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ENVIRONMENTAL ADULT EDUCATION FOR PREVENTING LASSA FEVER OUTBREAK IN NIGERIA

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ABSTRACT: *The incidence of Lassa fever outbreak in Nigeria, is worrisome and this is attributed to indiscriminate waste disposal habit of people. Waste not properly dispose attracts rodents, which are the primary carrier of Lassa virus that causes Lassa fever. In other to make our environment free form Lassa fever spread, waste disposal habit of people needs to be taken care of. This paper thus examined how environmental adult education programmes such as hygiene and waste disposal education which are components of health education can be utilized to inculcate proper waste disposal habit among city residents in Nigeria. Through this paper, the authors established that for creating a Lassa free environment through hygiene and waste disposal education, the design of the hygiene and waste disposal education programme should be based on four strategies which will convey information, build understanding, improve skills, and enable sustainable actions*

KEYWORDS: Lassa Fever, Lassa Virus, Waste, Waste Disposal, Environmental Education, Environmental Adult Education, Hygiene Education, Waste Disposal Education.

INTRODUCTION

Lassa fever spread in contemporary times has been of concern to medical practitioners political leaders, health workers and the populace at large. The vector carrying organism of Lassa fever is usually rodents. Rodents are found around the home environments where there are heaps of wastes (especially, domestic wastes). Indiscriminate dumping of waste around our home serve as feeding and breeding grounds for rodents and sometimes snakes. Allowing wastes to be littered around in the kitchen and surroundings, also attracts rodents. When rodents' breeds are on the increase around the homes due to poor waste disposal habit, the possibility of rodents introducing different health issues to the inhabitants of such environment is feasible. This happens because the quality of the environment in which one lives is strongly linked with the quality of his/her well-being. For instance, poor hygiene, poor waste disposal habit, poor sanitary measures influence the healthiness of people.

In support of this, Karija, Shibua and Lukaw (2013) assert that "among environmental determinants of health, poor hygiene and poor housing are the pressing problems of the urban cities". Urban dwellers in some cities in Nigeria are not left out. Most of the streets walk ways have been converted to domestic waste dump sites by the inhabitants of the area on a daily basis. The culture of proper waste disposal among the urban dwellers is far from expectations, even when government and agencies that are responsible for disposal and management of waste made provisions for waste disposal points, the residents do not adhere to rules and regulations because they are used to the habit of dumping their wastes indiscriminating.

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Improper waste disposal habits start from homes, most urban dwellers in Nigerian cities dispose their domestic wastes indiscriminately around their living homes, some baggage their wastes and allow them to stay for days before disposing them off. When wastes that are meant to be disposed of immediately after generating them are left undisposed, the tendency for it to get rotten and smell is possible. Rodents are thereby welcomed to feast on the wastes and to leave around our home environment. When rodents are living around the home environment, they not only feast on wastes, but on anything they can easily bite and chew including our foodstuffs. They also defecate on raw foodstuff and in the process transmit causative organism of Lassa fever to human beings who consume the virus infected food. According to United Nations Human Settlement Programme (UN-HABBIT, 2003), improper waste disposal results in breeding places for vectors of diseases, while poor levels of housing offer easy access to rodents, which is more common in urban areas. They further emphasize that this results in significant spread of communicable diseases or new syndromes, thus adding to the local disease burden. However, for safety of human lives in the environment, a rethink on how to properly dispose wastes generated in homes and our surrounding generally is inevitable. People need to be educated on proper waste disposal habit and also on how to manage wastes for the prevention of epidemic disease such as Lassa fever, as well as for safe and healthy environment. It is based on this background, that this paper tends to examine how health education as an environmental adult education programme can be utilized to inculcate proper waste disposal habit for the prevention of Lassa fever epidemic outbreak in Nigeria.

