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## **The Role of Nutrition Gardens in the Healthcare of HIV/AIDS Infected and Affected Urban Households**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author CTG performed the principal investigator. Authors EM, NM and DM collaborating researchers. All authors read and approved the final manuscript.*

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### **ABSTRACT**

This study assessed the role played by low input nutrition gardens in improving the livelihoods of HIV/AIDS infected and affected people in the urban areas of Zimbabwe. Structured interviews were conducted mainly with infected and affected households in the city of Harare's high density suburbs. A stratified random sampling design was used to select respondents from the three suburban areas, with each suburban area acting as a stratum. Sixty six households were then randomly selected from a sampling frame of 182 using the lottery technique from three suburbs. Data was analyzed using descriptive statistics. Most of the households (39%) grew green leafy vegetables in their low input nutrition gardens. Herbs and bulbous vegetables were grown by 33% and field crops by 28% of the households. Low input nutrition gardens contributed diversification of vegetables and herbs which enhanced the health status of the HIV infected and affected households. According to the respondents, nutrition gardens offered affordable healthy food because they are environmentally sustainable. Low input nutrition gardens should therefore be integral to the livelihoods of HIV/AIDS infected and affected households in a context characterized by prohibitive costs of acquiring food and medication.

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## 1. INTRODUCTION

Sub-Saharan Africa is faced with unprecedented levels of HIV/AIDS in both rural and urban areas. At least 31% of the adult population in Zimbabwe was infected by the HIV virus by the end of 2003 [1]. This scenario coupled with entrenched poverty, where households live on less than 1US\$ per day, has created a complex situation that requires a multi-sectoral approach to reducing the impact of the disease. The plight of people living with HIV/AIDS in Zimbabwe has seen the emergence of various social safety nets to reduce the level of suffering caused by the HIV/AIDS epidemic. Low external input nutrition gardens (LING) or micro urban farming located in urban areas and community gardens located in rural areas, are emerging as some of the most critical community based food security nets to people living with HIV/AIDS. This development is linked to the volatile macro-economic environment that has characterized the economic situation for most developing nations and limited access to anti-retroviral drugs (ARVs). With an estimated 1.8 million people infected in Zimbabwe, 42000 people had access to the drugs in 2006, resulting in the use of alternatives that include nutrition gardens [2]. This is used as complementary strategy to reduce the impacts of AIDS.

Conceptually, a low input nutrition garden is a piece of land located around or near the home where crops that supplement and add variety and nutritional value to the diet are grown [3]. In addition to the food, these gardens are sources of non-food items including spices, herbs and medicinal plants. Nutrition gardens have been used extensively in regions afflicted by HIV/AIDS in Africa. In Mozambique, nutrition gardens were established by non-governmental organizations such as Vida Positiva under the auspices of the country's National Aids Council (NAC). Generally, the impact of this concept was positive on the livelihoods of the poor including orphans and vulnerable children (OVC).

This study focused on a community-based organization involved in the training and development of low input nutrition gardens among HIV/AIDS infected and affected households in Zimbabwe. The community-based organization is located in the high-density suburb of Harare, the capital city of Zimbabwe. The home was formed in 1996 by people living with HIV/AIDS (PLWHA).

Currently the organization caters for HIV positive people in 3 suburbs of Harare. This study established the role that nutritional gardens play in the healthcare of the infected and affected people. In addition, the study ascertains the factors that ensure sustainability through identification of problems and potential opportunities created in this regard.

### 1.1 Social and Health Relevance of Nutrition Gardens

#### 1.1.1 Socio-economic impact of HIV/AIDS in Zimbabwe

Zimbabwe has the third highest incidence of HIV/AIDS in the sub Saharan region after Botswana and Swaziland [4]. As such a number of studies have attempted to assess the impact of the pandemic on the society using social and economic costs that are both quantifiable and non-quantifiable. Using a sampling methodology [5], it was shown that at least 1 in 70 households surveyed in Zimbabwe were child headed. Furthermore, related studies revealed that orphans suffer loss in many areas of the family that lead to the

