

Assessment of abattoirs operations and hygiene practices in Obio-Akpor Local Government Area, Rivers State, Nigeria

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Abstract

A survey was conducted to appraise the location, infrastructures, and slaughter operational activities in three abattoirs at Rumuokoro, Trans-Amadi and Rumuosi in Obio-Akpor Local Government Area of Rivers State, Nigeria. Thirty butchers of 10 per abattoir were purposively sampled for the study. The instrument used for data collection was a structured questionnaire. Data were analyzed using frequencies, percentages and mean statistics. Results of the socio-demographic characteristics of the butchers revealed that they were all males, married, within the age of 35 - 44 years, literate, with a butchering experience of 16 years upwards in private or public/Government owned abattoirs. The slaughter houses were located in areas devoid of bad odours, smoke, dust and close to coastal areas affected by tides to promote good sanitation. There were no adequately constructed lairages, Ante-mortem inspection and isolation pens were inadequate. There were no facilities and rooms for handling hides and skins, treatment of inedible and condemned carcass and meat. Animals were poorly restrained and not stunned before slaughtering. The slaughter houses had planned and controlled cleaning programs but lacked efficient disinfection operations and this will contribute to bacterial contamination of carcasses. The operational lapses by butchers were due to the use of obsolete facilities that lacked maintenance and inadequate supervision. This condition had brought about poor hygienic practices that undermine the quality of carcasses. The recommendations proffered are: the provision and maintenance facilities for effective operations to ensure carcass quality, to adequately enforce enacted laws on abattoir operations, there should be enlightenment for butchers and meat sellers, and there should be effective management of the wastes from slaughterhouses through regular fumigations and disposal systems.

Keywords: Abattoir, infrastructures, slaughter operations, hygiene and meat quality

Introduction

Abattoirs, slaughter houses or meat plants (Sharma, 2002) are described as any suitable sites that are officially permitted and registered by the controlling authority in which animals are slaughtered and dressed for human consumption (Codex Alimentarius, 1993). The major reason for establishing an abattoir, slaughterhouses or meat plants is to produce hygienically prepared meat through the compassionate handling of the animal using hygienic techniques for slaughtering and dressing (FAO, 1992). In abattoir operations, certain mandatory programmes have to be

considered to provide basic environmental and operating conditions that are necessary for production of safe food. These prerequisite programmes include good animal handling practices, good hygiene practice and standard operating procedures (Declan *et al.*, 2004). In addition are the needs for remoteness from local housing and other developments to avoid complaints about noise and smell, good quality stock nearby, soil suitable for good foundations including pilling, freedom from flooding, and sufficient space for possible expansion. Similarly, the components of an abattoir and other

services should include: lairage, slaughter hall, gut and tripe room, detained meat room, offal room, condemned meat room, hide and skin room. Others include cutting room, refrigeration room, supply of hot and cold water under pressure, veterinary inspection room, disinfection facilities, personnel welfare room, veterinary office, and facilities for condemned meat offal or carcass disposal; incinerator, chemical treatment and disposal, etc. Substandard and unmaintained abattoir infrastructures will seriously hamper standard operations for the production of safe and wholesome meat and meat products for human consumption, thereby, posing problems of meat hygiene and thus, endangering human health (Lawan, *et al.*, 2013). Consequently, there are some unacceptable practices undertaking in abattoirs during the slaughter process of animals that result in meat contamination that allows the transmission of pathogens and poor meat quality. This may be attributed to inadequate infrastructure/equipment, inadequate pre-slaughter and slaughter procedures, poor hygiene, lack of ante and post mortem inspection, and inadequate training for butchers and meat handlers. Hence, poor meat inspection and carcass handling methods in abattoirs in Obio-Akpor Local Government Area of Rivers State could possibly contribute to the risks of transmission of diseases to humans and meat contamination and quality. There are no documented information on the location and facilities and slaughter operations and hygiene on the quality of meat in Obio-Akpor Local Government Area of Rivers State, Nigeria. This study is therefore conducted to appraise the locations and infrastructures in abattoirs, their slaughtering operations and hygiene on meat quality in this geographical area in Nigeria.

Materials and methods

Research design

This study was a survey research conducted to appraise the location and infrastructures, operational facilities and activities in three abattoirs, located in Obio-Akpor Local Government Area (LGA) of Rivers State, Nigeria.

