

Environmental Problems Associated With Abattoir Operations In Gwagwalada Area Council, Federal Capital Territory, Abuja

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ABSTRACT

This study investigated environmental problems associated with abattoir operations in Gwagwalada, FCT, Abuja. The study focused on human health and the physical environmental effects of the operations of the abattoir. The descriptive survey design was adopted for the study. Two hundred and fifty (250) respondents including staff, users, and residents around the abattoir were randomly selected for the study. Data for the study were collected through a close-ended questionnaire designed by the researcher, and constructed in a four-point Likert scale format. Descriptive statistics like frequency counts, mean (\bar{x}) and simple percentage were used to analyze data collected with respect to research questions that were raised while the chi-square statistic was used to test the formulated hypotheses at 0.05 level of significance. The findings revealed that operations of Gwagwalada abattoir are not environmentally friendly, and that it poses serious health and environmental threats to the residents. Based on this, upgrading of the abattoir with modern infrastructures and facilities; tarring of the entire premises as well as construction of drainage and gutters; and sensitization of workers and residents of the abattoir on the environmental effects of improper management of abattoir wastes, among others, were recommended.

Key Words: Abattoir, Environment

BACKGROUND TO THE STUDY

In the environment, living species including humans interact with their non-living environment for survival. There is no doubt that during the interactions and the survival activities by the biotic components on the abiotic environment, wastes are generated. Wastes are inevitable components of the environment, they come out in form of solid, liquid and gaseous. Management of wastes within the environment is one of the responsibilities saddled on human beings as the most intelligent creature for the purpose of sustaining and ensuring a wholesome environment (Ekpo & Is'haq, 2016).

Abattoir is an example of establishments that generate solid, liquid and gaseous wastes. It is a designated establishment approved and registered by the government or other controlling authority for hygienic slaughtering, inspection, processing, effective preservation, and storage of meat products for human consumption (Alonge cited in Adonu, Dzokoto & Salifu, 2017). Abattoirs are expected to maintain high standard of hygienic practices and safety procedures that function effectively for welfare of humans in the society (Adonu, Dzokoto & Salifu, 2017). Abattoirs should be equipped with potable water and electricity, functional waste disposal systems linked with uncongested road or rail network. It should provide access for services of both public and private transport companies as well as open to people who supply various types of labour and services (Gracey, Collins & Huey cited in Adonu, Dzokoto & Salifu, 2017). Obnoxious odours, dust, smoke and wastes emanating from these facilities should be effectively controlled to avoid outbreak of epidemics.

Available data revealed that in Nigeria, abattoirs' surroundings are highly polluted. Most of them have marshy grounds as a result of improper channelization of waste water and

management of other solid wastes. These result in land, water and air pollution (Omole & Longe, 2008). The present study specifically investigates environmental problems associated with abattoir in Gwagwalada, Abuja, Nigeria.

Statement of the Problem

In Nigeria environmental problems associated with abattoirs are numerous and challenging. Diseases due to unsatisfactory waste and sewage disposal system, drinking of contaminated water, inadequate vector control, as well as general unsatisfactory condition of environment contribute immensely to poor public health and sanitation (Adonu, Dзокoto & Salifu, 2017). Indubitably, these pose threats to both human and the physical environment. This study investigates the negative effects of abattoir activities on human health and the physical environment in Gwagwalada, FCT, Abuja.

Objectives of the Study

The study:

- i. Investigates the negative effects of abattoir activities on human health in Gwagwalada, Abuja.
- ii. Investigates the effects of abattoir activities on the physical environment in Gwagwalada, Abuja.

Research Questions

In line with the above objectives, the following research questions were posed:

- i. To what extent do negative effect of abattoir activities affect human health in Gwagwalada, Abuja?
- ii. To what extent do negative effect of abattoir activities affect the physical environment in Gwagwalada, Abuja?

Hypotheses

H₀₁: Abattoir activities do not have any significant effect on human health in Gwagwalada, Abuja.

H₀₂: Abattoir activities do not have any significant effect on physical environment in Gwagwalada, Abuja.

