyse the behaviour of butchers practicing non-regulatory slaughter and to assess the impact on the transmission of hydatid cysts, presented hydatidosis as one of the most frequent parasitic diseases in Tunisia and constitutes a real public health problem following slaughter not controlled by the veterinary service. The present study was motivated by cases of vomiting and diarrhea observed among 8 people who had consumed dog meat purchased on the market of the City of Yakoma. This meat was mixed with beef based on the colour of their carcass which is similar. The purpose of this study is to provide the Congolese population in general and the City of Yakoma in particular with knowledge on the dangers that threaten them due to the negligence of the Veterinary Inspection Service, and to popularize the related consequences while demonstrating cases of partial and/or total seizures noted on certain meats.

II. Research Methods

2.1 Study Area

The present study was carried out in the centre of the City of Yakoma, which has tropical climate according to the classification of Köppen, characterized by a constant heat with an average temperature of 25 °C. It rains regularly throughout the year. This climate offers two distinct seasons: a dry season that runs from mid-November to mid-April, while the rainy season starts around mid-April until November of the year. The relative humidity is so high in December and early January that it is difficult to distinguish the dry season from the rainy season. The abundant vegetation is currently a wooded savannah with a fauna teeming with animal species found in the equatorial forest, running through a hydrography filled with several streams, with its important river Uele. The soil of this environment is clay and sand.

It should be noted that the main activities of the population located in Yakoma City are dominated by artisanal and line fishing, hunting, land work, artisanal livestock and trade (Mosala et al., 2019).

2.2 Materials

The identification of carcasses and/or organs subject to total and/or partial seizures to illustrate the danger of clandestine slaughter at the Central Market of the City of Yakoma was carried out over a period of three months with two raids per month. That is to say, every 15 days during the international market that brings together the populations of three countries (Democratic Republic of the Congo, Central African Republic and Sudan). The samples were taken from cattle belonging to two different breeds: Mbororo (Zebu) and N'dama (Taurin). Characterized respectively by a high height with a high weight and the presence of a hump at the withers, with a large dewlap development that extends under the belly, the coat is uniformly brown, dark mahogany and the mucous membranes are blond ; While the humpless (taurin) are generally small in size with an average weight not exceeding 300 kgs, they have lyre-shaped horns whose tips curve slightly inward, the tail is long and the dewlap is reduced; the N'dama breed that belongs to it is trypanotolerant. These animals were of two different sexes, two to five years old. They were selected at random from traders who slaughtered their animals on market days. Some of them did this at the market and others at home. We witnessed the slaughter of 14 cattle, including 7 males and 7 females, from five different locations: CAR (Bema) and DRC (Limasa, Ndangba Lau, Nzale and Gugo). For each slaughter, we were obliged to provide ourselves with the necessary equipment for slaughter and meat inspection, including a white gown, rubber boots, clean inspection knives, a knife holder attached to the belt, a white safety helmet, stamping equipment (stamp with the test stamp), slaughter knives and various tongs.

2.3 Methodology

a. Sampling and Data Collection

Cattle are domestic animals with a high meat production, which is loved and appreciated by many people. In this study, a sample of 14 oxen was inspected. This small number is justified by the limited frequency of slaughter and also because of the non-existence of a slaughterhouse. The data were collected during the slaughter of these animals. The surveys were conducted among slaughterers to obtain their views on slaughter conditions in the City of Yakoma. Beforehand, a follow-up form was set up to reach the local Veterinary Services so that they could inform us whether or not there was a

slaughterhouse in our research site and to obtain information on the management of beef by the services in charge.

To be able to detect cases of partial and/or total seizure, we proceeded to a participatory assistance during the slaughter of bovine. We followed a slaughter chain with the following stages: stunning, bleeding, heading, skinning, evisceration and splitting. Certain criteria must be observed to accompany a good slaughter, which we used to arrive at the results. In particular, a 24-hour rest before any slaughter, except in case of emergency, for the organoleptic and bacteriological qualities of the meat (a tired animal produces little muscle glycogen, poor lactic acidification in the muscles, and produces a dark meat, with a high pH that can finally favour putrefaction); Ante-mortem examination, to detect diseased and suspect animals, and collect information to facilitate post-mortem examination (Institut de l'Élevage, 2008); and finally, Post-mortem examination, the expertise was on the blood, carcass, organs and corresponding lymph nodes. For a serious inspection of the meat, 12 examinations were successively prescribed: spleen examination, general inspection of the carcass, examination of the head and tongue, lungs, heart, liver, digestive viscera, tenderloins, and kidneys, incision of the thigh and shoulder muscles, incision of the retro mammary and precursory lymph nodes and incision of the pre-scapular lymph nodes. A rigorous assistance to each slaughter was required to allow us to gather the elements on what we needed. And this should be accompanied by a veterinary expertise that can detect the cases of total and/or partial seizures.

