



ASSESSMENT OF VETERINARY INSPECTION PRACTICES ON QUALITY OF BEEF PRODUCED IN IBARAPA CENTRAL LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

Oyediran, Wasiu Oyeleke¹

¹Department of Agricultural Extension and Rural Development, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria

ABSTRACT

Beef is an important animal protein source in Nigerian diet and its quality depends on intrinsic and extrinsic attributes. Hence, this study was carried out to assess veterinary inspection practices on quality of beef produced in Ibarapa Central Local Government Area of Oyo State, Nigeria. The findings of this study showed that the butchers were young with mean age of 40.51 years and 95.70% were males. All the respondents strongly agreed that facilities such as lighting, carcass carriers, security fence and cooling facilities had never been provided in the study area. The result also showed that 45.70% of the respondents always cleaned the abattoir's environment once in a week or at month end, and dungs and wastes were dumped around the abattoir. None of the respondents neither hang the beef in the open air nor put it in a deep freezer but always displayed the beef on the table for customers to see. However, all the respondents allowed customers to touch the beef. It was revealed that ante-mortem inspection was always carried out by the Veterinary Officers attached to the abattoirs. The prominent challenges to quality of beef produced are lack of essential infrastructure, training and workshop for the butchers on hygiene practices and use of modern processing equipment. It can be concluded that beef production is a lucrative venture in the study area but the hygiene practices is below Codex Alimentarius recommended standard. It is hereby recommended that the veterinary officers should intensify effort on ante-mortem and post-mortem inspections while health extension workers and other stakeholders should organize a training/workshop on hygiene practices that will improve the quality of beef produced in the study area.

Keywords: Beef, Quality, Inspection, Veterinary, Practices, Produced, Animal protein.

Contribution/ Originality

This study is one of very few studies which have investigated the effects of veterinary practices on the quality of beef produced for public consumption in the rural areas. The study identified that the veterinary inspection of the beef was not comprehensive and the hygiene practices of butchers were shortcomings.

1. INTRODUCTION

Beef is the culinary name for meat from bovine especially domestic cattle. It can be obtained from other sources such as bulls, heifers or steers. The one from cows is the principal meats used in the cuisine of the Africa and it is an important protein source in Nigerian diet. The muscle meat can be cut into steak, roast or short ribs. Beef is considered as the most important and readily available source of protein for humans. In Nigeria, red meat constitutes major source of cheap animal protein for consumption in the rural and urban households. Beef quality has to do with intrinsic (i.e. tenderness, juiciness, flavour, appearance, nutritive value and safety) and extrinsic attributes (i.e. production, processing, transportation and retailing practices) depending on consumers and culture of a community or nation [1]. Beef is however poorly handled right from slaughtering, transportation and trading of the meat. Poor handling and inspection of beef produced is one of the most important causes of human deaths worldwide as a result of contaminants [2]. Many of the recent zoonotic infections have originated from animal or from products of animal origin [2]. Beef contains sufficient nutrients needed to support the growth of micro-organisms [3]. Poor abattoir hygiene and sanitation measures and absence of surveillance network on meat borne diseases also contributes to risks associated with meat borne zoonoses [2]. High rainfall pattern and humidity in Southwest Nigeria facilitate rapid microbial growth in beef, deterioration and meat borne diseases. It was reported that retail raw meats are often contaminated with foodborne pathogens [4]. Bacterial pathogens contribute to 60% of foodborne illnesses that lead to hospitalization and account for nearly two-thirds of the estimated number of foodborne pathogen-related deaths. Thus, beef inspection exercise becomes necessary in the overall system of monitoring endemic animal diseases and verification of level of compliance with animal welfare standards. It will help in early identification of potential problems that can inhibit animal health and quality of beef that is produced for human consumption. The main objective of beef inspection is to prevent the public from consuming infected and sick animals. Traditionally, inspection is done to detect and prevent public health hazards arising from food-borne diseases such as *Listeria monocytogenes*, *Escherichia coli*, *Campylobacteriosis salmonellosis*, *Salmonella typhimurium* etc. and chemical contaminants like steroids, veterinary drug residues, and additives among others [2]. Abattoir practices and more specifically veterinary inspection procedures along with welfare of animals therefore, need to be looked into in Ibarapa Central Local Government Area of Oyo State, Nigeria.

