



ASSESSMENT OF THE HYGIENIC CONDITIONS OF ABATTOIRS IN GOMBE STATE, NIGERIA

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Abstract

The purpose of this study was to determine the hygienic condition of abattoirs in Gombe State, Nigeria. The study was guided by two objectives, two research questions, and two null hypotheses. The study was anchored on the Theory of Reasoned Action (TRA) propounded by Fishbein and Ajzen (1967), which explains on the basis of sanitation and hygiene of butchers in abattoirs. Literature on sanitary condition of abattoirs and hygiene of butchers were reviewed. Survey research design was used for the study. The population of the study were sanitary labourers and butchers in Gombe state abattoirs from the three senatorial districts. Sample of 579 was randomly selected using a stratified random sampling technique. The instrument used for data collection was a self-developed 30-item questionnaire. Analysis of data were done using descriptive statistics (frequency counts and percentages) and inferential statistics of Analysis of Variance (ANOVA) at 0.05 level of significance and computed with SPSS version 27 to answer research questions and hypotheses. Results shows that, the sanitary conditions of abattoirs differed significantly across the districts ($F = 19.42, p < 0.05$), with Gombe North performing poorly compared to Gombe Central and Gombe South. The study also found no significant difference in butchers' personal hygiene ($F = 0.117, p > 0.05$), indicating uniformity in hygiene practices across districts. These findings suggest that Gombe North faces the greatest public health risk due to infrastructural deficiencies and poor waste management systems. Conversely, consistent hygiene among butchers reflects awareness fostered by occupational norms.

Keywords: Hygienic Condition, Abattoirs, Butchers



Introduction

Meat is very vital in our body, it makes our cells to function and develop wellbeing the source of protein, vitamin and nutrients, this enhance our health if hygienically handled by the butchers in abattoirs, in this regards health of butchers are of importance in meat processing, (Shilenge, 2017). Worldwide, foodborne diseases are associated with the consumption of contaminated meat due to poor or low hygiene of butchers, during processing, in which meat processing has been attributed as a primary source of illness when contaminated, butcher's cleanliness and neatness is highly required in abattoirs and meat selling points/markets, (Zerabruk, 2019). Bersisa, (2019), stated that, meat that is unhygienically prepared by butchers may end up having contaminated by pathogenic bacteria that the butchers may harbour in their bodies due to lack of hygiene practise and can lead to health hazards for the consumers, resulting in different disease conditions. It was observed by Khanal, (2017) that, butchers have a massive role to play in the prevention of meat-borne diseases if they can practise and maintain proper and suitable hygiene during meat preparing, processing and handling in the abattoirs.

It is mandatory and necessary for them (butchers) to provide wholesome and fresh meat for human consumption. Butchers low/poor personal hygiene serves as a reservoir (vector) for the spread of microorganisms through their hands, legs, rashes on skin, open wounds, lips, and uncovered hair, (Wambui, 2017). If proper hygiene practise, such as washing hands, wearing apron (protective clothes), cleaning and sanitizing of butchery equipment and utensils, are not followed, bacteria will surely contaminate meat, which can lead to meatborne epidemic among consumers.

Sanitation encompasses the control of environmental factors that are connected to transmission of infections through liquidwaste and solidwaste in abattoirs, Adelegan (2002). In every abattoirs sanitation is very vital and compulsory in order to maintain hygiene of meat and butchers as well, resulting to the health of entire population. Sanitation refers to public health practise and conditions which includes: treatment and disposal of animals and human excreta, having potable drinking water and proper sewage disposal, Center for Affordable Water and Sanitation Technology (CAWST, 2013). Having these in abattoirs been practise, means that meat is hygienic for human consumption, its promote health and prevent diseases. Nevertheless, sanitation aims to protect human health by providing clean environment that will stop fecal-oral transmission of these diseases: Ascariasis, (Helminthic) Schistosomiasis, Cholera, dysentery and diarrhea as a result of poor sanitation in a community, Bloomfield (2007). This can certainly result in



contaminating and disliking of meat. Sanitation is also the application of services and maintenance of hygiene in form of garbage collection and wastewater for proper and final disposal. It also deals with solid waste management, wastewater management systems and excreta management as well as the process of keeping places clean and healthy, especially by providing a sewage system and a clean water supply, (WHO,2015). Absence or poor sanitation in abattoirs can lead to contamination of meat, sanitation need to be considered important. Studies in Nigeria have also reported substandard facilities, unsanitary environments and poor hygienic practices in abattoirs and slaughterhouses, (Adesokan, 2014). Poor sanitation reduces human health, social and economic development.