REVIEW OF EMPIRICAL STUDIES

Bello and Oyedemi (2009) investigated the impact of abattoir activities and management in residential neighbourhoods in Ogbomoso, Osun State, Nigeria. The descriptive survey research design was adopted for the study. Both primary and secondary data were explored to gather data for the study. Water samples from selected wells in the study area were collected for analysis to investigate the effect on the water quality. Also, residents of buildings located approximately 100 meters radius to the abattoir were randomly selected for interview using relevant indicators to investigate effects on their health. Data collected for the study were analyzed using frequency count, chi-square and correlation test.

Based on the analyzed data of the study, it was revealed that abattoir activities and management have direct and indirect effects on the built-up environment and health of people especially residents of the abattoir vicinity. The study also indicated negative impact of abattoir activities on air and water qualities of residents within abattoir vicinity especially abattoir where special or effective waste disposal system is lacking. The health quality of residents living in abattoir vicinity was revealed to be reduced due to effect of pollutants from abattoir activities located in their neighbourhood. The study recommended, among others, that

abattoir should be excluded from facilities to be located within residential neighbourhood, rather it should be located and treated among industrial land use or agricultural land use; and for abattoir planning and construction, regulations controlling the movement and slaughter of live stocks, the availability of service and staff in abattoirs should be made.

Weobong and Adinyira (2011) assessed the impacts of Tamale abattoir on the environment at its operational stage. Specifically, the study focused on the water quality of the influents and effluents of the abattoir, and the noise generated at the abattoir. Tamale abattoir is located in the regional capital of the Northern Region of Ghana. The survey research design was adopted for the study. Data on noise quality were obtained using the Integrated Noise Level Meter at five different locations. In addition, questionnaire and interviews were used to obtain data from the respondents of the study. The respondents were made up of twenty-one (21) residents and ten (10) staff and non-staff of the abattoir. Interviews were held with key informants such as consultants from Environmental Health, Waste Management, the Environmental Protection Agency (EPA) and the Management of the Tamale abattoir. Data obtained were analyzed using the descriptive statistics.

The study revealed that the operations of the Tamale abattoir have negative impacts on its environment. Noises generated from various activities and equipment at the abattoir are above the maximum allowable levels set by the Environmental Protection Agency of Ghana, and this has long term health implications for residents and workers at the abattoir. The water used by the abattoir for its operations (influent) is generally of good quality. Physio-chemical parameters are within acceptable limits; microbiological parameters are however slightly above limits. Solid and liquid wastes generated at the abattoir are highly polluted. Effluent physio-chemical and microbiological parameters exceeded the EPA-Ghana standards. The effluent drain eventually empties in to the Sheshegu community dam; the low lying lands of the community are subsequently seasonally flooded with abattoir wastes. Disease prevalence and occurrence has increased since the establishment of the abattoir. The study recommended proper treatment and disposal of wastes from the abattoir. It also recommended that EPA Ghana should carry out its AKOBEN ratings - an environmental performance rating and disclosure initiative of the Environmental Protection Agency (EPA) of Ghana - on the Tamale Abattoir in order to bring to the public domain the real situation of the abattoir in terms of its environmental ratings.

Omole and Ogiye (2013) evaluated slaughterhouse wastes in south-west Nigeria. The study aimed at evaluating the current waste generation and waste handling practices while exploring the possibility of reducing to the barest minimum the percentage of live weight cow that is considered as waste. Survey design was employed for the study. The study was carried out between August to September 2011 at ten slaughterhouses, six of which are situated in Ogun State and four in Lagos State, Nigeria. data were obtained through questionnaire as well as interview. Respondents of the study consisted of butchers, cattle traders, meat sellers and transporters. Data obtained for the study were analyzed using descriptive statistics. The study revealed that dung, paunch contents and blood of the cows slaughtered at abattoirs constitute the greatest threat to the environment. It was recommended that research should be directed at finding ways to re-use these animal parts, and local industries should be encouraged in the re-use of animal fat and blood.

