

Original Article

Knowledge, attitude and practices of abattoir workers and veterinarians toward meat safety in abattoir or slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria

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ABSTRACT

Objectives: The knowledge and perceptions of meat handlers toward meat safety in most developing countries, particularly Nigeria, remain largely unknown. In this study, the knowledge, attitude, and practices of abattoir workers and veterinarians toward meat safety in abattoir or slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria were assessed.

Material and Methods: Fifty participants comprising abattoir workers (40) and veterinarians (10) were interviewed face-to-face on a once-off basis using two different structured questionnaires. Data were analyzed using SPSS (IBM version 23).

Results: The overall knowledge (82.5%), attitude (72.5%), and practices (67.5%) toward meat safety were poor in majority of abattoir workers. The poor knowledge, attitude, and practices were significantly associated with their education levels ($X^2 = 23.377$; $P = 0.000$), ages ($X^2 = 9.562$; $P = 0.023$), and years of working in the abattoir ($X^2 = 8.966$; $P = 0.011$), respectively. Veterinarians had good overall knowledge (70.0%), attitude, and practices (100.0%).

Conclusion: There is a need for proper training, monitoring, and education of abattoir workers as well as routine inspection by appropriate authorities to ensure compliance with standard practices toward ensuring production of safe wholesome meat. Also, professional training of veterinarians on meat safety despite their good knowledge, attitude, and practices is highly recommended.

Keywords: abattoir workers, Akwa Ibom State, meat safety, veterinarians

INTRODUCTION

Infectious diseases at the animal–human–ecosystem interface constitute a source of growing concern due to their endemicity, epidemic potential, and negative socioeconomic impact.^[1,2] Food safety constitutes a major global public health and economic concern as food-borne illnesses have caused significant morbidity and mortality worldwide, especially in developing countries.^[3] The majority of food-borne diseases in developing countries were suggested to be acquired from foods of animal origin.^[4] Meat handlers play a crucial role in the spread of food-borne pathogens either from contaminated utensils or from the animal itself.^[5]

Substandard facilities, unsanitary environments, and poor hygienic practices are reported in abattoirs and slaughterhouses across Nigeria,^[6,7] including Akwa Ibom State of Nigeria. Also,

there is paucity of data on knowledge, attitude, and practice toward meat safety among meat handlers in the abattoirs, however no such data for veterinarians is available. Hence, information from this study will result in the formulation of appropriate policies that will lead to improved meat safety and public health within the state. The specific objectives of the study are to determine the knowledge, attitude, and practices of veterinarians and abattoir workers toward meat safety in abattoir or slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

MATERIALS AND METHODS

Study area

The study was conducted in the Uyo central abattoir (5.055555°N, 7.883577°E), Akwa Ibom State, Nigeria

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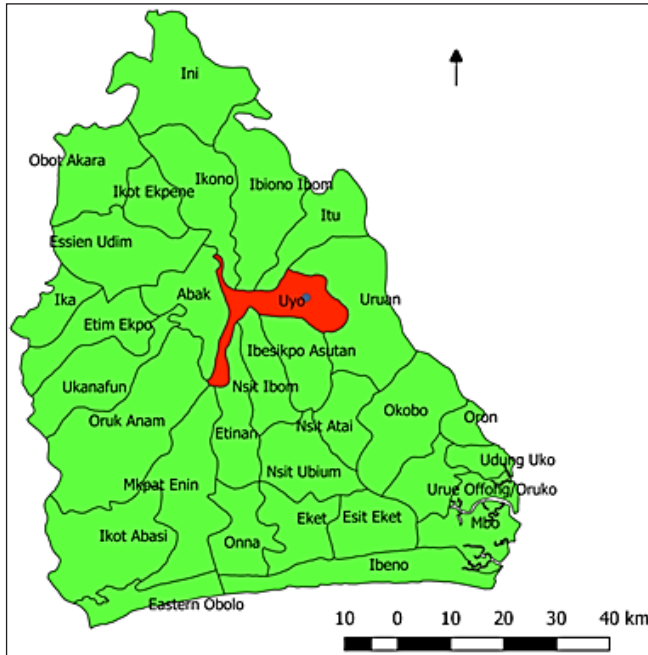


Figure 1: Map of Akwa Ibom State, Nigeria showing Uyo local government area (red) and Uyo central abattoir (blue circle).

