

EFFECTS OF PEST ON LIBRARY COLLECTIONS: A STUDY OF KENNETH DIKE LIBRARY PEST AND ITS CONTROL MECHANISM

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Abstract

This survey examines the incidents of pests in academic libraries with particular reference to Kenneth Dike Library, University of Ibadan, Nigeria. The study sets out to investigate the effects of pests on library materials and examine its control mechanisms. The study employed a descriptive survey method using the ex-post-facto design with a population sample of 70 respondents whose information was obtained through the use of a structured questionnaire. The data obtained was analysed using descriptive statistics of means and standard deviation. The results showed that pests; most especially rodents have constituted major deteriorating threats to print materials as well as constituting nuisance to both staff and patrons. The study further revealed that preventive mechanism was not adequate. Recommendations were made based on these findings that regular and periodic fumigation be adopted and that edible materials should be prevented from entering the library.

Keywords: Pest, Academic Library, Preventive Mechanism, Pest Control, Kenneth Dike Library

Introduction

Libraries are institutions set up to cater for the educational, cultural, research, recreational and information needs of their users. Libraries have the main objectives of being entrusted with the selection, acquisition, organisation, storage and dissemination of information to their patrons. A library can also be considered as a repository of wisdom of great thinkers of the past and the present. It is a social institution charged with the responsibility of disseminating knowledge to the people without any discrimination. Islam (2004) defines library as a learned institution equipped with treasures of knowledge maintained, organized and managed by trained personnel to educate the children, men and women continuously and assist in their daily development through an effective and prompt dissemination of information embodied in the resources. Omojuwa (1993) describes the library as an enabling factor to obtain spiritual, inspirational and recreational activities through reading and therefore the opportunity of interacting with the society's wealth and accumulated knowledge. Jama'a (1984) observed that academic libraries in particular, assume a focal point where users of diversified age groups, socio-political, economic backgrounds and cultural interests have to converge to utilise all the available resources that are relevant to their individual needs. As a result of this diverse use of the materials, these libraries stand to be vulnerable to all forms of deterioration resulting from various factors thus reducing the lifespan of such materials.

The life expectancy of collections is significantly affected by the environmental conditions in which they are stored (Henderson, 2007). Environmental problems in buildings can cause significant damage to collections. These can be quite easy to ignore, building up slowly over time until they reach crisis point. Poor conditions can lead to damage to hundreds or even thousands of items at one time, each of which may need expensive individual repair.

Conservators can often repair damage to books and documents, but this is rarely a cheap process and there are many other negative consequences. Books and documents that are being treated are not available for study, and regardless of the quality of the conservation work, something of the original is lost during treatment. This can lead to a less useful or less valuable item. Knowing the environmental conditions in a library or archive is essential for planning the best strategy for the preservation of collections and for targeting your resources effectively. With good recordkeeping, the information collected will provide evidence of good stewardship for funders, professional bodies and future donors.

The holdings of the libraries are the priceless heritage of mankind as they preserve facts, ideas, thoughts, accomplishments and evidences of human development in multifarious areas, ages and directions available in print and other forms. The past records constitute a natural resource and are indispensable to the present generation as well as to the generations to come. Any loss to such materials is simply irreplaceable. Therefore, preserving this intellectual and cultural heritage becomes not only the academic commitment but also the moral responsibility of the librarians / information scientists, who are in charge of these repositories. Besides, proper dissemination of library materials is possible if the documents are in good and usable condition. It thus behooves on everyone concerned with libraries to see to the maximum protection of library materials from pests. This paper therefore examines the effects of pests such as rodents, insects and microorganisms on library materials as well as looking at ways of reducing it to the barest minimum using Kenneth Dike Library (KDL) as a case study.

Objectives of the Study

The study is aimed at examining the effects of pest on library collections of the Kenneth Dike library, University of Ibadan. Specifically, it is to:

Determine the perception of Kenneth Dike Library staff about pest in the library. Identify types of pest present in the library.

Know the causes of pest in KDL, and

Identify ways of controlling pests in the library.

Research Question

The research will be guided by the following research questions:

What is the perception of library staff about the problem of pest in academic library? What type of pests is prevalent in the library?

What are the causes of pest intrusion of library?

In what ways can pest be controlled in academic libraries?

