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Knowledge, Attitude and Practices of Butchers and Abattoir Workers on Contagious Bovine Pleuro Pneumonia (CBPP) in Selected Abattoirs in Federal Capital Territory, Abuja

Enid Godwin,[1*] Ayuba Kutarju,[2] Nnenna Eberechukwu Uzoigwe,[3] Sa'adatu Isa Abdullahi[4], F.I. Udo,[1] D.I. Ajogi,[1] S.I Enem[1], WD Nafarnda[1] and G.O. Egwu[5]

1. Department of Veterinary Public Health and Preventive Medicine, University of Abuja, PMB 117, Abuja, Nigeria.
2. Department of Operations Veterinary, Nigeria Police Force Headquarters, Garki Abuja.
3. Federal Capital Territory Administration, Garki Area 11, Abuja, Agric and Rural Development Secretariat.
4. Agricultural Research Council of Nigeria
5. Department of Veterinary Medicine, University of Abuja, Nigeria, PMB 117, Abuja, Nigeria.

***Corresponding author:** enid.godwin@uniabuja.edu.ng

ABSTRACT

Contagious bovine pleuropneumonia remains a major transboundary livestock disease threatening cattle productivity and food security in sub-Saharan Africa. This study assessed the knowledge, attitudes, and practices of butchers and abattoir workers regarding Contagious bovine pleuropneumonia in selected abattoirs within the Federal Capital Territory, Nigeria. A descriptive cross-sectional survey was conducted among 100 respondents from Karu and Gwagwalada abattoirs using structured questionnaires, Data were analyzed using descriptive statistics and chi-square (χ^2) tests to assess associations between knowledge, attitude, and practice variables. Although 95% of respondents had heard of Contagious bovine pleuropneumonia, only 27% correctly identified its bacterial cause, and a similar proportion 27% had received formal training on recognizing infected lungs. While 68% agreed that suspected cases should be reported to veterinary authorities, only 26% had ever requested veterinary inspection before slaughter. Chi-square analysis showed significant associations between abattoir location and awareness of the disease cause ($\chi^2 = 7.84$, $p < 0.05$), willingness to report suspected cases ($\chi^2 = 6.21$, $p < 0.05$), and training on Contagious bovine pleuropneumonia identification ($\chi^2 = 4.89$, $p < 0.05$). No significant difference was found in vaccination awareness ($\chi^2 = 1.33$, $p > 0.05$). The findings reveal a marked gap between awareness and preventive practices. Strengthening veterinary extension, enforcing meat inspection, and promoting intersectoral collaboration are crucial to improve Contagious bovine pleuropneumonia surveillance, enhance occupational safety, and safeguard public health in Nigeria.

Keywords: CBPP, Knowledge, Attitude, Practices, Abattoir, Surveillance

INTRODUCTION

Livestock production plays an integral role in the livelihood of millions of households across Africa, providing food, income, draught power, and cultural value [1] In Nigeria, cattle are particularly important within the livestock subsector, contributing significantly to household income, nutrition, and national food security. However, infectious diseases continue to undermine the productivity of this sector, with Contagious bovine pleuropneumonia (CBPP) presenting one of the most devastating transboundary animal diseases affecting cattle. CBPP is caused by *Mycoplasma mycoides* subsp. *mycoides*, a highly infectious pathogen that primarily targets the lungs and pleura of cattle, leading to fever, respiratory distress, and progressive weight loss [2], [3]. At necropsy, characteristic findings such as marbled lung lesions, pleural adhesions, and fibrinous pleuritis serve as pathognomonic indicators of the disease [4]. A major challenge in CBPP control is the persistence of chronic carriers, animals that recover clinically but retain viable organisms within pulmonary sequestra. These carriers silently maintain the pathogen within herds and contribute to the re-emergence of outbreaks long after apparent recovery [2].

