Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) OF PRE-SLAUGHTER STUNNING OF CATTLE IN CALABAR MUNICIPALITY, CROSS RIVER STATE, NIGERIA

[*1] Inemesit A. Akpan, [1] Abigail M. Igbu, [2] Margaret I. Akpan, [3]Abasiofon I. Akpan, [2]Mmmefone A. Ojong, [1]Oluwatosin O. Kennedy, [1] Okokon O. Effiong, [1] Essien E. Nsa
[1]Department of Animal Science, University of Calabar
[2]Department of Public Health, University of Calabar
[3]Department of Sociology, University of Calabar
[*]*Correspondence email: inemesitakpan100@gmail.com*

Abstract
This study examined the knowledge, attitude, and practice (KAP) of pre-slaughter stunning among cattle workers in Calabar Municipality, Nigeria. A descriptive cross-sectional design was adopted and 155 participants including butchers, cattle traders, and abattoir workers were purposively selected. Data were obtained using a validated interviewer-administered questionnaires and analyzed. Descriptive and inferential analyses (Chi-square) revealed a profound deficit in knowledge and practice. The mean knowledge score was 1.17/10, with 82.6% of respondents exhibiting low knowledge. Only 18.7% had heard of stunning, and 16.8% understood its pain-reducing benefits. Attitudes were largely negative (46.5%) or neutral (40.6%), reflecting uncertainty about its religious acceptability and practical value. Notably, 98.1% did not practice stunning, and 100% demonstrated poor practice, largely attributed to 99.4% lack of access to equipment. Significant associations were observed between knowledge and practice (χ^2 = 102.122, p < 0.001), and between attitude and practice (χ^2 = 33.937, p < 0.001). Practice was also significantly linked to education (χ^2 = 62.077, p < 0.001), professional role (χ^2 = 35.516, p < 0.001), and years of experience (χ^2 = 27.860, p = 0.006), but not to age, gender, or religion. The study concludes that low awareness, negative perceptions, and infrastructural deficiencies critically impede stunning adoption. Targeted training, investment in abattoir facilities, and interfaith engagement are recommended to enhance animal welfare standards in Nigeria.

Keywords: Attitude, Cattle, Knowledge, Practice (KAP), Pre-slaughter Stunning.

Introduction
Pre-slaughter stunning renders animals' unconscious prior to exsanguination. It is widely regarded as a critical practice for enhancing animal welfare, meat quality, and processing worker safety (Sinclair *et al*., 2023). In many developing countries, including Nigeria, the implementation of stunning remains minimal, despite its endorsement by international welfare bodies such as the World Organization for Animal Health (OIE) (Eze *et al*., 2020). Investigating the level of knowledge, attitudes and practices (KAP) of stakeholders in abattoir operations is therefore instrumental to understanding the

barriers to adoption and informing targeted interventions. Despite mounting global concern regarding humane slaughter practices, evidence suggests that cattle are frequently slaughtered without prior stunning in Nigerian abattoirs; a scenario indicative of significant welfare, quality and regulatory deficits (Adzitey, 2011). The paucity of data on the KAP of butchers and abattoir workers concerning pre-slaughter stunning hampers the development of evidence-based policy and practice reforms. Without a clear understanding of stakeholders' knowledge levels, perceptual orientations, and practical behaviours, interventions may fail to address the socio-cultural, economic and infrastructural determinants that impede uptake. This study therefore sought to fill that gap by systematically assessing the KAP of pre-slaughter stunning among cattle slaughter personnel within Calabar Municipality, Cross River State, Nigeria.

Materials and methods

Study area
The study was conducted in Calabar Municipality, one of the two Local Government Areas that constitute Calabar Metropolis in Cross River State, Nigeria. The area serves as a major urban and commercial centre, characterized by diverse socio-economic activities, including livestock trading and meat processing. The municipality hosts the main abattoir and several slaughter slabs that supply meat to Calabar and its environs. It is therefore a strategic location for examining practices related to animal welfare, slaughter procedures, and public health, given its

central role in meat production and distribution within the region.