Haileselassie, Taddele, Adhana and Kalayou (2013) evaluated food safety knowledge and practices of abattoir and butchery shops and the microbial profile of meat in Mekelle City, Ethiopia. The study utilized the survey research design. Data were collected through a structured questionnaire from workers in and around the abattoir and butcher shops to assess

their food safety knowledge; while bacterial load was assessed by serial dilution method and the major bacterial pathogens were isolated by using standard procedures. Data obtained for the study were analyzed through Statistical Package for Social Sciences (SPSS). Descriptive statistics such as means and frequencies were used to present findings of the study. Mean of total viable count of microbial load in Makelle city abattoir, butchery shops and street meat sales from backyard slaughter were compared with one-way Analysis of Variance (ANOVA).

Based on results of the data analyzes, it was found that abattoir workers are not certified, they operate without protective clothes, and essential materials and facilities are lacking in the abattoir. Similarly, there is reasonable gap on food safety knowledge between butchers and shop owners, and microbial profile was higher compared to standard set by the World Health Organization. In line with the findings of the study, it was recommended that due attention should be given by government to improve the food safety knowledge and quality standard of meat sold.

Douglas, Ovua, Orji and Sapira (2013) investigated health implications of sanitation in a public abattoir in Port Harcourt, Nigeria. Descriptive cross-sectional design was adopted for the study. Respondents were selected by stratified sampling with proportionate representation of all categories of operators in the calculated sample size of 74 respondents. Data were collected using structured questionnaire. Data obtained were analyzed using the descriptive statistics. Results of the study showed that infrastructure and processes like lairage, waste disposal, water, pest and animal inspection were either non-functional or below acceptable standards. It was concluded that the abattoir lacked sanitary infrastructure. Based on the results of the study, the need to upgrade facilities at the slaughter house, and health education of the operators on modern, more hygienic and safer abattoir practices were advocated.

Adesokan and Sulaimon (2014) assessed the knowledge, attitudes and practices of proper waste management among slaughterhouse workers in Nigeria with a view to determining possible implications on achieving the Millennium Development Goals (MDGs). The survey research design was adopted for the study. Six out of the 36 states in the country were chosen, with Yobe, Kwara and Plateau representing the northern part; and Oyo, Lagos and Osun States for the south-western region. Major slaughter houses in each of the selected six states were chosen and a purposive sample sizes of 50 and 100 each from the varying estimated slaughterhouse workers' population ranges of between 50-100 (northern states) and 100 – 250 (south-western states), respectively. Three hundred and ninety (390) slaughterhouse workers were randomly selected in the selected states. Data for the study were collected through a semi-structured questionnaire designed to obtain information on their socio-demographic characteristics, knowledge of slaughterhouse wastes and management, their attitudes toward and practices of waste management.

Data collected were analyzed using multiple regression statistics. The results reveal that the majority of the respondents had poor attitudes (75.6%) and practices (97.4%) of proper waste management, though 51.5% demonstrated good knowledge. While 51.3% knew that slaughterhouse wastes are related to diseases, 75.4% were unconcerned that poor management could be major public health and environmental hazards and 74.4% discharged slaughterhouse wastewater into surrounding streams. Gender, education and work experience were significantly associated with good knowledge ($p < 0.05$). These poor attitudes and practices have negative implications on environmental health conditions, access to safe water and quality of life. It was recommended that addressing poor slaughterhouse waste

management issues in developing countries becomes imperative to making achieving the MDGs a reality.

Oloruntoba, Adebayo and Omokhodion (2014) evaluated the sanitary conditions of abattoirs in Ibadan, Southwest Nigeria. The study aimed at level of compliance with standards set by Federal Ministry of Environment. The study adopted the descriptive cross-sectional design, and used an observational checklist adapted from policy guidelines on market and abattoir sanitation by the Federal Ministry of Environment. Twelve (12) abattoirs in Ibadan metropolis were assessed. Data obtained were analyzed using descriptive statistics.

Findings of the study were as follows: concerning general inspection, only one (8.3%) of the abattoirs had adequate access route, potable water supply and functional drainage system. Many had poor solid waste management practices as heaps of refuse littered the surroundings. Internal inspection of the abattoirs revealed that two (16.7%) had adequate space and facilities. Ten (83.3%) had first aid posts even though they were not equipped with materials. Eleven (91.7%) abattoirs had toilet facilities that were either poorly kept or abandoned. It was concluded that most of the abattoirs in Ibadan metropolis were operating under unhygienic and sub-standard conditions and lacked basic requirements for a good abattoir as stipulated in the Policy Guidelines on Market and Abattoir Sanitation. Urgent need to enforce the minimum standards as stipulated in the policy guidelines was recommended.

