



INTERNATIONAL JOURNAL OF SCIENCE FOR GLOBAL SUSTAINABILITY
**Abattoir Management: A Case study of Malumfashi Local Govt.,
Katsina State, Nigeria**

¹Yusuf Buhari, ²Salisu Mansur Dabai and ³Abubakar Abdulazeez

¹Guangzhou Institute of Biomedicine and Health, Chinese Academy of Sciences

²Department of Biological Sciences, Federal University Gusau

³Department of Biotechnology, Nigerian Defence Academy

Corresponding Authors Email Address: buharivusuf38@gmail.com

Received on: March, 2020

Revised and Accepted on: June 2020

Published on: July 2020

ABSTRACT

Abattoirs are facilities approved for collection, inspection and slaughter of food animals for human consumption. These facilities are established to centralize slaughtering processes and ensure safety of meat and meat products. However, if not properly managed, abattoirs are a very good source of infection or even life-threatening morbidities. In this case report of Malumfashi abattoir, the procedure of slaughter, inspection, processing and marketing of the products are presented. An average of 3 cattle and 20 sheep and goats are slaughtered on a daily basis in this slaughter facility, which has been operative for 41 years. It was observed from this survey that the design of the abattoir is substandard, and a number of operations prompt intervention by the state government and other relevant stakeholders. This practice poses high risk of contamination of previously healthy products with unhealthy ones. Information in this report is based on personal observations and interview with abattoir community. Challenges and several inadequacies associated with this abattoir highlight the need for governmental intervention in managing such facilities for the safety of food and public health. It is highly recommended that the state government and local authorities provide adequate funding for abattoir management and ensure continuous monitoring of slaughter activities all over the state.

Key words: abattoir management, meat hygiene, food safety, public health, Nigeria

1.0 INTRODUCTION

Codex Alimentarius (1993) defined an abattoir as a licensed facility that has been duly registered and approved by the controlling authority to collect, slaughter and process food animals to ensure production of safe and wholesome meat for human consumption. It applies to premises provided by relevant authorities for butchers and other animal meat handlers for the slaughter and processing of livestock to produce meat (Ikeme, 1990; Obanu, 1990).

Abattoirs are needed to centralize slaughter processes and therefore ensure surveillance of animal diseases at slaughter in order to avoid

zoonotic transmission to humans through meat consumption. They are formally-established

institutions that ensure humane handling of animals and hygienic processing of meat animals and their products (FAO, 1992). Abattoir establishment ensures that final products produced follow adequate antemortem and postmortem inspection as well as hygienic processing to ascertain safety prior to retailing or distribution to the public.

The cycle of operation in a standard and formally-managed abattoir follows antemortem examination at the lairage, immobilization and slaughter, evisceration and postmortem examination, deboning, dressing and splitting of dressed carcass,

storage and retailing. However, substandard handling operations are quite evident in Nigerian abattoirs as the case is with the abattoir in this case study. Lairages are either unavailable or not put to use in most Nigerian abattoirs (Igwe, 2005; Aliyu et al., 2008). The cruel method of immobilization sabotages the meat quality (Ikeme, 1990) and occasionally results in abattoir workers sustaining injuries from physical struggle with larger animals. Unavailability or lack of exploitation of hoist facilities in abattoirs downgrades the quality of the carcass due to inadequate bleeding (Igwe, 2005) and therefore poses risk of infection. Declan et al. (2004) stated that hygiene and standard operating procedures are key to food safety in abattoirs.

A number of formal procedures have been designed to ensure public safety and safety of meat to be produced in abattoirs, which include securing an official permission from relevant authorities to establish the abattoir, presentation of the architectural design of the abattoir and undertaking an environmental impact assessment. So, to establish an abattoir, there are basically key considerations, which include proximity to residential sites, potable water source and electricity supply, animal source market, source of labor, good transport system, freedom from pollution and slope of the land for efficient draining of waste (Gracey et al., 1999).

A fitting architectural design and appropriate administrative structure is key to safety of abattoir and meat products. For example, in some abattoirs, the whole cycle of operation takes place in the same room as the case is with the facility in this case study. The safety of meat produced under this kind of condition is undoubtedly questionable. An ideal abattoir design should contain a lairage, the slaughter hall, a gut and tripe room, detained and condemned meat rooms, offal as well as hide and skin rooms, cold room, supply of both hot and cold water, a lavatory, a veterinary laboratory, personnel room, incinerator, supply of disinfectants, efficient waste disposal and sewage draining systems, supply of potable water and electricity. This, therefore, has a direct impact on the quality of products produced therein as it may encourage or discourage contamination and cross-contamination of products (Igwe, 2000 and 2005; Ikeme, 1990).