1.1. Specific Objectives are to

- i. ascertain socio-economic characteristics of respondents in the study area
- ii. assess the respondents' perception on facilities provided in the abattoirs in the study area
- iii. describe the beef hygiene practices commonly used by the respondents in the study area
- iv. identify various veterinary inspection practices in the study area
- v. identify problems to beef production business in the study area

1.2. Hypotheses

H₀₁: There is no significant relationship between the beef hygiene practices and veterinary inspection in the study area

H₀₂: There is no significant association between the socio-economic characteristic of the respondents and beef hygiene practices in the study area

2. MATERIALS AND METHODOLOGY

2.1. Sampling Procedure and Sample Size

The study was carried out in Ibarapa Central Local Government Area of Oyo State, Nigeria. There are butchery activities in strategic places in Igboora, the Local Government Headquarters. Part of beef produced in this community is normally taken to customers in the neighbourhood communities and villages (e.g. Eruwa, Lanlate, Maya, Alaagba etc.). Beef production is a very popular business in Igboora because there is high market demand for it. Also, a medium cow market is located at one of the entrances to the town for easy access in purchasing cows and in enhancing mutual business relationship among stakeholders. A multi stage sampling technique was used in selecting respondents for this study. There are ten wards in Ibarapa Central Local Government Area. Thirty percent of the wards were randomly selected (Pako/Igbole, Oke-Iserin and Isale-Oba). In the second stage one major abattoir was purposively selected from each of these wards (Oja-Pako, Oja-Igboora, and Odo-Eran abattoirs). 40 butchers were purposively selected from Oja-Igboora being the largest abattoir in the area while 15 butchers each were selected from Oja-Pako and Odo-Eran abattoirs to make up a total of 70 respondents for this study.

2.2. Data Collection Method

Interview guide was used to collect data from the respondents. The instrument was subjected to face validity by consulting experts in the field of Agricultural Extension and Rural Development. Items found ambiguous were removed. Test-retest was carried out at two weeks interval with ten butchers in Tapa community in Ibarapa North Local Government Area of Oyo State to ascertain the reliability of the instrument. A reliability coefficient of 0.78 was obtained. Since the reliability coefficient of 0.75 and above is termed reliable, it is adduced that the instrument used for this study was reliable.

2.3. Measurement of Variables

Age, years of experience and incomes were measured at ratio level while sex, educational level, and marital status were measured at nominal level. Beef inspections and Hygiene practices were measured using 3 indicators as AP – Always Practised, OP – Occasionally Practised, NP – Not Practised. Responses on the facilities in the abattoir were obtained with a self-constructed statements using 5 points Likert scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). Problems to the beef production were ranked by the respondents based on the degree of severity.

2.4. Method of Data Analysis

Data collected from this study were subjected to both descriptive statistics such as percentage, mean and frequency distribution. Chi-square and Pearson Product Moment Correlation (PPMC) were used for the hypotheses testing.

3. RESULTS AND DISCUSSION

3.1. Socio-Economic Characteristics of Respondents

In Table 1, the result revealed that 58.60% of the respondents were between 31 – 40 years while only few (12.90%) of the respondents were above 50 years of age. The mean age of the respondents was 40.51 years and the standard deviation was 8.15. The findings of this study showed that the butchers are young and they are within economic active part of population which is known to be innovative. Most (95.70%) of the respondents were males while very few (4.30%) of the respondents were females. Males dominate the butchery activities in the study area. This is not unconnected to that fact beef production requires men who are brave, strong and smart because of aggressive nature of animals they handle which may sometimes want to go out of hands. Women do the washing, cleaning and sales of intestines and hides. Majority (74.30%) of the respondents attended secondary school education while 7.10% of the respondents had tertiary education. This shows a high level of literacy among the butchers which can be used to facilitate the rate of learning and adoption of better butchery practices in the study area. The mean year of butchery was 11.23 years while the standard deviation was 2.75. The result also showed that 71.40% of the respondents had spent more than 10 years in beef production while just only 2.90% of the respondents engaged in beef production in less than 5 years. This is an indication that beef production is not a new practice to the people in the study area. The income per day ranges from ₦10,000.00 to ₦30,000.00 and above. The result shows that beef production is not a minor livelihood activity going by the income realized in the study area.