In most of the African countries, Ghana, many abattoirs dump their waste into streams and at the sometimes use same water source to wash meat for human consumption, Adelegan, (2002). A study conducted in Ghana Amasaman the capital of Ga West Municipal district in Greater Accra Region of Ghana. The Amasaman slaughterhouse shows that, Kumasi butchers dischard waste from abattoirs into Subin river which is just about one kilometer upstream of Asago community, (Weobong, 2001), an indication of poor sanitation resulting in meat contamination. Inadequate sanitation was estimated to cause 432, 000 deaths annually including intestinal worms, schistosomiasis, and trachoma, therefore sanitation in abattoirs should be taken very seriously to avoid contamination of meat by any means, so that customers may not be victims. Sanitation encompasses the control of environmental factors that are connected to transmission of infections through liquidwaste and solidwaste in abattoirs, Sunday Times, (2009).

Liquid and solid waste are generated in abattoirs every day during and after slaughter. For this waste must be handled with caution, all in the name of promoting hygiene in meat for people to eat wholesome meat in totallity. World Health Organization affirmed that sanitation is the promoting of health through preventing human contact with hazards of waste, treatment of waste and accurate disposal of sewage microbiological or chemical agents of infections. Waste that could cause health hazards are animals' excreta in abattoirs, for this, it needs extra attention in order not to contaminate meat.

In Nigeria, Gombe State to be precise almost every community, rural or urban, small or large has abattoir for slaughter purposes and to have sound meat for consumption. Abattoirs sanitation is a thing of concern for a successful living. National Environmental Sanitation policy



aply identified abattoirs sanitation as one of the key policies in addressing problems of environmental sanitation in nation. Problems faced in abattoirs are improper disposal of waste, insufficiency of potable water supply, low number of sanitary equipment and facilities, exposure of meat to flies and rodents. In this case, when sources of water are polluted, meat is also polluted by chance because of using the water to wash the meat.

Methodology

The research design used for this study was descriptive survey research design. According to Alamu and Olukosi, (2008), survey research design deals with the collection of data for the purpose of describing and interpreting existing conditions, prevailing practice, beliefs, attitudes and ongoing processes. The survey research design was appropriate in determining the appraisal of meat hygiene practice in abattoirs among butchers of Gombe State, Nigeria. The population for this study was two thousand nine hundred and sixty-one (2961) butchers of Gombe State, Nigeria. Stratified random sampling was used to select six abattoirs from the three (3) senatorial districts of Gombe State, thus Gombe Central, Dadin-Kowa and Kumo, Gombe North, Gombe town and Malan-Sidi and Gombe South, Kaltungo and Billiri. Simple random sampling technique was used using Letter S (meaning sample) was written on piece of papers and the piece of the papers were squeezed and then asked them to pick with replacement, any letter S that was picked stands as sample until the required numbers were obtained thus, five hundred and seventy-nine (579) respondents, it was done senatorial district by senatorial district of Gombe State. a self-developed questionnaire of 30 items.

Results Table 4.1: Demographic Characteristics of the Respondents ($n=579$)

S/N	Items	Responses	Frequency	Percentages (%)
1	District	Gombe Central	163	28.2
		Gombe North	255	44.0
		Gombe South	161	27.8
2	Age of Respondents	25 years and below	55	9.5
		26 – 30 years	164	28.3
		31 – 35 years	170	29.4
		36 – 40 years	136	23.5



		Above 40 years	54	9.3
3	Years of Experience	1 – 10 years	170	29.4
		11 – 20 years	219	37.8
		21 – 30 years	154	26.6
		31 years and above	36	6.2
4	Educational Level	FSLC	142	24.5
		WAEC/NECO/NABTEB	181	31.3
		OND/NCE	153	26.4
		Degree/HND	87	15.0
		Others	16	2.8
5	Marital Status	Single	92	15.9
		Married	331	57.2
		Widower	84	14.5
		Separated	72	12.4

H₀₁: There is no significant difference in the sanitary condition of abattoirs based on Senatorial Districts in Gombe State, Nigeria.

Table 4.2: ANOVA Summary Table on Sanitary Conditions of Abattoirs among Senatorial Districts in Gombe State
(n=579)

Source of Variation	Sum of Squares	Df	Mean Square	F	P-value	Remark
Between Groups	237.00	2	118.50		0.001	
Within Groups	3514.15	576	6.10			Rejected
Total	3751.14	578		19.43		

The result on table 4. 2 presents the results of ANOVA test was conducted to determine if there is significant difference in the sanitary conditions of abattoirs among the three senatorial districts in Gombe State, Nigeria. The findings reveal a statistically significant difference among abattoirs, with an F-value of 19.42, $p = 0.001$. This suggests that the null hypothesis (H_{01}), which states that



there is no significant difference in the sanitary conditions of abattoirs among Senatorial Districts in Gombe State, is rejected.