[Figure 1]. Akwa Ibom State is located in the south-south region of Nigeria, and meat is highly appreciated at every meal across the State.^[8] The state comprises 31 local government areas. The Uyo central abattoir has a holding capacity of 300 cattle with an average of 950 cattle slaughtered monthly. The abattoir is owned and managed by the State Government, and the slaughter operations take place on the floor in the absence of a cooling facility.

Study design and population

A descriptive cross-sectional study design was adopted, and the study population comprised veterinarians (10) posted at the central abattoir by the State Government and abattoir workers (40) who are involved in various slaughtering processes and meat handling. All veterinarians and abattoir workers present at the Uyo central abattoir who gave their consents were included in the study.

Data collection

Fifty respondents comprising 40 abattoir workers and 10 veterinarians were interviewed face-to-face on a once-off basis during working hours without prior notice of the interview using an interviewer-administered separate pretested structured questionnaire. Before the interview, the purpose of the study was explained to the participants and confidentiality of the status of respondents was assured. The questionnaire was divided into four sections (A–D). Section A covered the sociodemographic characteristics of respondents,

while Sections B, C, and D assessed the knowledge, attitude, and practices, respectively.

There were five questions each on knowledge, attitude, and practices toward meat safety, and each correct answer or opinion scored 1 mark while a wrong answer or opinion was scored 0. A total score >2.5 was considered as good while total score ≤ 2.5 was considered as poor.

Data analyses

The data collected were entered into the Microsoft Excel sheet and exported to Statistical Package for Social Sciences (SPSS, IBM version 23). Descriptive statistics were computed for all variables, and frequency distribution tables were used. Cross tabulations were generated for comparison of data using Chi-square. The level of significance was set at $P < 0.05$.

Ethical consideration

Ethical approval to conduct the study was granted by the appropriate authorities. The purpose and objectives of the study, voluntary participation, and confidentiality issues were explained to all participants, and their written informed consent was obtained.

RESULTS

Sociodemographic characteristics of respondents

A total of 50 respondents comprising 40 (80.0%) abattoir workers and 10 (20.0%) veterinarians were interviewed [Table 1]. Of the 40 abattoir workers, 35 (87.5%) were males and 5 (12.5%) were females; 15 (37.5%) were aged between 20 and 29 years, 17 (42.5%) between 30 and 39 years, 6 (15.0%) between 40 and 49 years, and 2 (5.0%) ≥ 50 years. Fifty percent (50%) of the abattoir workers were singles while the remaining 50% were married; 8 (20.0%) had no formal education, 13 (32.5%) had primary, 15 (37.5%) had secondary, and 4 (10.0%) had tertiary education; 10 (25.0%) had been working in the abattoir for less than a year, 19 (47.5%) for 1–3 years, and 11 (27.5%) for more than 3 years [Table 1].

Of the 10 veterinarians, 6 (60.0%) were males and 4 (40.0%) were females; 7 (70.0%) were aged between 30 and 39 years, and 3 (30.0%) were between 40 and 49 years. One (10.0%) of the veterinarians was single and 9 (90.0%) were married; all (100.0%) had tertiary education; 1 (10.0%) had been working in the abattoir for 1–3 years and 9 (90.0%) for more than 3 years [Table 1].

