



## EVALUATION OF ABATTOIR PRACTICES IN IJEBU ODE, NIGERIA

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### ABSTRACT

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If used properly, abattoirs can help with disease management, ante- or postmortem investigation of animals and the meat, and can protect the population from most zoonotic illnesses that can develop after eating unsanitary, unsafe, or unwholesome meat or meat products. This underscores the need to examine and explore present abattoir practises in order to better understand the current situation of meat production in Ijebu Ode, Nigeria. Data was retrieved from three (3) government-approved abattoirs using self-administered structured questionnaires, personal interviews, and observations, and the data were computed descriptively using a statistical software for social scientists. Findings from the empirical observation and evidence indicated significant deficiencies in the essential hygiene facilities and services, with the lack of a veterinary laboratory for microbiological confirmation of suspected meat, and all the butchers reported no utilisation of protective gear during slaughtering activities. 66.7% of the abattoirs disposed of their solid waste by open dumping in the nearby bushes, while the wastewater was discharged into public drains. The study revealed that the abattoir practises in Ijebu Ode are unsatisfactory, with unsanitary practises and shortfalls in fundamental hygiene facilities and services, which are critical for producing healthy meat for public consumption. As a result, standardisation of facilities, including the closure of substandard ones, and educational training of abattoir workers were proposed as ways to improve hygiene facilities and practises.

**Contribution/Originality:** The findings of this study are critical in understanding and regulating the meat sector in Ijebu-Ode, as they provide objective evidence that can be used to develop a holistic abattoir and meat hygiene intervention program, resulting in a reduction in the transmissible disease burden caused by poor abattoir practices.

## 1. INTRODUCTION

The object of an abattoir is to create sanitary meat by humanely managing animals and employing sanitary slaughtering and dressing processes, according to the Food and Agricultural Organization (FAO) [1]. At the same time, it allows for adequate meat inspection. As a result, any possible danger of meat-borne pathogenic agents reaching the public or harming the environment is eliminated [1]. Generally, some pre-requisites must be considered in order to offer the basic environmental and operating conditions required for producing safe and healthy meat and meat products. Good abattoir practises, and hygiene procedures are among the abattoir practises that must be followed [2]. Standard slaughterhouse practises will only result in the production of meat and its derivatives that are aesthetically pleasing, safe, healthful, and suitable for human consumption.

If used properly, abattoirs can help with disease management, ante- or post-mortem evaluation of animals and meat, and can prevent humans from most zoonotic illnesses that can develop after eating unsanitary, unsafe, or unwholesome meat or meat products. Aside from their primary function of meat inspection, abattoirs have contributed to the discovery and elimination of many diseases in most developed countries [3, 4]. However, according to recent work, some African regimes are becoming more proactive in adopting abattoir inspection services to combat tuberculosis [5]. Abattoirs are underutilised in most economically underdeveloped nations like Nigeria, and meat passed for human consumption is frequently inadequately examined, which is or may be harmful to health. According to WHO [6]; Woolhouse and Gaunt [7] zoonotic diseases are responsible for 60% of all infectious disease pathogens and 75% of all emerging pathogens. Inadequate meat examination has been linked to the spread of toxoplasmosis, bovine tuberculosis, and swine cysticercosis, according to new findings [8-11].