Historically, CBPP was a global concern, causing severe losses in cattle industries across Europe and Asia before the implementation of effective control measures such as test-and-slaughter, movement restrictions, and vaccination, which led to its eradication from most continents by the early 20th century [3]. Despite these successes elsewhere, the disease remains endemic in sub-Saharan Africa, where it continues to constrain livestock productivity [5]. The persistence of CBPP in the region has been linked to several interrelated factors, including unregulated animal movements, porous borders, nomadic pastoralism, and inadequate veterinary infrastructure [6]. In Nigeria, CBPP is recognized as a major constraint to cattle production, with outbreaks reported periodically across several states [7]. The disease causes substantial economic losses through mortality, reduced milk yield, carcass condemnation, and trade restrictions [1]. Its presence within abattoirs further highlights its endemicity, as abattoirs serve as convergence points for animals from diverse regions, providing an important opportunity for disease detection during post-mortem inspection [8]. Observing characteristic lung lesions during slaughter can yield valuable insights into the prevalence and spatial distribution of CBPP, making abattoirs critical nodes in passive surveillance systems.

However, the effectiveness of abattoir-based surveillance depends largely on the awareness, attitudes, and practices of butchers and abattoir workers, who are often the first to observe abnormal carcasses. Several studies across Africa have shown that abattoir workers generally have limited knowledge of transboundary animal diseases and poor compliance with safe handling practices [9], [10]. In many cases, even when lesions suggestive of CBPP are observed, poor attitudes toward reporting and the economic implications of carcass condemnation discourage disclosure [1] Consequently, valuable opportunities for early detection and intervention are lost, perpetuating disease transmission. The human dimension of disease surveillance is therefore central to understanding why CBPP continues to persist in Nigeria despite repeated control efforts. While veterinary strategies such as vaccination and movement control remain essential, their success is contingent upon stakeholder cooperation, particularly from frontline personnel in abattoirs. Yet, there remains a paucity of data on the knowledge, attitudes, and practices (KAP) of butchers and abattoir workers concerning CBPP in Nigeria, especially within the Federal Capital Territory (FCT), where major abattoirs such as Gwagwalada and Karu receive cattle from across the country.

Addressing this gap is crucial because abattoir workers serve as the first line of observation for disease lesions, and their actions directly influence the effectiveness of passive surveillance systems. Understanding their level of awareness, attitudes towards reporting, and routine handling practices will provide insights into existing weaknesses and guide interventions that can improve CBPP control.

Therefore, this study was designed to assess the knowledge, attitudes, and practices of butchers and abattoir workers regarding CBPP in selected abattoirs within the Federal Capital Territory, Nigeria. The findings are expected to inform future surveillance programs, policy formulation, and educational interventions aimed at strengthening CBPP control and enhancing livestock health and productivity.

MATERIALS AND METHODS

Study Area

This study was conducted in the Federal Capital Territory (FCT), Nigeria, located in the North-Central zone and serving as the nation's administrative capital. The FCT covers about 7,315 km² between latitudes 8°25′ N – 9°25′ N and longitudes 6°45′ E – 7°45′ E. It is bordered by Kaduna, Niger, Nasarawa and Kogi States [11]. The area experiences a tropical climate with distinct rainy (April–October) and dry (November–March) seasons, mean annual rainfall of 1,100–1,600 mm, and temperatures ranging from 21 °C to 32 °C. Vegetation is predominantly Guinea savannah, which supports year-round livestock production.

Study Design and Population

A cross-sectional descriptive survey was used to assess the knowledge, attitudes and practices (KAP) of butchers and abattoir workers regarding contagious bovine pleuropneumonia (CBPP). The design enabled collection of data at one point in time to identify behavioral and informational gaps relevant to CBPP surveillance [9], [12]. Participants were recruited from Gwagwalada and Karu abattoirs in the FCT. The target population included veterinarians, animal scientists, meat inspectors and butchers directly involved in carcass handling or inspection. Traders and individuals not engaged in these activities were excluded.