3.2. Facilities in the a Battoir

The result in Table 2 showed that more than half of the respondents strongly disagreed that the distance of the abattoir to market place is too far. About forty-five percent of the respondents

agreed that clean and stable water is available while very few of the respondents disagreed (mean = 3.90, SD = 1.08). The reason for disagreement may be due to the fact that hand pump borehole water and water from flowing river are being used in the abattoirs for washing and cleaning the beef.

Table-1. Socio-economic characteristics of respondents (n = 70)

Variables	Frequency	Percentage	Mean	Std. deviation
Age				
≤ 30	04	5.70	40.51	8.15
31 – 40	41	58.60		
41 – 50	16	22.80		
> 50	09	12.90		
Sex				
Male;	67	95.70		
Female	03	4.30		
Years of experience				
≤ 5	02	2.90	11.23	2.75
6 – 10	18	25.70		
> 10	50	71.40		
Educational status				
No formal education	0	0.00		
Primary education	13	18.60		
Secondary education	52	74.30		
Tertiary education	05	7.10		
Marital status				
Single	04	5.70		
Married	56	80.00		
Divorced	10	14.30		
Income (₦/day)				
≤ 10,000.00	02	17.10	18,157.00	78.21
11,000.00 – 20,000.00	40	57.20		
21,000.00 – 30,000.00	11	15.70		
> 30,000.00	07	10.00		

Source: Field survey, 2014

Also, many of the respondents agreed on the quality of concrete slab while some of the respondents disagreed on the ground that it is too old and have fractures (mean = 3.44, SD = 1.24). [Erick, et al. \[5\]](#) reported that many abattoirs and slaughter slabs in developing countries are poorly constructed, have poor slaughter and meat inspection facilities while qualified meat inspectors are always inadequate.

Table-2. Respondents' perception on the facilities in the abattoirs (n = 70)

s/n	Statements	Mean	Std. Dev.
i.	The abattoir is too far from major markets	1.50	0.63
ii.	Adequate clean and flowing water for washing the beef and slab	3.90	1.08
iii.	A well-constructed concrete slab	3.44	1.24
iv.	A well-constructed wall and roofing in the abattoir to prevent cross contamination	1.09	0.28
v.	Good lighting for slaughtering and inspection	1.00	0.00
vi.	Carcass carriers are not available	5.00	0.00
vii.	The abattoir is adequately fenced for security purpose	1.00	0.00
viii.	Cooling facilities are not provided	5.00	0.00

Most of the respondents strongly disagreed (mean = 5.00, SD = 0.00) on wall and roofing because it was not in existence in the study area. However, oil-palm trees are being used as sheds. All the respondents strongly agreed (mean = 1.00, SD = 0.00) that facilities such as lighting,

carcass carriers, security fence and cooling facilities had never been provided in the study area. This result corroborates the findings by Joshi, et al. [6] in India that facilities are grossly inadequate in the slaughter houses.