Abattoir practises, inefficient standard operating procedures, poor environmental hygiene, and insufficient hygiene facilities and services could all contribute to sanitary difficulties with food animals. Individual butchers in Nigeria, for example, Oruonye [12] carry out abattoir activities in untidy surroundings and outside the slaughterhouse due to a lack of hygienic awareness. Males, uneducated, and school-dropouts are also thought to predominate in butchery [13]. These findings support research from Nepal and Ghana, which found that 80 percent and 64 percent of butchers, respectively, lacked a formal education [14, 15]. According to an earlier study by Nwanta, et al. [16] the killing and processing amenities at slaughterhouses are inadequate, because there are no sewage or waste disposal systems, sufficient potable water, functional drainage, or refrigeration. All of these filthy slaughterhouse practises increase the danger of meat intended for human consumption becoming contaminated. According to recently published work, all of the main slaughterhouses in Sokoto, Kano, and Kaduna states were dilapidated, and the vandalised infrastructure could not sustain the production of hygienic and safe meat and its derivatives [17]. These observations corroborate complaints from other nations in East-Africa about a lack of facilities, poor cleanliness, and insufficient meat inspection [11, 18]. The high occurrences of brucellosis, tuberculosis, cysticercosis, teniasis, and fascioliasis documented in humans across Nigeria are largely believed to be due to these deficiencies. As a result, Lawan, et al. [17] reported that the most prevalent zoonotic diseases observed (tuberculosis, cysticercosis, and hydatidosis) were consistent with findings from Cadmus, et al. [19] who also reported a high incidence of zoonotic bovine tuberculosis in abattoirs. Hence, evidence abounds on the influence of abattoir practices on urban people's health Singh and Neelam [20]; Bello and Oyedemi [21]. Okoli, et al. [13] emphasised the fact that poor quality meats are produced, handled, sold, and consumed in Nigeria, posing major public health issues. Despite significant research on slaughterhouses and potential health risks, no one study exists that evaluates abattoir operations in Ogun State, Nigeria in general, and Ijebu Ode, the state's second biggest city, in particular. In order to fill these research voids, it is necessary to analyse and explore the existing situation of abattoir procedures in Ijebu Ode. As a result, findings from this inquiry are expected to influence compliant and well-organized abattoir operations, facilitating hygienic meat production and public health promotion through the consumption of healthy meat and its derivatives.

## 2. MATERIALS AND METHODS

The Evaluation of Abattoir Practices in Ijebu Ode, Nigeria, was conducted in the City of Ijebu Ode, Nigeria, which is located some 60 kilometres north-west of Lagos, and with a population of 154,032 [22]. Ijebu Ode is fast growing and has powerfully spreading sub-urban areas, with a population growth rate of 3.10% and with an estimated current population of 344,676 [23] see Figure 1. The present observation adopted both qualitative and quantitative approaches, wherein data were sourced by means of self-administered structured questionnaires, personal interview and observations, from the abattoirs' administrative supervisors, butchers, meat inspectors and casual labourers, to elicit necessary information about the slaughterhouse attributes, availability of essential hygiene facilities and services, and the environmental hygiene practices in the slaughterhouses. Data were gathered from

three (3) purposively chosen approved abattoirs located at Ijebu Ode, being the major slaughterhouses and meat source within the area of study. The gathered data were computationally performed descriptively by means of statistical software for social scientist (SPSS;v20.0), and graphically represented in charts using Microsoft windows office suite.

