

The Impact of Abattoir Activities and Management in Residential Neighbourhoods: A Case Study of Ogbomoso, Nigeria

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ABSTRACT Abattoir is one of the facilities available in most towns and cities, as the killing of animals to supply meat for human consumption in them is a common practice in Nigeria. The danger posed on the local built environment and health of residents by those abattoirs located in residential neighborhoods as a result of pollution from their management is of great concern. The study therefore investigates the direct and indirect effects of management of abattoirs on the quality of local built environment and the health of residents in their vicinity using Ogbomoso as a case 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. The result was analyzed using frequency count, chi-square and correlation test. The study indicated pollution of wells and air quality of the local built environment in the vicinity of the abattoir as well as reduced quality of health of residents in the area, as there were reported cases of elevation of excessive coughing, typhoid fever, diarrhea, and malaria and muscle pains among these residents. The study concluded with appropriate recommendations to address the problem and as well suggested the exclusion of abattoir facility from residential neighbourhood.

INTRODUCTION

The provision of facilities and services in cities and neighbourhoods is crucial to their sustainability and efficiency. The facilities and services in residential neighbourhood

include among others: nursery and primary school, neighbourhood center, shopping center or market, retail shops, health centre, place of worship, police station, bank, petrol station, children playground, public utilities sites for electricity, transformer, water service reservoir, some service industries, and abattoir. The location and management of these facilities and services in the neighbourhood are very important. One of the objectives of a neighborhood is to provide an environment in which the residents may have an easy walk to shopping centre where they may obtain their daily household goods, and other services and facilities. However, the disadvantage of locating some of these facilities in the neighbourhood outweighs the advantage. Abattoir is one of such facilities. The accessibility

and nearness of abattoir and meat shops to consumers may present some merits, but the impact of its management on the local built environment and health of residents in abattoir vicinity poses great risk. More concern is being expressed over danger to health of residents who are neighbours to abattoirs, especially in developing countries where level of awareness is low. People are expressing dissatisfaction with the location and ways abattoirs in their neighbourhood are being managed. Today, residents who are neighbours to abattoirs doubt the compatibility of abattoir with residential land use.

LITERATURE REVIEW

Abattoir, also known as slaughter house is a place where animals are butchered for food. (Collins English Dictionary). Abattoir Acts (1988) defined abattoir as any premises used for or in connection with the slaughter of animals whose meat is intended for human consumption and include a slaughterhouse but does not include a place situated on a farm. Animals include cattle, sheep, pigs, goats and other equine animals. The killing of animals for community consumption is inevitable in most nations of the world and dated back to antiquity. Public abattoir had been traced to Roman civilization and in France by 15th and 16th centuries, public slaughter houses were

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among the public facilities. In Italy, a law of 1890 required that public abattoir be provided in all communities of more than six thousand inhabitants. Similar things were reported in Norway, Sweden, Denmark, Netherlands and Rumania (Jode Loverdo et al. 1906). Robert Forster (2005) reported that in United Kingdom, abattoirs or slaughterhouses perform a vital role in purchasing cattle, and sheep from farms and transforming them into carcass meat. He revealed that in 2001, there were about 360 licensed red-meat abattoirs in UK compared with almost 900 in 1990. In Nigeria, nearly every town and neighbourhood is provided with slaughter house or slaughter slab.

Edwards et al. (1979) published on slaughter facilities for tropical conditions and observed that abattoir may be situated in urban, rural and nominated industrial site and that each has advantages and disadvantages. The advantages of the rural site according to him out-weighed those of the other sites and recommended that a rural location be chosen where possible. They recommended that abattoir should be built on firm gently sloping land away from other buildings, residential areas and factories. He further suggested that the site for abattoir should be chosen well away from town boundaries including projected town boundaries. Abattoir management provides a service in slaughtering of animals. Edwards et al. (1979) reported that the slaughter of animals in abattoirs of developing countries was carried out in unsuitable buildings by untrained slaughter men and butchers that were unaware of sanitary principles. Wastes generated by abattoirs are potential environmental quality problems. Raymond (1977) submitted that, problem may be more dependent upon the abattoir activities or operation practices and waste management techniques than the size of the operation, the number of cattle or amount of waste involved. In Nigeria, Sridhar (1998) reported that, a cow brought for slaughtering produces 328.4Kg of waste in form of dung, bone, blood, horn and hoof. Robert (2005) submitted that the disposal of waste product is a problem that has always dominated the slaughter sector and on average, 45 per cent of each live beef animal, 53 per cent of each sheep, and 34 per cent of each pig consist of non-meat substances. The characteristics of slaughter house waste and effluent vary from day to day depending on the number, types of stock being processed and the method (Tove 1985). Waste generated by abattoirs include solid waste,