3.3. Beef Hygiene Practices by the Respondents

Most (80.00%) of the respondents always clean their equipment before and immediately after use to remove blood stains. Asse, et al. [7] mentioned that slaughtered animals may harbour relatively few bacteria, but the meat surface is exposed to contamination during slaughter, evisceration, and other operations after slaughter that can lead to contamination of beef. Cleaning is done to minimize contamination of the beef to be sold. All the respondents always sharpened their knives and machetes for easy cutting and piercing of the cow but none of the butchers always put on their overall coat. 85.70% of the respondents always washed the animal blood to gutter after slaughtering to reduce unpleasant odour. Many (45.70%) of the respondents always cleaned the abattoir environment while 18.60% of the respondents did not care to clean their surroundings at the commencement of daily business, they usually do sanitation once in a week or month end. Meanwhile none of the respondents buried the dungs and wastes. It was deposited in an open place thereby constituting nuisance with unpleasant odour in the area. The implication is that the more the dungs and wastes are piled up the more irritating the odour and discomfort to the people around the abattoirs especially when there is rainfall. Codex Alimentarius recommended that all areas and equipment in the abattoir should be designed and built to allow good hygiene practices. Beef contamination will be prevented through effective cleaning, sanitation and maintenance which can be done during and between functional periods. Separate rooms should be designed for different purposes such as emptying and cleaning of alimentary tracts, keeping hide and skin, dressing and chilling carcasses and equip with necessary tools for washing hands, cleaning and sanitation of implements. Ventilation should be designed to minimize flow of air from unclean areas (slaughter and dressing areas) to clean areas (chilling room) [8]. Also, none of the respondents transported the beef in a cooling van. The reason is that cooling van is not available in the study area. However, beef were taken from abattoirs to the markets on heads in concave pans, motorcycles and open vehicles. Meat transportation system is a serious challenge to meat hygiene as transportation in motorbike and open vehicles could be a source of physical contamination because they have multiple uses such as carrying cement, timbers and any other items [2]. The practice in the study area is short of codex recommendation that vehicles should be designed and equipped so that meat does not contact the floor, have door seal that prevent entry of all sources of contamination. It should be equipped to temperature control and humidity can be maintained and monitored [8]. The result further showed that none of the respondents either hang the beef in the open air or put it in a deep freezer but always displayed the beef on the table for customers to see and negotiate the price. All the respondents always allow customers to touch the beef on the table. This is bad, uncivilized and unhygienic

practice in the study area. The reason attributed to this practice among customers is that there is no standardized measuring scale hence the pricing is based on visual and hand weighing of the beef to be purchased.

Table-3. Distribution based on beef hygiene practices by the respondents (n = 70)

Statements	Always	Occasionally	Not at all
Cleaning of the equipment with soap and plenty water before and after use	56 (80.00)	14 (20.00)	0 (0.00)
Sharpening of the cutting and piercing instruments with files	70 (100)	0 (0.00)	0 (0.00)
Wearing of coat	0 (0.00)	0 (0.00)	70 (100)
Washing off the blood to gutter after open slaughtering	60 (85.70)	10 (14.30)	0 (0.00)
Tidying up of the abattoir surrounding	32 (45.70)	25 (35.70)	13 (18.60)
Burying of dungs and other wastes	0 (0.00)	0 (0.00)	70 (100)
Transportation by cold van	0 (0.00)	0 (0.00)	70 (100)
Transportation by motorcycle	30 (42.90)	35 (50.00)	05 (7.10)
Transportation via open vehicle	12 (17.10)	20 (28.60)	38 (54.30)
Transportation by carry it on head	10 (14.30)	03 (4.30)	57 (81.40)
Display in the netted kiosk/stall	05 (7.10)	10 (14.30)	55 (78.60)
Hang in the open air	0 (0.00)	0 (0.00)	70 (100)
Display openly on the table	60 (85.70)	04 (5.70)	06 (8.60)
Put in the freezer or cold room	0 (0.00)	0 (0.00)	70 (100)
Allowing customers to touch the beef	70 (100)	0 (0.00)	0 (0.00)

Source: Field survey, 2014

Values in parenthesis are percentages

3.4. Veterinary Inspection Practices

All the respondents indicated that ante-mortem inspection was always carried out by the Veterinary Officers attached to the abattoirs. Specified amount of money is being paid by the butchers for this service. The practice concurs to codex recommendations that slaughter cow should be presented to ante-mortem inspection, where competent authority determining measures and tests to be used. This inspection should include the confirmation that animal is properly identified and tested, and considered the behaviour, appearance as well as symptoms of disease in live animals with the recognition of relevant information on slaughter population [8]. It is a necessary step which plays an important part of the process involved in the production of wholesome, safe meat. The finding of this study however contradicts the report of Thakur, et al. [2] that post-mortem practice is mainly carried out in India as there are no adequate rules backing ante-mortem inspection. Majority (70.00%) of the respondents indicated that veterinary officers occasionally carried out post-mortem inspection as well. The argument is that the ante-mortem inspection covered every operation in the abattoir. 74.30% of the respondents revealed that regular visitation to the beef shops for inspection were always done by the experts. Post-mortem inspection of meat and other relevant parts should be carried out and use information from production at farm level and ante-mortem inspection, together with the result for organoleptic inspection of the head, carcass and viscera to make decision on the safety and suitability of meat needed for human consumption [8]. It can be inferred from the findings of this

