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Prevalence And Species Composition Of Cockroaches In Male And Female Hostels Of Kaduna State University, Nigeria

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Abstract

Cockroach infestations pose a significant threat on public health due to their ability to contaminate food and spread pathogens. In university setting, where student populations are concentrated in hostels, the risk of cockroach infestations is heightened. The aim of this research is to determine the prevalence and cockroach species in male and female hostels of Kaduna State University, Nigeria. The sample was collected from dustbins, toilets, rooms, kitchens and stores of the female and male hostels. Glue boards and baits were used to collect cockroaches from the toilets, kitchen and inside the hostels. Cockroaches seen were killed with broom/sprayed with insecticides. The Cockroaches were packed into the container containing 10% formalin using broom and packer. The cockroaches collected were taken to the zoology laboratory in Department of Biological Sciences, Kaduna State University for identification. The results showed that female hostel had more prevalence (74.96%) than the male hostel with 25.04%. The species of cockroaches identified are *Blattela germinica, Supella longipalpa and Periplaneta americana. Blattela germinica* had the highest prevalence (53.4%); followed by *Periplaneta americana* (26.3%) while *Supella longipalpa* had the least (20.3%). Cockroach infestation in relation to sex of the cockroaches showed that more female cockroaches were identified (67.05%) when compared with the male (32.95%). In conclusion, high prevalence of cockroach infestation was observed in this study hence the need for the creation of awareness to educate the students and University community on the control measures and importance of environmental sanitation.

KEY Words: Cockroaches, Hostels, Health implications, Awareness creation

INTRODUCTION

Cockroaches are the most abundant and obnoxious insect in residential buildings, hospitals, hostels, and restaurants [17].

They move freely from one building to another or from sewage drains, food stores, and toilets to human habitations. Cockroaches feed on a wide range of animal products and manufactured materials. Pathogenic microorganisms have been isolated from the alimentary canal and other parts of the cockroach's body,

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[9, 18]. Since they feed on human faeces as well as human food, their potential for transmitting food-borne infections has generated a lot of research interest. They are known to be mechanical vectors [7, 10, 11] of some deadly diseases. In Nigeria, however, the vector competence of cockroaches seem to have been underrated considering the dearth of information and the little research interest it has attracted over the years. As urban population increases in Nigeria, with attendant deterioration in housing conditions and poverty, enabling environment is created for the proliferation of insect breeding habitats and of insect-borne pathogens. Cockroaches have been reported as carriers of gastrointestinal parasites on their body surfaces and guts in Nigeria and other parts of the world [1, 3]. Ingested bacteria in cockroaches can survive for months or even years in cockroach's digestive system and can be passed to humans when cockroaches defecate on foods consumed by humans, leading to mechanical transmission of diseases. Diseases associated with these parasites, such as ascariasis, giardiasis, ameobiasis, liver diseases etc. pose serious public health problems especially in poor areas, where they lack proper hygiene to combat the spread. They vomit and defecate on exposed foods, which can easily be transmitted to humans when they feed on foods contaminated by cockroaches.

About 30 species of cockroaches live in human dwellings and are associated with areas with biological wastes like septic tanks, garbage cans, animal cages etc. [12]. Cockroaches' indiscriminate choice of diets, their feeding and filthy habits in terms of their activities and their body structure make them suitable and effective mechanical transmitters of pathogenic parasites [3]. Since they mostly live around human dwelling, their presence poses serious threat to human health and the environment [3, 4].

Cockroach infestations can be of great concern in dormitories or hostels, where large numbers of individuals reside in close proximity, creating an ideal breeding ground for these pests [15]. Previous reports on cockroach infestation in residential areas and dormitories were high. A prevalence of 64.5% was reported from student dormitories in Kashan University of Medical Sciences, Iran [14]. Furthermore, 73.8% and 26.2% prevalence of cockroach infestation in male and female hostels of Tafawa Balewa University, Yelwa campus Bauchi State, Nigeria was reported [2].

Study Area

The study was conducted in boys and girls hostels of Kaduna State University, Kaduna; located at 11º 12ˈN, long 7º 33ˈE.

Kaduna State University has hostel accommodations for students. Female has a total of five hostels which include Hamdala with 56 rooms, 16 toilets and 8 kitchens), Kadabo hostel (4 floors, 56 rooms, 32 toilets and 8 kitchens), MKR hostel (4 floors, 100 rooms, 100 toilet and 100 kitchens), Royal Tropicana hostel (300 rooms, 300 toilets and 300 kitchen), ASD hostel (8 floors, 114 rooms, 52 toilets and 8 kitchens),

The sample size involved all the Male and Female Hostels of KASU.

Data collection

The cockroaches were collected by spraying of insecticide on them, physical killing with broom and use of glue boards with bait.

The sample was collected from dustbins, toilets, hostel rooms, kitchens and stores of the female and male hostels. The Cockroaches were packed into the container containing 10% formalin and taken to the zoology laboratory in Department of Biological Sciences of Kaduna State University for identification.

Cockroach Identification

Species of Cockroaches were identified by using standard taxonomy keys describe by [5]. Structured questionnaire was used to get information on health implications and economic importance of Cockroaches.

Data Analysis: Percentage was computed to determine the prevalence; student t test was used to test the significant level between the differences in prevalence of the cockroach infestation in male and female hostels.

It was also used to determine the significant level of the differences between the male and female cockroaches.

RESULTS

Three species of cockroaches were identified namely *Blatella germinica*, *Supella longipalpa and Periplaneta americana. Blatella germinica* had the highest prevalence of (53.4%); followed by *Periplaneta americana* (26.3%) prevalence while *Supella longipalpa* had the least prevalence with 20.3% (Table 1).