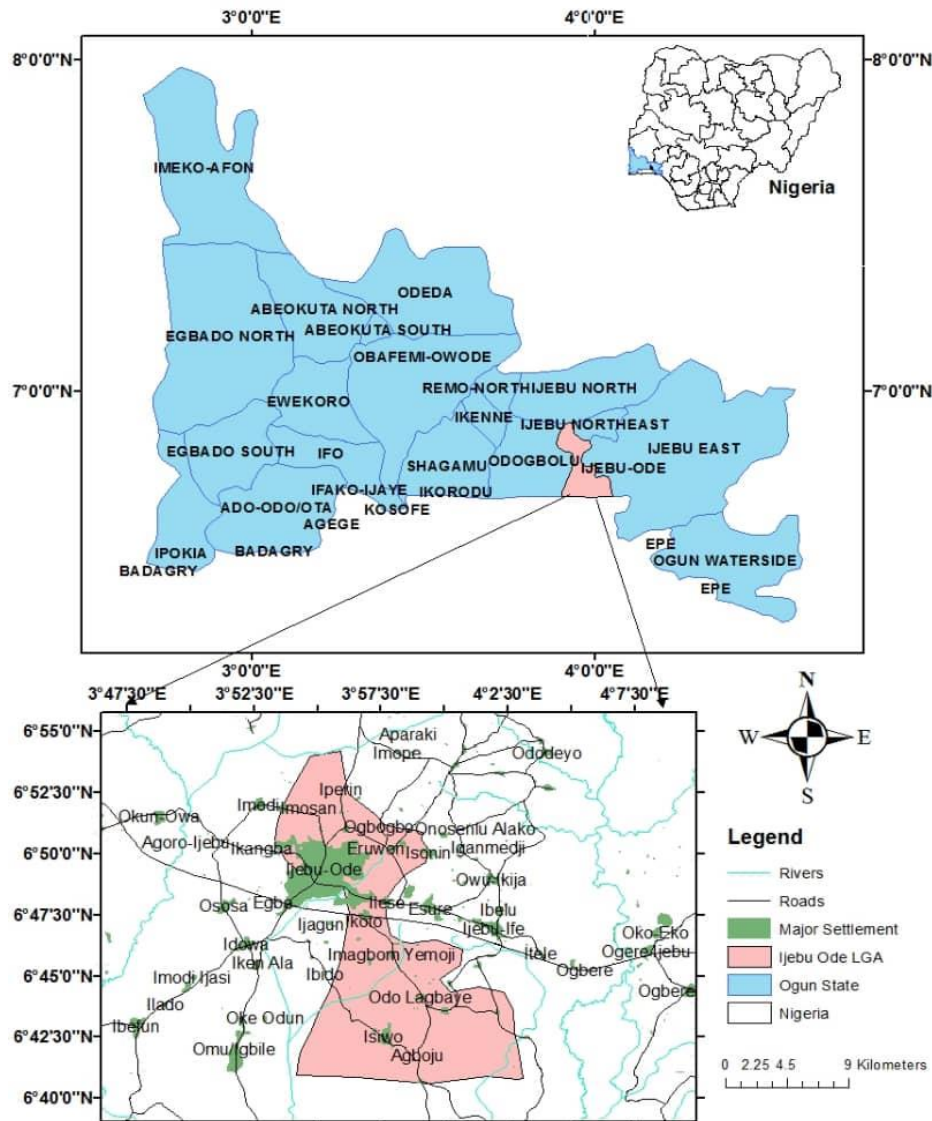


Figure 1. Spatial Map of Ijebu Ode.

### 3. RESULTS

Analysis of preliminary data on the abattoir features as illustrated in Table 1 revealed that 33.3% of the abattoirs were established around 1 – 15 years ago and 66.7% were established more than 25 years past. On the legitimacy of operations, analysis also indicated that all the abattoirs were registered with the authorities. More analysis showed that 33.3% of these abattoirs slaughter between 1 – 3 cows, 4 -7 cows, and 8 cows and above, respectively, by slitting of the throat 100%.

Table 2 shows that 66.7% of abattoirs have a lairage and a slaughter hall, while 33.3% do not. When it comes to animal examination, 66.7% perform ante-mortem and post-mortem measures, whereas 33.3% do not. Similarly, the data shows that 66.7% of abattoirs conduct medical exams for butchers, whereas 33.35% do not. 66.7% of abattoirs had cool rooms, whereas 33.3% did not. More importantly, all three abattoirs (100%) had disinfection facilities, although none (0%) possessed a veterinary laboratory or first-aid services.

Table 1. Socio-physical attributes.

Period of Establishment	F	%
1 - 15 Yrs	1	33.3
15 - 25 Yrs	0	0.0
26 - above	2	66.7
Total	3	100
Registration with Authority		
Yes	3	100
No	0	0
Total	3	100
NO of Slaughter per Day		
1 - 3 Cows	1	33.3
4 -7 Cows	1	33.3
8 Cows - above	1	33.3
Total	3	100
Method of Slaughter		
Gunning	0	0
Gassing	0	0
Electrocution	0	0
Throat Slitting	3	100
Total	3	100

Table 2. Availability of essential facilities and services.