H₀₃: There is no significant difference in hygienic Condition of abattoirs based on Senatorial Districts in Gombe State, Nigeria.

Table 4.3: ANOVA Result of Hygienic Condition of Abattoirs in Gombe State

Source	Sum of Squares	df	Mean Squares	F-value	p-value	Remark
Between Groups	1.14	2	.569		.890	
Within Groups	2810.04		4.879	.117		Accepted
Total	2811.17	578				

The table 4.3 presents the ANOVA results on hygiene practices among butchers across Senatorial Districts in Gombe State, Nigeria. The analysis produced an F-value of 0.117 and a pvalue of 0.890, which is far above the 0.05 level of significance. This result indicates that there is no statistically significant difference in hygiene practices among butchers across the senatorial districts. Consequently, the null hypothesis (H₀₆), which posits that there is no significant difference in hygiene of butchers in Senatorial Districts in Gombe State, is retained.

Discussion

The study determined the practice of meat hygiene among butchers in abattoirs in Gombe State, Nigeria, focusing on two key variables: the sanitary condition of abattoirs and hygiene of butchers in abattoirs.

The study on the sanitary condition of abattoirs revealed that a statistically significant difference existed among the three senatorial districts of Gombe State, Nigeria, with Gombe North found to have significantly poorer sanitary conditions compared to Gombe Central and Gombe South. This finding indicates that the level of hygiene and cleanliness in abattoirs varies by districts, suggesting that infrastructural, managerial, and behavioural disparities strongly influence the general sanitary



status of abattoirs. Poor drainage systems, irregular water supply, inadequate waste disposal (management), and limited enforcement of hygiene regulations appear to contribute to the unsanitary state observed in Gombe North. This variation shows that while some districts have made notable improvements in abattoir management and sanitation, others still face deep-rooted structural and operational challenges that threaten public health and meat safety.

The result of this study is consistent with the work of the sanitary conditions and microbial load of abattoirs in the Amhara Region of Ethiopia and discovered that 80% of the abattoirs lacked proper infrastructure and effective waste disposal systems. Their study also confirmed a strong relationship between poor sanitary infrastructure and high bacterial contamination on carcasses. Similarly, 70% of the abattoirs examined operated with inadequate drainage and waste disposal systems, leading to high microbial loads on meat surfaces. Both studies aligned with the current finding that poor infrastructure directly compromises the sanitary integrity of abattoirs and increases the risk of contamination. The situation in Gombe North reflects similar infrastructural deficits and poor hygiene enforcement observed across abattoirs in many developing countries, underscoring the urgent need for policy interventions and infrastructural upgrading.

Conversely, the study findings are significant improvement in abattoir sanitation following the implementation of structured veterinary inspections and feedback systems. Their research found that regular inspections improved compliance with hygiene standards and reduced microbial contamination. In Punjab, Pakistan, established that abattoirs equipped with certified Hazard Analysis and Critical Control Point (HACCP) systems recorded substantially lower microbial counts compared to non-certified facilities. These studies suggest that systematic management and supervision can mitigate sanitation challenges even in resource-limited settings. The variation observed in Gombe State, therefore, indicates that while managerial oversight improves hygiene outcomes in some districts, weak supervision and absence of institutional accountability in others, particularly Gombe North, lead to persistent unhygienic conditions.

In addition, a large proportion of butchers had adequate knowledge of hygiene, only a small fraction practised it consistently. Their findings showed that attitude and motivation, rather than knowledge alone, predicted hygienic behaviour. This conclusion partly disagrees with the Gombe study, where environmental and infrastructural differences appear to be the dominant factors influencing sanitary outcomes. However, it also suggests that human behavioural elements, such as complacency and lack of motivation, may compound the problem in poorly maintained abattoirs. Similarly, accessing to clean water significantly improved sanitary outcomes, indicating that structural deficiencies and



behavioural attitudes operate together in determining hygiene performance. These studies collectively reinforce that improving sanitation requires both environmental provision and behavioural reform.