Knowledge of meat safety by abattoir workers and veterinarians

Among the abattoir workers, 22 (55.0%) had not heard about meat safety; 28 (70.0%) did not have knowledge

Table 1: Sociodemographic characteristics of abattoir workers and veterinarians assessed for knowledge, attitude, and practices toward meat safety in slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

Characteristic	Number of abattoir workers (%)	Number of veterinarians (%)	Total number of respondents (%)
Overall	40 (80.00)	10 (20.00)	50 (100.0)
Gender			
Male	35 (87.5)	6 (60.0)	41 (82.0)
Female	5 (12.5)	4 (40.0)	9 (18.0)
Age (years)			
20–29	15 (37.5)	0 (0.0)	15 (30.0)
30–39	17 (42.5)	7 (70.0)	24 (48.0)
40–49	6 (15.0)	3 (30.0)	9 (18.0)
≥50	2 (5.0)	0 (0.0)	2 (4.0)
Marital status			
Single	20 (50.0)	1 (10.0)	21 (42.0)
Married	20 (50.0)	9 (90.0)	29 (58.0)
Education level			
No formal education	8 (20.0)	-	8 (16.0)
Primary	13 (32.5)	-	13 (26.0)
Secondary	15 (37.5)	-	15 (30.0)
Tertiary	4 (10.0)	10 (100.0)	14 (28.0)
Number of years working in the abattoir			
<1	10 (25.0)	0 (0.0)	10 (20.0)
1–3	19 (47.5)	1 (10.0)	20 (40.0)
>3	11 (27.5)	9 (90.0)	20 (40.0)

about the regular washing of hands before and during meat processing, and 29 (72.5%) were unaware that using gloves while handling meat could reduce the risk of contamination [Table 2]. Twenty-eight (70.0%) of them were unaware that cleaning and sanitization of working surfaces and tools could reduce the risk of meat contamination; 37 (92.5%) did not know that insects and pests could be a source of contamination to raw meat [Table 2]. The poor categorized knowledge (82.5%) of abattoir workers showed no significant association with gender ($X^2 = 0.025$; $P = 1.000$), age ($X^2 = 1.647$; $P = 0.649$), marital status ($X^2 = 0.173$; $P = 1.000$), and years of working ($X^2 = 0.085$; $P = 0.958$). However, the level of education had a significant association ($X^2 = 23.377$; $P = 0.000$) with the categorized knowledge of abattoir workers [Table 3].

All the veterinarians (100.0%) knew about meat safety; 6 (60.0%) had no professional experience, and neither of them (100.0%) ever received training on meat safety. All (100.0%) veterinarians were aware of the potential contamination sources in the abattoir; however 6 (60.0%) of them were unaware of the fact that meat should be refrigerated before being sold out to consumers [Table 2]. The good categorized knowledge of veterinarians (70.0%) had no significant

Table 2: Knowledge of meat safety by abattoir workers and veterinarians in slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

Knowledge questions	Number	Proportion (%)
Abattoir workers		
Have you heard about meat safety?		
Yes	18	45.0
No	22	55.0
Do you know that regular washing of hands before and during meat processing can reduce risk of contamination?		
Yes	12	30.0
No	28	70.0
Do you know that using gloves while handling meat can reduce the risk of contamination?		
Yes	11	27.5
No	29	72.5
Do you know that proper cleaning and sanitization of working surfaces and tools can reduce the risk of meat contamination?		
Yes	12	30.0
No	28	70.0
Do you think that insects and pests could be a source of contamination to raw meat?		
Yes	3	7.5
No	37	92.5
Categorized knowledge score		
Good	7	17.5
Poor	33	82.5
Veterinarians		
Have you heard about meat safety?		
Yes	10	100.0
No	0	0.0
Do you have any professional experience in meat safety?		
Yes	4	40.0
No	6	60.0
How often do you receive training on meat safety?		
Never	10	100.0
Once in a year	0	0.0
When the need arises	0	0.0
Do you know of potential contamination sources in the abattoir?		
Yes	10	0.0
No	0	0.0
Do you know that meat should be refrigerated before allowed to be sold out to consumers?		
Yes	6	60.0
No	4	40.0
Categorized knowledge score		
Good	7	70.0
Poor	3	30.0

association with gender ($X^2 = 0.079$; $P = 1.000$), age ($X^2 = 0.023$; $P = 1.000$), marital status ($X^2 = 0.476$; $P = 1.000$), and years of working in the abattoir ($X^2 = 0.476$; $P = 1.000$). See [Table 3].