study that veterinary inspection is being carried out but more still need to be done on the post-mortem to enhance quality of beef produced in the study area. Meat quality is highly subjective issue and it depends on consumers' perception of the beef which may vary from one society to another.

Table-4. Distribution according to veterinary inspection practices (n = 70)

Statements	Always	Occasionally	Not at all
Ante-mortem inspection	70 (100)	0 (0.00)	0 (0.00)
Post-mortem inspection	21 (30.00)	49 (70.00)	0 (0.00)
Inspection of slaughtering (open)	28 (40.00)	32 (45.70)	10 (14.30)
Inspection of resting places (<i>kaara</i>)	30 (42.90)	40 (57.10)	0 (0.00)
Regular visit to abattoir and beef shops for inspection	52 (74.30)	18 (25.70)	0 (0.00)

Source: Field survey, 2014

Values in parenthesis are percentages

3.5. Problems Facing Quality Beef Production

There are many problems confronting quality beef production in the study area. The major one is the poor infrastructure (e.g. water supply, lighting, modern slabs, cold rooms etc.) in the abattoir (94.30%). This result supports the findings of Thakur, et al. [2] that poor infrastructure of butcheries is the major challenge for application of good hygiene practices in selling meat. Other serious problems are lack of regular training and workshop for the butchers on hygiene and quality beef production (90%), lack of modern processing equipment and dilapidated meat shops (88.60%). Persons engaged in meat hygiene activities should be trained, and/or instructed to a required level of training, knowledge, skills, and ability [8]. Bribery and corruption among a few scrupulous inspectors also affect the beef quality (82.90%). This is not a very common practice but it happens in the study area.

Table-5. Distribution based on the problems facing beef production (n = 70)

Problems	Frequency	Percentage	Rank
Poor infrastructure in the slaughter house	66	94.30	1 st
Lack of regular training and workshop on beef production hygiene	63	90.00	2 nd
Lack of modern beef processing equipment	62	88.60	3 rd
Bribery and corruption among the inspectors	58	82.90	4 th
Dilapidated meat shops	57	81.40	5 th
Lack of safety facilities against injuries	50	71.40	6 th
Poor insurance cover against risks and accidents	46	65.70	7 th
Poor financial support from banks	41	58.60	8 th

Source: Field survey, 2014

The implication is that whenever it happens, the quality standard is compromised, and the sick cow that are supposed to be discarded and buried will find its way into the beef market for public consumption. Although the price will be cheaper it is inimical to human health. Lack of

safety tools (71.40%), poor insurance cover (65.70%) and financial support (58.60%) are other impediments to quality beef production in the study area.

3.6. Testing of Hypotheses

3.6.1. Relationship between the Hygiene Practices and Veterinary Inspection

There is no significant relationship between the hygiene practices and veterinary inspection in the study area. The result of correlation analysis in Table 6a showed that there was a positive and significant relationship between the hygiene practices and veterinary inspection ($r = 0.08$, $p < 0.05$). The result of chi-square analysis in Table 6b also showed a similar result that significant relationship existed between hygiene practices ($\chi^2 = 7.33$, $df = 1$) and veterinary inspection at $p < 0.05$ level of significance. The inspection of the abattoir is not comprehensive enough thereby lowering hygiene practices. The practice by the experts is below codex standard that ante-mortem and post-mortem test should be carried out so as to attain the animal health in order to cater for public health objectives. Hence, it will have bearing on the quality of beef produced.