Oruonye (2015) examined the challenges posed by the poor waste disposal from the abattoir in Jalingo metropolis. Investigative approach to data collection was employed along with secondary desk review of relevant data. The Jalingo main abattoir was considered as the study site. Data on the number of animals (cattle, goats and sheep) slaughtered daily were collected from records on abattoir operations. Additional information was collected through interviews with key informants (veterinary experts and meat inspectors) using interview schedule. The data collected were analyzed using descriptive statistics. The result of the study revealed that after over 35 years of its establishment, the abattoir has not expanded to accommodate the increasing population and demand for meat. This resulted in overstretch and deterioration of the facility and poor waste disposal. The findings of this study also showed that the daily slaughter of animals ranges between 50 – 55 cows and 125-130 goats/sheep. The poor abattoir waste disposal affect air quality (stench), pollutes agricultural land, potable water supply source and aquatic life. The challenges of abattoir waste in the area include poor abattoir designs and obsolete facilities, location of the abattoir in residential areas, apathy by the state government over responsibilities of establishment and management of abattoirs, poor funding and lack of effective abattoir waste disposal equipment. The study recommended the regulation of animal waste disposal system which is better than the present dumping regime, legislative measures on land use zoning and waste regulation to control the location and management of abattoirs in the State.

Nwachukwu (2015) examined the environmental sanitation situation of Abattoirs in Onitsha Metropolis. The study focused on waste disposal method, sanitary facilities and effective monitoring. Descriptive research design was adopted for the study. The population of the study was eighty (80) butchers. There was no sample since the population was small. Questionnaire was used to collect data from the 80 butchers which was validated and the reliability found to be 0.78. Mean scores was used to answer the three research questions raised for the study. Results of the study revealed that modern methods of waste disposal are not implemented in Abattoirs, and there were insufficient sanitary facilities though there is effective monitoring and supervision guiding the abattoirs. Based on the findings of the study, improvement in

waste disposal, inclusion of modern sanitary facilities and general sanitation among others were recommended.

Olowoporoku (2016) examined environmental sanitation practices in slaughterhouses in Osogbo, Nigeria. This came about based on the recognition of the disposal of meat waste as sources of environmental pollution in the built environment. Survey for the study involved questionnaire administration at slaughterhouses and field observation. A total of thirty-three slaughterhouses were identified in the study area out of which fifteen (45.0%) were randomly selected. Simple random technique was adopted in sourcing information from an operator in each of the slaughterhouses selected. Thus, fifteen operators were sampled on which questionnaire were administered. Data collected through the survey include socioeconomic attributes of the operators and those pertaining to environmental sanitation practices in the slaughterhouses. The gathered data were analyzed using descriptive statistics, Cross-tabulation and Microsoft Excel in windows office suite.

Findings revealed that an average of two cows were slaughtered daily in each of the slaughterhouses sampled and majority (80.0%) of the slaughterhouses were located near water bodies or places with high water table. Dumping of waste in premises of the slaughterhouses was the commonest method of the disposal of solid animal waste while liquid waste, effluents and wastewater were indiscriminately discharged into nearby streams and drainage. The practices of the slaughtering of animals and disposal of waste in the city were without consideration for its polluting effect and concerns for public health. The study recommended efficient and effective enforcement of environmental sanitation laws on slaughterhouses operations and environmental education for the slaughterhouse operators and residents.