Lairage	F	%
Yes	2	66.7
No	1	33.3
Total	3	100
Slaughter Hall		
Yes	2	66.7
No	1	33.3
Total	3	100
Ante-mortem Examination		
Yes	2	66.7
No	1	33.3
Total	3	100
Post-mortem Examination		
Yes	2	66.7
No	1	33.3
Total	3	100
Medical Examination of Butchers		
Yes	1	33.3
No	2	66.7
Total	3	100
Cold Room		
Yes	2	66.7
No	1	33.3
Total	3	100
Veterinary Laboratory		
Yes	0	0
No	3	100
Total	3	100
Disinfecting Facilities		
Yes	3	100
No	0	0
Total	3	100
Use of Protective Equipment		
Yes	0	0
No	3	100
Total	3	100

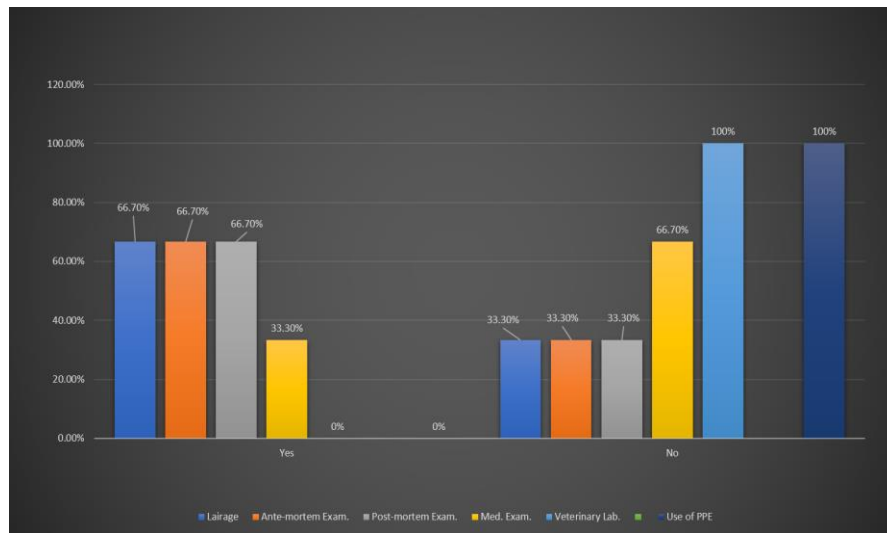


Figure 2. Availability of essential hygiene facilities and services.



Figure 3. Slaughter hall.

Table 3. Environmental hygiene practices.

Water Source	F	%
Well	0	0
Borehole	2	66.7
Public Tap	1	33.3
Total	3	100
Toilet Facility		
Pit Latrine	3	100
Water Closet	0	0
Ventilated Improved Latrine	0	0
None	0	0
Total	3	100
Drainage Facility		
Available/Functional	1	33.3
Available /Non-Functional	1	33.3
Absent	1	33.3
Total	3	100.0
Solid Waste Disposal		
Burning	1	33.3
Dump in Nearby Bush	2	66.7
Drains	0	0
Total	3	100
Wastewater Disposal		
Channel Into Drains	3	100
Channel Into Stream	0	0
Total	3	100



Table 3 shows that 66.7% of the abattoirs use borehole water, whereas 33.3% use public taps. Furthermore, the abattoir's pit latrines are used by the entire facility. There was functional drainage in 33.3% of the abattoirs, non-functional drainage in 33.3%, and no drainage at all in 33.3%. According to further investigation, 66.7% of abattoirs dump their waste into adjacent bush, while 33.3 percent burn it openly. Similarly, when it came to wastewater management, all abattoirs (100%) dumped their waste into public sewers.

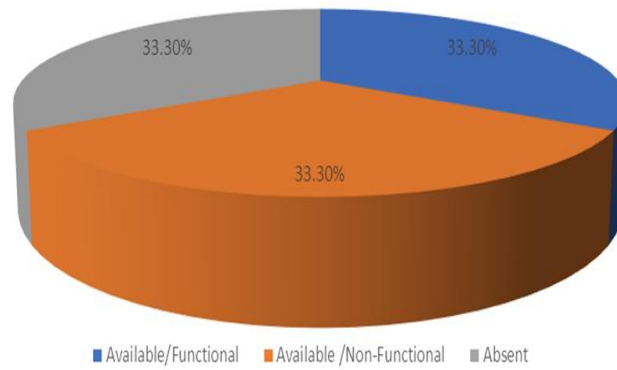


Figure 4. Availability of functional drainage system.