Study design
A descriptive cross-sectional study design was employed for this study. This design was chosen because it allowed for the collection of data on the variables of interest (knowledge, attitude, and practice) from the study population at a single point in time, providing a snapshot of the situation (Wang & Chang, 2020)

Study population
The study population consisted of cattle handlers, butchers, abattoir and slaughterhouse workers, and cattle traders actively involved in the cattle slaughter process across the slaughterhouses and abattoirs within Calabar Municipality.

Sample size
A total of 155 (One Hundred and Fifty-five) participants were recruited during the data collection period, which was deemed sufficient (Taro, 1967) for this descriptive study.

Sampling procedure

A purposive snowball sampling technique was employed to recruit participants from major and representative slaughterhouses within the study area (Campbell *et al.,* *2020*). This non-probability approach was adopted to intentionally include individuals with relevant knowledge and experience pertaining to the research focus. Data collection was conducted at the main abattoir and other slaughter points in Calabar Municipality, where all eligible and available respondents meeting the inclusion

Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

criteria were invited to participate until the desired sample size was attained.

Instrument for data collection

Data were obtained through a structured, interviewer-administered questionnaires designed to elicit information on respondents' socio-demographic characteristics, assess their knowledge of pre-slaughter stunning, evaluate their attitudes toward the practice, and examine their actual implementation of pre-slaughter stunning procedures.

Method of data analysis

Completed questionnaires were validated for completeness, coded, and analyzed using SPSS version 25.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) summarized socio-demographic characteristics and KAP scores, while Chi-square test assessed associations between categorical variables. Statistical significance was set at $p < 0.05$.

Results and discussion

Results

Result in Table 1 shows that respondents had a mean age of 42 years, with most (80.6%) aged 30–49 years. The sample was predominantly male (65.8%) and married (81.3%). In terms of education, 59.4% had secondary education, while 18.7% and 11.0% had primary and no formal education, respectively; only 11.0% attained tertiary education. Cattle traders (41.9%) and butchers (40.0%) constituted the largest occupational groups, with workers and meat handlers (17.4%) forming the remainder. The workforce was largely experienced, as 69.7% had over five years of professional engagement. Religiously, the majority were Christians (87.7%), with Muslims accounting for 12.3%.

Respondents' knowledge regarding pre-slaughter stunning

Results in Tables 2 and 3 show that respondents demonstrated very low awareness of pre-slaughter stunning. Only 18.7% had heard of the practice, 21.3% understood its meaning, and 20.6% correctly identified it as a method to render animals unconscious before slaughter. Knowledge of its benefits was limited. 16.8% recognized its role in reducing pain, and 20.0% linked it to improved meat quality. Awareness of stunning methods (18.7%), local practice (17.4%), legal frameworks (12.3%), and religious or cultural acceptance (19.4%) was also low. Overall, the mean knowledge score was 1.17 ± 0.38, with 82.6% of respondents categorized as having low knowledge.

Respondents' attitudes toward pre-slaughter stunning

As presented in Tables 4 and 5, respondents exhibited generally unfavourable attitudes toward pre-slaughter stunning. The mean attitude score was 1.66 ± 0.69, with 46.5% displaying negative, 40.6% neutral, and only 12.9% positive attitudes. Across most statements, neutrality and disagreement predominated. Nearly half (49.0%) were neutral on the importance of stunning for animal welfare, and 55.5% were neutral regarding its humaneness. Over half of the respondents remained neutral on key items, including religious acceptability (51.6%),

Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

enforcement support (51.6%), and universal abattoir adoption (52.9%). Similarly, most were undecided about its practical benefits or cost implications (≈54%). Overall, responses reflected limited conviction and uncertainty regarding the value and necessity of pre-slaughter stunning.

Respondents' pre-slaughter stunning practices

As presented in Tables 6 and 7, pre-slaughter stunning was virtually non-existent among respondents. Nearly all (98.1%) reported not practicing stunning, and 99.4% lacked access to stunning equipment. The majority (94.2%) opposed making it compulsory in Nigerian abattoirs, while 75.5% did not believe it improves meat quality. Nonetheless, 40.0% indicated willingness to receive training. The mean practice score was 1.00 ± 0.00, with all respondents (100%) classified as having poor practice, reflecting a total absence of stunning implementation.

