# EFFECTIVENESS OF NUTRITIONAL AND HEALTH INTERVENTIONS ON HIV INFECTED CHILDREN IN MATHARE.

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This research was carried out in one of the municipal council health centre in Nairobi, Kenya located in a slum.

Key words: Nutrition, Health, Interventions, Children, Mathare.

**ABSTRACT**
This study sought to establish the effectiveness of nutritional and health interventions on HIV infected children in Mathare. Study respondents were mothers of HIV positive children under five years attending clinic at Mathare health centre and staff.Data was collected using a structured questionnaire, entered and analysed by SPSS version 12.0. From the study, marital status, mother's education and income level influenced access to interventions.(22%), (11%) and (19%) of the children in the study were stunted, wasted and underweight respectively. The most frequent illnesses and symptoms included: diarrhoea (38%), loss of appetite (29%) and cold (28%). There was a significant relationship between nutritional counselling and nutrition status ($X^2=12$;df=4;p=0.043, there was a relationship between food by prescription and nutrition status ($X^2=8$;df=3;p=0.048.) Up-take of prophylaxis and ART showed a significant relationship with presence of illness ($X^2=21$;df=5;p=0.032). Nutritional counselling is cheap compared to provision of ART, can be extended to all children

**Introduction**

More than 10 million children a year, or 30 000 a day, die from usually treatable or preventable causes (Ahmad et al. 2000) The World Health Report 2005 estimated that HIV infection contributed 3% to the global mortality among children younger than 5 years of age in 2005 (WHO, 2005). The proportion of mortality among children younger than 5 years of age attributable to HIV was about 7% in Africa as a whole but was estimated to exceed 50% in some of the most severely affected countries (WHO, 2008). Achievement of two of the Millennium Development Goals (MDGs) aimed at reducing malnutrition and child mortality by 2015 will depend in part on the ability of governments/policymakers to address the health and nutritional status of all children in general and of children infected or affected by HIV/AIDS in particular.

According to UNAIDS and WHO 2004, there were more than 1.3 million people infected with HIV and AIDS in Kenya; and more than 100,000 children below the age of 15 years. Over 60% of those infected live in the rural areas where the socio-economic conditions are worsening due to poverty and unemployment. This has strained the already inadequate and ill-equipped health facilities with over 50% of public hospital beds being occupied by patients with HIV and AIDS related infections. It is estimated that many more persons living with HIV and AIDS stay at home unable to access healthcare and stressing the households' ability to cope (GOK, 2005).

HIV/AIDS is associated with nutritional deficiencies in infected children (Wilson et al, 1997) while undernutrition influences disease progression, increases morbidity and lowers survival of HIV infected persons (Berhane et al, 1997). In the recent years, growth, nutrition and metabolism of HIV infected children have received increased attention for several reasons. It has been recognized for the past decade that HIV infected children generally do not grow as well as their uninfected counterparts, but more recent evidence suggests that this is often true even in the face of adequate virologic control, given also that growth is a predictor of survival, there has been closer scrutiny of nutritional and metabolic factors that can contribute to poor growth (Steven and Jennifer, 2006).

Specific and proven efficacious nutrition interventions could prevent more than onethird of the current 10 million child deaths. The most important nutrition-related interventions are exclusive breast-feeding, zinc supplements for treatment and prevention, complementary feeding, vitamin A supplementation and oral rehydration therapy. The coverage of many of these efficacious interventions is usually low. The potential role of nutrition interventions to promote global child survival is great. Child survival issues and the role of nutrition in preventing child deaths must be reintroduced on international health agendas. This is a prerequisite for reaching the fourth Millennium Development Goal, a reduction in child deaths by two-thirds before 2015.

Infant and young child nutrition and health interventions for HIV-exposed and infected children include counseling on feeding options and support for safer breastfeeding or replacement feeding, per WHO or Ministry of health and sanitation protocols. Food rations and therapeutic foods may also be provided depending on local circumstances such as food availability, diet quality, and malnutrition rates. Vitamin A supplementation is recommended. Provision of prophylaxis as recommended by the Ministry of health that all infants who are HIV-infected or born to HIV-infected women should receive prophylaxis with cotrimoxazole from 6 weeks to 1 year of age or until it is established that the child is not HIV infected and treatment by ART therapy if the diagnosis of HIV has been confirmed and if they have advanced HIV disease according to either clinical or laboratory criteria.

**MATERIALS AND METHODS**
**Study site selection**
The study was carried out within the Mathare slums in Nairobi located within Kasarani Division. The Mathare North Health Centre was purposively sampled from among ten facilities in the division, where six of them are run by the Nairobi City Council while four are run by the government. The Health Centre provides comprehensive care for HIV positive patients, both adults and children since it has trained clinical officers who are running the clinic. The health centre has proved its capacity not to run out of stock of drugs treating the patients. In addition, there are machines that aid in the treatment of the patients. Therefore, it has been classified as a referral health centre for other clinics. Systematic Sampling was used to select mothers into the study, that is, for every mother falling in an even position from an existing list of patients that is ($2^{nd}$, $4^{th}$ …) was included into the sample.