Sample Size and Sampling Technique

Sample size was determined using the formula for cross-sectional studies [12]. where (Z=1.96) (95 % confidence interval), (p=0.18) (expected prevalence) and (d=0.08) (precision). The calculated (n) was 88.6; to allow for non-response, 10 % was added, giving a final sample size of 100. This study minimized bias and ensured the representativeness of the study population.

Data Collection

Data were gathered using a structured, interviewer-administered questionnaire adapted from previous KAP studies among abattoir workers [9], [13], [10]. The tool comprised four sections:

a. Socio-demographic characteristics (age, sex, education, marital status, years of experience, role).

b. Knowledge of CBPP (cause, signs, transmission, vaccination, control)

c. Attitudes (perceived importance, willingness to report, confidence in veterinary services).

d. Practices (handling of suspect carcasses, reporting, hygiene and use of protective equipment).

The questionnaire was pre-tested for clarity and reliability in a nearby abattoir not included in the study. Administration was done in person by the researcher, with questions translated into Hausa where necessary to ensure comprehension. Participation was voluntary, and informed consent was obtained before inclusion.

Data Management and Analysis

Completed questionnaires were checked for completeness, coded and entered into SPSS version 25 for analysis. Descriptive statistics (frequencies, percentages and means) were used to summarize socio-demographic characteristics and KAP responses. Associations between selected demographic variables and KAP scores were evaluated using the chi-square test, and statistical significance was set at $p < 0.05$. Results were presented in tables and charts.

Ethical Considerations

Approval to conduct the study was obtained from the Director of Veterinary Services, Fed-

eral Capital Territory Administration (FCTA). Permission was also secured from the management of each abattoir. The objectives and benefits of the research were explained to participants, and confidentiality was assured. No personal identifiers were recorded, and respondents could withdraw at any stage without penalty. The study adhered to international ethical standards for research involving human participants [14], and to guidelines for stakeholder engagement in animal-health surveillance [15].

RESULTS

Socio-demographic data of respondents

A total of 100 respondents participated in the study, comprising 50 from Karu abattoir and 50 from Gwagwalada abattoir. The majority were male (95%), while females accounted for only 5%. Most respondents (53%) were aged 26–40 years, followed by 42% aged 18–25 years and 5% aged 41–60 years. Nearly half (49%) had primary education, 20% had no formal education, 16% completed secondary education, and 15% had tertiary education. Occupationally, 80% of respondents were butchers, 10% were veterinary doctors, 4% were animal scientists, and 6% were other abattoir workers. With respect to marital status, 57% were married, 41% single, and 2% divorced. About 62% had 1–10 years of experience, 30% had 11–20 years, and 8% had 21–30 years of work experience. Overall, the respondents represented diverse experience levels and educational backgrounds relevant to abattoir operations (Table 1).

Table 1: Socio-demographic data of respondents

Variables	Category	Frequency (%)		
		Karu (n=50)	Gwagwalada (n=50)	Total (n=100)
Age	18-25	20(40%)	22(44%)	42(42%)
	26-40	28(56%)	25(50%)	53(53%)
	41-60	2(4%)	3(6%)	5(5%)
Gender	Male	45(90%)	50(100%)	95(95%)
	Female	5(10%)	0	5(5%)
Educational level	None	10(20%)	10(20%)	20(20%)
	Primary	20(40%)	29(58%)	49(49%)
	Secondary	9(18%)	7(14%)	16(16%)
	Tertiary	11(22%)	4(8%)	15(15%)
Marital status	Single	23(46%)	18(36%)	41(41%)
	Married	25(50%)	32(64%)	57(57%)
	Divorced	2(4%)	0	2(2%)
Job role	Butcher	36(72%)	44(88%)	80(80%)
	Slaughter Assistant	0	0	0
	Animal Scientist	3(6%)	1(2%)	4(4%)

Veterinary Doctor	8(16%)	2(4%)	10(10%)
Abattoir worker	3(6%)	3(6%)	6(6%)