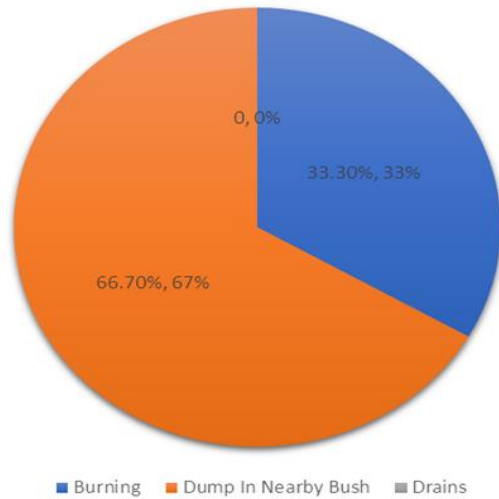


Figure 5. Refuse disposal methods.



Figure 6. Open dump of animal waste.

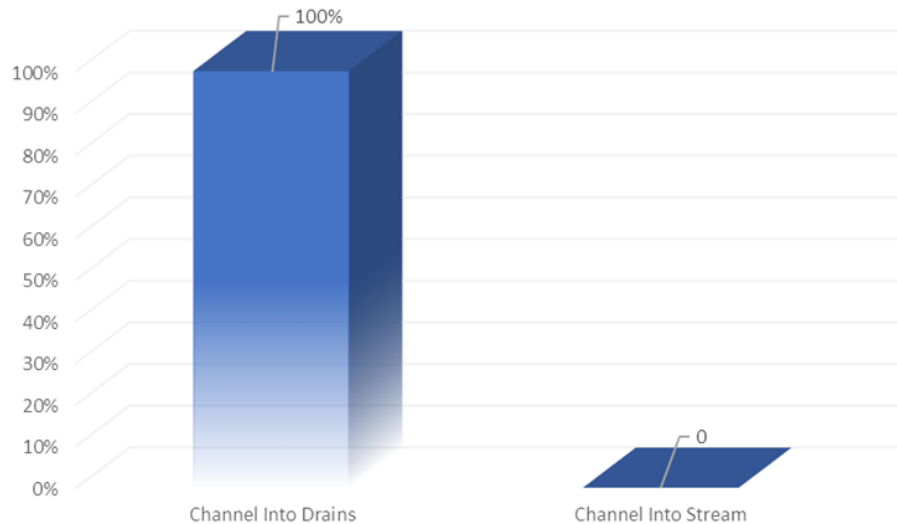


Figure 7. Sewage disposal method.

#### 4. DISCUSSIONS

The current research assesses the abattoir practises in Ijebu Ode, Nigeria with a focus on hygiene infrastructure and services and environmental sanitation practices. Based on preliminary data analysis of some of the structural conditions of the abattoirs, findings indicated that 33.3% of the abattoirs were established around 1–15 years ago and 66.7% were established more than 25 years ago. Analysis revealed also that all the abattoirs were registered with the authorities, which is supposed to ensure compliance with standard operating procedures, especially about meat hygiene and environmental management protection. Similarly, the analysis also indicated that 33.3% of these abattoirs slaughter between 1 and 3 cows, 4–7 cows, and 8 cows and above daily, presumably to cater for the increasing demand for meat as a major source of protein for the teeming populace of Ijebu Ode, with a growth rate of 3.10% [23]. More so, all the three abattoirs slaughter animals by slitting the throat using a sharp knife, which is humane. According to Omodu [24] animals should not unnecessarily be made to suffer while dying, and as such, sharp and, if possible, automatic instruments should be used for animals slaughtering.