following: depression, malnutrition, homelessness, starvation and crime [6]. The severity of the HIV/AIDS problem in Zimbabwe is overshadowing every other problem in the country and is also contributing to the humanitarian crisis [7]. In Zimbabwe, HIV/AIDS has affected all socio economic groups [8]. Its spread among the professional elite has resulted in severe disruption in administrative and economic activities. At the same time as the virus spreads on, HIV is likely to advance to its terminal stage fastest among the most disadvantaged economic groups who have a poor nutritional status and little access to education and health and social services. In the same study, it was noted that there is over reliance on "n'angas" (traditional healers) of which there is evidence that many traditional healers serve to further impoverish the families of AIDS patients by offering expensive and unproven 'treatment' regimes. Many families do not have adequate food supplies to last the whole year. Most shortages occur from just before the beginning of the rainy season (September/October) to the end of growing season (February/March) [9]. The groups most affected by low weight for age (WFA) malnutrition are households on large-scale commercial farms, followed by families in resettlement schemes, households in semi-arid communal areas and low-income urban households. Inadequate access to food has often been cited as the main underlying cause of malnutrition. Social costs due to the pandemic were estimated at the household level, and these included remittances and other social support systems and lack of access to education of the orphans. Household expenditures for health care, food, clothes that are meant for the infected individual may reduce income available for other members hence compromising access to basic needs [10]. Other social costs that are encountered by orphans include lack of love, affection, security, cultural values and integration into the society. The impact of orphan-hood was found to affect changes in care giver and family composition, new responsibilities, education, loss of home and assets, health and nutrition, psycho-social impact among other factors [11]. The effect of HIV on the productivity of workers both skilled and unskilled in the agricultural sector was assessed in 1996. The study revealed that productivity was likely to be reduced by half if the high levels of infection were maintained [12]. This was particularly in light of the fact that most people who spent many hours in the fields were women and were infected. The situation was further exacerbated by the fact that women did not have access to factors of production such as land, training, credit and new technological innovations [13,14] noted that it is difficult to forecast and quantify the overall impact of HIV/AIDS on the economy. However, this study established that sickness and mortality has had a significant effect on the quality and quantity of labour. Whilst the economic adjustment program in the early 1990s sought to improve economic progress, the HIV/AIDS pandemic was hindering any meaningful development particularly the maintenance of socio-economic achievements that had been accumulated in the 1980s [15].

Income levels of orphaned and non-orphaned households in developing countries were compared and findings indicated that they were 20-30% lower for orphaned households [11]. It was further noted that the reduction in incomes is largely due to greater household expenditure in orphaned households. In addition, the research found out that food consumption in such households had been reduced by 41%. Households were characteristically noted to sell assets to finance funerals and this further placed them far below the poverty datum line. In general, the incidence of HIV/AIDS impacts negatively on social capital formation and further straining the national discus. Reduced household and government savings lead to little investment, less productive employment, low incomes and slower rate of GNP growth [16].

### **1.1.2 The use of nutrition gardens program among the urban poor**

Organizations involved with urban nutrition gardens focuses on issues related to HIV/AIDS and amongst them are food relief programme and Home Based Care. The organisations found it necessary to introduce permaculture to the HIV/AIDS affected households in the form of Low Inputs nutrition Gardens (LING). The LING complemented the Food Relief Programme (FRP). LING were identified as a means of buttressing food, medicinal and nutritional requirements of the people infected and affected by HIV/AIDS in Harare and thus reduce malnutrition among PLWHA.

The idea behind LING was to grow healthy, nutritious food using the locally available resources at the same time without damaging the environmental resources on which we depend on. LING were seen as an answer to the increasing gap noted between the rural and urban poor in terms of access to nutrition. Rural people in Zimbabwe used to eat rich and varied diets with over 180 traditional food plants harvested from the wild or grown in the gardens and an average of 150g of fibre per day from fruits, vegetables pulses and unrefined grains. However, today urban Zimbabweans commonly eat less than ten food plants (maize, rape, covo, onions, tomatoes, cabbage, tsunga and seasonally sweet potatoes, pumpkin leaves). The urban Zimbabwean consumes less than 20g of fibre per day and use unhealthy amounts of fat, salt and sugar. The concept adopted by the organizations involved in nutrition gardens is typically characterized by diversified crops including herbs of different medicinal properties that were targeted at the vulnerable groups (PLWHA and OVC) in the urban areas who usually suffer from malnutrition as a result of poor diets [17].