made up of paunch content, bones, horns, and faecal components, slurry of suspended solids, fat, blood and soluble materials (Sangodoyin et al. 1992). Raymond (1977) however reported that waste can affect water, land or air qualities if proper practices of management are not followed. Animal waste can be valuable for crops but can cause water quality impairment. It also contains organic solids, trace heavy metals, salts, bacteria, viruses, other micro organisms and sediment. The waste from animals can also be washed into streams if not protected and reduces oxygen in water, thereby endangering aquatic life. Raymond (1977) also reported that improper animal waste disposal can lead to animal diseases being transmitted to human through contact with animal faeces. Cooper et al. (1979) reported that abattoir effluent reaching streams contributed significant level of nitrogen, phosphorous and biochemical oxygen demand and other nutrients resulting in stream pollution. George (1987) attributed excessive nitrate problem in New Zealand ground waters to concentrated livestock and manure usage. Sangodoyin et al. (1992) also reported that the ground water quality in vicinity of the abattoir were adversely affected by seepage of abattoir effluent as well as water quality of receiving stream that was located away from the abattoir. The health of the city is linked to the health of the dwellers. The health of the dweller is affected by the environment. In every neighbourhood, there is a considerable range of biological and chemical pollutants that cause or contribute to diseases. Some may pose health risk for specific particular group while others for the entire neighbourhood. Carolyn et al. (1985) reported that pathogens from cattle waste could be transmitted to humans via water-based recreations. The wells in the meat processing areas sometimes result in been polluted. Wells in vicinity of abattoirs which serves as source of water to the abattoir users was traced by Sangodoyin et al. (1992) to be polluted by effluent from the abattoir and constitute health risk for the butchers and users of the wells. Noise pollution was reported by Oyedemi (2004) to be associated with abattoir activities and location. Wing and Wolf (2000) noted decrease health and quality of life of residents around intensive livestock operations and hinted that respiratory and mucous membrane effects were common with neighbours of intensive swine operation. Medical experts were reported by Oyedemi (2004) to have associated some

diseases with abattoir activities which include pneumonia, diarrhea, typhoid fever, asthma, wool sorter diseases, respiratory and chest diseases. *E. coli* infection source was reported to be undercooked beef which has been contaminated, often in abattoirs, with faeces containing the bacterium. (Encarta 2005). These diseases can spread from the abattoir to the neighbourhood via vectors or animals. However, growing population with increase in demand for meat has resulted in increased abattoir related pollution and has attracted intervention in many developed countries. There is high level of awareness on pollution from animal waste (including abattoir) whether in the farm or in the city and over the years several measures have been put in place to protect the public health and the environment (Merington et al. 1984). According to Robert (2005), in 1992, the European Commission introduced a Pan-European fresh-meat directive designed to standardize structural and hygiene regulations for abattoirs in all EU countries. The requirement was said to have a profound impact on slaughter industry structures in the United Kingdom. Similar intervention was recorded in United States of America with the introduction of Abattoir Act (1988). In the contrary, little intervention or response had been made in the developing nations.

OVERVIEW OF THE STUDY AREA

The study was carried out in Ogbomoso, Oyo State, Nigeria. Ogbomoso is the second largest city in Oyo state after the state capital, Ibadan. Ogbomoso is the administrative headquarters of both Ogbomoso North and South Local Governments. It is situated 57 kilometers South-West of Ilorin, the capital of Kwara state, 104 kilometers North of Ibadan and 58 kilometers North-West of Osogbo, the capital of Osun state. The popular Atanda abattoir was chosen for the study with the large expanse of built up area comprising of low, medium and high housing densities. Majority of residents are civil servants and traders. The abattoir harbors meat shops where slaughtered meat is sold. There are two wells within the slaughter area. The abattoir is surrounded at the south with residential developments and in the north by office complex and west and east by school and shops respectively. The abattoir is about 200meters from the main road (Ibadan-Ilorin road).