Table 1: Demographic characteristics of respondents (n = 155)

Parameter	Category	Frequency	Percentage (%)
Age range (Yrs)	Below 20	1	0.6
	20 – 29	3	1.9
	30 – 39	62	40.0
	40 – 49	63	40.6
	Above 50	26	16.8
Gender	Male	102	65.8
	Female	53	34.1
Marital Status	Married	126	81.3
	Single	21	13.5
	Widowed	8	5.2
Level of Education	No formal education	17	11.0
	Primary education	29	18.7
	Secondary education	92	59.4
	Tertiary education	17	11.0
Role	Worker/cleaner/meat handler	27	17.4
	Butcher	62	40.0
	Cattle trader	65	41.9
	Veterinary personnel	1	0.6
Years of experience	Less than 1Yr	1	0.6
	1 – 5Yrs	46	29.7
	6 – 10Yrs	66	42.6
	More than 10Yrs	42	27.1
Religion	Christian	136	87.7
	Islam	19	12.3

Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

Table 2: Respondents' knowledge regarding pre-slaughter stunning (n = 155)

Statement	Category	Frequency (n)	Percentage (%)
Heard of pre-slaughter stunning?	Yes	29	18.7
	No	126	81.3
Knowledge of what pre-slaughter stunning mean?	Yes	33	21.3
	No	122	78.7
Is pre-slaughter stunning a method used to make animals unconscious before slaughter?	Yes	32	20.6
	No	123	79.3
Are you aware that pre-slaughter stunning reduces pain and stress for animals?	Yes	26	16.8
	No	129	83.2
Do you know that pre-slaughter stunning can improve meat quality?	Yes	31	20.0
	No	124	80.0
Are you aware of the different stunning methods?	Yes	29	18.7
	No	126	81.3
Do you if pre-slaughter stunning is practiced in Nigeria?	Yes	27	17.4
	No	128	82.5
Are you aware of any laws or regulations in Nigeria regarding pre-slaughter stunning?	Yes	19	12.3
	No	136	87.7
Do you know whether pre-slaughter stunning is accepted in your religion/culture?	Yes	30	19.4
	No	124	80.6
In your opinion, is pre-slaughter stunning safe for both animals and humans?	Yes	33	21.3
	No	122	78.7

Table 3: Knowledge category from the respondent's knowledge score (n = 155)

Knowledge category	Frequency (n)	Percentage (%)
Low knowledge	128	82.6
High knowledge	27	17.4
Total	155	100

Table 4: Respondents' Attitude regarding pre-slaughter stunning (n = 155)

Statement	SD	D	N	A	SA
	n (%)	n (%)	n (%)	n (%)	n (%)
Pre-slaughter stunning is important for animal welfare	8 (5.2)	60 (38.7)	76 (49.0)	10 (6.5)	1 (0.6)
Pre-slaughter stunning makes slaughtering more humane	17 (11.0)	37 (23.9)	86 (55.5)	13 (8.4)	2 (1.3)
Stunning cattle before slaughter is necessary	16 (10.3)	41 (26.5)	80 (51.6)	16 (10.3)	2 (1.3)
Using stunning methods is acceptable in my religion	11 (7.1)	36 (23.2)	80 (51.6)	24 (15.5)	2 (1.3)
I believe stunning should be practiced in all abattoirs	7 (4.5)	46 (29.7)	82 (52.9)	19 (12.3)	1 (0.6)
Stunning reduces the suffering of cattle during slaughter	16 (10.3)	31 (20.0)	85 (54.8)	21 (13.5)	2 (1.3)
Stunning makes the work of butchers and abattoir workers easier	12 (7.7)	38 (24.5)	84 (54.2)	16 (10.3)	5 (3.2)
I would support government enforcement of stunning before slaughter	17 (11.0)	37 (23.9)	80 (51.6)	20 (12.9)	1 (0.6)
Pre-slaughter stunning increases the cost of meat production unnecessarily	15 (9.7)	39 (25.2)	85 (54.8)	15 (9.7)	1 (0.6)
I am willing to adopt pre-slaughter stunning if facilities are provided	18 (11.6)	33 (21.3)	87 (56.1)	15 (9.7)	2 (1.3)