Table 1. Selection of slaughtered animals and their expertise

Month	Selection		Expertise of slaughtered animals			
	Male	Female	Observations	No animals slaughtered	Symptoms	Decisions
April	2	3	1st	3	Coughing figure (n° 2); Weakness due to distance (n° 3)	No danger
			2nd	2	Fatigue and Dyspnea	No danger
May	3	2	3rd	2	None	No danger
			4th	3	Weight loss, tachycardia, spleen with black blood, hydronephrosis (n° 8); pus in liver (9); and hydronephrosis (n° 10)	One full and two partial seizure cases
June	2	2	5th	4	Presence of cough (n°14)	No danger
			6th	0		

b. Statistical Analysis

World and Excel (version 5.0, 2010) programs were used to develop the cards, enter the data, and perform some of the analysis. Statistical comparisons were made using the Wilcoxon test (R Core 5.1, 2018).

III. Results and Discussion

3.1 Prevalence of Seizure Cases

The centre of Yakoma has no livestock to feed the population living there; it remains dependent on the surrounding towns that have cattle farms to supply it. Its position on the border with Central African Republic allows for the exchange of foodstuffs and trade products. However, animals coming from this border country through the Bema domestication centre took an important part in our selection. 64.3% of the animals slaughtered during our investigation came from the Central African Republic, higher than the four Democratic Republic of the Congo settlements, 35.7%. Similarly, of the two breeds considered in this study, the Zebu breed had a proportion of 78.6% compared to only 21.4% for the bulls. The majority of the animals slaughtered were younger, where we recorded a proportion of 71.4% for oxen less than four years old, and 28.6% for those between 4 and 5 years old (cf. Table 2). Although this, the proportions of males and females are the same (50%) (cf. Table 1). Considering their central tendency, especially for the selections that had identifications every month, results revealed that the Zebu breed gives an average of 3.7 ± 0.6 . For the CAR selection with only one site (Bema), the average is 3 ± 1 . While for animals under four years of age, the average is 3.3 ± 0.6 . The increase in the number of Zebu cattle over the course of the experiment was not significant (p-value = 0.3868) for the Bema site that produced several cattle that were slaughtered.

Table 2. Breeds and ages of slaughtered cattle and their origin

Month	Breed		Provenance		Age (year)	
	Zébu	Taurin	CAR (1 site)	DRC (4 sites)	2 to 3.5	4 to 5
April	4	0	2	3	3	2
May	4	1	3	2	3	2
June	3	2	4	0	4	0

Legend: Democratic Republic of the Congo (DRC), Central African Republic (CAR)

The Congolese selection, although low in proportion, had a higher prevalence of seizure (40%, or 2 cases) than the CAR (11.1%, or 1 case). The same situation was found for the age category, with a prevalence of 50.0% (2 cases) in the 4 to 5 year old age group compared to only 10.0% in the 2 to 3.5 year old age group (Table 3). After analysis of the results obtained, the total prevalence rate for the entire selection (n = 14) was 21.4%. The high number of cattle from the CAR did not affect the identification of seizure cases; however, the age of cattle showed a remarkable variation. This means that if the majority of cattle slaughtered were over four or five years old, the number of seizure cases would be higher than recorded.

Table 3. Prevalence of recorded seizure cases

Parameter	Provenance			Age (year)		
	CAR	DRC	Total	2 to 3.5	4 to 5	Total
No animals	9	5	14	10	4	14
Seizure cases	1	2	3	1	2	3
Prevalence	11,1%	40,0%	21,4%	10,0%	50,0%	21,4%

Legend: Democratic Republic of the Congo (DRC), Central African Republic (CAR)



Figure 1. Uncontrolled Slaughter of beefs at Yakoma city, Nord Ubangi (Congo DR)