A poor administrative structure, however, sabotages the quality of meat produced in abattoirs. For example, an appropriate abattoir administration must include a meat inspector, lack of which poses a question of meat safety and seriously jeopardizes the health of consumers.

Abattoirs serve as surveillance points for animal diseases and control of animal-human transmission of diseases, hence the need for hygienic practices and careful examination of meat prior to retailing in these facilities. One of the key requirements in abattoir practice is sanitation (Ikeme, 1990) due to generation of wastes during and after daily operations in the abattoir, which need to be carefully handled to avoid risk of potential danger or meat-borne infectious diseases reaching the public or contaminating the environment (FAO, 1992). Poor handling of meat, selling and consumption of poor-quality products constitute grave health risks to the country (Okoli et al., 2006), which is evident in different segments of the country's livestock industry (Lawan et al., 2013).

Magaji et al. (2013) observes that keeping and periodic review of abattoir records as well as adequate inspection and issuing of compensation where necessary are key to ensuring safety of meat produced in abattoirs. Enforcement of antemortem inspection, sanitation and public health education programs are good measures to ensure standard abattoir practices in Nigeria (Dandago et al., 2009).

2.0 BACKGROUND OF THE ABATTOIR

Malumfashi abattoir is also known as Mayanka among the abattoir workers (Mahauta), and popularly referred to as Kwata by the town residents. The facility has no officially recognized name and can rather be called a slaughter house (Plate VII) than a standard abattoir. It is owned and managed by the Malumfashi Local Government and has been licensed to slaughter and process food animals prior to retailing for human consumption. The first ever Malumfashi abattoir was situated within residential sites, but due to population growth and for public safety, the current abattoir was constructed towards the end of the military regime of General Olusegun Obasanjo around 1979 and was commissioned during the early regime of Alhaji Shehu Shagari.

However, this facility is currently enclosed within residential settlements – a place now known as Fayamasa and therefore prompts further relocation. Consequently, the state government under the leadership of His Excellency Aminu Bello Masari, has constructed a new abattoir, which is yet to commence operations.

The principal purpose for establishment of this abattoir is the same as any slaughter facility - to centralize slaughter processes and therefore serve as a surveillance point for meat contamination and disease, as well as to ensure compliance to guiding principles for slaughter processes (Ikeme, 1990; Obanu, 1990; FAO, 1992).

The administration of the abattoir constitutes the head of staff (Sarkin Fawa), his deputy that serves in his absence and other butchers. Division of labor is evident in the abattoir, with various people tasked with various responsibilities. The senior staffs are mostly charged with slaughter, evisceration, deboning and splitting of dressed carcasses, whereas the junior staffs are mostly charged with flaying and removal of extremities. Some are especially responsible for fetching water from the borehole (Plate VI) as the abattoir water supply does not meet up with demands due to inconsistency in supply.

Though not specific about the licensing authority, workers maintain that the abattoir is a licensed facility. Compared to the previous capacity, not more than an average of 3 cattle and 20 small ruminants are slaughtered on a daily basis in the abattoir. The abattoir had an initial workforce of about 30 personnel in total compared to the current, which is roughly over 10 personnel and this is due to the reduced workload of the abattoir. At inception, over 30 cattle and more than 200 small ruminants (goats and sheep) are slaughtered on a daily basis. The animals slaughtered in the facility are primarily cattle, sheep and goats (Table 1). The relative reduction in the figures in the table is probably due to the presence of small slaughter slabs in town and neighboring villages.

Despite the potential benefits attached to abattoir by-products, it was observed that such potentials are not exploited in this local abattoir. Blood and digesta are

discarded, which finally find their way into a nearby river through runoff. Wastes generated in the abattoir are utilized for other purposes. Fecal wastes are sometimes used as organic manure for irrigation farming and farming during the raining season. It was also found that wastes such as feces and by products such as bones are sold to raise funds for maintenance of the abattoir. Hides and skin are also sold to local merchants who preserve and later transport to distant places for further industrial processing. The exploitation of offal as food is a normal practice. However, the head, extremities and skin are also processed to make a native food called Ganda/Ragadada.

