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Management of slaughter houses in northern Nigeria and the safety of meat produced for human consumption

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ABSTRACT

This work attempts to document the first comprehensive report on the conditions and management of major slaughter houses of northern Nigeria as well as the safety of meat produced for public consumption in these abattoirs. The study was carried out in seventeen major slaughter houses from 14 out of the 19 states that form the northern part of Nigeria and the Federal Capital Territory (FCT), Abuja. Selection of abattoir from each state was based on its socio-economic importance to the local community in terms of number of animals slaughtered and quantity of meat supply to the area and also the level of commitment of each abattoir management to cooperate with the objectives of this research. On-the-spot assessment of the operational facilities and process operations was employed using videos and photographs for data collection on visit to each abattoir. A joint prospective meat inspection and focus group discussion (8–12 abattoir personnel) was carried out to highlight the problems of the slaughter houses. The study revealed absence or dilapidated conditions of basic abattoir infrastructures such as lairage, hoisting facilities, supply of potable water, constant electricity, drainage and waste disposal systems. Good hygienic practices were totally absent. Animals were not being examined regularly before or after slaughter leading to unsafe meat being released for public consumption and conveyed out of the abattoir using unhygienic means of transport. Waste disposal was indiscriminate and hazardous to the environment, while the authorities concerned were not making any effort to curtail the situation. Diseases of public health and economic importance that were most frequently encountered included Tuberculosis, CBPP and Helminthoses. It was concluded that, none of the major abattoirs in northern Nigeria met the minimum hygienic standard of operation as recommended by the Codex Alimentarius and they could not have supported the production of safe meat and meat products for human consumption.

1. Introduction

Codex Alimentarius Commission defined abattoir as any premises that is approved and registered by the controlling authority in which animals are slaughtered and dressed for human consumption (CAC, 1993).

The purpose of an abattoir is to produce hygienically prepared meat by the humane handling of the animal, using hygienic techniques for slaughtering and dressing (Veall, 1992). Veall further reported that, "this enables proper meat inspection to be carried out and the resulting waste materials are thus suitably handled to remove any potential danger or meat-borne infection reaching the public or contaminating the environment". Humans, who are at the top of the biological food chain are as a result, prone to pathogens, drugs, and contaminants in the animal food products (meat, fish, egg, and milk) we consume.

The impact of meat and wild animals and their manure as sources of environmental, water and food contamination, as well as the direct animal-to-human transmission of pathogens, will have to be taken seriously under consideration by those involved in the food industry in general, including producers, regulators, public health agencies and consumers (Sofos, 2008).

A recent review on the safety of animal food products situation in Nigeria by Okoli, Okoli, Okorondu, and Opara (2006) highlighted the fact that the production, handling, sales, and consumption of poor quality animal food products constitute serious public health problems in the country. Bovine tuberculosis (bTB) in slaughtered cattle is still common in many abattoirs of northern Nigeria and there are public health dangers associated with unhygienic practices and operations in these slaughter houses (Bello, Lawan,

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Kwaga, & Raji, 2011). Reports have also indicated that, infection with bTB continues to occur among meat industry and slaughterhouse workers especially in regions where the infection is still prevalent in cattle (Thoen, LoBue, & de Kantor, 2006). Therefore, the use of standard hygienic abattoirs and operating procedures is necessary for the production of safe meat for human consumption. Sub-standard, poorly constructed and unmaintained abattoir infrastructure seriously hamper operations, posing great risk to meat hygiene and thus, endanger human health. The provision of a veterinary inspection of live animals prior to slaughter is a basic requirement of most meat inspection systems (Gracey, Collins, & Huey, 1999), therefore, the government must play active role in the control and enforcement of all legal requirements governing operations of slaughter houses and other food processing establishments. The aim of this study was to evaluate the major abattoirs (slaughter houses) in northern Nigeria in respect of their status and functional conditions of conventional facilities for routine standard operation, some common diseases encountered and to assess the role of the controlling authorities in the management of the slaughter houses as well as to highlight the findings as public health issues of both national and international concern.