Population of the study

The population of the study consists of 30 butchers purposively selected as members of the Rivers State Butchers Association of Nigeria in three abattoirs located at Rumuokoro, Trans-Amadi and Rumuosi in Obio-Akpor Local Government Area of Rivers State, Nigeria.

Study sample and sampling technique

A total of 30 butchers were purposively selected to represent the sample population for the study. Ten (10) butchers were selected per abattoir.

Research instrument

The instrument used for data collection in the course of this study was a structured questionnaire to elicit information on the site/location and infrastructural facilities/equipment in relation to adequate design of buildings and fixtures, the adequacy of pre-slaughter, slaughter and carcass handling procedures and the extent of sanitation and hygiene. The questionnaire comprised of three sections. Section A was used to provide information on the socio-demographic characteristics of the butchers. Section B was used to elicit information on the site/location and infrastructural facilities/equipment in the abattoirs. Section C was used to elicit information on the pre-slaughter, slaughter and carcass handling procedures in the abattoirs. Section D was used to provide information on the extent of sanitation and hygiene, lack of ante and post mortem inspection, and inadequate training for butchers and meat handlers in the abattoirs. The question items in Sections B, C and D

of the questionnaire were responded to on a 4-point Likert scale of Strongly Agree (SA) – 4; Agree (A) – 3; Disagree (D) – 2 and Strongly Disagree (SD) – 1.

Data analytical procedure

Data were analyzed using frequencies, percentages and mean statistics with the mean established at 2.5 (i.e. the 4 i.e. $4 + 3 + 2 + 1 = 10$ divided by 4). Any item having the mean of 2.5 and above was considered as an “Agreed response” while one with the mean less than 2.5 was considered as a “Disagreed response” respectively, for the responses to the question items on Sections C and D. The responses reported by the respondents (butchers or abattoir workers) were further substantiated by personal observations by the researcher.

Results and discussion

Socio-demographic characteristics of the butchers

Table 1 shows the socio-demographic characteristics of the respondents (butchers or abattoir workers) used in the study. The results obtained revealed that greater proportions (100%) of butchers in the slaughters were all males and majority of them were married (83.3%). Similarly, a greater number of the butchers (46.7%) were engaged in the various slaughter operations in the abattoirs investigated fell within the age brackets of 35 - 44years and majority of them were reported to be literate (66.7%). As regards the scale of slaughtering operations undertaking (i.e. the number of animals- cattle, sheep and goats slaughtered per day), small scale slaughtering (66.7%) operations was reported to be carried out in these slaughter houses. On the contrary it was reported that large scale (33.3%) slaughtering operations also took place but this was carried out at

the only Government and public/central abattoir located at the Trans-Amadi municipality, within the Port Harcourt city LGA of Rivers State. Out of the butchers (abattoir workers) used during the investigation a large proportion (33.3%) reported to have a butchering experience of 16 years and above as against those that reported a butchering experiences of 6-15years (26.7%) and 1-5years (13.3%) respectively. However, some of the socio-demographic characteristics observed among the abattoir workers are in agreement with those reported by Abdullahi, *et al.* (2016), who reported that majority of abattoir workers in Malaysia were males with a mean age of 40 years, married and had a secondary school education, which implied that they were literate.

The Site/Location and infrastructural facilities/equipment of Abattoirs in Rivers State

Table 2 provides the responses of the respondents as it relates to the site or location and availability of infrastructural facilities or equipment in abattoirs in Rivers State. Personal observations by the researcher were in agreement with the responses of the respondents which revealed that the slaughterhouses in Rivers State were located in areas free from bad odours, smoke and dust. They were located close to coastal areas affected by tides to promote good sanitation as well as in areas with tarred dust-free access road connecting them. They were also separated from industrial, crop farms and residential buildings. This is in agreement with the requirements of the Meat Safety Act (2000) and KEBS (2017) that slaughterhouses, abattoirs or meat plants should be located in

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Table 1: Socio-demographic characteristics of Respondents

Question item	Response	No. of Respondents	Percentage
Sex	Male	30	100
	Female	0	0
	Total	30	100
Age	Below 24 years	0	0
	25 – 34 years	6	20
	35 – 44 years	14	46.7
	45 years and above	10	33.3
	Total	30	100
Educational status	Illiterate	10	33.3
	Literate	20	66.7
	Total	30	100
Scale of slaughtering	Small scale	20	66.7
	Large scale	10	33.3
	Total	30	100
Years of Experience	1 – 5 years	4	13.3
	6 – 10 years	8	26.7
	11 – 15 years	8	26.7
	16 – 20 years	10	33.3
	Total	30	100