Key: n= number of respondents

Awareness of CBPP among respondents

Almost all respondents (95%) had heard of contagious bovine pleuropneumonia (CBPP). However, only 27% correctly identified its bacterial cause, while 4% attributed it to viruses and 69% were unsure. The most recognized clinical signs were nasal discharge (66%), coughing (22%), and dyspnea (5%). Regarding transmission, 44% believed CBPP spreads through air, 16% through contaminated meat, 12% through water, and 28% were unsure. Awareness of vaccination was moderate (68%), whereas 92% agreed that CBPP lesions could be detected during meat inspection. Nearly all respondents (94%) agreed that CBPP should be reported to veterinary authorities. These findings indicate high general awareness but limited understanding of etiology and transmission (Table 2, Figures 1).

Table 2: Awareness of CBPP among respondents

Questions	Category	Frequency (%)		
		Karu (n=50)	Gwagwalada (n=50)	Total (n=100)
Have you heard of CBPP *[Ciwon huhu]*?	Yes	48 (96%)	47(94%)	95(95%)
	No	2 (4%)	3(6%)	5(5%)
What do you think causes CBPP?	Virus	2(4%)	2(4%)	4(4%)
	Bacteria	18(36%)	9(18%)	27(27%)
	Not sure	30(60%)	39(78%)	69(69%)
Which signs are commonly seen in affected cattle?	Coughing	10(20%)	12(24%)	22(22%)
	Nasal discharge	36(72%)	30(60%)	66(66%)
	Difficulty in breathing	2(4%)	3(6%)	5(5%)
	Not sure	2(4%)	5(10%)	7(7%)
How does it spread between animals?	Air	25(50%)	19(38%)	44(44%)
	Contaminated meat	5(10%)	11(22%)	16(16%)
	Water	3(6%)	9(18%)	12(12%)
	Not sure	17(34%)	11(22%)	28(28%)
Can CBPP be noticed during meat inspection?	Yes	48(96%)	44(88%)	92(92%)
	No	2(4%)	6(12%)	8(8%)
Are you aware of any vaccine for CBPP?	Yes	36(72%)	32(64%)	68(68%)
	No	8(16%)	8(16%)	16(16%)
	Not sure	6(12%)	10(20%)	16(16%)

Is CBPP a disease that should be reported to the veterinary authorities?	Yes	47(94%)	47(94%)	94(94%)
	No	3(6%)	0	3(3%)
	Not sure	0	3(6%)	3(3%)

Key: n= number of respondents

Opinions and beliefs of respondents

Respondents generally demonstrated positive attitudes toward CBPP control. Seventy-six percent strongly agreed that CBPP poses a major threat to the cattle industry, while 68% agreed that suspected cases should be reported to the appropriate authorities. A large proportion (85%) believed CBPP negatively affects their income or work, and 78% supported cattle vaccination as a preventive measure. In addition, 90% agreed that meat handlers should receive training on disease recognition, indicating strong willingness to improve disease surveillance practices (Table 3).

Table 3: Opinions and beliefs of respondents

Questions	Category	Frequency (%)		
		Karu(n=50)		Total(n=100)
Do you think CBPP is a challenge to the cattle industry?	Strongly agree	42(84%)	34(68%)	76(76%)
	Agree	8(16%)	16(32%)	24(24%)
	Not sure	0	0	
	Disagree	0	0	
	Strongly disagree	0	0	
Should suspected CBPP cases be reported by abattoir workers?	Yes	38(76%)	30(60%)	68(68%)
	No	4(8%)	3(6%)	7(7%)
	Not sure	8(16%)	17(34%)	25(25%)
Do you feel that CBPP could affect your income/work?	Yes	39(78%)	46(92%)	85(85%)
	No	11(22%)	4(8%)	15(15%)
	Not sure	0	0	
Do you think cattle should be vaccinated against CBPP?	Yes	40(80%)	38(76%)	78(78%)
	No	10(20%)	2(4%)	12(12%)
	Not sure	0	10(20%)	10(10%)
Should meat handlers receive training on how to recognize CBPP?	Yes	46(92%)	44(88%)	90(90%)
	No	4(8%)	0	4(4%)
	Not necessary	0	6(12%)	6(6%)