3.0 METHOD

The method used in this study is similar to that of Lawan et. al. (2013). This cross-sectional survey was conducted in Malumfashi metropolitan abattoir, a slaughter facility popularly known as Kwata by the residents. The study was aimed at assessing the slaughter and management practices of the abattoir. The facility is located in Malumfashi local government area of Katsina State, Nigeria. Malumfashi is located on latitude 11.7929° N, 7.6168° E.

The abattoir was visited every day from 6:00am to 9:00am (the period of abattoir operations) for 7 days to observe the management practices in this slaughter facility. Information, including that of the license and history of the abattoir was sought from management of the abattoir, which was achieved through a four-man interview with the abattoir officials. The daily slaughter capacity of the abattoir was observed and documented (Table 1). The presence and operational states of key facilities was observed and supported with photographs as shown in this report. Positive (+) and negative (-) signs were used to designate presence and absence of key facilities (Table 2) respectively. Abattoir operations were monitored and all details were documented and supported with photographs. The slaughter practices in this facility were also noted (Table 3) and supported with photographs.

4.0 RESULTS

Tables 1 presents the previous and current number of animals slaughtered in the facility on a daily basis,

table 2 shows the abattoir facilities and their functional states, whereas table 3 presents the practices of workers in the abattoir. The operations of the abattoir as captured on camera are also presented.

Table 1: Operational capacity

| Animals slaughtered | Daily capacity | |
|---------------------|----------------|---------|
| | Previous | Current |
| Cattle | 20 | 3 |
| Small ruminants | 200 | 20 |

Table 2: Abattoir Design

| Component of abattoir | Availability | operational state |
|-------------------------|--------------|---------------------------------------|
| Lairage | + | Inoperative |
| Slaughter hall | + | Fully operative |
| Gut and tripe | - | - |
| Cold room | - | - |
| Detained meat room | - | - |
| Condemned meat room | - | - |
| Drainage system | + | So dilapidated |
| Veterinary laboratory | - | - |
| Water supply | + | Inadequate |
| Electricity supply | - | - |
| Hide and skin room | - | - |
| Disinfection facilities | - | - |
| First aid room | - | - |
| Administrative office | - | - |
| Dressing room | + | Function served by the slaughter hall |
| Hoisting facilities | + | Fully operative |
| Rest room | - | - |
| Grazing area | - | - |

*+ = *Present* - = *Absent*

Table 3: Abattoir practice

| Abattoir activity | Current situation |
|-------------------------------|---|
| Ante mortem inspection | Absent |
| Immobilization | Cruel. Abattoir workers oftentimes sustain injuries in attempts to lay down larger animals |
| Killing | On the floor, the halal way |
| Evisceration | Absolutely skillful |
| Postmortem inspection | Absent |
| Splitting of carcass | Absolutely skillful |
| Waste handling and sanitation | Poor, no proper internal supply of water, rinsing with detergents but no use of disinfectants |



Plate I: Evisceration, deboning and splitting of dressed carcasses.



Plate II: Removal of fecal content from intestines



Plate III: Removal of intestinal content on a bare, untidy floor



Plate IV: A heap of feces on the floor in the abattoir



Plate V: Flaying and removal of extremities on a bare, untidy floor in the abattoir



Plate VI: Lairage and water source



Plate VII: The slaughter hall



Plate VIII: Slaughtered animals on a bare, untidy floor in the abattoir

5.0 DISCUSSION

It was revealed by this survey that the abattoir is essentially a slaughter house (Plate VII), not a standard abattoir. Conditions of animal slaughter were evidently unsatisfying (Plates IV, V and VIII), as the case may be with most local abattoirs and slaughter slabs (Aliyu *et. al.*, 2008). The abattoir design is substandard (Table 2), lacking lairage (Lawan *et. al.*, 2013), isolation room, slaughter hall, cold room, hide and skin room, guttery and tripery, administrative office(s), condemned meat room, laboratory and lavatory, dressing room and lockers, and laundry among others.

Despite regulations related to animal slaughter in the country, slaughter of animals on untidy floors (Plate VIII), absence of stunning operation, lack of sewage disposal systems, lack of electricity and inadequate supply of clean water and poor meat handling behavior are common in this abattoir. By passing the stunning procedure might have been compensated by the Halal method of slaughter practiced in the abattoir. Other observed limitations include lack of a refrigeration system and inadequate transport system for meat products, which is probably due to small scale of operation. Poor public health standard in this facility is quite evident, hence exposing butchers and meat consumers to possible risk of meat with bacterial, viral and parasitic infectious agents (FAO, 1992).