### **1.1.3 Importance of nutrition gardens**

In Sub-Saharan Africa, malnutrition has been noted as a common clinical problem in advanced HIV infection [18]. The presence of opportunistic infections and malignancies increases the need for nutrients and impairs absorption. Malnutrition can impair organ function independently worsen immune dysfunction, compromises the nutritional status of infected individuals and, in turn, poor nutrition status can increase the progression of HIV infection to full blown AIDS. It was emphasized that there was need to identify nutritional interventions that would improve the quality and length of life for people living with HIV. In addition, there is need to advocate for interventions which are effective, affordable and acceptable for PLWHA such as low input nutrition gardens in Africa. [19] Recognized the value of boosting immunity through maintaining a good diet, general fitness and positive frame of mind. This brings a holistic approach that recognizes the link between mental and physical health. Lyne Francis who has lived with HIV for 15 years and runs the center in Harare for PLWHA noted that nutrition is the only form of therapy available. A lesson was drawn that, with correct nutrition, which includes vitamin supplementation and a holistic approach to HIV/AIDS, one can remain healthy almost indefinitely if started early enough.

### **1.1.4 Measures of Food and nutritional Improvement in HIV/AIDS affected communities**

Generally, methods used to measure food and nutritional improvements are classified into two categories, direct and indirect measurements. The direct measures are anthropometrical in nature that is they focus on ratios such as Weight for Height, Weight for Age and Height for Age among children. The results of the analysis are then compared with existing standards to ascertain whether there is malnutrition or not. Indirect measures focus on indicators of food availability such as the variety of food consumed, frequency of meals, and

food production vs. food needs or expenditures [20]. This study looked at indirect measurements.

## 2. MATERIALS AND METHODS

In this study, descriptive techniques were used [21]. The study was based on a pragmatic research methodology [22]. The approach incorporated both positive and normative approaches to research. Bar charts and tables were used to present findings.

### 2.1 Description of Study Area

The research was carried out in the 3 suburbs in the west-southwest district of Harare where the concept of nutritional gardens have been developed. Table 1 shows the Suburbs in which nutritional gardens have been developed.

**Table 1. Suburbs with nutritional gardens in Harare as of 2006, Zimbabwe**

Suburb number	Suburb name	Number of low input nutrition garden
1	Mufakose	16
2	Budiriro	72
3	Glen View	94

### 2.2 Sampling Method

A stratified random sampling design was used to select twenty two respondents from each of the three areas Mufakose, Budiriro and Glen View, with each suburban area acting as a stratum. Households were randomly selected using the lottery technique from each suburb using name lists obtained from LING organisations. Participation by respondents in the study was on a voluntary basis.

### 2.3 Data Gathering Techniques

The main source of information used in this study was primary data. It was collected through the use of structured questionnaires that comprised closed and open-ended questions. The questionnaires elicited information on family's' socio-economic status, role of nutrition gardens and constraints and opportunities. They were administered in face-to-face interviews, which took place at the respondents' homes. Focus group discussions were also held with the following stakeholders:

- Volunteers
- Foster parents
- Orphans and vulnerable children
- Home based care coordinators
- School heads and community centre leaders

Field visits were conducted to give the researchers the opportunity to observe low input nutrition gardens that were established in the three suburbs.

## 2.4 Analytical Tools

Descriptive statistics (frequencies) were used to analyze data. Data was entered and analyzed using Microsoft excel.

## 3. RESULTS

### 3.1 Socio-economic Status of Respondents

The various sources of livelihoods for households in the three suburbs are depicted in Fig. 1. The income base is generally varied but urban farming emerged as the most important source of livelihood for 42% of the interviewed households. The main activities within urban farming included horticultural production (tomatoes, onions, herbs and green vegetables) and maize. Most of the respondents were aged between 28–55years and had at least acquired some form of formal education up to secondary level. The average family size was seven and 25% of the households had at least one family member in formal employment, with the majority of respondents engaged in informal activities. Forty five percent of those interviewed were married, 33% widows, 15% single parents and 7% were single.