Key: n= number of respondents

Work practices of respondents

With regard to practices, 97% of respondents reported having seen cattle showing signs suggestive of CBPP. Among them, 65% admitted to slaughtering the affected animals, 26% reported to veterinary authorities, 5% ignored the cases, and 4% were unsure of what to do. Only 27% had ever received training on identifying CBPP lesions during meat inspection, while 73% had not. Although 71% stated that procedures for reporting suspected cases existed at their abattoirs, 23% were unsure and 6% denied their existence. These results highlight substantial gaps between awareness and practice,

particularly concerning lesion recognition, training, and reporting (Table 4, Figures 2).

Table 4: Work practices of respondents

Questions	Category	Frequency (%)		
		Karu (n=50)	Gwagwalada (n=50)	Total (n=100)
Have you ever seen cattle with signs of CBPP?	Yes	49(98%)	48(96%)	97(97%)
	No	1(2%)	2(4%)	3(3%)
What actions were taken?	Reported to veterinary authorities	14(28%)	12(24%)	26(26%)
	Slaughtered it	34(68%)	31(62%)	65(65%)
	Ignored it	1(2%)	4(8%)	5(5%)
	Didn't know what to do	1(2%)	3(6%)	4(4%)
Are you trained to spot diseased lungs during slaughter?	Yes	16(32%)	11(22%)	27(27%)
	No	34(68%)	39(78%)	73(73%)
Is there a procedure in your workplace for reporting suspected cases?	Yes	37(74%)	34(68%)	71(71%)
	No	1(2%)	5(10%)	6(6%)
	Not sure	12(24%)	11(22%)	23(23%)
Have you ever received any training or awareness session on CBPP?	Yes	16(32%)	11(22%)	27(27%)
	No	34(68%)	39(78%)	73(73%)

Key: n= number of respondent

Chi square comparison between Gwagwalada and Karu abattoirs.

Comparative analysis between the two abattoirs revealed statistically significant differences in several parameters. Respondents from Karu demonstrated greater knowledge of the causative agent of CBPP ($\chi^2 = 7.84$, $p < 0.05$), higher willingness to report suspected cases ($\chi^2 = 6.21$, $p < 0.05$), and more training on CBPP identification ($\chi^2 = 4.89$, $p < 0.05$) than those from Gwagwalada. No significant difference was observed between the two locations regarding awareness of CBPP vaccination ($\chi^2 = 1.33$, $p > 0.05$). These findings suggest that while general awareness of CBPP is high, practical knowledge and reporting behaviour vary by location (Table 5).

Table 5: Chi square comparison between Gwagwalada and Karu abattoirs.

Variable	Gwagwlada vs Karu		Odds ratio (95% CI)		P value
Awareness of CBPP cause (Bacteria Vs Not sure)	47(94%) 48(96%)	vs	3.30 (1.30 - 8.50)	7.84	< 0.05
Willingness to report suspected cases	14(28%) 12(24%)	vs	2.65(1.10 - 6.40)	6.21	<0.05
Awareness of vaccination	36(72%) 32(64%)	vs	1.10(0.45 - 2.80)	1.33	>0.05
Training on CBPP identification	16(32%) 11(22%)	vs	2.47(1.00 – 6.10)	4.89	<0.05