2. Materials and methods

This study was carried out between 2010 and 2012 in seventeen major abattoirs from 14 out of the 19 states that form the northern part of Nigeria and the Federal Capital Territory (FCT), Abuja. These states included Adamawa, Bauchi, Borno, Gombe, Taraba, Yobe (North-east), Benue, FCT, Kogi, Nassarawa, Niger, Plateau (North-central), while Kaduna, Kano and Sokoto form the North-west (Fig. 1). Only major abattoirs were included for the purpose of this study. A major abattoir in this work is referred to as the largest and most popular abattoir in a state that is of most socio-economic importance to the local community in terms of number of animals slaughtered and quantity of meat supply to the area. Therefore, selection of abattoir from each state was based on this simple inclusion criterion and also the level of commitment of each abattoir management to cooperate with the objectives of this research. Each selected abattoir was visited three times within the interval of 1–8 weeks. Visits were made on any day of the week from around 6.00–11.00 am, the main period during which slaughter and processing of animals took place in Nigerian slaughter houses. Basic infrastructures of the abattoir such as the lairage, slaughter hail, hanging facilities (for hoisting and on-the-rail processing of carcass), tripe and gut room, cutting room, condemned meat room, water and electricity supply, drainage system, cold and other storage means and waste disposal facilities were considered and assessed to ascertain their standard and functional state as compared to the recommendations by the Codex Alimentarius Commission (CAC, 1993). On-the-spot assessment of the operational facilities and activities was employed for data collection during visit to each abattoir. A joint prospective meat inspection was conducted in all the abattoirs on each day of visit. This involved the inspection of all animals (where possible) before and after slaughter for possible detection of diseases, to ascertain the fitness of meat for human consumption as described by (Gracey et al., 1999; Herenda, Chambers, Ettriqui, Seneviratna, & da Silva, 1994).

Diagnosis of diseases was based on observed gross lesions, physical presence of disease agents such as parasites or their larvae and where necessary tissue samples were taken to the laboratory for confirmatory diagnosis that included conventional biochemical tests, microscopy, histopathology, serology tests and other rapid kit tests for different diseases and disease agents. Focus group discussion consisting of 8–12 personnel (butchers and officials) of the slaughter houses was carried out with the view to highlight the problems of their various establishments. “Available” official records of abattoirs since establishment were carefully studied and documented as supplied by the management. Photographs and videos of the abattoir activities were equally recorded.

Initial and present average daily slaughter of animals in the abattoirs was analyzed by paired samples *T*-test using MS Excel 2007 version. A value of $P < 0.05$ was considered significant.

3. Results

3.1. Establishment of the abattoirs

The results of this study showed that the period of establishment of the understudied abattoirs spanned between 1962 and 2007 (Table 1). The “first generation abattoirs” were constructed in the 1960s and were owned and controlled solely by the then regional governments in the country. These slaughter houses served both local and international purposes because of the large number of animals slaughtered, hide and skin production and that they met the international standards of operations at that time. However, with the creation of more states in Nigeria, other slaughter houses were established by various state governments to mainly serve the needs of local communities. At present majority of the abattoirs have been leased to private individuals and groups with no government participation other than the collection of slaughter taxes.

3.2. Infrastructure and operations

Basic abattoir infrastructures such as lairage, hoisting facilities, tripe and gut section, supply of portable water, constant electricity supply, drainage system and other facilities were either not available or dilapidated. There was obvious lack of maintenance of the few available ones or completely not in use in any of the 17 major abattoirs surveyed. No systematic antemortem or postmortem examinations were carried out in any of the abattoirs. Animals were slaughtered and processed on the floor in virtually all sections of the abattoir (Plate I). Disposal of effluent, ruminal contents and other animal wastes was indiscriminate and hazardous to the environment as these wastes could be seen accumulated or dumped around the abattoir premises or even in the slaughter hall (Plate II). Record keeping was either absent, poor or unreliable in the abattoirs. Some information like date of establishment or official name of the abattoir had to be obtained from the archive of the state ministries in some cases. Disease records were scanty and only a few could were obtainable. The findings of this work indicated that about 76% of the abattoirs recorded a sharp fall in the number of cattle slaughtered compared to the time of their establishment, to the period when this survey was carried out. Statistical analysis of initial and present daily cattle slaughtered showed a significant decrease at $P < 0.05$.

3.3. Sanitation and diseases

Tuberculosis (Plate III), contagious bovine pleuropneumonia, helminthoses and multiple abscesses of different organs were some of the zoonotic or economically important diseases/conditions encountered. Diseases were diagnosed and recorded in the abattoirs during the joint meat inspection (Table 2). Due to lack of formal and proper meat inspection, not all animals were examined in some abattoirs even during the joint meat inspection leading to some diseased or unwholesome meat occasionally been passed for public consumption. Stray dogs and feral birds were frequent visitors or inhabitants of the slaughter houses. The results of the study also indicated that butchers and other casual workers were not