Cockroach infestation in relation to hostels

The results showed that female hostel had more prevalence (74.96%) than the male hostel with 25.04% prevalence (Table2). The difference between the two hostels was significant.

Cockroach infestation with respect to sex of the Cockroaches

The results showed that more female cockroaches were identified (67.05%) when compared with the male counterparts (32.95%) and the difference also was significant (Table 3).

Table 1: Cockroach species identified during the study

Types	**No of cockroaches**	**Percentage (%)**
German Cockroaches (*Blatella germinica*)	925	53.4
Brown banded cockroaches (*Supella longipalpa*)	352	20.3
American cockroaches (*Periplaneta americana*)	456	26.3
Total	1733	100

Table 2: Cockroach infestation in relation to hostels

Hostels	**No of Cockroaches collected**	**Percentage (%)**
Male	434	25.04
Female	1299	74.96
Total	1733	100

Table 3: Male and Female Cockroaches Identified

Cockroaches	**Frequency**	**Percentage (%)**
Male	571	32.95
Female	1162	67.05
Total	1733	100

RESULTS FROM QUESTIONNAIRE

Where the respondents keep their refuse

In terms of where the respondents keep their refuse, 170(69.96%) of the respondents were keeping their refuse in front of their hostels while 73(30.04%) were keeping their own inside their hostels (Table 4)

Diseases Transmitted by cockroaches

In terms of diseases transmitted by cockroaches, most of the respondents indicated that typhoid fever was the most common diseases transmitted by the cockroach with 78(32%) prevalence followed by dysentery with 60(24.69%), relapsing fever with 55(22.6%) followed by Salmonellosis with 30(12.3%), leprosy with 20(8.2%) while 15(62%) believed that cockroach transmit all the diseases listed above (Table5)

Whether the respondents are aware of the health implications associated with Cockroach infestation

For awareness about the health implications of the cockroach infestation, 88(36.2%) of the respondents were aware while 155(63.8%) of them were not aware (Table6)

Economic Importance of Cockroach infestation

With respect to economic importance of the cockroach infestation, majority of the respondents 90(37%) were of the opinion that much money is spent in purchasing insecticides, 87(35.8%) said much money is spent in replacing food contaminated with cockroach faeces, 46(18.9%) said that much money is spent in replacing bags, carpets and shoes damaged by cockroaches while 20(8.2%) said that a lot is spent in treatment of the diseases transmitted by cockroaches (Table7)

Table4: Where the respondents keep their refuse

Option	No of respondent	Percentage (%)
In front of the hostel	170	69.96
Inside the hostel	73	30.04
Total	243	100.00

Table 5: Diseases Transmitted by cockroaches

Option	No of respondents	Percentage (%)
Typhoid fever	78	32.10
Leprosy	20	8.23
Dysentery	60	24.69
Salmonellosis	30	12.35
Relapsing fever	55	22.63
Total	243	100.00

Table 6: Whether the respondents are aware of the health implications associated with the Cockroach infestation

Options	Number of respondents	Percentage (%)
Yes	88	36.2
No	155	63.8
Total	243	100.0

Table 7: Economic Importance of Cockroach infestation

Options	Number of respondents	Percentage (%)
A lot of Money is spent in replacing the bags, shoes and carpets damaged by cockroaches	46	18.93
Much money is used for the treatment of diseases transmitted by cockroaches	20	8.23
Much money is used to purchase insecticides used in controlling the insects	90	37.04
Much money is used to replace the food items contaminated with cockroach feces	87	35.80
Total	243	100.00

DISCUSSION

Three species of cockroaches were identified in this study. The result is in line with [13] who stated that the three species are the most common cockroaches in family dwellings where they prefer kitchens as well as warm and humid areas close to food and latrines. These species are also known to reproduce faster than other species of cockroaches [9]. The high cockroach infestation at the study locations could be attributed to availability and abundance of diverse food materials, suitable refuge and lack of sustained control efforts.

The results showed that the female hostel had more prevalence than the male hostel. This may be attributed to the fact that female students usually have more materials such as clothes, shoes and even provisions which they sometimes carelessly litter everywhere hence attracting cockroaches in their hostel.

Blatella germanica had the highest prevalence which indicates that they are more adapted to the environment. This high prevalence observed is in agreement with the results reported by [16] who reported 97.8% of *Blattela germanica* in their study. It is also in line with the result reported by [13] who reported 66% prevalence of *Blattela germanica*. On the other hand, the result is not in agreement with [8] who reported *Periplaneta americana* as the most prevalent species (47.9%) in their study in Gombe State. Similarly, [6] reported *Periplaneta americana* as the most prevalent species in their study in Akwa Ibom State. Similarly [2] reported *Periplaneta americana* as the most prevalent species in their study.

Cockroach infestation in relation to sex of the cockroaches showed that more female cockroaches were identified when compared with the male counterpart. The higher prevalence in female may be due to the fact that the females eat more voraciously than the males to enable them survive and lay more eggs.

In terms of disease transmitted by cockroaches, most of the respondents indicated that typhoid fever was the most common diseases transmitted by the cockroach. The choice may be due to the fact that the symptoms of typhoid fever are easily noticed.

CONCLUSIONS

High prevalence was observed in this study an indication that the students are at risk of contracting deadly diseases transmitted by Cockroaches. It may also be as a result of unsanitary environment. The school authority should plan intervention programme towards control measures of cockroach infestation in the hostels and University community in general.

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