Key: CI= Confidence interval

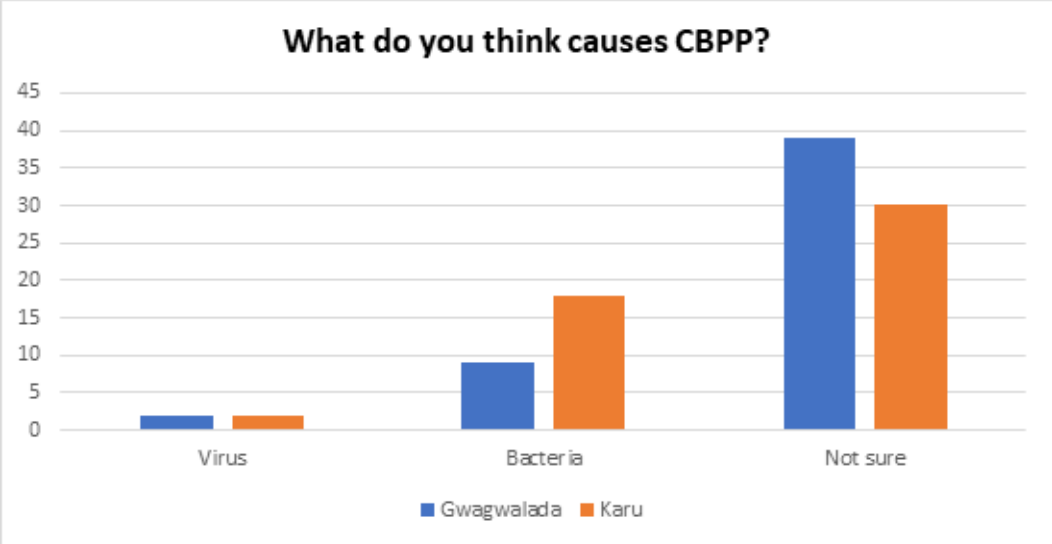

Figure 1: Showing the knowledge of the respondents on the causative agent for CBPP.