Table 3: Association of categorized knowledge score with sociodemographic characteristics of abattoir workers and veterinarians in slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

Characteristic	Abattoir workers				Veterinarians			
	Good (%)	Poor (%)	X ²	P	Good (%)	Poor (%)	X ²	P
Gender								
Male	6 (17.1)	29 (82.9)	0.025	1.000	4 (66.7)	2 (33.3)	0.079	1.000
Female	1 (20.0)	4 (80.0)			3 (75.0)	1 (25.0)		
Age (years)								
20–29	2 (13.3)	13 (86.7)	1.647	0.649	0 (0.0)	0 (0.0)	0.023	1.000
30–39	3 (17.6)	14 (82.4)			5 (71.4)	2 (28.6)		
40–49	2 (33.3)	4 (66.7)			2 (66.7)	1 (33.3)		
≥50	0 (0.0)	2 (100.0)			0 (0.0)	0 (0.0)		
Marital status								
Single	4 (20.0)	16 (80.0)	0.173	1.000	1 (100.0)	0 (0.0)	0.476	1.000
Married	3 (15.0)	17 (85.0)			6 (66.7)	3 (33.3)		
Education level								
No formal education	0 (0.0)	8 (100.0)	23.377	0.000*	-	-	-	-
Primary	0 (0.0)	13 (100.0)			-	-		
Secondary	3 (20.0)	12 (80.0)			-	-		
Tertiary	4 (100.0)	0 (0.0)			10 (100.0)	-		
Years working in the abattoir								
<1	2 (20.0)	8 (80.0)	0.085	0.958	0 (0.0)	0 (0.0)	0.476	1.000
1–3	3 (15.8)	16 (84.2)			1 (100.0)	0 (0.0)		
>3	2 (18.2)	9 (81.8)			6 (66.7)	3 (33.3)		

*showed significant association at P < 0.05.

Attitude toward meat safety by abattoir workers and veterinarians

28 (70.0%) abattoir workers believed that safe meat handling to avoid contamination and diseases was not part of their responsibilities; 29 (72.5%) of the respondents were unaware that animals had to be inspected before and after slaughtering [Table 4]. 30 (75.0%) of them did not know that workers with wounds, bruises, or injuries on their hands should not handle meat; and 28 (70.0%) of them were unaware that wearing clean protective clothing improved meat safety. Majority (70.0%) of the respondents believed that eating and drinking at the slaughter areas were appropriate. The categorized attitude was poor in majority (72.5%) of the abattoir workers [Table 4].

All veterinarians (100.0%) were of the opinion that meat safety was part of their responsibilities, training would be useful toward improving meat safety, eating and drinking in the slaughter area was inappropriate, and animals should be inspected before and after slaughtering. Majority (70.0%) of the veterinarians were of the opinion that slaughtering on the floor was better than using a line. The categorized attitude was good (100.0%) among the veterinarians [Table 4].

The poor categorized attitude of abattoir workers had no significant association with gender ($X^2 = 0.448$; $P = 0.603$),

marital status ($X^2 = 1.129$; $P = 0.480$), education level ($X^2 = 5.610$; $P = 0.132$), and years of working ($X^2 = 1.593$; $P = 0.451$). The ages of abattoir workers showed significant association ($X^2 = 9.562$; $P = 0.023$) with their categorized attitude score [Table 5].

Practices toward Meat Safety by Abattoir Workers and Veterinarians

Majority of the abattoir workers handled or processed meat when they were ill (77.5%), when they had cuts, wounds, bruises, or injuries on their hands (72.5%), processed carcass and offal or intestines in the same place (85.0%), and used enough clean water during processing of carcass (67.5%). All (100.0%) of the workers washed their hands regularly before and during the handling of meat. The categorized practice was poor in majority (67.5%) of the workers [Table 6].

All veterinarians (100.0%) inspected the animals before and after slaughtering, wore clean and protective clothing during meat inspection, and washed their hands before and after meat inspection. Majority of the veterinarians did not touch the meat with their bare hands during inspection (70.0%) and did not perform meat inspection when they were ill (60.0%). The categorized practice was good in all (100.0%) veterinarians.