Daramola and Olowoporoku (2017) assessed the effects of slaughterhouse activities on the health of surrounding residents in Osogbo Nigeria. The study aimed at suggesting policy response capable of enhancing healthy environment in the city and others with similar background. The survey research design was employed for the study. A total of thirty-three (33) slaughterhouses were identified in the study area out of which fifteen (45%) were randomly selected for questionnaire administration. This was followed by stratification of 500metre radial distance from the respective residences surrounding them into 1-250 metres and 251-500 metres. In the strata, questionnaires were administered on 98 residents comprising 44 and 54 in the first and second strata respectively. Data analysis was done using cross tabulation and Chi-square tests. Findings of the study revealed that slaughterhouse activities pollute the environment and this inevitably had negative impacts on the health of the surrounding residents; most of the surrounding residences were infested by flies and mosquitoes with varying degrees as distance increases from the slaughterhouses; and the quality of the environment varied with distance from the slaughterhouses. Similarly, the proportion of residents that treated malaria and diarrhoea continually in the study areas was 69.4 % and 70.4 % respectively. Policy making towards planning effective and sustainable intervention strategies for slaughterhouse activities in Osogbo and other cities with similar background were recommended.

Adonu, Dzokoto and Salifu (2017) examined the sanitary and hygiene conditions of the slaughterhouse and its effect on the health of residents in the host community. Amasaman slaughterhouse in the Ga West Municipality, Ghana was used as a case study. The descriptive survey design was used for the study. The target population of the study were staff of the slaughterhouse and residents of Amasaman community. The sample size of the study consisted

of 150 respondents, comprising; twenty (20) workers of the slaughterhouse, and hundred thirty (130) residents from the community. Questionnaires, consisting of opened and closed ended questions, and interview guide, were the main data collection instruments used to carry out the study. The collected data was analyzed using frequencies, percentages, charts and tables. The study revealed that the operations of the slaughterhouse do have effect on the health of the residents of the community because wastewater was disposed off into the streams and rivers which serve a source of drinking water. The workers of the slaughterhouse also attested to it. 74.2% of the residents representing majority answered no when they were asked if the operations of the slaughterhouse were inspected. This was expected because most (70%) of the residents indicated in a follow up question that they have never seen an inspector before. The study recommends that government must compel the Accra Metropolitan Assembly (AMA), to stop the operators of slaughterhouses and abattoir from construction at unauthorized places.

METHODOLOGY

The descriptive survey design was adopted for this study. Descriptive survey describes and interprets prevailing conditions or situations based on the available data (Aggarwal cited in Salaria, 2012). The design, according to Salaria (2012), is concerned with the present phenomena in terms of conditions, practices, beliefs, processes, relationships or trends, and invariably includes proper analyses, interpretation, comparisons, identification of trends and relationships.

Population of the study comprised of entire staff, and users of the abattoir as well as residents surrounding the abattoir. Two hundred and fifty (250) respondents were purposively selected for the study. They include staff, and users (customers) of the abattoir as well as residents of the area. A researcher-designed close-ended questionnaire was used for collection of data. The instrument was constructed in a four-point Likert scale format with the following scales:

- i. Strongly Agree (SA) - 4 points
- ii. Agree (A) - 3 points
- iii. Disagree (D) - 2 points, and
- iv. Strongly Disagree (SD)- 1 point.

Descriptive statistics of frequency count, mean (\bar{x}), and simple percentage were used for analysis of the data collected with respect to research questions raised. Since the questionnaire was constructed on a 4-point Likert scale, a mean score cut-off point of 2.50 and above for any item (statement) was regarded as agreed; while a mean score cut-off point that was below 2.50 was regarded as disagreed. This is obtained thus:

$$\text{Hence: } \frac{\text{Sum of rating}}{\text{No of option/grade}} = \frac{4 + 3 + 2 + 1}{4} = \frac{10}{4} = \underline{\underline{2.50}}$$

Formulated hypotheses were tested using the chi-square statistics at 0.05 level of significance. Below is the chi-square formula.

$$x^2 = \frac{(O - E)^2}{E}$$

$$\text{df (degree of freedom)} = (r-1)(c-1)$$

Where:

χ^2 = Chi-square

O = Observed frequency

E = Expected frequency.

r = Row

c = Column

RESULTS AND DISCUSSION

Out of the total number of questionnaires distributed, two hundred and forty-three (243) were returned which implied that the study enjoyed 97.2% returned rate. However, twenty-seven (27) of these copies were not adequately filled, hence, analysis of the study were based on two hundred and sixteen (216) copies of the questionnaire equivalent to 86.4% of the total copies of questionnaire distributed.