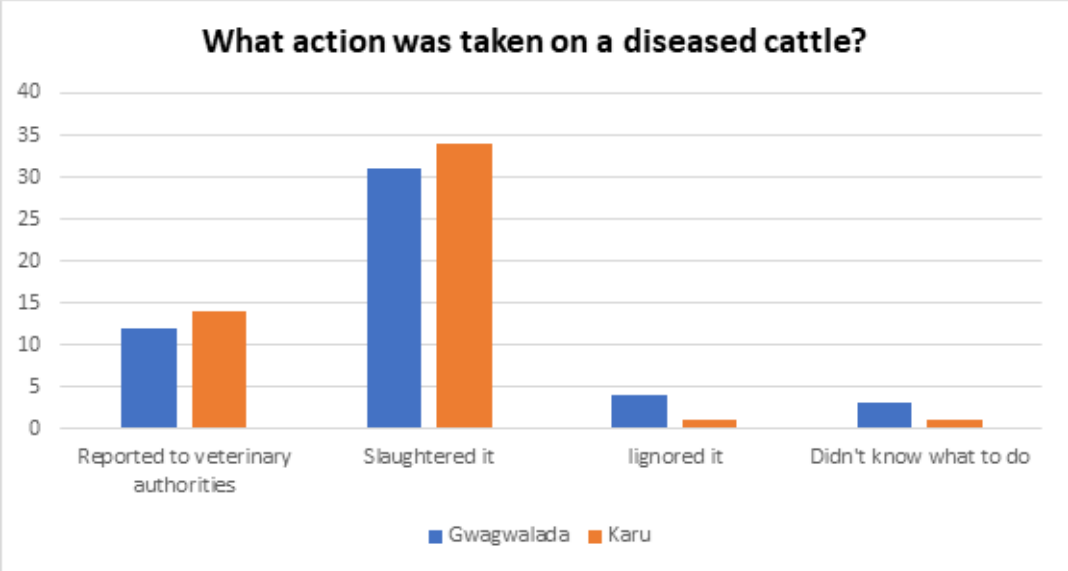

Figure 2: Showing the actions taken by respondents when CBPP signs are seen

DISCUSSION

The results revealed that although awareness of CBPP was high (95%), detailed knowledge about its cause, transmission, and control was poor. This pattern mirrors findings in other African contexts where CBPP remains endemic, including Tanzania, where [8] reported 92% awareness but only 31% had correct understanding of transmission routes; Ethiopia, where [9] found 89% awareness yet only 21% identified the correct causative organism; and northern Nigeria, where [13] recorded 94% awareness but less than 30% etiological knowledge. The high awareness observed in this study likely results from routine observation of pneumonic lesions during slaughter, yet technical understanding of *Mycoplasma mycoides* subsp. *mycoides* as the etiological agent was limited to about one-quarter of respondents. Similar low etiological knowledge has been reported by [16], who found only 28% correct responses among Ethiopian abattoir workers, and by [17] in Kenya, who recorded 25% etiological awareness, highlighting a widespread deficiency in disease-specific training among meat workers

Although most respondents could identify nasal discharge and persistent coughing as clinical signs, few recognized more specific features such as dyspnea or marbled lungs. This partial understanding suggests limited diagnostic ability, which can delay disease reporting and control actions. According to [18], [19], early recognition of classical lesions is critical to preventing spread at abattoirs that serve as surveillance hubs. These findings underscore the need for continuous training and refresher education of frontline personnel to improve diagnostic vigilance. Attitudinally, most respondents perceived CBPP as a major constraint to cattle production and agreed that vaccination was essential for its prevention, consistent with the views reported by [20], [21]. However, only about one in four workers expressed willingness to report suspected cases to veterinary authorities. Similar underreporting patterns have been described by [22], [23], who noted that fear of carcass condemnation and the absence of compensation discourage timely reporting. This behavior undermines passive surveillance and contributes to the continued endemicity of CBPP in Nigeria despite recurrent vaccination efforts.

Risky slaughter practices were also prominent. Nearly all respondents had encountered CBPP-like lesions in cattle, yet most continued with processing rather than reporting. Comparable tendencies were reported by [8], [23], where economic dependence and weak enforcement led to poor compli-

ance with inspection protocols. Such practices not only perpetuate CBPP transmission among cattle but also create food safety risks when infected carcasses enter the market. Economic motives and lack of veterinary supervision remain critical barriers to effective abattoir based control.

Training deficiencies were evident across both study sites, with more than 70% of workers lacking formal education on CBPP identification or prevention. Similar deficits have been noted across sub-Saharan Africa [9], [16]. Inadequate technical capacity limits the role of abattoirs as early-warning systems for transboundary diseases and reduces the sensitivity of passive surveillance. Addressing this gap through targeted training could significantly enhance disease reporting, aligning with recommendations by [5] for integrating human behaviour into CBPP control frameworks. Differences between Karu and Gwagwalada abattoirs were observed in certain aspects of knowledge and practices. Workers in Karu were more likely to correctly identify the causative agent, report suspected cases, and have received training. Such spatial variations reflect differential exposure to extension activities, as observed by [2], [7]. However, awareness of vaccination and prevention measures remained uniformly low, indicating the need for region-wide sensitization rather than isolated interventions. The consistent weaknesses across both abattoirs reinforce the need for systematic policy-driven education and monitoring.

Although CBPP is not zoonotic, its persistence has broad One Health implications through economic disruption, loss of livelihoods, and food insecurity. The slaughter of diseased cattle and marketing of infected meat can indirectly affect human health and nutrition. Integrating veterinary public health strategies with community engagement, enforcement of abattoir regulations, and vaccination campaigns is therefore essential for sustainable control [19], [5]. Strengthening abattoir-based surveillance and ensuring that butchers, meat inspectors, and livestock traders are active partners in disease control can substantially improve early detection and reporting.

In conclusion, despite widespread awareness of CBPP among abattoir workers, critical deficiencies persist in etiological knowledge, disease recognition, and reporting practices. Bridging these gaps requires regular training, strengthened meat inspection enforcement, and community engagement through veterinary extension. Establishing compensation frameworks for carcass condemnation and fostering multi-sectoral collaboration under the One Health approach will be vital for sustainable CBPP control in Nigeria.

CONFLICT OF INTEREST

Authors declare that there was no conflict of interest.

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