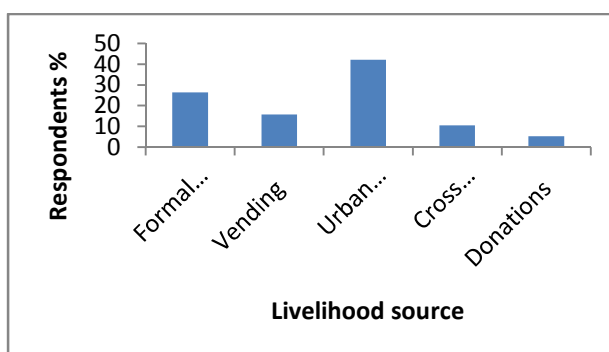
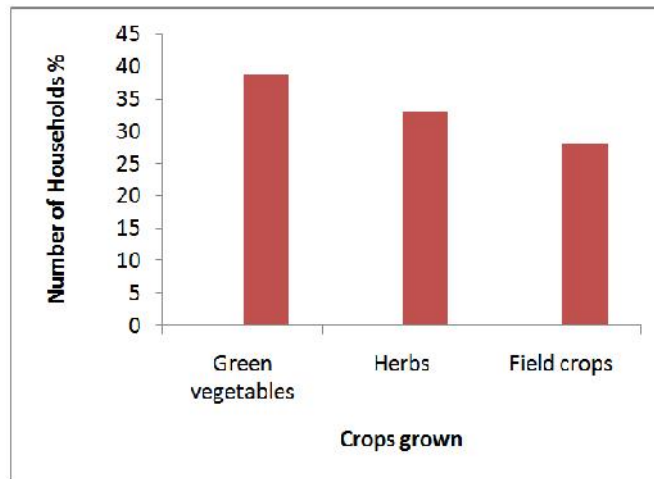


Fig. 1. Respondents' sources of livelihood

### 3.2 Characterization of Crops Grown and Role of Nutrition Gardens

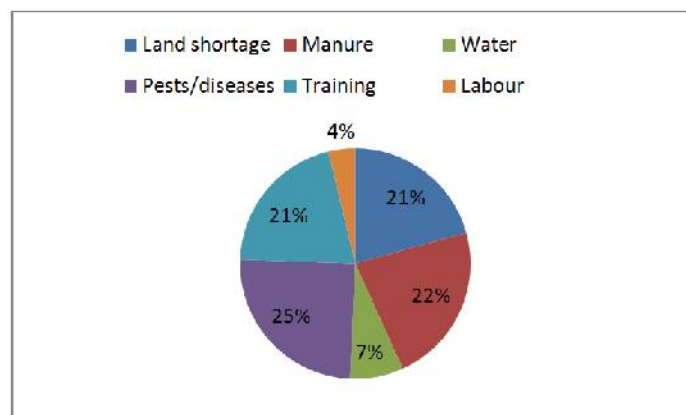
Most of the households (39%) grew green vegetables such as covo, rugare and rape in low input nutrition gardens. Herbs and onions were grown by 33% of the households as illustrated in Fig. 2. Herbs that were used for medicinal and cooking purposes included *Moringa Olifera*, wormwood, lemongrass, thyme, ginger, chillies and lavender. The respondents indicated that these crops are important because of their nutritional and medicinal value [23]. Beans and maize were also grown by 28% of the families as sources of protein and energy respectively. Madagascar and bush beans were grown against fence mainly due to shortage of space since they are climbers. The average size of garden was 48.8 square meters whilst most families indicated adopting nutrition gardens over a period of 2-6 years. Nutrition gardens were reported as a major source of healthy food as most families live far below poverty datum line that stands at about US\$450.00 per family of six (GOZ 2011) and could not afford to buy expensive vegetables from the open market on daily basis. An average family consisted of about 7 members.