Table 1: Bio-data of the Respondents

Variable	Group	Frequency	Percentage
Status	Staff	7	3.24
	Users	66	30.56
	Residents	143	66.20
	Total	216	100
Gender	Male	129	59.72
	Female	87	40.28
	Total	216	100
Academic Qualification	SSCE	27	12.5
	ND/NCE	79	36.58
	BSc	89	41.20
	Post Graduate	21	9.72
	Total	216	100

Source: Field Survey, 2018

The research respondents comprised of seven (7) staff, sixty-six (66) users (customers), and one hundred and forty-three (143) residents. One hundred and twenty-nine (129) respondents were males while remaining eighty-seven (87) were females. Only twenty-seven (27) respondents were SSCE holders, seventy-nine (79) were either ND or NCE certificate holders, while eighty-nine (89) were university first degree holders, and twenty-one (21) respondents had additional certificates to their university first degree. This implied that the respondents were mature and educated enough to give adequate information on the subject under review.

ANALYSIS OF RESEARCH QUESTIONS

Research Question One: To what extent do negative abattoir activities affect human health in Gwagwalada Area Council, Abuja?

Table 2: Data from Research Question One

S/N	Item	SA	A	D	SD	Mean (\bar{x})
1	Health of residents who are neighbours to abattoir are in danger	76	69	34	37	2.85
2	Residents of abattoir are at risk of outbreak of water borne diseases due to unhygienic nature of the activities of abattoir	79	77	29	31	2.94
3	Disposal of wastes in abattoir is destructive to people, other earthbound and amphibian life	80	65	31	40	2.86
4	Residences of abattoir are infested by flies and mosquitoes with varying degrees as per distance	61	88	33	34	2.81
5	Wastes produced by abattoir operations are associated with several infectious diseases	66	79	37	34	2.82
6	Level of prevalence of infestation of mosquitoes, flies, and other vectors is more predominant on workers and residents around the abattoir which in turn has impact on their health	70	92	26	28	2.94
7	Odour emissions from abattoir could cause eye, nose and throat irritation, nausea, cough, bronchitis, shortness of breath, stress, drowsiness and alterations of mood	77	72	32	35	2.88
8	Abattoir operations could be associated with incessant infection of residents with typhoid, malaria and diarrhea	69	78	32	37	2.83
General Mean						2.87

Source: Field Survey, 2018

Data obtained from research question one were presented on Table 2 which showed that the entire questionnaire items were agreed with. The minimum and maximum rating means (\bar{x}) to the items were 2.81 and 2.94 respectively, and a general rating mean of 2.87. It therefore implied that abattoir activities have negative effects on human health in Gwagwalada.

Research Question Two: To what extent do abattoir activities affect the physical environment in Gwagwalada Area Council, Abuja?

Table 3: Data from Research Question Two

S/N	Item	SA	A	D	SD	Mean (\bar{x})
1	Infrastructure and facilities in the abattoir are obsolete and inadequate to provide for hygienic slaughtering, handling and storage of meat	66	82	36	32	2.84
2	Abattoir environment is unsightly, and odour from its operations attracts flies, mosquitoes, rodents and other disease vectors which cause nuisance in the neighbourhood.	75	69	33	39	2.83
3	Improper channeling of wastewater causes land to become marshy/muddy in and around abattoir premises	69	71	38	38	2.79
4	Method of roasting and removing of hides from slaughtered animals pollute air, water, and land	59	76	41	40	2.71
5	Environment around the abattoir is characterized by highly pungent odour; no waste is treated before discharge into the environment	71	65	37	43	2.76
6	Lairage in the abattoir is inadequate and not hygienically maintained	75	79	37	25	2.94
7	Daily sanitary and animal inspection are not adequately carried out in the abattoir	70	69	35	42	2.77
8	Workshops and seminars on environmental education on negative effects of poor management of abattoir are irregular	65	73	36	42	2.75
General Mean						2.80

Source: Field Survey, 2018

Obtained data from research question two were presented on table 3. The entire questionnaire items were agreed with. The minimum and maximum rating means to the items were 2.71 and 2.94 respectively, and a general rating mean was 2.80. It therefore implied that Gwagwalada abattoir's activities affect the environment negatively.