Investigations into the availability of essential hygiene facilities and services as shown in Figure 2 revealed that 66.7% of the abattoirs had lairage and slaughter hall respectively, while 33.3% had no lairage and slaughter hall respectively. It is therefore reasonable to presume that carrying-out ante-mortem check without a lairage will be difficult, and a slaughter hall is essential for hygienic processing of the carcass. The absence, as in this case, will portend the processing of meat on unhygienic floors and wooden tables, and such procedures will simply raise the likelihood of carcass cross-contamination and, as a result, hazardous meat production (see Figure 3). This supports the conclusions of Igwe [25] and Aliyu, et al. [26] which documented that lairages are not available in most Nigerian abattoirs and that, because of the lack of or ineffectiveness of lairages, there is little ante-mortem investigation in the Kano Abattoir.

On animal examination, 66.7% of the abattoirs reported conducting ante and postmortem investigations, whereas 33.3% did not. These findings are congruent with those of Dandago, et al. [27] who in a similar study reported that there was no ante-mortem examination in Kano abattoirs, and that of Bello, et al. [28] who claimed that In Northern Nigeria, most abattoirs lack ante-mortem examinations. This, by implication, could have a deleterious result on the health of the public, as chances are that sick or diseased animals could be slaughtered for public consumption with a high risk of zoonotic infection. According to Gweba, et al. [29] meat inspection is critical in the spread of infection to humans, and routine meat inspection is lacking in most slaughterhouses in Zuru, Nigeria, and must be considered a critical influencing factor due to the danger of forming a point source of infection.

Similarly, on medical examination of butchers in the abattoirs, the analysis demonstrated that 33.3% of the abattoirs do not carry out medical examinations for the butchers and meat handlers. Nigerian public health laws require medical examinations of butchers as part of food handlers to be subject to medical examinations of fitness every six months to ensure meat handlers are fit and healthy to lessen the danger of disease spread.

Cold room services were available at 66.7% of the abattoirs, while 33.3% had no cold rooms. From the personal interview with the abattoir personnel, they reported that, even though the cold rooms are available, they are not making use of them because of a lack of power supply. This could result in increased chances of meat contamination and spoilage due to a lack of adequate refrigeration in the cold room. The three abattoirs (100%) had disinfecting facilities, but none of them (0%) had veterinary laboratory and first aid services. This claim is supported by recent work, which documented that major abattoirs in the Northwestern states of Nigeria lack essential facilities such as veterinary laboratories, first aid services, and cold rooms [17]. This, by implications, poses a serious public health challenge, as the bacteriological confirmation of the safety of slaughtered animals becomes practically impossible, thereby increasing the chances of passing unwholesome meat for public consumption.

Similarly, statistics on the usage of personal protection equipment (PPE) at the point of slaughter and processing found that none of the abattoir butchers and meat handlers wore PPE. This observation is consistent with Edia-Asuke, et al. [30] which found that butchers in abattoirs had inadequate hygiene because they did not wear hand gloves or aprons during slaughtering. This is also consistent with earlier observations in Nepal, which found that butchers did not use gloves or masks when handling raw meat, and just over 30% wore an apron on a routine basis [14] as well as similar other research [13, 31, 32]. Protective clothing is worn at the slaughterhouse to safeguard the meat produce from contamination, but it has also been found to protect meat handlers from directly transmitted meat-borne diseases such as brucellosis and leptospirosis [33, 34]. In Tanzania and Uganda, inadequacy of protective gears has been highlighted as a source of brucellosis among abattoir workers [33, 35].

Further observational analysis of the environmental hygiene practises of abattoirs, as illustrated in Table 3, revealed that 66.7% of the abattoirs had borehole as their water source, whereas 33.3% had no access to adequate water sources, thereby resulting in public water sources that are not adequate and regular. Water supply is among the most essential hygiene requirements of any abattoir and the absence or shortage in supply presents a strict barrier to the hygiene operation of the abattoir vis-à-vis the hygiene of the supplied meat. The high occurrence of echinococcosis could be because of poor hygiene, as well as because of the unregulated disposal of animal intestinal contents after slaughter [36]. According to the same source, this disease is endemic in the Mediterranean, Africa, the Middle East, and South America. More so, the results demonstrated that 100% of the abattoirs operate pit latrines. This may have potential public health concerns as most of the pit latrines are not sanitary and allow access to the excreta by flies, which is a major vector in the transmission of germs, and in this case, to the slaughtered meat without adequate protection.