Literature Review

Most academic libraries have paper based reading materials in the form of manuscripts, books, periodicals, paintings, drawings, charts, maps etc. According to Agarwal and Mandana (1997), the basic materials and constituents of the physical entity of these library materials are mostly organic in nature, which are susceptible to natural decay and deterioration. In books, apart from paper, the other materials used are board, cloth, leather, thread, ink, adhesive etc. All these materials used are nutrition to some living organisms (Sahoo, 2000). So the library materials need protection from factors of deterioration such as pests (O'Neill & Boomgaarden, 1995).

Deterioration is a change of original state of any material by interaction between the object and the factors of destruction (Bokhare, 1997). The different types of deterioration of the paper based materials are reflected in wear and tear, shrinkage, cracks, brittleness, warping, bio-infestation, discoloration, abrasion, hole, dust and dirt accumulation etc. Generally library materials are susceptible to deterioration by the following factors suggested by Bokhare (1997):-

Environmental (climatic Factors) factors like light, heat, humidity and moisture, dust and dirt, water.

Biological factors:- Microorganisms, insects and rodents.
Chemical factors
Human factors
and Disasters

The focus of this paper is on biological factors comprising micro organisms, insects and rodents. The deterioration caused by biological agents such as micro-organisms, insects and rodents is generally known as bio-deterioration. Almost all book components such as paper, leather, textiles or straw board used for binding are prone to attacks by these biological agents. The problem of bio-deterioration is a matter of considerable significance of tropical hot and humid climate like Nigeria. The climatic condition accelerates the growth and multiplication of living organisms. There is perhaps no library, which has not suffered the ravages of these agents of bio-deterioration including Kenneth Dike Library, University of Ibadan. These biological agents can be subdivided into :-

- Micro-organisms- Fungus or moulds, bacteria etc.
- Insects
- Rodents

Micro- organisms

A. Fungus- Fungus is a large heterogeneous group of plant organisms. The fungal spores are present in the earth, water and air and remain in a dormant state for long periods. These spores sprout and grow when they have the required moisture and heat. Generally fungi grow in a relative humidity range of 63-100% and temperature range of 15-35°C. In libraries fungal growth is known as mould or mildew and they appear as brown/black vegetative growth on paper, leather and textiles (Sahoo, 2000). Fungus consume cellulose and also thrive on nutrients in leather, glues, pastes, binding threads etc. they weaken and stain the paper and can cause discoloration.

B. Bacteria- Besides fungus, bacteria also decompose cellulose in paper and binding textiles. **(ii) Insects:** Even though there are thousands of insects, only certain insects badly damage the archive/library materials (Sahoo, 2000). They are silverfish, cockroaches, booklice, bookworms and termites.

A. Silverfish – The main source of these insects are food materials like starch, glue and gelatin which are used in paper as sizing materials. Dust and dirt also attract these insects. They're fond of dark places and are active in nights only. Silverfish do not have wings and are silvery or pearl gray in colour and about 8 to 10 mm. in length. They eat the surface of the paper and also eat gum from postage stamps, envelopes etc. They grow holes in paper, prints, photographs, catalogue cards and cardboard boxes. The dark spaces on the library racks, catalogue cabinets, and drawers are the places for their egg laying (Sahoo, 2000).

B. Cockroaches – cockroaches are common all over the world which are brown or blackish brown in colour. They eat paper leaves, bookbinding, fabrics and other organic materials (Jeyraj, 1995). They are frequently found in libraries, archives and museums and are very active during the night. They live in corners which are damp, cleavages in walls and floors, behind and beneath shelves and in wooden cupboards. They excrete a dark brown liquid, which leave stains on the paper and become difficult to remove.

C. Book worms or Book beetles- Bookworms affect very much books and manuscripts. As the name itself suggests they feed on paper and damage the paper extensively. In libraries the bookworms lay their eggs on the edges of the books and on the surface of the bookbinding. They make tunnels in the pages and boards of the books.

D. Book lice: - Dark dusty areas filled with unused books, dampness and warmth are essential requirements for the growth of booklice. They are gray or white in colour. They injure the bindings of books by eating paste and glue and also eat the fungus formed in between the edges of inner cover of the books.