Table-6a. Relationship between the hygiene practices and veterinary inspection

Variable	r	p-value	Decision
Hygiene practices	0.80	0.00	Significant

Source: Field survey, 2014
Significant at $p < 0.05$

Table-6b. Association between the hygiene practices and veterinary inspection

Variable	χ^2	df	p-value	Decision
Hygiene practices	7.33	1	0.05	Significant

Source: Field survey, 2014
Significant at $p \leq 0.05$

3.6.2. Association between the Socio-Economic Characteristic and Hygiene Practices

There is no significant association between the socio-economic characteristics of the respondents and hygiene practices in the study area. The result of chi-square analysis in Table 7 indicated that a significant relationship existed between the educational status ($\chi^2 = 33.09$, $df = 2$), marital status ($\chi^2 = 26.25$, $df = 2$) and hygiene practices at $p < 0.05$ level of significance. This means that the educated butchers are likely to clean their surroundings while those with low literacy display nonchalant attitude to sanitation. Also, those with large household size can seek for more hands within the family to join them in doing cleaning exercise. However, sex of the respondents was not significant to hygiene practices. This shows that hygiene practices had nothing to do with sex, it is based on individual neatness.

Table-7. Association between the socio-economic characteristic and hygiene practices

Variable	χ^2	df	p-value	Decision
Educational status	33.09	2	0.00	Significant
Sex	0.34	1	0.73	Not significant
Marital status	26.25	2	0.00	Significant

Source: Field survey, 2014
Significant at $p < 0.05$

4. CONCLUSION AND RECOMMENDATION

It can be concluded that beef production is a lucrative venture in the study area but the hygiene practices is below Codex Alimentarius recommended standard. The inspectors are more concentrated on ante-mortem. Also, the poor state of abattoir facilities is quite alarming. Therefore, the veterinary officers should intensify effort on ante-mortem and post-mortem inspections while health extension workers and other stakeholders should organize a training/workshop on good handling and hygiene practices for the butchers as this will help in promoting the quality of beef produced in the study area; this training should be on continuous basis. The butchers should as well form themselves into cooperatives to do some self-help projects in the abattoirs. Government at all level (Federal, State and Local) should assist in providing enabling environment at abattoirs in order to achieve and sustain production of quality beef in the study area.

REFERENCES

- [1] W. K. Devine and C. Jensen, *Encyclopedia of meat science*. Amsterdam: Elsevier Academic Press, 2004.
- [2] D. Thakur, R. K. Ravikumar, P. Kumar, A. Gupta, A. Sharma, S. Katoch, and V. K. Bodh, "Meat inspection and animal welfare practices: Evidences from North-Western Himalayan region, India," *Veterinary World*, vol. 5, pp. 718-722, 2012.
- [3] R. A. Olufemi, O. M. Edugbo, E. O. Solanke, and A. J. Akinyeye, "Meat quality, nutrition security and public health: A review of beef processing practices in Nigeria," *African Journal of Food Sciences and Technology*, vol. 4, pp. 96 – 99, 2013.
- [4] S. Buncic, *Integrated food safety and veterinary public health*. Wallingford: Oxford Shire, 2006.
- [5] V. G. Erick, E. V. Komba, E. M. Komba, A. O. Mkupasi, S. M. Mbyuzi, M. Alexanda, and L. Denice, "Sanitary practices and occurrence of zoonotic conditions in cattle at slaughter in Morogoro municipality, Tanzania: Implications for public health," *Tanzania Journal of Health Research*, vol. 14, pp. 1-12, 2012.
- [6] D. D. Joshi, M. Maharjan, M. V. Johansen, A. L. Willingham, and M. Sharma, "Improving meat inspection and control in resource poor communities; the Nepal example," *Acta Tropical*, vol. 87, pp. 119 – 127, 2003.
- [7] T. A. Asse, G. Kagambe, A. Kaisa, H. Anja, S. Alfred, S. Traore, and B. Niclas, "Prevalence of salmonella enterica and hygienic indicator escherichia coli in raw meat at markets in Ouagadougou, Burkina Faso," *Journal of Food Protection*, vol. 74, pp. 1547-1551, 2011.
- [8] Codex Alimentarius Commission (FAO & WHO), *The tenth session of the codex committee on meat hygiene*. New Zealand: Auckland University Press, 2005.

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Veterinary Sciences Research shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.