

Rat Infestation in a Typical Nigerian University Halls of Residence: Implications for Hygiene and Sanitation

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Abstract: Nothing could be more disturbing than to find a live rat within one's room. Rat infestation is a common occurrence in many places especially where hygiene practices are low and in places providing harbourage for the rats. Most university halls of residence in Nigeria are being increasingly infested with rats as well as other rodents hence this study. About 360 students from randomly selected rooms in Obafemi Awolowo University, Ile-Ife, Nigeria were interviewed as regards their awareness of the existence of rat infestation in their rooms, the kinds of articles destroyed by the rats, their food storage and cooking practices and methods of controlling the infestation. Most of the respondents (78%) had observed the presence of rats and were aware of the problems of rat infestation in their rooms. All respondents cook in their rooms. Several personal properties of the students including their food items and books had been destroyed by rats. Cooking and keeping cooked food inside the rooms could be linked with the proliferation of rats in the hostels. The use of chemical poison remained the most widely used method of rat control by the students a practice considered to be hazardous in case of accidental transfer of poisons to cooked and raw foods by the rats during feeding. Practical ways of dealing with the problem of rat infestation were suggested. These include disallowing storage and cooking of foods in the rooms by providing kitchenette in each of the hostel floor and rat proofing of the rooms among others. Knowledge of the respondents regarding the possibility of rats transmitting communicable diseases was poor as most of them could not link the infestation with the spread of specific diseases. The need to link environmental sanitation problems with health and disease was suggested as a way of enhancing improved sanitation and health promotion.

Key words: Rat infestation, economic loss, university hostels, sanitation, rodent control, prevention and control.

INTRODUCTION

Rat infestation is both a health risk and a source of economic loss. Apart from the possibility of destroying properties, the possibility of transmitting zoonotic diseases is a reality. Rodents are vertebrates that gnaw articles with their teeth that are adapted specially for that purpose. They generally include rats, mice, moles, squirrel rabbits and some few others. There are not many problems that could be as disturbing than to find one rodent or the other inside ones wardrobe, food safe and bookshelves. Mice and rats, which are the most commonly found around human habitations, are objects of widespread fear and revulsion. They have been known to cause untoward damage to household articles and properties such as books, food items, clothing and textiles.

Although most people may not be alarmists about the presence of rats in their homes, their potential to cause serious health conditions leave much to be desired^[1]. While most people are aware of the presence of rodents in their homes, they seem to be helpless as most people often

time do not make much effort at getting rid of them. Langton, Cowan & Meyer^[2] found out that between 42% and 50% of people in urban and high population density areas seem to have accepted to live permanently with rats as they seem not have bothered much about controlling them.

It has been established that domestic mouse is most likely to occur where there is poor structural maintenance, poor hygiene arising from improper storage and disposal of wastes, and ample harbourage due to insanitary stacking of food items as well as congestion of rooms with different kinds of disused articles^[3].

In the mid 1980s, the Federal Government of Nigeria cancelled central cafeteria services in federal educational institutions. Apart from withdrawing the subsidy on feeding, it also went ahead to cancel subsidy on books. The development left cafeteria services entirely in the hands of private entrepreneurs whose products became exorbitant and out of the reach of most students. Students therefore resulted into cooking in their rooms and on corridors in order to reduce their cost of subsistence.

A common feature of most Nigerian university hostel is the stocking of foodstuffs by individual students inside their rooms especially under their beds and inside the wardrobe. This came as a result of the cancellation of the subsidised central feeding system by the federal government.

The resultant effect of the cancellation of central cafeteria services complicated the problems of sanitation and hygiene conditions of halls of residence in those institutions. Prior to this time a well subsidised central feeding system which did not encourage students to store nor cook food within their rooms was in operation in all higher institutions in Nigeria. Significant among the problems so created by cooking in the halls of residence are the increased volume of garbage and similar wastes which are not collected for disposal frequently, poor hygiene of rooms resulting from cooking and stocking of food stuffs inside the rooms. These according to Childs *et al.*^[4] and Meyer Drummond^[5] encourages ingress of rats and other rodents into living rooms. While the risk to health is a sufficient reason for controlling domestic rat infestation, it would be naïve to assume that this is the sole justification.