Table 4: Attitude toward meat safety by abattoir workers and veterinarians in slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

Attitude questions	Number	Proportion (%)
Abattoir workers		
Do you think that safe meat handling to avoid contamination and diseases is part of your responsibilities?		
Yes	12	30.0
No	28	70.0
Do you think that animals should be inspected before and after slaughtering?		
Yes	11	27.5
No	29	72.5
Do you think that abattoir workers with wounds, bruises or injuries on their hands should handle meat?		
Yes	30	75.0
No	10	25.0
Do you think that wearing of clean protective clothing will improve meat safety?		
Yes	12	30.0
No	28	70.0
Do you think that eating and drinking in the slaughter area is appropriate?		
Yes	12	30.0
No	28	70.0
Categorized attitude score		
Good	11	27.5
Poor	29	72.5
Veterinarians		
Do you think that meat safety is part of your responsibilities as a veterinarian?		
Yes	10	100.0
No	0	0.0
Do you think that training will be useful toward improving meat safety in the abattoir?		
Yes	10	100.0
No	0	0.0
Do you think that eating and drinking in the slaughter area is appropriate?		
Yes	0	0.0
No	10	100.0
Do you think the animals should be inspected before and after slaughtering?		
Yes	10	100.0
No	0	0.0
Do you think that slaughtering on the floor is better than using a line?		
Yes	7	70.0
No	3	30.0
Categorized attitude score		
Good	10	100.0
Poor	0	0.0

The categorized practice of abattoir workers had no significant association with gender ($X^2 = 1.970$; $P = 0.307$), age ($X^2 = 2.237$; $P = 0.525$), marital status ($X^2 = 0.114$; $P = 1.000$), and

education level ($X^2 = 0.216$; $P = 0.975$). There was significant association ($X^2 = 8.966$; $P = 0.011$) between categorized practice of workers and years of working in the abattoir [Table 7].

DISCUSSION

Meat safety is a critical issue that requires the full involvement of all parties involved in meat processing, and good knowledge, attitude, and practice toward the concept are necessary to ensure public health. In this study, the knowledge, attitude, and practice of abattoir workers and veterinarians toward meat safety in slaughter slabs within Uyo metropolis, Akwa Ibom State Nigeria were assessed. Majority of the abattoir workers (87.5%) and veterinarians (60.0%) were males. The dominance of male abattoir workers in this study might be due to the rigorous and risky nature of the butchery and meat handling processes, which was consistent with that observed in similar studies.^[7,9,10] The limited number of female veterinarians (5) in the Akwa Ibom State Civil Service of which four were posted in the abattoir in which this study was conducted might be the reason for the high number of male veterinarians than females.

The age category of 20–29 (37.5%) and 30–39 (42.5%) years in which most of the abattoir workers are composed points to the fact that ages filled with energy are needed for the rigor of the abattoir tasks, which was similar to that reported in other studies.^[9,10] The educational distribution in this study revealed that 32.5 and 37.5% of respondents attended primary and secondary school, respectively. This observation might be due to the belief that the tasks involved match individuals with no or these levels of education and/or the belief that individuals with tertiary education are not supposed to be involved with butchery and meat handling processes in the abattoir.

The overall poor knowledge of abattoir workers resulted in the lack of knowledge on meat safety, reduction of contamination risk through regular hand washing, and use of hand gloves and cleaning of working surfaces. These may indicate a lack of regular and consistent training for the meat handlers. Hence, it is important to put in place interventions such as regular update training to bridge the knowledge gap of abattoir workers. The overall good knowledge of veterinarians is likely due to the fact that they have been informed on meat safety during their trainings in the university. However, the negative responses by some veterinarians toward professional experience (60.0%) and need for refrigeration of meat before sale (40.0%) suggest the need for their regular and consistent training on meat safety. However, the absence of a cold room in the abattoir in Akwa Ibom State might be responsible for the negative response to refrigeration of meat before sale.