Lassa Fever

This disease got its name from where it was first discovered in Northern part of Nigeria, precisely, Lassa town in Borno State where two missionary nurses died of the illness. Since then, the disease has spread to neighbouring African countries such as Southern Mali, Ghana, Cote d'Ivoire and Burkina Faso, Benin and Togo where scores of deaths had been recorded. (Disabled World, 2015). This disease is an acute viral hemorrhagic disease caused by Lassa virus. The virus is a member of arenaviride virus family and is a single-stranded RNA virus. It is an animal-borne disease (zoonotic) spread by wild multimammate rats (Mastomys species), which shed the virus in their urine and droppings. It is worthy of note that infected rodents shed this virus throughout their life. They carry the virus in their urine and feaces and live in homes and areas where food is stored. Lassa is endemic in West Africa and Nigeria in particular. According to Ogundipe (2016), during 2012 and 2013 outbreaks, more than 2,900 cases were reported in widespread outbreaks that occurred across many states. Reports of the outbreak of Lassa fever in at least 10 states including the FCT leaving 43 dead and at least 100 hospitalized, necessitated the need for public enlightenment and appropriate information to protect lives. When someone is infected with Lassa, the signs and symptoms do not show immediately, but, manifests between one to three weeks (twenty-one days). Within this period, the infected person will start having the signs of weakness, headache, slight fever, and general respiratory malaise. If these signs and symptoms are not immediately attended to, it will metamorphose into hemorrhaging of the person's eyes, gums or nose, repeated vomiting, respiratory distress, pain in the back, chest and abdomen, facial swelling and shock. (Iacono et. al*)*. They further explained that neurological issues have also been described in relation to Lassa fever, to include tremors, hearing loss and encephalitis. An infected person may die within two weeks of their initial symptoms because of multi-organ failure. They went further to assert that the most common complication of Lassa fever is deafness. Different degrees of deafness happen in about one-third of the infected people. In many cases, the hearing loss is

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permanent. Pregnant women are the worst victims of this disease because of its ability to facilitate increase in death rate of pregnant women in the third trimester of pregnancy.

Causes of Lassa Fever

The primary source of Lassa fever is poor hygiene and improper waste disposal and management. When wastes are indiscriminately disposed around our living environment, it attracts rodents and reptiles. Rodents which are the primary causative transmitter of Lassa virus through their droppings, inject the virus into food that human beings consume. When humans consume the infected food, the virus stay and multiply in the body of the carrier. This carrier turns out to be a secondary transmitter of the disease. Contact with a carrier of Lassa fever virus, in most cases, leads to spread of the disease.

Human beings are secondary transmitters of Lassa fever. The spread of Lassa fever is usually more with human to human transmission because one infected patient if not early detected and quarantined may end up infecting scores of persons. Ogundipe (2013) explained that Lassa disease can be contacted by ingestion of foods and drinks contaminated by the saliva, and faeces of infected rats. Others include catching and preparing infected rats as food, inhaling particulate matter in the air contaminated with infected rat urine or droppings, and direct contact with a sick person's blood or body fluids, through mucous membranes, like eyes, nose, or mouth. Persons at risk most include health workers, families and friends of an infected person in the course of feeding, holding and caring for them.

Prevention of Lassa fever

In other to prevent the prevalence of Lassa fever, we need to take cursory look at method of disposal of household (wastes) because rodents feed on wastes. Waste is simply an unwanted thing generated by humans through domestic, industrial, market activities, and so on. Wastes are things, materials and products that have been rejected by their holders in their current state meant to be disposed off as refuse and rubbish in the environment. This waste can either be in the form of liquid, solid, or gaseous in nature. Okorie (2015) contends that the way and manner people handle wastes has in one way or the other contributed to environmental problems. Lassa epidemic emanates from improper domestic waste disposal by human which keeps the environment dirty, making it attractive to the causative vectors. this affects the safety and life of human in the environment. Leton and Omotosho (2004), Babayemi and Dauda, (2009) Mbalisi and Offor (2012) definition and categorization of solid waste as non-liquid and non-gaseous products of human activities regarded as being useless, which include garbage, sludge and refuse, gives a clearer understanding of what constitutes domestic waste.

Domestic wastes can further be broken into groceries, spoiled food items, garbage, papers, cartons, rage plastic and polythene, tins and metals, bottles, glasses, ashes, dusts, and other miscellaneous articles or materials. These categories of wastes are generated and discarded daily around home environment thereby creating room for multiplicity of rodents. In other to prevent the multiplicity of rodents around our home, humans need to be properly educated on the danger they pose to their life through indiscriminate waste disposal and how they can keep their environment clean and properly dispose waste for Lassa free environment through environmental adult education programmes.