**Fig. 2. Types of crops grown in nutrition gardens by various households**

### **3.3 Constraints and Opportunities Faced by Households with Low Input Nutrition Gardens**

Land shortage, lack of adequate manure, training and pests and diseases were noted as the main problems affecting the expansion prospects of nutrition gardens among respondents as shown in Fig. 3. Water did not emerge as a big source of constraint (7%) since most households have access to shallow wells. The potential opportunities emanated from the fact that low input nutrition gardens used locally available materials such as leaf litter and other environmentally benign resources with minimal use of synthetics, and the availability of local markets for products. Training in issues such as manure preparation and general management of nutrition gardens was noted as vital in improving the use and efficiency of low input nutrition gardens. The need for training is underscored by [20] who observed that training is important in the improvement of food security in households affected with HIV/AIDS. Expansion could also be improved through institutional linkages established with local schools that own large tracts of underutilized land.



**Fig. 3. Constraints faced by urban households involved in nutrition gardens**



An analysis was carried out with stakeholders to determine the sustainability of nutrition gardens among urban households. According to respondents, nutrition gardens were socially, environmentally and economically (SEE) sustainable since they rely on locally available materials such as leaf litter and animal manure that reduces investment and start up costs. They can also be established under scenarios of limited housing space to sustain health and food consumption needs of households with people living with the HIV/AIDS. There was a readily available market particularly for herbs in the local community. Opportunities for commercializing nutrition gardens exist if local institutions such as schools and other public oriented institutions that are involved. The main weakness was limited funding that constrained training of new households in the concept.

#### Strengths

- Uses locally available material (cheap)
- Grow herbal plants which are both of nutritional and medicinal value
- Uses family labour including the primary caregiver who also benefits from the garden.
- Information diffusion within the community

#### Weaknesses

- Need for continuous training for new beneficiaries
- Relies heavily on secondary caregivers
- Only produces for self consumption

#### Opportunities

- It has locally available market for produce
- It can expand into schools and community centers
- Group focused gardens are quite possible
- Manure from local dumping sites contributes to environmental sustainability

#### Threats

- Shortage of land and water storage facilities
- Limited financial support

## **4. DISCUSSIONS**

### **4.1 Crops Grown in Nutrition Gardens**

The observations showed that a diversity of crops and herbs were grown by the HIV/AIDS infected and affected families. However, most of the crops were exotic at the exclusion of indigenous vegetables and herbs that are more adaptable to the local environment. This is attributed to little documentation and lack of research on how to grow specific indigenous vegetables and herbs. According to [24], local wild and adapted species should be the first plants to introduce into permaculture nutrition gardens, especially since it is easy to collect seeds without disturbing the wild populations.

Respondents noted that herbs played a key positive role to health through reduction in the incidence of opportunistic infections associated with HIV/AIDS and thus saving on medical

costs. These observations were underscored by [25] who noted that home gardens can help provide variety in the diet and supply vital vitamins and minerals, carbohydrates and proteins and helping to improve family health. Since most urban households were not formally employed, they have to rely on self help projects such as gardening in order to cater for the nutritional needs and health of the family.

## **4.2 Sustainability of Low Input Nutrition Gardens**

Low input nutrition gardens were sustainable among households mainly due to availability of cheap waste material such as kitchen waste, grass mown from road verges, hedges and stover from nearby urban agriculture fields. However, the constraints faced, due to incidence of pests and diseases were largely due to lack of training on how to make herbal preparations and appropriate intercropping with relevant pest repellants. These observations are consistent with [26] who noted that nutrition gardening is a sustainable system since it relies on low-cost and low-risk technology. Landless households also benefit from simple hydroponics, container gardening, grow bags, cut tyres and community or school gardening. Nutrition gardens are also sustainable since there is readily available labour within urban households emanating from increased rural-urban migration and high unemployment rate which stands at over 60% in Zimbabwe.

## **5. CONCLUSION AND RECOMMENDATION**

Low input nutrition gardens increased the range of vegetables and herbs available to households with people living with HIV/AIDS, improved their health and also reduced medical costs associated with the need to seek treatment from opportunistic infections. Thus they should be considered integral to the livelihoods of HIV/AIDS infected and affected household in a context characterized by prohibitive costs of acquiring food and medication. Long-term sustainability can be ensured if appropriate training in organic based pest and disease management and processing of composts as a form of fertilizer are conducted. Expansion prospects can also be achieved through linkages with local institutions such as schools and other centers to establish community nutrition gardens for the benefit of urban households. This can be facilitated if indigenous approaches to HIV/AIDS management are effectively taken into account by the HIV/AIDS policy makers.

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## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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