Table 5: Association of categorized attitude score with sociodemographic characteristics of abattoir workers and veterinarians in slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

Characteristic	Abattoir workers				Veterinarians			
	Good (%)	Poor (%)	X ²	P	Good (%)	Poor (%)	X ²	P
Gender								
Male	9 (25.7)	26 (74.3)	0.448	0.603	6 (100.0)	0 (0.0)	-	-
Female	2 (40.0)	3 (60.0)			4 (100.0)	0 (0.0)		
Age (years)								
20–29	0 (0.0)	15 (100.0)	9.562	0.023*	0 (0.0)	0 (0.0)	-	-
30–39	8 (47.1)	9 (52.9)			7 (100.0)	0 (0.0)		
40–49	2 (33.3)	4 (66.7)			3 (100.0)	0 (0.0)		
≥50	1 (50.0)	1 (50.0)			0 (0.0)	0 (0.0)		
Marital status								
Single	4 (20.0)	16 (80.0)	1.129	0.480	1 (100.0)	0 (0.0)	-	-
Married	7 (35.0)	13 (65.0)			9 (100.0)	0 (0.0)		
Education level								
No formal education	4 (50.0)	4 (50.0)	5.610	0.132	-	-	-	-
Primary	1 (7.7)	12 (92.3)			-	-		
Secondary	4 (26.7)	11 (73.3)			-	-		
Tertiary	2 (50.0)	2 (50.0)			10 (100.0)	-		
Years working in the abattoir								
<1	2 (20.0)	8 (80.0)	1.593	0.451	1 (100.0)	0 (0.0)	-	-
1–3	7 (36.8)	12 (63.2)			9 (100.0)	0 (0.0)		
>3	2 (18.2)	9 (81.8)						

*showed significant association at P < 0.05.

Table 6: Practices toward meat safety by abattoir workers and veterinarians in slaughter slabs within Uyo Metropolis, Akwa Ibom State.

Practices questions	Number	Proportion (%)
Abattoir workers		
Do you handle/process meat when you are ill?		
Yes	9	22.5
No	31	77.5
Do you handle/process meat when you have cuts, wounds, bruises, or injuries on your hands?		
Yes	11	27.5
No	21	72.5
Do you process carcass and offal/intestine in the same place?		
Yes	6	15.0
No	34	85.0
Do you use enough clean water during processing of carcass?		
Yes	27	67.5
No	13	32.5
Do you wash your hands regularly before and during handling of meat?		
Yes	40	100.0
No	0	0.0
Categorized practice score		
Good	13	32.5
Poor	27	67.5

Practices questions	Number	Proportion (%)
Veterinarians		
Do you inspect all the animals before and after slaughtering?		
Yes	10	100.0
No	0	0.0
Do you wear clean and protective clothing during meat inspection?		
Yes	10	100.0
No	0	0.0
Do you touch the meat with your bare hands during inspection?		
Yes	3	30.0
No	7	70.0
Do you wash your hands before and after meat inspection?		
Yes	10	100.0
No	0	0.0
Do you perform meat inspection when you are ill?		
Yes	4	40.0
No	6	60.0
Categorized practice score		
Good	10	100.0
Poor	0	0

Table 7: Association of categorized practices score with sociodemographic characteristics of abattoir workers and veterinarians in slaughter slabs within Uyo Metropolis, Akwa Ibom State, Nigeria.

Characteristic	Abattoir workers				Veterinarians			
	Good (%)	Poor (%)	X ²	P	Good (%)	Poor (%)	X ²	P
Gender								
Male	10 (28.6)	25 (71.4)	1.970	0.307	6 (100.0)	0 (0.0)	-	-
Female	3 (60.0)	2 (40.0)			4 (100.0)	0 (0.0)		
Age (years)								
20–29	5 (33.3)	10 (66.7)	2.237	0.525	7 (70.0)	0 (0.0)	-	-
30–39	7 (41.2)	10 (58.8)			3 (30.0)	0 (0.0)		
40–49	1 (16.7)	5 (83.3)						
≥50	0 (0.0)	2 (100.0)						
Marital status								
Single	7 (35.0)	13 (65.0)	0.114	1.000	1 (100.0)	0 (0.0)	-	-
Married	6 (30.0)	14 (70.0)			9 (100.0)	0 (0.0)		
Educational level								
No formal education	3 (37.5)	5 (62.5)	0.216	0.975	-	-	-	-
Primary	4 (30.8)	9 (69.2)			-	-		
Secondary	5 (33.3)	10 (66.7)			-	-		
Tertiary	1 (25.0)	3 (75.0)			-	-		
Years working in the abattoir								
<1	7 (70.0)	3 (30.0)	8.966	0.011*	1 (100.0)	0 (0.0)	-	-
1–3	3 (15.8)	16 (84.2)			9 (100.0)	0 (0.0)		
>3	3 (27.3)	8 (72.7)						