Previous attempts to involve local residents in control programmes have reported varying degrees of success^{6, 7,8}. The modern approach specifies the full involvement of the people who suffer the impact of the infestation so that control effort could be sustainable^[5].

The presence of rodents in any living environment could be confirmed when their droppings are found on the ground or floor, evidence of rat runs, burrows on walls and corners of rooms, evidence of gnawing on furniture and other articles, the sound produced especially when foraging for food and by noticing live rats in the premises^[6].

In a study conducted by Murphy *et al.*^[3] it was found that mice tended to be more common around food storage, food preparation and eating areas. This informed the need to critically examine features in the kitchen and other similar areas when considering factors likely to encourage rodent's infestation.

The fact that most university hostels are infested with rats is not in doubt. What is probably not known is the extent of the infestation and destruction caused to students' articles and materials. The objective of this study was to identify among other things, the problem of rat infestation in the students' hostels and students' behavioural factors associated with the infestation.

MATERIALS AND METHODS

The study was conducted at the Obafemi Awolowo University Ile-Ife between October 2003 and February 2004. Ile-Ife an ancient and historical town is located between latitude 7.4°E and longitude 4°N in the south-

western part of Nigeria with a population of about 150,000. The university was established about 40 years ago.

There are nine halls of residence in the university each averaging about 250 rooms to serve a student population of about 40,000. The rooms were originally designed for between 2 and 4 students but now officially have between 8 and 10 students per room due to large increase in student admission without corresponding increase in hostel facilities. It was proposed to select forty (40) rooms in each hall making a total of 360 rooms. The rooms chosen for the study were randomly selected among a table of random numbers. In each selected room respondent was identified based on the first occupant of the room that came to collect the key to their room from the porter's lodge. The student is given a questionnaire to fill consisting of semi-structured questions on knowledge of the presence of rats in the room, evidence of their effects on articles and food items, the respondent's knowledge of likely diseases associated with rat infestation and the means of preventing rat infestation among others. A visit is paid to their room by appointment to assess the living conditions of the rooms for rat runs or droppings as well as for other evidences of rat infestation. Further oral interactions were made to elicit further information from the students. Simple analysis using frequencies and percentages were carried out on the data for purpose of interpretation.

RESULTS AND DISCUSSIONS

The ages of the students ranged between 15 and 34. Respondents of the age bracket 20-24 were about 70% of the total respondents.

More than three quarters (78.1%) of the students claimed that rats are in their rooms. They have also seen it as a major problem they have to live with in their rooms as against 21.9% who may not have noticed the presence of rats or have seen it as a problem. In addition to these, 24.4% of the respondents had noticed evidence of rat runs in their rooms, 21% had seen a rat hole or borrow and 16% had ever seen a live rat inside their wardrobes or at other locations inside the room (Table 1). The fact that rats have become regular 'occupants' of students' room could therefore not be pushed aside and the nuisances they constitute due to noise (13.1%) and the health risk their droppings (7.2%) could constitute noteworthy. This situation presents a serious public health problem bearing in mind the wide range of diseases that could be transmitted by rats and other rodents.

Many factors were found to be associated with the ingress of rats into students' living rooms. Table 2 shows a causal relationship between presence of rats and the location of food store in the rooms. Students' rooms where food stuffs are kept inside the wardrobe and under the beds, accounted for 92.5% of all rat infested rooms as

Table 1: Respondent's Noticeable evidence of Infestation

Evidence	Frequency	%
Rat runs noticed in corners of rooms	88	24.4
Hole/borrow inside wardrobe/corners of rooms	76	21.1
Live rats often found inside cupboards/wardrobes	58	16.1
Rat noise heard	47	13.1
Droppings found on the floor	26	7.2
Reduction in amount of food stuff	21	5.8
No response	44	12.3
Total	360	100.0

Table 2: Relationship Between Presence of rats and Location of food store/safe

Location of Food Safe in the room	Rat Present	Rat Absence
Inside the wardrobe in the room	138 (49.1)	25 (31.7)
Under the bed/table	122 (43.4)	9 (11.4)
In sealed plastic container	17 (6.1)	42 (53.2)
No response	4 (1.4)	3 (3.7)
Total	281 (100.0)	79 (100.0)

compared with the 6.1% of food kept in sealed plastic containers ($p = 0.000$). The infestation of rats has been known to have close link with nearness to sources of food supplies in most living environment. Rodents are known to be present in environments where foodstuffs are kept uncovered, kept inside living rooms and also where receptacles for storage of garbage are close to living premises^[8,5,2]. Specifically, the need to reduce congestion in the students' room becomes necessary so as to reduce the opportunities for rat's harbourage and subsequent infestation.