Similarly, it is clear from Table 3 that in the drainage of the abattoir premises, 33.3% had functional drainage, 33.3% had drainage which was not functional, and 33.3% had none at all (see Figure 4), and for the wastewater generated, all the abattoirs 100% channelled their sewage into the public drains (see Figure 7). According to recent information, 55.0 percent of slaughterhouses discharge their sewage into surrounding water bodies, while 45.0 percent discharge their liquid waste into nearby sewers [37]. It therefore possible to assume that these will generate obnoxious odour [38] and pollute the ambient air and in worse case it will be washed up into the nearby surface water causing water pollution, or infiltrates to pollute the ground water [39].

However, personal discussion and interviews with the abattoir supervisors revealed that the majority of them (66.7%) clean their drainage weekly while 33.3% clean theirs every month. The frequency of cleaning the drainage will reduce the chances of wastewater stagnation, which generates an offensive smell and the breeding of malaria vectors. According to earlier investigations by Olowoporoku [37] and Daramola and Olowoporoku [40] mosquitoes in respondents' homes affected 84.1 percent and 15.9 percent of residents residing within 1–250 metres



of an abattoir, respectively. The observations further documented that residents residing within 1-250 metres of slaughterhouses reported treating malaria in their household for the last three months at a rate of 77.3 percent. These findings support prior research findings [21, 41] which found a statistically significant link between abattoir operations and public health.

Further analysis demonstrated that 66.7% of the abattoirs dump their refuse (condemned carcasses, non-edible offal, intestinal contents, bones, fur, horns, etc.) into the nearby bush while 33.3% practise open burning (see Figure 5 and Figure 6). This research backs up the observations of a recent survey, which found that 13.0% of slaughterhouses burn their waste; 65.3 percent dump their trash on vacant ground adjacent to slaughterhouses; and 8.7% of respondents disposed of their refuse in the bush near-by Olowoporoku [37]. This, by implications, will result in ambient air pollution [40] from the uncontrolled combustion of abattoir waste, which contributes to greenhouse effects, and open waste dumping practice is known to provide breeding foci for vectors (e.g., fly infestation) and generate offensive odors, which could constitute public nuisance for the neighborhoods. According to research into the incidence of flies infestation in residents' homes, as 76.5 percent of residents living adjacent slaughterhouses were reported to have always been plagued with flies [40]. The inquiry also revealed that 78.9% of nearby households had complained about the unpleasant odour originating from the slaughterhouses [40].

However, owing to resource limitations, it is outside the space of this research to investigate the waste to wealth concept in the recycling and re-use of abattoir non-edible products, which would assist in employment creation and, more importantly, reduce overall abattoir waste generation and its associated consequences for the environmental media and human health. As a result, more research in this area would be extremely important for public health.

## 5. CONCLUSION

Empirical findings and evidence indicated significant deficiencies in the essential hygiene facilities and services, as shown by the results that the abattoir butchers do not use personal protective equipment and the lack of a veterinary laboratory for microbiological verification of suspected meat. 66.7% of the abattoirs disposed of their solid waste by open dumping, while the wastewater was discharged into public drains. The study revealed that the abattoir operations in Ijebu Ode are unsatisfactory, with unsanitary practises and shortfalls in fundamental hygiene facilities and services, which are critical for the provision of healthy meat for public consumption.

As a result, standardisation of facilities with the closure of substandard ones, as well as educational training for abattoir workers, were proposed as ways to improve hygiene facilities and practises. Prioritization of coordinated efforts by government at all levels to ensure strict adherence to existing and legal frameworks in the establishment and operation of abattoirs in Ijebu Ode and throughout the country.

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