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an area which is reasonably free from objectionable odours, smoke and dust. On the contrary, abattoir workers disagreed in their responses by revealing that their slaughters have properly built and drained lairage with good races or fence that takes the animal to the place of slaughter and that the lairages erected are slightly separated within a few distance from the slaughter area and equipped with adequate facilities for ante-mortem inspection and isolation pens for sick animals. There were further disagreements to the fact that slaughters have separate facilities for handling hides and skins, separate rooms for the cleaning and treatment of intestines and offal as well as those for the storage, disposal and treatment of inedible and condemned animals, carcass and meat. The results of this study are in disagreement to the basic requirements for facilities in standard abattoirs prescribed by KEBS (2017). However, the results of the study are in agreement with the deplorable state of most abattoirs in Nigeria reported by Lawan *et al.*

(2013) in their study while evaluating the physical facilities and processing operations of major abattoirs in the North-western geo-political zones of Nigeria. The result of their assessment of abattoirs in these areas showed that most of the facilities present in them such as the lairage, slaughter hall, gut and tripe, cold room, hide and skin room, veterinary laboratory, condemned and detained meat room were not in functional state and thus were graded either as absent, poor or unsatisfactory. However, the non-availability or non-functionality of some facilities especially the installation of cool rooms may be attributed to the scale of slaughtering of animals in the abattoirs as most butchers attached less importance to the use of cold rooms on the grounds that animals were slaughtered and processed into carcasses and marketed to consumers the same day and therefore there may be no need to store meat (Lawan *et al.*, 2013). The workers agreed that the surfaces used for placing the carcasses and meat were impervious and

can easily be cleaned. The workers however, disagreed that the slaughter houses had properly constructed walls and floors with sanitary bumpers to prevent damage by movable equipment and disagreed that their slaughterhouses had stunning facilities. There was no stunning facility in the abattoirs in Rivers State. This observation is also true of abattoirs in Jos

South Plateau State, Nigeria (Tekki *et al.*, 2012). Thus, instead of the use of conventional methods of handling animals by stunning, alternative methods are adopted where animals were physically “wrestled down” after much struggle to immobilize the animals prior to slaughtering in all the abattoirs in Rivers State (Akpabio *et al.*, 2015).

Table 2: Site/Location and infrastructural facilities/equipment of Abattoirs in Rivers State

ITEM	1	2	3	4	ΣF	N	X	Decision
Slaughterhouses are located in areas free from bad odors, smoke and dust	0	0	12	18	108	30	3.6	Agree
Slaughterhouses are located close to coastal areas affected by tides to promote good sanitation.	0	0	10	20	110	30	3.7	Agree
Slaughterhouses have a properly tarred dust -free access road connecting to it.	0	0	10	20	110	30	3.7	Agree
Slaughterhouses are separated from industrial, crop farms, residential building and to the building used for the processing of the meat.	0	0	20	10	100	30	3.3	Agree
Slaughters have properly built and drained lairage with good races or fence that takes the animal to the place of slaughter.	8	12	8	2	64	30	2.1	Disagree
The lairage erected is slightly separated within a few distance from the slaughter area and equipped with adequate facilities for ante -mortem inspection and Isolation pens for sick animals.	8	20	2	0	54	30	1.8	Disagree
Slaughters have separate facilities for handling hides and skins.	12	18	0	0	48	30	1.6	Disagree
Slaughters have a separate room for the cleaning and treatment of intestines and offal.	12	18	0	0	48	30	1.6	Disagree
Slaughters have a separate room for the storage, disposal and treatment of inedible and condemned animals, carcass and meat.	12	18	0	0	48	30	1.6	Disagree
The surfaces used for placing the carcasses and meat are impervious, can be easily cleaned and is resistant to wear and corrosion.	0	0	14	16	106	30	3.5	Agree
Slaughters have properly constructed walls and floors with sanitary bumpers to prevent damage by movable equipment.	4	6	12	4	66	30	2.2	Disagree
Slaughters have stunning facilities.	20	10	0	0	40	30	1.3	Disagree