METHODOLOGY

Data for this study was collected from both primary and secondary sources. The primary source was through two sets of structured questionnaire. One set was designed for the abattoir users to obtain information on ownership, year of establishment, available facilities in the abattoir, average number of cows killed per day, abattoir staff strength, operation and activities, waste disposal methods employed, and other abattoir management issues. The other set was designed for the residents to address the resident's characteristics: age, sex, household size, marital status, effect of the abattoir on their environmental conditions, water quality especially for residents with well as source of water supply. Few questions were asked on their health history and life style, for example, do you smoke? A positive answer may interfere with findings on effect of abattoir on residents' health. The second section of the questionnaire listed several symptoms that may be associated with abattoir or possibly related to air borne emission from abattoir activities or pollutants. Symptoms that are not related were also included as a check. Respondents were requested to report frequency of symptoms, whether very often, often, occasionally or never. In the residential area around the abattoir, residents in buildings approximately 100meters from the abattoir were randomly selected for questionnaire administration. In all, 95 residents were randomly selected. The secondary source was through relevant past studies, magazines and journals. The information collected was analyzed based on frequency, chi-square and correlation statistics.

RESULTS AND DISCUSSION

The investigation carried out revealed that the abattoir had been in operation for more than thirty years. The slaughter slab provided in the abattoir is covered to provide shield from elements of weather. It is not fenced. On scale of operation, average numbers of fifteen cows are slaughtered daily in the abattoir. The cows are usually brought from the cattle ranch or cattle market which is located about one kilometer away from the abattoir. The movement of the cows through the neighborhood street from the cattle ranch to the abattoir is among the nuisance reported by residents that the abattoir location in their neighborhood constituted. There is usually traffic

and resident's wells indicated pollution of water quality. Result revealed the contamination of water by waste from the abattoir with a total of sixty six organisms belonging to seven different genera of public health importance isolated from the samples. The presence of these organisms in the wells that serve as a source of domestic water supply to the neighbourhood is a significant health risk. Residents whose source of water is well also confirmed notice of contamination of their wells with abattoir effluent. The effect of abattoir pollutants on air quality was easily perceived and reported by respondents. Over seven three percent reported disturbance of bad odour from the abattoir. They reported that it limited children outdoor recreation. Another effect reported was the contamination of food items of residents in abattoir vicinity by flies and insects; flies and mosquitoes were in abnormal rate. These insects and flies were reported to be attracted to the area by abattoir waste. Other limitations imposed on residents in abattoir vicinity by abattoir nuisance are noise pollution from the abattoir, inability to open windows in the direction of the abattoir and prevention of normal breathing. Forty three percent reported interference of odour with their breathing. Fifty eight percent were willing to relocate from the area because of the negative effects of the abattoir

On effect of abattoir activities on health of respondents, studies cited previously have reported elevation of some symptoms among residents of intensive livestock operations (Wing and Wolf 2000). In this study, headache, excessive coughing, shortness of breath, heart burn, diarrhea\ dysentery, general body weakness, fever and typhoid fever were reported to be elevated generally among residents in abattoir vicinity (SPSS output). Results indicated the symptoms experienced at least often by residents in abattoir vicinity to include excessive coughing, typhoid fever, shortness of breath, diarrhea, fever and muscle pain. The test of significance of these prevalent symptoms (statistical method-SPSS output) indicated possible association with abattoir activities. However, biases are issues in any survey. It is possible for respondents to have reported occurrence of more symptoms because of their personal feelings about the negative impact of the abattoir operation in their area. However, this was observed to be limited or not to have been done as some symptoms not related to abattoir activities included in the questions to check this excess indicated lowest occurrence.