E. Termites or White Ants – In the tropical climate the damages to the library materials due to termites are much. Wet or damp conditions are most suitable places for termites. They eat wood and paper and can attack any type of material containing cellulose. If once they start destroying the books they can do irreparable damage in no time. They leave mud encrustation on the attacked materials (Jeyraj, 1995). They are of two categories like earth dwelling termites and wood dwelling termites. Earth dwelling termites live in the soil and in the libraries their presence can be noticed by their mud tunnels on the walls, book cases and furniture. Wood dwelling termites live above the ground and enter the building through cracks and openings.

Rodents

Rodents include mice, rats, squirrels and many other species. Mice and rats are mainly found in libraries and they find their way into buildings through dry drains and openings in doors and windows. In libraries they eat and destroy materials made up of paper, cloth, leather, glue, etc (Sahoo, 2000). These animals are very swift to move and hide in dark corners.

It is generally agreed and accepted that the major mandate or task of any library is to support, promote and facilitate the achievement of the mission, vision, goals and objectives of its parent body and the target community or society to be served. This done especially through the provision of needed and relevant information resources, services, customer – friendly environment, state-of-the art systems and facilities and competent personnel. Thus, the vision, mission and values of a library must align with that of the body establishing it.

The proliferation of information in different formats and the attendant complexity in retrieval processes have promoted and sustained the need for society to share resources, work, ideas and information. This provides the rationale for library and information practice. The belief in the need for human beings to share information and ideas implies the recognition of information rights as expressed in the United Nations Universal Declaration of Human Rights (1948), Article 19 which sets out the right to freedom of opinion, expression and access to information for all and the right to seek, receive and impart information and ideas in any media, regardless of frontiers (IFLA, 2011).

Pests, other biological threats to document collections, Good Housekeeping Programs (GHP) and Integrated Pest Management (IPM)

Insects, rodents, mould, even stray animals such as birds and cats can cause considerable harm to collections. Some insects feed on the types of materials found in libraries and archives; while other pests will cause damage simply through the effects of their life cycle on collections, for example, in shredding paper to make nests.

Increasingly, libraries and archives have realised that relying solely on toxic poisons and fumigants is increasingly undesirable and ineffective. Increasingly, the approach taken to manage pest activity is to use an Integrated Pest Management (IPM) approach. IPM programs are designed to prevent pests getting into storage areas and establishing themselves there Minicka (2012). IPM strategies include monitoring for the presence of pests, as well as taking measures to ensure that the book and storage environment is as unwelcoming to insects and pests as possible. Another IPM-related strategy is a sound building maintenance program, as a sound building fabric is the first line of defence against pests and other threats to heritage collections.

Insects and pests prefer quiet, dark, moist environments that also have food sources close at hand. Good Housekeeping Programs (GHP) according to Minicka (2012), are used to prevent these conditions from arising by keeping storage areas clean, tidy, and to eliminate potential sources of food and comfort for insects and pests. Good Housekeeping is a systematic program to keep storage areas as clean and sterile as possible and forms an important, low toxicity approach to helping to eliminate pests from the storage environment.

Importance of Preservation and Conservation

The processes of preservation, conservation and restoration are applied to safeguard the library materials from further decay and deterioration. Preservation is the process in which all actions are taken to check and retard deterioration where as conservation includes proper diagnosis of the decayed material, timely curative treatment and appropriate prevention from further decay. More over there are two aspects of preservation of library materials:

The preventive measures which include all forms of indirect actions aimed at increasing the life expectancy of undamaged or damaged elements of cultural property. It comprises all the methods of good house-keeping, caretaking, dusting, periodical supervision and prevention of any possibility of damage by physical, chemical, biological and other factors. (ii) **The Curative measures** which consist of all forms of direct actions aimed at increasing the life expectancy of undamaged or damaged elements of cultural property. It includes repairing, mending, fumigation, de acidification, lamination, and other jobs which are required considering the physical condition of the individual document. Handerson (2007) opined that preventive conservation plays a vital role and has assumed much importance in our country because a large number of institutions do not have proper conservation facilities. In fact if diagnosis in time is followed by proper preventive measures many problems can be solved. Here in this paper in accordance with the principles of preventive conservation some measures have been suggested to control the library materials from the effect of various deteriorating factors.

Research Method

The study employed a descriptive survey method using the *expost-facto* design. The population for this study consists of all categories of staff of Kenneth Dike Library, University of Ibadan.