Linking these results to the Theory of Reasoned Action (TRA) provides a behavioural interpretation of the observed pattern. The theory posits that an individual's behaviour is driven by their attitude toward the behaviour and subjective norms—that is, the social pressures influencing their decisions. The findings from Gombe State align with the theory's central argument: where butchers perceived that maintaining hygiene yields beneficial outcomes and where social or regulatory norms reinforce such behaviour, compliance is higher as seen in Gombe South and Central. In contrast, in Gombe North, where institutional enforcement and community expectations are weaker, butchers' attitudes toward hygiene appear negative, resulting in unsanitary conditions. The theory, therefore, supports the interpretation that improving sanitary conditions requires shaping positive attitudes through training, awareness, and enforcement, as well as creating strong social and institutional norms that reward hygienic behaviour. The study, however, slightly diverges from the TRA by emphasizing infrastructural factors as key determinants of sanitation, showing that behavioural intention alone may not guarantee hygienic outcomes without the necessary environmental support. The implication is that public health interventions must combine behavioural change strategies with infrastructural development to ensure sustainable improvements in abattoir sanitation across Gombe State.

Likewise, in terms hygiene of butchers in Gombe state abattoirs, the study on the hygiene of butchers in abattoirs in Gombe State revealed no statistically significant difference across the three senatorial districts, indicating that butchers in Gombe North, Gombe Central, and Gombe South maintain similar hygiene practices. This result suggests that personal hygiene standards among butchers are uniformly practiced across the state, with no district exhibiting markedly superior or inferior performance. The lack of significant difference implies that butchers share comparable working environments, hygiene awareness levels, and behavioural attitudes toward sanitation. This uniformity could be attributed to shared training deficiencies, cultural practices, and the absence of systematic hygiene monitoring or health surveillance mechanisms across abattoirs. The result also reflects a broader challenge in the Nigerian abattoir system, where hygiene standards are largely dependent on individual effort rather than institutional enforcement. Although the result might indicate equality in behaviour, it may also signal a stagnant level of hygiene performance that has not been enhanced through structured training, modern sanitation infrastructure, or health-based policy enforcement. Thus, the uniformity observed across districts calls for targeted interventions



that integrate both behavioural reinforcement and institutional accountability to improve hygiene outcomes statewide.

This finding aligns with the subjective norms and perceived behavioural control were the strongest predictors of hygiene behaviour among butchers. Their results emphasized that hygiene practices are more influenced by psychosocial and cultural factors than by regional or infrastructural differences, supporting the uniform pattern seen in Gombe. Similarly, when cultural and religious practices were integrated with scientific hygiene principles, compliance improved across diverse work environments, highlighting how shared beliefs can produce consistent hygiene behaviour. However, the Gombe findings contrast with demonstrated that targeted hand hygiene training, antimicrobial uniforms, and structured laundering significantly improved hygiene compliance in industrial abattoirs, suggesting that variation in hygiene levels can emerge when modern systems and training are introduced. Studies further revealed that implementing standardized hand sanitization and footwear hygiene protocols led to significant reductions in contamination, indicating that procedural interventions can break behavioural uniformity and raise standards. In the context of the Theory of Reasoned Action (TRA) the Gombe findings can be interpreted as a reflection of shared attitudes and subjective norms among butchers. Their similar perceptions of hygiene and the limited social or institutional pressure to improve result in uniform, unchanging practices. While the TRA helps explain this behavioural consistency, it also reveals the need for stronger motivational and normative forces such as regulatory supervision, structured training, and cultural adaptation of hygiene messages to drive behavioural transformation and elevate personal hygiene standards among butchers across all abattoirs in Gombe State.

Conclusion

Based on the findings, it was concluded that meat hygiene practices in Gombe State's abattoirs were of low practice and vary significantly across the three (3) senatorial districts. The most notable disparities were in sanitary conditions, Gombe North consistently underperformed across these domains, raising significant public health concerns. Conversely, butchers' personal hygiene practices appeared consistent all over the state, which was a positive indication of awareness at the individual level.



Recommendations

Based on the findings of this study, the following recommendations were made: The Gombe State to adhere to the practice of sanitation in order to promote sanitary condition of the abattoirs/environments, infrastructure in abattoirs by employing more sanitary labourers and supply them with sanitary equipment (Wheelbarrows, Rakes, Waste bins, Brooms, Shovels, Hoes, Van attach with driver and labourers for final disposal of the waste generated, etc), particularly in Gombe North in collaboration with Ministry of Health Gombe state by ensuring the sufficiency of potable water, and availability of waste disposal systems/sides. In the same vein the butcher's association are to join hands in providing the sanitary equipment such as rakes, shovels, brooms, hoes, waste bins and many more. They can as well plan for weekly environmental sanitation of the abattoirs or the association will employ sanitary labourer(s), all with the aim of keeping and maintaining cleanliness of the abattoirs.

Public health campaigns should be initiated by health educators and other statutory agencies to increase awareness among butchers (meat vendors) and the butchers are to partake in the campaign. So that they can be updated about the implications of poor hygiene on human health, including the spread of zoonotic diseases in collaboration with Ministry of Health.

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