Cholera, asthma and pneumonia were expected to be among physical health symptoms to be elevated among respondents in abattoir vicinity, as they are associated with abattoir activities. However the case was otherwise in the study. Results however showed that pollutants from abattoir activities have direct and indirect effects on human and the local built environment, especially those in close proximity to abattoir. However, weather condition at the time surveys were being carried out could have influenced findings. Some respondents reported that the negative effects are more severe during dry season than presently. Study was not able to evaluate levels of impact on residents within the same area but at different distance to abattoir. There is possibility of different level of effect because of differences in distance, building orientation or elevations, direction, physical barrier and amount of time spent at home. Study was also not able to evaluate health impact on specific population group. Such groups include children, aged, and asthmatic patients. There may be possibility of different group being affected differently by abattoir activities. These are possible areas of future inquiry.

CONCLUSION AND RECOMMENDATIONS

The study revealed that abattoir activities and management have direct and indirect effects on the built-up environment and health of people especially residents in abattoir vicinity. The study 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 not practiced. 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. It was noted that children outdoor recreation in abattoir vicinity was also limited. Therefore, there is need to control abattoir as strictly as industries have been controlled in matter of location and management in Nigeria.

Abattoir should be excluded from facilities to be located within residential neighbourhood. It should be included and treated as among industrial land use or agricultural land use.

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. For large

abattoir, provision should be made for separate livestock market for sheep, goat and cattle, fresh water pumping station or storage and waste treatment plant. The abattoir management system should include a waste management plan designed for abattoir operation

Legislative measures are also necessary. Laws and rules on zoning, land use, and waste regulation to control the location and management of abattoirs should be made. The government should enforce existing laws related to abattoir and new ones. Design criteria and siting restriction which include setbacks from neighbours and buffer must be specified. Measures to protect against encroachment into buffer by property developers should be provided. Rules requiring odour abatement plans and provision of environmental impact assessment for abattoirs should be enforced.

Licensing of abattoir, certification of all operators as well as training of employees involved in abattoir activities should be made. In addition, public awareness and enlightenment on possible impact of pollution from abattoir wastes should be embarked upon by relevant agencies and public participation to be included in the development of policies for abattoir management.

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APPENDIX

Table 1: Characteristics of the respondents and their answers to abattoir activities

<i>Characteristics</i>	<i>Frequency (percentage)</i>	<i>Characteristics</i>	<i>Frequency (percentage)</i>	<i>Characteristic</i>	<i>Frequency (percentage)</i>
<i>Sex-</i>		<i>Age-</i>		<i>Marital Status</i>	
male	40	10-18	5	Single	42
female	60	19-40	84	Married	55
		41-60	8	Divorced	1
		<60	3	Widowed	2
<i>Average hour spent at home if employed outside</i>		<i>Length of stay in the area-</i>		<i>Employment out of the home</i>	
Below 10hrs	17	Below 3 years	15	Yes	53
10-12	46	3-5	40	No	44
13-15	19	6-10	35	No response	3
Above 16	18	11-15	3		
		16-20	3		
		21-25	0		
		Above26	4		
<i>Status at Home</i>		<i>Meet abattoir in the area</i>		<i>Smoking</i>	
Landlord	27	Yes	99	Yes	8
Tenants	72	No	1	No	82
Visitors	1			No response	10

Source: Authors field survey, 2006.

<i>Characteristics</i>	<i>Frequency (percentage)</i>	<i>Characteristics</i>	<i>Frequency (percentage)</i>	<i>Characteristic</i>	<i>Frequency (percentage)</i>
<i>Abattoir odour percetion and problem</i>		<i>Abattoir odour limits children recreation outdoor</i>		<i>Contamination of well with abattoir effluent</i>	
Yes	73	Yes	98	Yes	58
No	26	No	1	No	8
I don't know	1	I don't know	1	I'm not sure	34
<i>Contamination of food items or incidence of flies and insects</i>		<i>Odour affects breathing</i>		<i>Odour causes respiratory ailment</i>	
Yes	94	Yes	43	Yes	13
No	6	No	14	No	24
		I don't know	43	I don't know	63
<i>Abattoir is nuisance to you</i>		<i>Move from the area because of abattoir</i>		<i>Awareness of abattoir's closeness to residents</i>	
Yes	94	Yes	58	Yes	98
No	3	No	24	No	2
No response	2	I don't know	18		
		<i>Household size</i>		<i>Source of drinking water</i>	
		1	3	Well	68
		2	1	Borehole	29
		3-4	47		
		5-12	23		
		Above 12	2		
		No response	24		

Source: Authors field survey, 2006.