Due to outbreak of Lassa fever in Nigeria in 2012, government through her ministry of health, medical professionals and some non-governmental bodies gave out warnings to the

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publics on how to avoid Lassa virus. One of such was issued by Lagos State Government to the general public through her Directorate of Disease Control under the Ministry of Health in 2012. Some of the information contained in the warning as a way of preventing the spread of Lassa fever in Lagos communities include the following:

1. Avoid contact between rats and human beings.
2. Observe good personal hygiene including hand washing with soap and running water regularly
3. Dispose of your waste properly and clean the environment so that rats are not attracted
4. Store foods in rat proof containers and cook all foods thoroughly before eating.
5. Discourage rodents from entering the house by blocking all possible entry points
6. Kill all rats within your home, office and surroundings using rodenticides
7. Ensure food is properly covered, either cooked or uncooked
8. Food manufacturers and handlers should not spread food where rats can have access to it.
9. Report any cases of above symptoms or persistent high fever not responding to standard treatment for malaria and typhoid fever to the nearest health centre.

All fluids from an infected person are extremely dangerous. Health workers are also advised to be at alert, wear personal protective equipment, observe universal basic precautions, nurse suspected cases in isolation and report same to the LGA or Ministry of Health immediately. However, proper waste disposal among city residents in Nigeria requires active sensitization of the people through environmental adult education awareness raising strategy on the relationship that exists between Lassa fever spread and indiscriminate littering and dumping of waste. Once they understand this, it is then possible to bring about change in their perception toward waste disposal.

Environmental Adult Education

Environmental education according to UNESCO (1978) "is any educational programme that enhances critical thinking, problem solving, and effective decision-making skills". In a more elaborate way, UNESCO (1997), again defines Environmental Education (EE) as "a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivation, commitment, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones."Based on this definition, Ifoni in okorie (2015) points out that environmental adult education is "an educational programme that will increase adult learners' knowledge about the environment, develop in the adult the necessary skills and also change their behaviour towards the environment". This is in support of NEEAC's (1996) explanation that environmental education is concerned with knowledge, values, and attitudes, and has as its aim responsible environmental behaviour. For an environment associated issue such as lassa fever, environmental adult education, will raise the awareness of risks associated with Lassa fever, inculcate proper waste disposal habit among the adults,

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and equip them with necessary skills required to manage wastes generated in their homes and surroundings at large.

Eheazu (2016) defines environmental adult education as a learning process that increases knowledge of adults and their awareness about the environment and its associated challenges, develops necessary skills and expertise to address the challenges as well as foster the right attitude, motivation and commitment for adults to make informal decisions, accept responsibility for their environmental problems and take responsible action.

From these definitions, Lassa fever which is an aftermath of humanity's attitude towards disposing of wastes indiscriminately can be prevented through environmental adult education programmes such as hygiene and waste disposal education. This conform to goal two and three of world's first intergovernmental conference on environmental education declaration, called Tbilisi Declaration of 1997, which emphasizes the provision of opportunities for every person to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; and to create new patterns of behaviour of individuals, groups, and society as a whole towards the environment.

Hygiene Education Programme

Hygiene is the practice of keeping yourself and your surroundings clean, especially in order to prevent illness or the spread of diseases (English Cobuild Collins Dictionary, 2003). Hygiene education is defined as education on diseases and behavioural practices that can affect the health and well-being of people. Hygiene education is defined as education that relates to all activities that aim to increase an individual's knowledge about issues relating to personal habits and practices, particularly in relation to sanitation, that affect one's health (Naidoo, Chidley & McNamara, 2008). Hygiene education for adults is an adult heath education programme that is aimed at helping adult members of a society to become aware of the links between poor hygiene behaviour and its associated diseases. This type of educational programme will bring about behavioural changes for improved healthy ways of living among the beneficiaries. Hygiene education in this ramification will be concerned with teaching people about how Lassa fever spreads through unhygienic ways of handling waste in our home. According to World Bank Group in UN (2008), hygiene education is the process that helps people learn about the things and practices that prevent sickness and promote good health. It enables people to understand their situation, empowers them to plan and act to prevent diseases. Improper disposal of wastes is unhygienic and leads to rodent infestation of our surroundings. Rodents in the course of looking for what to feed on deposit Lassa virus through their droppings directly on foods that human beings consume and as a result, spread Lassa fever. For Lassa free environment, there is need for educating the adults on how to keep their surroundingss clean through hygiene education. Hygiene education for adults with focus on waste management in our home and surrounding will:

1. encourage and help improve beneficiariesbehaviour towards proper waste disposal habits

2. provide information and understanding of behavioural changes on their attitudes towards sanitation of home environment

3. provides information on the link between poor hygiene and disease such as lassa fever

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4. encourage and help beneficiaries to improve on those behaviours which if changed will lead to reduction in spread of lassa fever

5. help teach beneficiaries proper ways of handling wastes in their homes and surroundings

6. provides beneficiaries with a basic knowledge and understanding of lassa fever and the inter-relationship between rodents and improper waste disposal

7. promote awareness of lassa fever prevention measures in beneficiaries by keeping their environment clean

8. encourage beneficiaries to value aesthetic nature of the environment and consider it important and tries to inspire participation in the process of improving and protecting it.

Waste Management Education Programme

Waste disposal habit in rural communities and urban cities in Nigeria is not encouraging. Wastes are indiscriminately disposed by people not minding the aesthetic value of the environment. Cities in Nigeria, are the worst-hit of waste littering habit of her inhabitants. In Nigeria, wastes are usually indiscriminately disposed and displayed along major road medians and walk ways. People prefer dumping waste on walk ways created for pedestrians on high ways and street roads than carrying their wastes to designated dumping sites. The home environment is not left out, many surroundings in urban cities in Nigeria, today are better described as dirty cities due to indiscriminate waste disposal habit of the residents. People dispose wastes without minding the effects of such actions on their lives.

Wastes are a major source of illness and diseases because through wastes, many disease-causing organisms are bred unknowingly to the people who dump these wastes, of which one is Lassa fever rat species (vector). Lassa fever is caused by Lassa virus which is gotten from rodents. Littering of wastes around home environment attracts rodents. However, in order to improve waste disposal habit of residents of such homes, they need educational programmes that:

1. will create the awareness of dangers associated with improper waste disposal habit.

2. will equip them with knowledge and understanding of proper waste disposal habit,

3. induce attitudinal change on how to maintain the aesthetic value of the environment for a free Lassa environment

4. equip them with necessary skills to participate in making their environment Lassa free.

Waste management education is best suited to perform such functions as listed above. Waste management education is a learning process through which the participants acquire knowledge and skills of waste management strategies required for proper handling of wastes at home, workplace, school, market and other public places. Such waste management strategies according to Earth Day Network (2018) include:

1. source reduction;

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2. refusal to accumulate unwanted materials;
3. reuse of materials that would have turned into wastes
4. recycling of waste materials; and
5. removal of accumulated waste materials.

Rodents-carrying lassa fever are usually attracted to homes by solid wastes materials especially, food scraps (leftovers). Getting food leftovers off homes would amount to keeping rodents (including lassa fever vectors) away from homes. The recipients of waste management education who have acquired knowledge and skills of waste management strategies will be well equipped to engage in practices targeted at solving solid waste management problems associated with lassa fever outbreak. Such practices include the following:

1. reduction in the quantity of food cooked at home to avoid leftovers;
2. refusal to allow unwanted food items at to accumulate around the home. Such unwanted food items may include spoilt cereals, tubers, vegetables, fish, meat, etc that may in any way attract rodents to homes;
3. composting spoilt food items in a well-enclosed site for use as manure for farming in subsequent farming season; and
4. complete removal of unwanted food items from around homes.

With these practices which keep rodents away from homes and what people eat, lassa fever virus will be kept far from human system, hence outbreak of lassa fever in human society will be prevented. This feat will be achieved due to change in the behavior of people which is demonstrated through practices they engage in to keep rodents away from homes. This change in behavior unarguably results from the waste management education they received.

Development of Environmental Adult Education Programmes for Lassa Free Environment

Environmental adult education programme for Lassa free environment is an integrated sequence of planned educational experiences and materials which is aimed at the prevention and control of Lassa fever. Based on this aim, the objectives will be to:

1. create awareness on Lassa fever through hygiene education;
2. educate people on how to properly dispose their wastes at home and market places;
3. educate people on how to avoid been infected with Lassa virus and
4. providing necessary skills for the prevention of Lassa fever

Any adult environmental education programme designed for the purpose of Lassa free environment with adult as the recipients need to be packaged in a way that the target audience will be motivated and information and ideas should be presented in a manner that it will be relevant to the learners. Adult learners are motivated when the learning process involves practical experiences and as a result, becomes problem-based. Lassa free environment

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programme will make meaning to adult learners when the experiences of adult learners are integrated during the implementation stage of the programme.