*showed significant association at P < 0.05.

The statistically significant association (P = 0.000) between education level and knowledge of meat safety among abattoir workers suggests that those with tertiary education had better knowledge of meat safety than those with no formal, primary, and secondary educations in Uyo Akwa Ibom State. This might be due to the fact those with tertiary education had been informed in one way or the other about meat safety in their tertiary institutions. No significant association was observed between overall knowledge of meat safety with gender, age, marital status, and experience working in the abattoir. In contrast, studies have demonstrated better knowledge in younger meat handlers as they are more willing to learn than older ones,^[11] though the latter had more years of experience.^[9]

The overall poor attitude of abattoir workers is contrary to the overall good (53.1%) attitude to meat hygiene reported in Lagos State.^[9] The good overall attitude of veterinarians in this study is not unexpected as it will go a long way to help them disseminate their duties appropriately. However, negative responses provided by some veterinarians (30.0%) such as comparing slaughtering on the floor and using a line might be due to their lack of familiarity and/or inadequate awareness of the drastic reduction in contamination risk on using the line in meat processing. The absence of a line in abattoirs in Akwa Ibom State might be another reason that informed their negative response. The statistically significant association (P = 0.023) between overall attitude and age

revealed that workers in the age group of 20–29 years had poorer attitude toward meat safety as they were more likely to ignore or neglect safety tips than older ones due to their youthful exuberance.

The abattoir workers had overall poor practices, but they all provided a positive response to hand washing practice and this is consistent with that reported in Lagos State.^[9] Regular and proper hand washing constitute key considerations toward alteration of routes of disease transmission via meat contamination.^[12] It is therefore critical to ensure that meat handlers maintain this habit and also improve on other important hygienic procedures to avoid meat contamination.^[13] Improper meat handling and poor hygiene were reported to constitute the primary risk factors promoting food contamination and subsequent food-borne diseases.^[5,14] Therefore, it is recommended that meat handlers with open skin injuries or bruises, gastroenteritis, ear or throat diseases, and any similar infectious diseases should not be involved in any form of meat handling or processing as these individuals are potential risks for meat contamination and spread of such diseases.^[14,15]

The statistically significant association (P = 0.011) between overall practice toward meat safety and years of experience showed that workers with less than 1-year experience had poorer practices toward meat safety as they were not familiar

with such safety practices in the abattoir. In addition, despite the overall good practices, veterinarians should be enlightened on the danger of performing meat inspection with bare hands and when they are ill.

From this study, it was evident that abattoir workers in slaughter houses within Uyo metropolis, Akwa Ibom State, Nigeria had poor while veterinarians had good knowledge, attitude, and practices toward meat safety. This suggests that the issue of meat safety within Uyo metropolis is a serious concern and should be given immediate attention.

CONCLUSIONS

Abattoir workers had poor knowledge, attitude, and practice, while veterinarians had good knowledge, attitude, and practice toward meat safety in abattoir or slaughter slabs within Uyo Metropolis, Akwa Ibom State. There is a need for adequate regular and consistent training of abattoir workers and veterinarians, a massive public enlightenment and awareness on meat safety. The State Government should ensure renovation of the abattoir to match minimum requirement for standard abattoir practices. Furthermore, there is a need for routine inspection of the abattoir or slaughter slab and enforcement of compliance with good meat hygiene practices.

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Declaration of patient consent

Patients' consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflict of interest.

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