It is important to present the danger of clandestine slaughter in the city of Yakoma, given that this agglomeration is located in a strategic position at the border. It has a market that brings together people from several countries and towns. The absence of a slaughterhouse in such a centre and even in the surrounding areas is a permanent problem that requires an adequate solution in order to avoid any contamination with so-called zoonotic diseases. Several factors present risks of contamination, such as the absence of Community Health Workers (veterinarians), although the service exists, it is only used for tax collection when the meat is presented at the market. Besbes *et al.* (2003), who surveyed butchers about their knowledge of hydatidosis, report that more than 80% of butchers set aside a designated area around the butcher shop to sacrifice their animals. They noted the presence of dogs with owners in 52.6% of cases and stray dogs in 43.3% of cases. Only 13.4% of butchers knew the mode of transmission of the disease. Parasitized viscera are thrown away by butchers in the garbage. The presence of dogs and the discarding of the viscera is an interesting factor for the transmission of this pathology. Also, passers-by who sit down to consume the uninspected meat run an obvious risk of contamination. Estimates made by Mravili (2013) indicate that for the four Central African countries (Cameroon, Congo, Gabon, and Chad); the percentages of controlled slaughter remain very low. Similarly, in the event of a control, the sanitary inspection of meat is not systematically under the direct supervision of a Veterinary Surgeon. Moreover, in the absence of a blood collection system and prior treatment of wastewater, the direct discharge of these effluents, especially into the water environment, seriously affects the quality of the environment. In addition, due to the lack of means, the disposal of solid waste and seized meat also poses an environmental and health problem. This situation is the same for our study area. In the

different slaughters experienced (n =14) during the investigation, the number of males is the same as the number of females; this selection was imposed on us during the investigation which was done in a random way. This is in contrast to other studies, such as the one conducted in France, which indicated that of the 1.445 million calves slaughtered before the age of six months in 2005, three quarters were males (Monniot *et al.*, 2007). For Richard *et al.* (2012), females still hold a prominent place, accounting for 63% of slaughter (49% for cows alone). Bullocks account for 25% of slaughter volumes and steers for 7%. The animals slaughtered during this research were of two breeds: Zebu and Taurine. The increase in the number of Zebu (78.6%) was not statistically significant with the origin of oxen for CAR (64.9%). But compared to the DRC with its four settlements, we can still draw a conclusion. The presence of these two breeds is defined by the migration for domestication of this species.

The Zebu is much appreciated for the quality and quantity of meat, while the Taurin, such as N'dama for example, is more prized for its trypanotolerance. In Senegal, the bovine population is composed of zebu, taurine and products of their crossbreeding. The zebu gobra constitutes 54% of the cattle population, while the taurine, represented by the N'Dama, is a hardy and tripanotolerant breed (Abakar, 1994). According to Mishra and N'depo (1978), the majority of large ruminants slaughtered in Côte d'Ivoire are Zebu, frequently N'Dama and rarely Baoule.

In terms of the breed, sex and age of the animals exploited in the DRC, as analyzed in Beni Territory, Kibwana *et al.* (2012) report that the majority of the herds surveyed (89.2%) were of local breeds, notably Ankole and Lugware, and mixed breeds resulting from a cross between local and exogenous breeds, mainly of the Friesian, Swiss Brown, Jersey, or Sahiwal type. The average herd size was 78% female. The proportion of young animals decreased with age, while the young pubescent animals, especially the heifers, had higher numbers. This statement shows how our selection was composed more of young animals than adults. The prevalence of mortality for the whole study or prevalence rate was 21.4% or three cases. For the case of *Cysticerci* in Abidjan, Mishra and N'depo (1978) determined a proportion of 0.87%. This low prevalence rate, which is lower than ours, is justified by the fact that their study focused on a single disease, whereas for us, any lesion that constituted the case of seizure was taken into account. In our total sample size, the number of cattle selected for DRC in the four settlements was small, but had a high prevalence (40%). Similarly, the number of animals in the age range of 4 to 5 years was low, but had more identification (2 cases or 50%). We conclude by saying that, in these different environments where husbandry is not maintained, the age of the animals could influence the identification of diseases (data not analyzed). All other things being equal, if the number of older animals was higher, the prevalence rate would also be higher.

IV. Conclusion

The clandestine slaughter of cattle at the Central Market of Yakoma, a border territory between Democratic Republic of the Congo and Central African Republic, presents many dangers for consumers of beef. The Community Health Agents responsible for meat inspection and slaughter control are more concerned with administration than with veterinary services. Several cases of seizure (partial and total) escape their control; this exposes the population to multiple cases of contamination. The establishment of slaughter structures by the political-administrative authorities with a restructuring of the competent services could facilitate the surveillance and control of zoonotic pathologies of epidemic appearance.

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