The slovenly slaughter hall with its poor water supply also lacks facilities for collection and disposal of wastes (Adeyemo, 2002). Lack of supervision was also obvious, with unchecked

animal handling, slaughter and processing as well as meat inspection before and after slaughter. Fonseca (2000) noted that water used in washing needs to meet drinking standard, which is the case with this facility. However, procured water from borehole (Plate VI) is stored in half-size drums standing by in the slaughter hall, which are inadequate, hence the continuous reuse of sewage to wash visceral organs, promoting risk of contamination by gastrointestinal pathogens (Igwe, 2000). The standards of operations observed in this facility are quite disgusting and require immediate governmental intervention (Table 3). However, there is no supply of electricity in the abattoir, which is indispensable if an upgraded, mechanized slaughter practice should be embraced by this facility (Akinro *et al.*, 2009; Lawan *et. al.*, 2013).

Animals are sourced from markets or bought from private owners. Animals are lined at the entrance of the abattoir and slaughtered before other animals, demonstrating little sense of inhumanity in the slaughter process. The circle of operation follows arrival of animals, slaughter (the halal way, with no stunning procedure), decapitation, flaying and removal of extremities (Plate V), all of which take place on a bare, untidy floor (Lawan *et. al.*, 2013). The carcass is then hoisted and eviscerated. Digesta and fecal content of the intestines are removed (triperly) and discarded in the abattoir (Plate IV). Deboning, dressing and splitting of the dressed carcass take place while it is still hanged to the hoisting facility (Plate I) prior to distribution. The abattoir is washed with water and detergent before closing. All operations in the abattoir take place in one building – the slaughter hall.

Though one was not seen during the entire course of visit to the abattoir, it was mentioned that there is no permanent or resident meat inspector for the abattoir, but one comes occasionally, whom they think is occasionally sent by the government to monitor activities of the abattoir. Meat inspection procedure is essentially not observed in this facility (Bello *et. al.*, 2008). When asked whether sick animals are slaughtered in the facility, the sources mentioned that sick animals are slaughtered in the abattoir but pathological changes in organs and carcasses might

sometimes prompt partial or total condemnation of the meat. Condemned meat is usually buried in the ground. For example, for animals with dog bites, the bitten site is removed and discarded whereas for snake bites, the whole animal is condemned for consumption. During the course of this survey, no disease record was observed in this facility. As to previous disease record, there is no documented information regarding specific diseases encountered routinely in the abattoir, but partial condemnation is a common practice.

6.0 CONCLUSION

Abattoirs are indispensable to stable public health. Unhygienic practices in such facilities potentiate the possible risk of consumers contracting resistant and even fatal bacterial, parasitic and viral infections. If not promptly handled, poor hygienic meat handling behavior and absence of meat inspection may lead to serious point of transmitting diseases to the general populace. In addition to proper infrastructural design, an ideal abattoir administration should constitute a veterinarian, which are obviously not the case with this facility. Therefore, production of meat under such conditions may harbor great health hazard. It is quite imperative that relevant stakeholders intervene to ensure safety of meat and meat products produced from abattoirs for human consumption by providing special training programs to butchers in animal handling and proper bleeding, enforcement of antemortem and postmortem inspection, ensuring safe handling of sewage and waste, cleaning, washing and disinfection procedures.

However, poor managerial approach, lack of adherence to legislations, inadequately-trained personnel, obsoletely designed abattoirs and by passing of meat inspection, as observed in this slaughter facility, are common to local abattoirs in Nigeria. These have contributed immensely to the transmission of drug resistant infectious agents and therefore pose threat to food security and public health. Therefore, to ensure the safety of food and public health, it is imperative that federal, state and local authorities enforce legislations on meat handling and good sanitary standards in abattoirs. Meat inspection is a key procedure in meat processing and therefore needs to be enforced

alongside constituting the right administrative teams in abattoirs. Proper infrastructural design, professional training of personnel and provision of clean water, electricity and viable drainage networks are key to ensuring smooth and safe cycle of abattoir operations in Nigeria.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the guidance of Professor Mohammed Bello and Dr. M. K. Lawan of Department of Veterinary Public Health and Preventive Medicine, Ahmadu Bello University, Zaria, Nigeria as well as the staff and management of Malumfashi Abattoir.