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Pre-slaughter, slaughter and carcass handling procedures in Abattoirs in Rivers State

Table 3 provides the responses of the respondents as it relates to the pre-slaughter, slaughter and carcass handling procedures

for animals in abattoirs in Rivers State. The abattoir workers disagreed that the animals they slaughter suffer from pre-slaughter stresses such as bruises, injuries, tiredness, food and water deprivation, loading and unloading into vehicles and long distance

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transportation before they are slaughtered. The prevention of this practice or condition by abattoir workers and their subsidiaries may be due to the fact that they understand and agree with the reports of Lawrie and Ledward (2006) that with higher levels of stress poorer meat quality is eminent. Furthermore, apart from the fact that the subjection of animals prior to their being slaughtered is an inhumane practice or infringes with the welfare of the animals, it may likely affect meat condemnation during inspection and ultimately the preference by consumers (Broom, 2000). Conversely, the abattoir workers agreed that animals are not properly restrained and stunned before they are slaughtered thereby compromising their welfare that portrays

bad handling practices, since at most times the animals are first 'cast' to the ground, using ropes and/or chains (Babatunde, 2011) or physically "wrestling down" the animals (Akpabio *et al.*, 2015), especially for cattle before slaughtering. This practice may not be too far from the fact that these facilities are not available and workers may resort to alternative cruel methods that may compromise the quality of meat produced at the long run. The carcasses were properly eviscerated and washed before splitting. However, the respondents disagreed that the slaughterhouses in Rivers has good refrigeration facilities and this may be attributed to poor electricity supply as was also reported by Akpabio *et al.* (2015) while assessing facilities and slaughter practices in Aba abattoir in Abia State, Nigeria.

Table 3: Pre-slaughter, slaughter and carcass handling procedures in Abattoirs

ITEM	1	2	3	4	ΣF	N	X	Decision
Animals suffer from pre-slaughter stresses such as bruises, injuries, starvation and tiredness before they are slaughtered	14	16	0	0	46	30	1.5	Disagree
Animals suffer from pre-slaughter stresses such as water and food deprivation, loading and unloading onto vehicles and long distance transportation before they are slaughtered	16	12	0	2	48	30	1.6	Disagree
Animals are not properly restrained and stunned before they are slaughtered	2	2	18	8	92	30	3.1	Agree
Animals' welfare is compromised because of bad handling	2	8	12	8	86	30	2.9	Agree
The butchers say there Muslim prayers before slaughter of animals	0	0	8	22	112	30	3.7	Agree
Animals are first 'cast' to the ground, using ropes and/or chains, especially for cattle before slaughtering	0	0	6	24	114	30	3.8	Agree
The carcass is properly eviscerated and washed before splitting	0	0	18	12	102	30	3.4	Agree
The slaughter has good refrigeration facilities	12	18	0	0	48	30	1.6	Disagree

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Sanitation and hygiene, post mortem inspection, and training for butchers and meat handlers in abattoirs in Rivers State

Table 4 provides the responses of the respondents as it relates to the extent of sanitation and hygiene, post mortem inspection, and training for butchers and

meat handlers in abattoirs in Rivers State. The abattoir workers agreed that their slaughterhouses have regular well-planned and controlled cleaning and sanitation program. This was in agreement to the observation by the researcher who confirmed the regular compulsory

sanitation exercise carried out every Thursdays on a weekly basis instituted by the Government authorities of the Ministry of Environment in Rivers State. The respondents agreed that their slaughterhouses lacked efficient sanitation and proper disinfection program and this can contribute to bacterial contamination of carcasses. They further reported that poor faecal matter (animal dungs) handling is a major source of contamination of carcasses through direct or indirect means. This was observed as slaughtering was done on the floor. This practice is an agreement with the reports by Tekki *et al.* (2012) who explained that slaughtering of animals on the floor is one of the myriads of problems of meat handling procedures in most abattoirs of Nigeria that can contaminate carcasses. Similarly, Lawan *et al.* (2013) explained that in Kano, Sokoto and Zango abattoirs, flaying, evisceration and splitting of carcass were carried out on unhygienic floors (concrete) and such practice increases the chances of carcass contamination and consequently the production of unsafe meat. The butchers disagreed that their slaughterhouses lacked good sewage or waste disposal systems. However, it was observed that although these facilities were made available, based on the researcher's judgment, they were not properly built and they lacked adequate maintenance. The sewage and waste disposal systems based on observations was an ugly site of heaps with vultures and rodents running around them and these may constitute serious environmental and public health hazards. In agreement to the researcher's observations at the abattoirs investigated in Rivers State is the seriousness of the likely environmental and health problems reported by Oruonye (2015) in abattoirs at Jalingo metropolis in Taraba State, Nigeria, where isolated species of pathogenic bacteria from the