Methods of dissemination of information of programme content should be based on non-formal in approach, because adult learners have wealth of experiences and they go into the programme for a specific purpose. Therefore, the content of the programme should be instructionally sound to reflect that which the adults want to learn in order to improve the situation they find themselves that brought them to the programme. Furthermore, adults need to be actively involved in all stages of the programme development from the planning to evaluation stages.

Strategies for Designing Environmental Adult Education Programme for Lassa Free Environment

In designing any environmental adult education programme, the programme designer need to clearly identify the problem or opportunity, assess needs, and choose an intervention that addresses defined needs and that strategy which is most likely to lead to the desired result. Strategies in this context are the skillful ways in which the programme designer intends to reach the stated goals and objectives. Strategies for any environmental adult education programmes should therefore be based on certain framework if effectiveness is sought for. This framework will help environmental adult educators to determine appropriate goal and recognize strategies that are most effective for that goal, and evaluate why an intervention may or may not have been effective. For the purpose of this environmental issue, the programme designer can adopt the type of environmental strategy proposed by Monroe et. al (2007). The strategies are discussed below:

- Conveying information
- Building understanding
- Improving skills
- Enabling Sustainable Actions

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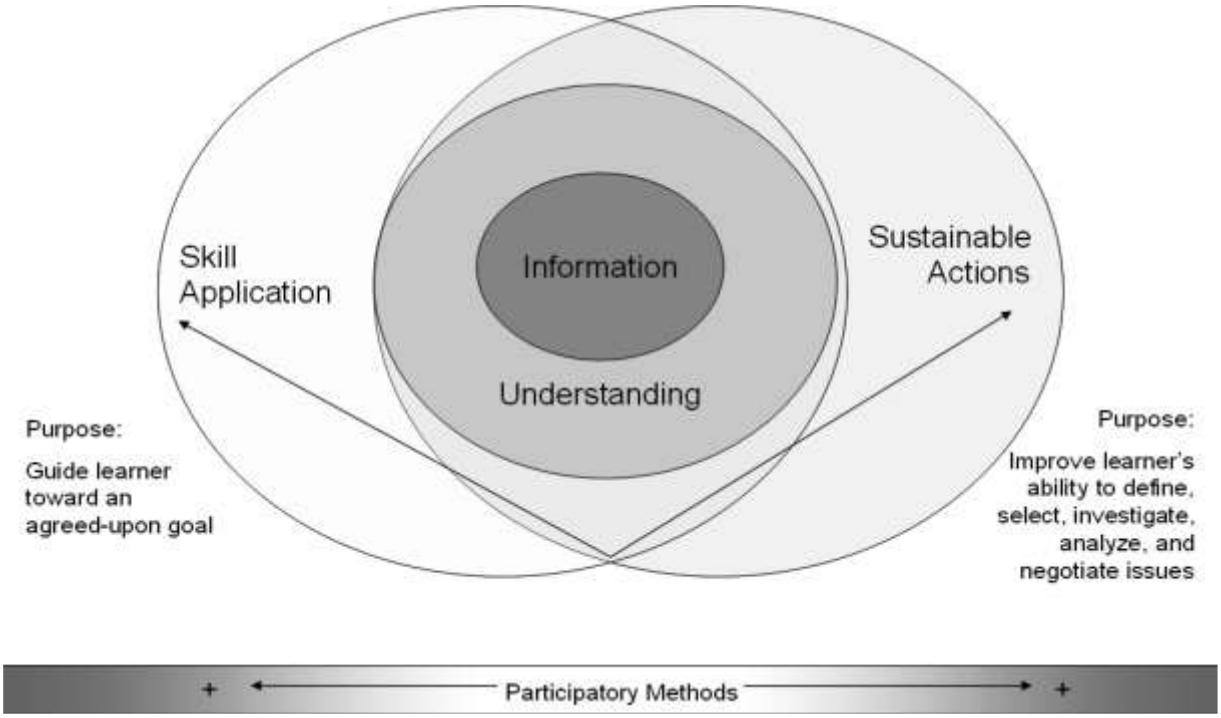
Fig 1: A Framework for Environmental Education Strategies adapted from Monroe et al. (2007)