Table 5: Attitude category from the respondent's attitude score (n = 155)

Attitude category	Frequency (n)	Percentage (%)
Negative attitude	72	46.5
Neutral attitude	63	40.6
Positive attitude	20	12.9
Total	**155**	**100**

Table 6: Respondents' practice regarding pre-slaughter stunning (n = 155)

Statement	Category	Frequency (n)	Percentage (%)
Do you currently practice pre-slaughter stunning?	Yes	3	1.90
	No	152	98.10
Do you have access to stunning equipment in your abattoir?	Yes	1	0.60
	No	154	99.40
Would you be willing to undergo training on pre-slaughter stunning?	Yes	62	40.00
	No	93	60.00
Do you think stunning should be made compulsory in all abattoir in Nigeria?	Yes	9	5.80
	No	146	94.20
In practice, do you believe stunning improves meat quality?	Yes	37	23.90
	No	117	75.50

Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

Table 7: Practice category from the respondent's practice score (n = 155)

Knowledge category	Frequency (n)	Percentage (%)
Good practice	0	0.00
Poor practice	155	100
Total	**155**	**100**

Association between knowledge of respondents and adoption of pre-slaughter stunning practices

A Chi-square test was conducted to assess the association between respondents' knowledge level and the practice of pre-slaughter stunning (Table 8). The null hypothesis stated that knowledge does not significantly influence practice. As all respondents demonstrated poor practice, no cases were recorded in the "good practice" category across knowledge groups. The test yielded a Chi-square value of χ^2 (3, N = 155) = 102.122, p < 0.001, indicating a significant association between knowledge and practice at the 95% confidence level.

Association between attitudes of respondents and adoption of pre-slaughter stunning practices

A Chi-square test assessed the association between respondents' attitude and practice of pre-slaughter stunning (Table 9). No respondent reported good practice across attitude groups. The result χ^2 (6, N = 155) = 33.937, p < 0.001) indicates a significant relationship between attitude and practice at the 95% confidence level.

Table 8: Statistical association between knowledge level and pre-slaughter stunning practice among respondents (n = 155)

Variable	Category	Practice		χ^2	df	p-value
		Good	Poor			
Knowledge	Low	0 (0.00%)	126 (81.3%)	102.122[a]	3	<0.001
	High	0 (0.00%)	29 (18.7%)			

Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

Table 9: Statistical association between respondents' attitude and pre-slaughter stunning practice (n = 155)

Variable	Category	Practice		χ^2	df	p-value
		Good	**Poor**			
Attitude	Negative	0 (0.00%)	71 (45.8%)	33.937[a]	6	<0.001
	Neutral	0 (0.00%)	62 (40.0%)			
	Positive	0 (0.00%)	22 (14.2%)			

Discussion

The study revealed a critical deficit in knowledge, attitude, and practice (KAP) regarding pre-slaughter stunning among cattle workers in Calabar Municipality, Nigeria. Awareness of the practice and its welfare implications was notably poor, as fewer than one-fifth of respondents had heard of or understood the concept. This is in tandem with a study in Ghana by Awuni *et al*. (2025) who reported significant gaps in slaughterhouse workers' understanding of animal welfare concepts, including stunning. This regional pattern suggests a systemic issue, where formal training on modern animal welfare practices has not been integrated into the meat industry. The attitudinal findings mirrored this knowledge gap, with nearly half of respondents exhibiting negative perceptions and most expressing neutrality on key issues such as welfare importance, religious acceptability, and regulatory enforcement. These findings are consistent with studies in similar contexts. Njoga *et al*. (2023) in Southeast Nigeria also reported that animal welfare was not a primary consideration for many slaughterhouse workers. This widespread indifference and uncertainty indicate that, beyond lack of awareness, there exists a deeper skepticism or absence of conviction about the relevance and feasibility of stunning in the local context. Practically, stunning was almost entirely absent, with 98.1% of respondents not practicing it and 99.4% lacking access to equipment. The near-universal opposition to making stunning compulsory underscores both infrastructural inadequacy and weak policy enforcement. However, the willingness of 40% to receive training reflects a potential entry point for intervention through capacity building. The Chi-square analyses confirmed that both knowledge (χ^2 = 102.122, p < 0.001) and attitude (χ^2 = 33.937, p < 0.001) significantly influenced practice. These findings align with a previous study which reported that increased knowledge underpinned attitudinal changes and thereby improved the potential for behavioural change among abattoir workers (Descovich *et al*., 2019). This emphasizes the interdependence of awareness, perception, and behavioural adoption in animal welfare interventions. Overall, the results highlight the urgent need for

structured education, targeted sensitization, investment in abattoir infrastructure, and policy support to facilitate the gradual integration of humane slaughter practices in Nigeria.