The infestation of rats in the hostels has caused untold damage to various articles and properties of the students. When asked to mention one important article/property that had been destroyed by the rodents, 31% of the students had had their food items eaten by rats, 27% had their books damaged and 10.3% of them had their furniture damaged by rats. In all about 86% of the respondents had one thing or the other damaged by rats (See Table 3). The economic implications of the damage could be worrisome to students as most of them may not be able to find a replacement for the damaged articles bearing in mind that the need for cost saving could have been a major reason for resulting into cooking in the rooms in the first instance.

Although the university established bukateria restaurants which were hire out to private operators, students prefer to cook their meals to reduce cost from the expensive meals at the restaurants room. Virtually in all the rooms inspected cooking of food takes place either inside the room or on the corridor leading directly into the rooms. This situation has led to a development in which students' rooms are better described as kitchenettes with large quantities of raw and processed foods stored. The various methods of cooking in the rooms have also substantially contributed to low level of sanitation and hygiene in the rooms. All these in no small ways could have encouraged the breeding, ingress and the subsequent infestation of rats in the rooms.

Table 3: Damage to items/properties caused by rats.

Damage caused by rats to respondents' properties	Frequency	%
Food items	88	31.2
Books	76	27.1
Furniture	29	10.3
Textiles	25	8.9
Shoes	24	8.1
Carpets	13	4.6
No items destroyed	39	13.8
Total	281	100.0

Table 4: Respondent's Methods of Rat control in the room

Adopted Method of Control	Freq.	%
Rat Poison	69	19.2
Physical Killing/attack	47	13.1
Use of Traps	27	7.5
Use of adhesive gums	4	1.1
Varieties of methods	37	10.3
Never did anything	176	48.8
Total	360	100.0

In addition to these facts, students' rooms in Nigerian universities are known to be largely overcrowded with more than twice the number of students expected to occupy the rooms. This also has the tendency to escalate the breeding of rats and their rate of infesting the rooms. Also important in this respect is the fact that cooking in the hostels as well as the level of overcrowding have substantially increased the amount of waste generated in the hostels probably beyond the coping capacities of the environmental health unit of the health centre.

It is therefore obvious that the problems of rat infestation may not be properly addressed without finding a better solution to the problems of overcrowding in the rooms and also more important is the need to overcome the problems of cooking and stocking of foods inside the rooms which are in all ramifications against basic hygiene and public health standards.

As a result of the high infestation of rats in the rooms, students have adopted various ways of controlling them. While the initiatives of the students could be commended, the public health implications demand a careful consideration of the various methods. From Table 4, it is clear that 18.6% of the students employed one form of rat poison or the other. Rat poisons have been found very useful in public health in controlling rats but their use requires a lot of caution. The fact that the use of poisons could cause accidental contamination of foodstuffs inside students' rooms which could subsequently poison humans would make the adoption of this methods undesirable in order to avert undesirable consequences that could result from uncontrolled use of 'rat killers' as they are usually called. Equally important is the need to educate the students on the possible hazards associated with the use of such chemicals. About 7.5% of the students adopted the use of traps in controlling the rats. Traps are (on chemical poisoning point of view) safe, but could constitute danger to the students bearing in mind that the rooms are already overcrowded.

Probably more significant is the level of apathy exhibited by almost half (48.8%) of the respondents to the problem of rat infestation in their rooms. The fact that they could not do anything could be termed to mean that they must have accepted to live with the problem. It could also be termed to mean that they are ignorant of what to do. This latter claim could be substantiated by the fact that the study also found out that only 30 respondents (8.3%) are aware of the existence of an office/unit in the university where they could obtain information and help as regards rat control. These probably suggest that awareness creation as regards environmental sanitation services including resource centres is poor in the university.