The instrument used for data collection was a self developed structured questionnaire tagged “Questionnaire on Pest Control in Academic Libraries (QPCAL)”. The questionnaire consists of two sections namely sections A and B. Section A contains demographic information of the respondents while section B contains items aimed at eliciting information on the effects of pest and its control mechanism in KDL. The population of KDL staff is 95. A sample size of 70 respondents was drawn from the population. This was derived by taking 74% of the entire population. All the copies of the questionnaire were retrieved thus ensuring 100 percent response rate. The data collected were analysed using descriptive statistics (i.e. mean, ranking and standard deviation).

Table 1: Study Population

Staff category	Number	Number of sample
Academic	26	20
Senior non academic	40	30
Junior non academic	29	20
Total	95	70

Data Analysis and Discussion of Findings

Research Question One: what is the perception of library staff about the problem of pest in academic library? Respondents were asked about their perception on the incidence of pest in the library. The responses are summarized in table 2 below.

Table 2: Perception of Library staff on Pest

S/N	ITEMS	MEAN X	STD	MEAN CLUSTER	RANK
A	Pest is a form of library security	3.53	20.72	13.96	2 nd
B	Pest is a major problem in the library	3.55	20.94		1 st
C	Incidence of pest in the library is negligible	3.41	18.60		4 th
D	Pest destroys library materials	3.48	19.60		3 rd

In table 2, the respondents were asked to indicate their perception about library pests and the way they see it and findings reveal that item “b” with the mean score of 3.55 and standard deviation of 20.94 ranked highest. This therefore indicates majority of the respondents feel that pest is a major problem in academic libraries. This means that pest is encountered by library on

regular basis and it is seen as a problem to be addressed. Item “b” by means of rating ranked first (1st) as the item perceived highest by the respondents concerning pest.

Item “a” with the mean score of 3.53 and standard deviation of 20.72 shows clearly pest is a form of library security. Item “a” therefore ranked second (2nd) in the perception of pest incidents in the library. Item “d” has the mean score of 3.48 and standard deviation of 19.60 which indicates that pest destroys library materials and if not checked or controlled is likely to cause major disasters to library collections. This item is ranked third (3rd) as the perception rating of the respondents. Lastly item “C” with the mean score 3.41 and standard deviation of 18.60 indicates that incidence of pest is negligible in the library. Item “C” therefore by means of rating is the least item perceived by the respondents about pest. From the rankings, it could be summarized that pest is perceived by library staff as a major concern which should be given adequate attention

Research Question Two: What type of pests is prevalent in the library?

Respondents were asked to indicate how often they encounter any of the pests and their effects on books and other library materials. The response is as shown in table 3

Table 3: Types of Pest Prevalent in the Library

S/N	ITEMS	MEAN X	STD	MEAN CLUSTER	RANK
A	Rodents	4.21	27.85		1 st
B	Fungi	3.67	22.15	15.25	4 th
C	Worms	3.68	22.15		3 rd
D	Insects (termites, cockroaches, booklice etc.)	3.96	22.25		2 nd

In table 3, the respondents were asked to indicate the prevalence rate of each type of pests in the library. From the answers given by the respondents, it shows that the most common pest that is most noticeable in the library is rodents. Item “a” therefore ranks first as one of the most common types of pest that destroys library materials because it has the highest mean score of 4.21 and standard deviation 27.85.

Item “d” with the mean score of 3.69 and standard deviation of 22.25 reveals that insects are the second highest in terms of ranking. That is item “d” ranks second meaning that insect pest is one of the greatest pests that pose threats to library collections.

In the above table, item “C” reveals that the respondents’ answers indicate that worms ranked 3rd. Item “C” has the mean score of 3.68 and standard deviation of 22.15 thus ranking third as one of the common types of pests found in the library. Item “b” which is fungi ranked 4th meaning that fungi pest is not as pronounced as the other types of library pests. This might not be unconnected with the fact that fungi are micro organisms which cannot be seen with naked eyes but their effects could only be noticed.

Research Question Three: What are the causes of pest intrusion of library?
 The respondents were asked to indicate the possible causes of library pest. The response is as shown in table 4.