Conclusion

This study demonstrates that the adoption of pre-slaughter stunning among cattle workers in Calabar Municipality, Nigeria is virtually non-existent. The findings attributed this to a combination of profound knowledge deficits, uncertain or negative attitudes, and a complete absence of enabling infrastructure. Most respondents lacked a clear understanding of the concept and its welfare or quality benefits, while others expressed uncertainty regarding its religious permissibility. Even among those with favourable perceptions, implementation was constrained by the unavailability of stunning equipment. Thus, the non-practice of stunning reflects not deliberate resistance but a systemic failure driven by informational, attitudinal, and infrastructural barriers. Addressing these constraints through education, capacity building, and

facility improvement is essential to promote humane slaughter practices in Calabar Municipality, Nigeria.

Recommendations

Based on the findings of this study, the following recommendations have been proffered:

Regular training and capacity-building programs should be organized to improve butchers' and abattoir workers' understanding of pre-slaughter stunning, its procedures, and benefit. Targeted awareness campaigns should address misconceptions and religious or cultural concerns, fostering more favourable attitudes toward humane slaughter practices.

1. Government and relevant agencies should provide functional stunning equipment and technical support in abattoirs to enable practical adoption and routine use.

2. Collaborative engagement with religious leaders, community stakeholders, and policymakers is essential to overcome cultural resistance, strengthen regulations, and improve infrastructural support for humane slaughter standards.

References

Adzitey, F., Teye, G. A., & Dinko, M. M. (2011). Pre- and post-slaughter animal handling by butchers in the Bawku Municipality of the Upper East Region of Ghana.

Awuni, E., Abiliba, D. B., Asare, D. A., Kasim, S. M., Takyi, P. N., & Emikpe, B. O. (2025). Insights into animal welfare at slaughter: perceptions, knowledge and practices among slaughterhouse workers in Ghana. *PAMJ-One Health*, *16*(4),12-36

Descovich, K., Li, X., Sinclair, M., Wang, Y., & Phillips, C. J. C. (2019). The effect of animal welfare training on the knowledge and attitudes of abattoir stakeholders in China. *Animals*, *9*(11), 989-1008.

Eze, I. E., Nwokeocha, C. C., Achonwa, C. C., Ukwu, C. P., Etuk, I. F., & Okoli, I. C. (2020). The concepts of animal welfare and its current situation in trade cattle management in Nigeria: Nigerian Society for Animal Production (NSAP) 45TH Annual

Journal of Agriculture, Forestry and Environment, 2025, Special Edition 1: 56-66
Knowledge, attitude and practice (kap)
Akpan et al.

Conference Bauchi 2020 Book of Proceedings. -423-426

Njoga, E. O., Ilo, S. U., Nwobi, O. C., Onwumere-Idolor, O. S., Ajibo, F. E., Okoli, C. E., & Oguttu, J. W. (2023). Pre-slaughter, slaughter and post-slaughter practices of slaughterhouse workers in Southeast, Nigeria: Animal welfare, meat quality, food safety and public health implications. *PLoS One*, *18* (3), e0282418.

Sinclair, M., Hötzel, M. J., Lee, N. Y., De Luna, M. C. T., Sharma, A., Idris, M., & Marchant, J. N. (2023). Animal welfare at slaughter: perceptions and knowledge across cultures. *Frontiers in Animal Science*, *4*, 1141789.

Taro, Y. (1967). Statistics_ An introductory analysis (2nd ed.), Harper and Row.

Wang, C., & Cheng, Y. (2020). Effects of long-term gentle handling un behavioral responses production performance meat quality of pigs. *Animals* 10(2):330-