REFERENCES

- Adeyemo, K. O. (2002). Unhygienic operation of a city abattoir in South-western Nigeria: environmental implication. *African Journal of Environmental Assessment and Management*, 4(1): 23-28.
- Akinro, A. O., Ologunagba, I. B. & Yahaya O (2009). Environmental implication of unhygienic operation of a city abattoir in Akure, Western Nigeria. *Journal of Engineering and Applied Sciences*. 4(9): 61-63.
- Aliyu, J., Ibrahim, A. A. & Abba Aja, H. K. (2008). The effect of livestock slaughter on fetal loss and disease incidence in Maiduguri Abattoir. *Techno-Science Africana Journal* 2(1):15-22.
- Bello, M., Lawan, M. K., Dzikwi, A. A., Maikai, B. V., Imam, J. & Sanusi, M. (2008). Abattoir conditions in Nigeria and public health significance under sustainable food security. *Book of Abstracts: International Conference of Science and Technology, Held 28th- 30th October, 2008 at University of Abuja Conference Hall, Nigeria*. Pp 88.
- Codex Alimentarius, (1993). Code of Hygiene practice for meat (CAC/RCP 58- 2005) http://www.codexalimentarius.net/download/standard/10196/cxp_058e Retrieved 2010-02-11.
- Dandago, M. A., Farouk, S. U. and Igwe, E. C. (2009). Evaluation of slaughter practices in Kano Abattoir. *Techno Science Africana Journal*, 3(1) 28-31.

- Declan, J. B., Alice, M. D. & James, J. S. (2004). Beef HACCP: Intervention and nonintervention system. *International Journal of Food Microbiology*, 66 (1-2) 119-129.
- Fonseca, L. F. L. (2000). Concentration of hardness, alkalinity and nitrate in water used for cleaning milk equipment in Brazilian dairy farms, *Proceedings of 10th International Society for Animal Hygiene* 2-6 July 2000. Maastricht Netherlands. Pp 100-103.
- Food and Agricultural Organization. (1992). Construction and operation of medium-sized abattoirs in developing countries. In: 97th *Animal Production and Health Paper*. Pp 1-104.
- Gracey, J., David, S. C. & Robert, H. (1999). *Textbook of Meat Hygiene* 10th edition. Bailliere Tindall, England. Pp 102-260.
- Igwe, E. C. (2005): Adamawa State Meat Industry. In *Agriculture in Adamawa State*. Edited by Igwe, E. C., S. I. Mshelia, S. I. & Jada, M. Y. Paraclete Pub. Yola. ISSN: 978-8055-26-5
- Igwe, E. C. & Yakubu, B. (2000). *Animal Slaughter Characteristics: Implications for the future of Beef production and Peoples' nutrition*. Proc. 5th Ann. Conf. Animal Science Assoc. of Nigeria. Port Harcourt, Nigeria. September, 2000.
- Ikeme, A. I. (1990). *Meat Science and Technology: A Comprehensive approach*. African FEP Publishers, Onitsha Kano Abattoir (2008). Record of daily activities. Unpublished
- Lawan, M. K., Bello, M, Kwaga, J. K. P. & Raji, M. A. (2013). Evaluation of physical facilities and processing operations of major abattoirs in North-western states of Nigeria. *Sokoto Journal of Veterinary Sciences*, 11 (1) 56-61. <http://dx.doi.org/10.4314/sokjvs.v11i1.9>
- Magajia, A. A., Ibrahim, K., Saulawa, M. A., Salihu, M. D. & Mohammed A. A. (2013). Prevalence of giardiasis in cattle slaughtered in Sokoto metropolitan abattoir, Sokoto, Nigeria. *Scientific Journal of Veterinary Advances* (2013) 2(6) 76-82. ISSN 2322-1879
- Muhammad, I. R., Rabi, A. & Abdullahi, A. Y. (2007). Implications of slaughter of pregnant Ewes and Does to future livestock in semi-arid urban abattoir. *Journal of Animal and Vet. Advances* 6(6):819-822.
- Obanu, Z. A. (1986). Losses and their control in the meat industry. Paper Presented at National workshop on postharvest food losses and their control. University of Nigeria, Nsukka.
- Okoli, C. G., Okoli, I. C., Okorundu, U. V. & Opara, M. N. (2006). Environmental and public health issues of animal food products delivery system in Imo state, Nigeria. *Online Journal of Health and Allied Science*, .5(2)2.