Conveying Information

This refers to the factual, conceptual, or procedural knowledge. Providing details that people want or information to clarify particular issues and increase awareness essential to environmental education programmes (Jacobson, 1999). According to Monroe et. al., conveying information forms the core of many environmental education programmes. For environmental adult education programme focused on Lassa free environment, the target audience needs to be furnished with instructionally sound information that will promote Lassa fever awareness among the learners. They further explain that the nature of one-way information flow in this category often excludes participation, especially when the learners are not involved in selecting content or distribution mechanisms (and therefore it is a relatively small shape in Figure 1). It can be improved, however, with elements of the next strategy.

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Building Understanding

This strategy according to Monroe et. al (2007) is a two-way transmission of information that aims to engage audiences in developing their own mental models to understand a concept, values, or attitudes. Understanding involves multiple thinking skills such as remembering, recognizing, interpreting, summarizing, and explaining, (Anderson &Krathwohl, 2001). Educators of environmental adult education programme on Lassa free environment need to build in modalities that will help in developing mental exercise on content issue among target audience.

Improving Skills

According to Anderson & Krathwohl (2001), some education and communication programmes aim to do more than develop knowledge and understanding. They seek to build skills that enhance or change practice, performance, and behaviour. In this category, learners apply or implement a skill, or organize and critique information. However, the effectiveness of strategies in this category is enhanced by using instructional materials created through interactive communication between the learner and educator and by focusing efforts on issues that are more relevant to the learner.

Enabling Sustainable Actions

The purpose of educational strategies in this category is to transform the learner, the issue, the educator, and perhaps the organization through the process of critically addressing problems. These processes allow the educator and learner to work together to define both goals and/or methods of the intervention. More than activities that promote understanding or skill building, this strategy builds capacity for effective citizenship in a complex world. When communities and managers acknowledge the limitations of their facts and seek new information, they are redefining and transforming the issue and their understanding of it.

Based on fig 1 above, Monroe et al. developed a table for non- formal education framework across the environmental education framework as shown in table 1. The strategies outlined and discussed in this framework serve as a model for environmental adult education programme developer for developing lassa free environment programme for any adult audience.

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Table 1: Non- Formal Education Strategies across the Environmental Education Framework

S/N	CATEGORY	NON-FORMAL FREE CHOICE LEARNING STRATEGIES	NON-FORMAL FREE CHOICE LEARNING STRATEGIES
1	Conveying information	To disseminate information, raise awareness, to inform.	Information campaign, electronic media, Internet resource or website, poster, brochure, sign, Public Service Announcement, news article, exhibit
2	Building understanding	To exchange ideas and provide dialogue, to build a sense of place, to clarify and enhance the understanding of information and issues, and to generate concern.	Workshop, presentation with discussion, charette, interactive website, simulation, case study, survey, focus group, interview, peer to peer training, action research, issue investigation, environmental monitoring, guided tour, guided nature walk.
3	Improving skills	To build and practice Skills.	Coaching, mentoring, demonstrations, technical training, environmental monitoring; providing a chance to practice a specific skill or work on a task, persuasion and social marketing strategies that modify social norms, including: modeling, commitment, incentives, and prompts to encourage skills building and behaviour change,
4	Enable Sustainable Actions	To build transformative capacity for leadership, creative problem solving, monitoring	Adaptive collaborative management, actioner search, training for organizational effectiveness, facilitating partnerships and networks, joint fact finding, mediation, alternative dispute resolution, negotiated rulemaking, learning networks

Monroe et al. (2007)

CONCLUSION

In conclusion, in order to achieve the objective of Lassa free environment, adults who are responsible for generation of wastes and also littering of wastes around the home environment need to be properly educated on the implications of their action and the resultant effect to their wellbeing. Therefore, they need environmental adult education such as hygiene

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and waste management education that will expose the implications of poor hygiene and poor wastes handling to them including Lassa fever outbreak. For the programmes to achieve its specified objectives, it has to be designed in accordance with the four strategies (convey information, build understanding, improve skills, and enable sustainable actions) proposed by Monroe et al., (2007).

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