Table 4: Causes of Pest in the Library

S/N	ITEM	MEAN X	STD	MEAN CLUSTER	RANK
A	Food items brought to the library by users	4.26	29.26	19.28	1 st
B	Food items brought in by staff members	4.11	26.9		2 nd
C	Dust	3.49	19.05		5 th
D	Non frequent fumigation	3.80	22.83		3 rd
E	Inadequate weeding of affected materials	3.62	21.42		4 th

Table 2 shows the answers of respondents to research question 3. In the above, item “a” with a mean of 4.26 and standard deviation of 29.26 show that food items brought in by users is the strongest cause of pest in the library. By means of rating, item “a” ranks first (1st) as the greatest cause of pest in the library. From the above analysis, it implies that for pest to be adequately controlled, users must be prevented from bringing food items into the library.

Item “b” with the mean score of 4.11 and standard deviation of 26.93 indicates item “b” is the second strongest cause of library pest. According to the data collected and analyzed, it reveals that some staff members do bring in food items into the library which invite rodents and cockroaches and this is attributed to lack of supervision from superior officers.

Item “d’ has a mean score of 3.80 and standard deviation of 22.83 which indicates that non frequent fumigation of library is another cause of pest manifestation in the library. This is closely followed in rank by item E which is rated 4th among the causes of pest in the library. Item “c’ on the other hand is the least cause of pest in the library. Item “C” has a mean score of 3.49 and standard deviation of 19.05 which implies that although dust is a cause of pest but it is not so pronounced.

Research Question four: In what ways can pest be controlled in academic libraries? Respondents were asked to indicate the control mechanism adopted to prevent and reduce pests in the library and how effective this has been in reducing pest incidence in the library. The response is summarized in table 5.

Table 5: Ways of Controlling Pests

S/N	ITEMS	MEAN X	STD	MEAN CLUSTER	RANK
A	Weeding of affected materials	3.73	21.91		3 rd
B	User education	3.83	23.45		2 nd
C	Periodic fumigation	4.24	27.49		1 st
D	Regular cleaning of books on the shelf	3.46	19.53	15.28	4 th

The research question 4 seeks to know the ways of controlling pest in the library. The research findings show that item “C” with a mean score of 4.24 and standard deviation of 27.49 indicates that regular and periodic fumigation is the highest and most effective way of controlling pests in the library. Item “C” ranks first as the greatest way of controlling pest. Item “B” with the mean score of 3.83 and standard deviation of 23.45 shows that user education on “dos” and “don’ts” of library are another effective way of controlling pest. This is because if users are quite aware of the implication of bringing food items into the library and the effects on books and other library materials, they will abide by the library regulation. Item “A” with a mean of 3.73 and standard deviation of 21.91 shows that weeding of affected materials will help to reduce the rate of pest incidence in the library. Item “D’ with the mean score of 3.46 and standard deviation of 19.53 indicates that regular cleaning of books in the shelf is another way of pest prevention in the library as it ranked 4th.

Conclusion and Recommendations

The findings of these study have revealed that pests most especially rodents are posing serious threats to print materials in academic libraries and that little efforts are made at curbing their menace. The need to take regular preventive measures in tackling the incidences of pests and their destructive tendencies cannot be overemphasized. It is therefore hoped that the findings of this study will be given adequate consideration by academic libraries in general and Kenneth Dike library in particular.

Since stagnant air, dampness, dark and dingy places in a library facilitate the growth of biological pests, good housekeeping and maintenance of optimum storage condition is necessary to control the propagation of the insects. Provision of cross windows, ventilators, and exhaust fans ensures good circulation of air but at times it is necessary to circulate the air inside the room with electric fans. It is preferable to avoid contact of book racks with walls (at least

15 cm away from the walls) to eliminate dampness. Attending to cracks, crevices and loose joints in floors and walls eliminate the possibility of insect hiding in these places. Presence of edibles inside the library should not be allowed. Regular and periodic fumigation of the library as well as use of insecticidal powder or solution like lindane at the dark corner walls, beneath the racks and almirahs is a good precautionary measure to prevent insects. It is safe to use paradichloro-benzene as it acts both as an insect repellent and insecticide.

A simple practice is to keep naphthalene bricks on the shelves as it repels the insects from coming to the book racks. Dry neem leaves, neem seed powder and camphor tablets tied in muslin bags should be kept inside the racks for keeping the pests away.

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