Knowledge of the respondents as regards the potentials of the infestation resulting in outbreak and spread of some communicable diseases was poor among the respondents as 81% of them (292 respondents) did not know that the presence of rats in living rooms could cause diseases. When asked to mention specific diseases that could arise from such infestation, most (75%) respondents could not mention diseases like lassa fever, plague, yaws and others. It could be inferred that if the students are not aware of the health implications of the infestation, they are not likely to bother to do something about it nor think of how to limit contact with them. The need to provide hygiene education to link specific environmental sanitation problems with health and disease as well as with general well-being has continued to be recognised as an important way of promoting the health of the public and also to ensure health protection in the overall interest of the health of the people.

Conclusions: Infestation of rat is a serious problem in the students' hostels in the university. This study has shown that most of the students' rooms were infested with rats causing serious damages to their properties and food items. The presence of the rats in the rooms was evident from the existence of rat runs and borrows as claimed by the respondents. The stocking of food items especially in the wardrobes and under the beds have been found to be associated with the infestation while knowledge of the respondents as regards the hazards of the infestation and the possible places in the university where help could be obtained regarding the control was poor. It could therefore be concluded that a major cause of the infestation was the level of indoor hygiene and sanitation being practiced by the students particularly regarding cooking and stocking of food items in the living rooms. It is clear that the problem of rat infestation in the hostels is a multi-faceted one. The control of the infestation would also require a comprehensive approach of reducing overcrowding of rooms, prohibiting cooking of foods in the rooms and the general maintenance of the sanitation level of the whole campus. Part of this would require a reconsideration of the feeding system in the university. While it may not be possible to stop students from cooking in the hostels especially in the short run, concrete plans must be put in

place to facilitate the use of common facilities for storage and cooking on individual floor basis. These common facilities should be rat proofed to prevent ingress of rats and other rodents. On the long run, the resuscitation of the central feeding system, which would limit cooking and such other domestic practices to designated places (cafeteria) would have to be considered. In future policy makers would need to consider environmental impact (among others) of policies relating to feeding and sanitation in human habitations and particularly in hostels of educational institutions. Effort may also have to be made to rat proof the rooms by providing self closing doors, rat proofing of windows and blocking all other borrows and openings through which rats could enter the rooms. Awareness creation regarding safe methods of rodent prevention and control as well as on the hazards of their infestation is also indicated. By doing these, the university authority would be alleviating the burden of having to cope with living with unwanted yet dangerous occupants of students' rooms.

REFERENCES

1. Tickell, S.T. and S.A. Bull, 1991. The Norway Rat as a Reservoir host of *Cryptosporidium parvum*. *Jnl. of Wildlife Diseases* 1991, 35: 660-670.
2. Langton, S.D., D.P. Cowan and A.N. Meyer, 2001. The Occurrence of Commensal Rodents in Dwellings as Revealed by the 1996 English House Condition Survey. *Jnl. of Applied Ecology*, 38: 699-709.
3. Murphy, R.G. and D.J. Oldbury, 2002. Rat Control by Local Authorities within the UK. In: *Proceedings of the fourth International Conference on Urban Pests 7-10 July 2002 South Carolina USA.*, Edited by. S.C Jones *et al*, Charleston,, 2002:, 77: 413-420.
4. Childs, J.E., G.E. Glass and J.W. LeDuc, 1991. Rodent Sightings and Contacts in an inner city population of Baltimore, Maryland. *Bull. Of the Society of Vector Ecology* 1991, 16: 245-255.
5. Meyer, A.N. and Drummond DC. 1980. Improving Rodent Control Strategies in Lambeth. *Environmental Health*; 1980, 88: 77-81.
6. Colvin, B.A. and W.A. Jackson, 1999. Urban Rodent Control Programme for the 21st Century. In: *Ecologically based Rodent Management*. Edited by Singleton GR *et al*. Australian Centre for International Agricultural Research, Australia. 1999: pp: 143-176.
7. Lambropoulos, A.S., J.B. Fine, A. Perbeck, D. Torres, G.E. Glass and P. McHugh, 1999. Rodent Control in Urban Areas: an Interdisciplinary Approach. *Environmental Health*, Jan./Feb. 12-17.. 1999. 5-12
8. Margulis, H.L., 1977. Rat Fields, neighbourhood Sanitation and Rat complaints in Newark, New Jersey. *Geographical Review*, 1977, 67: 221-231.