solid waste and effluents from abattoirs has been reported. Similar reports by Adeyemo (2002) revealed that abattoir waste piled up within the environment not only caused pollution but can also produce methane gas that will intensify greenhouse effects. It has also been reported that the piled up waste could be washed away by surface runoff to contaminate ground and surface waters including market places and streets (Abiade- Paul *et al.*, 2006). They also disagreed that their slaughterhouses lacked adequate clean water supplies. This is because in all the abattoirs investigated bore holes were installed as a means of portable water supply. This is contrary to the studies by Akpabio *et al.* (2015) who observed that there is no functional pipe borne water and the butchers' source water from nearby river for washing carcasses in the Aba abattoir. The butchers do not have poor knowledge of meat processing and hygiene as well as a poor knowledge of environmental hygiene that can compromise public health. They disagreed that butchers had poor knowledge of environmental hygiene that can compromise public health and that the animals built for slaughtering lacked ante and post mortem inspection as well as keep record of prevalent diseases that occurs within the slaughter. They agreed that they had regular sensitization and training programmes on meat handling procedures and hygiene. From the researcher's observations the respondents have a fair knowledge of the intricacies involved in their operations, but have attributed their operational lapses to the use of obsolete facilities that lacked room for modification and maintenance, inadequate supervision of operations such as animal handling, slaughter and processing and lack of proper meat inspection. Other lapses include, the non enforcement of state legislations on slaughter sanitation, local government

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authorities only interested in revenue collection rather than good management and maintenance, managers or owners of private slaughters often not properly trained

or committed, inconsistent government policies and funding, and non existence of insurance or compensation schemes for butchers (Tekki *et al.*, 2012).

Table 4: Extent of sanitation and hygiene, lack of ante and post mortem inspection, and training for butchers and meat handlers in the abattoirs

ITEM	1	2	3	4	ΣF	N	X	Decision
Slaughterhouses have a regular well-planned and controlled cleaning and sanitation program.	4	6	10	10	86	30	2.9	Agree
Slaughterhouses lack efficient sanitation and improper disinfection program that can contribute to bacterial contamination of carcasses.	0	2	20	8	96	30	3.2	Agree
Poor faecal matter (animal dungs) handling is a major source of contamination of carcasses through direct or indirect means.	0	0	12	18	108	30	3.6	Agree
Slaughters lacks good sewage or waste disposal systems.	8	10	6	6	70	30	2.3	Disagree
Slaughters lack adequate clean water supplies.	18	12	0	0	42	30	1.4	Disagree
Butchers have a poor knowledge of meat processing and hygiene.	8	10	8	4	68	30	2.3	Disagree
Butchers have poor knowledge of environmental hygiene that can compromise public health.	8	10	8	4	68	30	2.3	Disagree
There is lack of ante and post mortem inspection of animals in our slaughterhouse.	8	6	12	4	72	30	2.4	Disagree
Butchers/meat inspectors do not keep record of prevalent diseases that occurs within the slaughter.	10	10	6	4	64	30	2.1	Disagree
Butchers have regular sensitization and training programmes on meat handling procedures and hygiene.	10	16	4	0	80	30	2.6	Agree

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Conclusion

The socio-demographic characteristics of the butchers in the abattoirs in Rivers state revealed that all the butchers were male with majority of them married within the age of brackets of 35 - 44years and literate with a butchering experience of 16 years and above, engaged in both small and large scale slaughtering operations carried out in the private abattoirs public/Government owned abattoirs, respectively.

The operational lapses by butchers were due to the use of obsolete facilities that lacked maintenance and inadequate supervision. This condition had brought about poor hygienic practices that undermine the quality of carcasses. The recommendations proffered by this study are: the provision and maintenance facilities for effective operations to ensure carcass quality; to adequately enforce

enacted laws on abattoir operations; there should be enlightenment for butchers and meat sellers, and there should be effective management of the wastes from slaughterhouses through regular fumigations and disposal systems.

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