Test of Hypotheses

Hypothesis One: Abattoir activities do not have significant effect on human health in Gwagwalada Area Council, Abuja.

χ^2	df	Table Value	P	Decision
17.21	21	11.59	0.05	Rejected

Data presented on Table 2 were used to test hypothesis one. Result of the chi-square from test of hypothesis one showed 17.21 while the table value at degree of freedom of 21 shows 11.59. Since the calculated value is greater than the table value, hypothesis one is rejected. This implies that Gwagwalada abattoir activities do have significant effect on human health.

Hypothesis Two: Abattoir activities do not have significant effect on physical environment in Gwagwalada Area Council, Abuja.

χ^2	df	Table Value	P	Decision
14.13	21	11.59	0.05	Rejected

Data presented on Table 3 were used to test hypothesis two. Result of the chi-square from test of hypothesis two showed 14.13 while the table value at degree of freedom of 21 shows 11.59. Since the calculated value is greater than the table value, hypothesis two is rejected. This implies that Abattoir activities do have significant effect on physical environment in Gwagwalada Area Council, Abuja.

DISCUSSION OF FINDINGS

This study examined environmental effects of abattoir operations in Gwagwalada Area Council of the FCT, Abuja. The study disclosed that lack of sanitary operational environment in Gwagwalada abattoir, health of staff/workers, users/customers, residents, and host communities living within and around the abattoir are at risk of outbreak of water borne diseases. More so, wastes produced by abattoir operations are associated with several infectious diseases; disposal of wastes in abattoir is destructive to people and other earthbound and amphibian life; odour emissions from abattoir could cause eye, nose and throat irritation, nausea, cough, bronchitis, shortness of breath, stress, drowsiness, alterations of mood, residences are infested by flies and mosquitoes with varying degrees as per distance. These imply that operations of Gwagwalada abattoir have negative health effects on humans and the bio-physical environment.

These findings agree with the findings of Bello and Oyedemi (2009) which disclosed negative effect of abattoir operations on the health of people in Ogbomoso, Osun State. The findings also support earlier studies conducted by Weobong and Adinyira (2011) that revealed long term health implications of Tamale abattoir on workers and residents.

These findings equally corroborate the earlier findings of Douglas, Ovua, Orji and Sapira (2013); Oloruntoba, Adebayo and Omokhodion (2014); Olowoporoku (2016); Adonu, Dzokoto and Salifu (2017); and Daramola and Olowoporoku (2017) who respectively submitted that abattoir operations carried out in different areas under investigation had negative effects on public health and safety.

In terms of physical environmental implications of abattoir operations in Gwagwalada, it was discovered that abattoir's environment is unsightly, and odour from its operations attracts flies, mosquitoes, rodents and other disease vectors which cause nuisance in the neighbourhood. The abattoir is characterized by improper channeling of wastewater which results in muddiness and marshiness of land within and around the abattoir. Furthermore, activities in the abattoir pollute air in host and neighbouring communities as well as surface water bodies which are polluted by wastewater from the abattoir operations as a result of poor channelization.

These findings agree with that of Bello and Oyedemi (2009) which disclosed negative impact of abattoir activities on air and water qualities of residents within abattoir vicinity in Ogbomoso, Osun State. Weobong and Adinyira (2011) found that the Tamale abattoir operations equally have negative impacts on its environment. The present study also support the findings of Oruonye (2015) who disclosed that poor wastes disposal in abattoir in Jalingo metropolis affect air quality. The wastes produce stench that pollutes agricultural land, potable water supply source which in turn have deleterious effect on humans and aquatic life.

CONCLUSION AND RECOMMENDATIONS

Operations of Gwagwalada abattoir are not environmental friendly, and pose serious health and environmental challenges to the residents. Hence, the following recommendations:

- i. The existing abattoir should be upgraded with modern abattoir infrastructures and facilities for hygienic slaughtering, handling, storage and selling of meat to consumers to forestall infestation of meat by flies and other vectors that affect human health.
- ii. The entire premises should be tarred. Drainages and gutters should be constructed for channeling of waste water; adequate and well-constructed underground reservoirs should be constructed as a panacea for prevention of land/premises of the abattoir from becoming muddy/marshy or polluted with waste water.
- iii. Pollution of air should be controlled by ensuring that used tyres are not burnt and used as means of roasting meat or removing hides from slaughtered animals. This is harmful to both humans and the environment.
- iv. Lairage and waste disposal equipment should be provided; all types of waste should be treated before discharge into any media of the environment to avoid the pollution of such medium or media.
- v. Modern waste management practices which involve waste reduction, re-use and recycling should be adopted whereby animal wastes such as bones, horns, skin, hides, and blood are integrated and used respectively as bye-products in other sectors of the economy.
- vi. Government of the Area Council should be proactive in the monitoring of operations of the abattoir by carrying out routine inspection including animal and meat supervisions and general sanitary inspection of the abattoir as well as ensuring maximum compliance to the global requirements and sanitary regulations and standards governing abattoir operations.
- vii. Sensitization of stakeholders through environmental education on the implications of poor waste management of abattoir for both workers and residents.

References

- Adesokan, H. K. & Sulaimon, M. A. (2014). Poor slaughterhouse waste management: Empirical evidences from Nigeria and implications on achieving millennium development goals. *An International Journal of Science and Technology*, 3(1), 110 – 127.
- Adonu, R. E., Dzokoto, L., & Salifu, S. I. (2017). Sanitary and hygiene conditions of slaughterhouses and its effect on the health of residents: A case study of Amasaman slaughterhouse in the Ga west municipality, Ghana. *Food Science and Quality Management*, 65, 11- 15.
- Bello, Y. O. & Oyedemi, D. T. A. (2009). The impact of abattoir activities and management in residential neighbourhoods: A case study of Ogbomoso, Nigeria. *J Soc Sci*.
- Daramola, O. P. & Olowoporoku, A. O. (2017). Living with a fatal choice: Effects of slaughterhouse activities on residents' health in Osogbo, Nigeria. *International Journal of Environmental Problems*, 3(1), 26 – 35.
- Douglas, K. E., Ovua, A., Orji, C., & Sapira, B. (2013). Health implications of sanitation in a public abattoir in Port Harcourt, Nigeria. *The Nigerian Health Journal*, 13(2), 91 – 95.
- Ekpo, C. G. & Is'haq, A. B. (2016). Islam and the environment: Implications of Islamic funeral practice on environmental sustainability. *IOSR Journal of Research & Method in Education (IOSR-JRME)*, 6(1), 58 – 63. Retrieved from www.iosrjournals.org
- Haileselassie, M., Taddele, H., Adhana, K., & Kalayou, S. (2013). Food safety knowledge and practices of abattoir and butchery shops and the microbial profile of meat in Mekelle City, Ethiopia. *Asian Pacific Journal of Tropical Biomedicine*, 3(5), 407 – 412.
- Nwachukwu, C. G. (2015). Environmental sanitation situation in abattoirs in Onitsha metropolis. *Knowledge Review*, 32(1), 37 – 44.
- Oloruntoba, E. O., Adebayo, A. M., & Omokhodion, F. O. (2014). Sanitary conditions of abattoirs in Ibadan, Southwest Nigeria. *Afr J Med Med Sci*, 43(3), 231 -237.
- Olowoporoku, O. A. (2016). Assessing environmental sanitation practices in slaughterhouses in Osogbo, Nigeria: Taking the good with the bad. *Journal of Environmental Science*, 1, 44 – 54.
- Omole, D. O., & Longe, E.O. (2008). An assessment of the impact of abattoir effluents on River Illo, Ota, Nigeria. *Journal of Environmental Science and Technology*, 1(2), 56 - 54.
- Omole, D. O. & Ogbiye, A. S. (2013). An evaluation of slaughterhouse wastes in south-west Nigeria. *American Journal of Environmental Protection*, 2(3), 85 – 89. doi: 10.11648/j.ajep.20130203.12
- Oruonye, E. D. (2015). Challenges of abattoir waste management in Jalingo Metropolis, Nigeria. *International Journal of Research in Geography*, 1(2), 22 – 35.
- Weobong, C. A., & Adinyira, E. Y. (2011). Operational impacts of the Tamale abattoir on the environment. *Journal of Public Health and Epidemiology*, 3(9), 386 – 393.