**Study population and sample size determination**
The study population was spread within Kasarani Division. It consisted of mothers with HIV positive children under the age of 5 years, and who sought comprehensive care from Mathare North Health Centre. This is the only health facility offering comprehensive care for pediatrics in the division. Also in the population were service providers who offered counselling services to mothers at the facility.The sample size was determined using the formula as used by Fisher et al. (1998) formula recommended by Mugenda and Mugenda (1999) as effective for social sciences. Where the desired sample size for target population is over 10,000.Thus the calculated sample was 107. This was increased to 120 to cater for any attrition.

**Systematic sampling**
 This was used to select mothers or care-giver of the under five children who were the respondent into the study, that is, for every mother falling in an even position from an existing list of patients that is ($2^{nd}$, $4^{th}$ …) was included into the sample to ensure that the data was well randomized to minimize bias until the desired number was secured.

**Data collection instruments**
Data for the study was collected using questionnaires, which were self administered. One was addressed to mothers or care givers, while the other was administered on health workers to assess the kind of interventions that are in place for the children. Questions were asked in the order in which they are presented in the questionnaire. During the interview, the questions were translated into Kiswahili by one of the research assistants.

**Data collection procedure**
Permission was sought from the respondents and only those who consented were interviewed. Questionnaires were administered to care givers/ mothers of children under five and service providers.
Anthropometric data was collected. The equipments for taking weight and height were borrowed from the health centre. Children younger than 24 months were measured lying down (recumbent length) on the board, while standing height was measured for older children. For measurement of height, the child stood ~~erect~~upright, without shoes with weight equally distributed on both feet and heels together and touching the vertical board and looking straight ahead. Height was recorded to the nearest 0.1 cm. Body weight was measured using hanging spring scales

measuring in 100g graduations as recommended for weighing infants from birth (WHO, 2002). The child, in minimum clothing and without shoes was weighed.

## Data Analyses

After completion of data collection, the questionnaire was scored. Data was edited, coded and entered into the computer for analysis. The Statistical Package for Social Sciences (SPSS 12.0) was used in the analysis. Descriptive statistics used to summarize the sample population included percentages, frequency distributions and charts. Chi-square was used to determine the relationship between categorical variables namely up-take of health and nutrition interventions versus nutrition status and presence of illnesses. Data was measured at 95% confidence level ($p < 0.05$).

## RESULTS

**Socio- demographic and socio-economic status among care-givers of HIV infected children.**
The socio-demographic and socio-economic characteristics of the care-givers was assessed by asking the respondents about their age, marital status, number and age of their children, occupation, educational level, and income. Age and sex are important demographic variables and are the primary basis of demographic classification. The table ~~below~~ 4.1 summarizes the socio-demographic and socio-economic status of the respondents attending Mathare health centre.
Majority of the respondents, sixty six percent were married and were in age group 18-30 years. Age groups below 18 years and above 30 years constituted a small proportion of the respondents. It was observed that most of the respondents' children were in age group 0-11 months and only 12% were in age group 37-60 months.

The study found that mothers or caretakers were either engaged in micro-businesses, casual labour or were unemployed. This reflects low income among most of them with the majority (74.2%) of them earning between Ksh. 2,000 - 4,000 per month as shown in figure (4.1). Most of the respondents had two children. It was observed that, sixty five percent of the respondents had attained primary level education, and only 1% had attained tertiary education. (figure 4.1).

**Nutritional and health interventions in place at Mathare Health Centre and the proportion of population accessing these interventions**
 **Interventions in place**
The study established the following interventions: nutritional counselling, food by prescription, vitamin A supplementation, immunization, prophylaxis and antiretroviral therapy were being offered at the health centre depending on the nutritional status of the children.

**Nutrition counseling and Vitamin A supplementation**
Figure (4.3) shows the proportion of children attending Mathare health centre accessing different interventions. The study established that, 28% of the respondents had undergone nutritional counselling on how to improve the diet of their children, maintaining body weight, preventing food- and water-borne infections, managing dietary complications of HIV related symptoms and secondary infections, and managing side effects from ART and other medications. All the respondents reported usage of Vitamin A supplements, this was because it was the government's policy that all children should be given this supplement at an interval of six months until the children attained the age of five years.

**Food by prescription**
Eight percent of the respondents reported to be using food by prescription which included plumpy' nuts and therapeutic milk.  These foods were packaged in small quantities (as part of treatment therapy) to take home and consumed as prescribed .It was also established that no food rations were being offered at Mathare but children who were found to be very malnourished and needed food rations were being referred to Lea Toto' facility at Kariobangi, a nearby division. These food rations included: home rations – where food is provided to the household to take home for storage, preparation, and consumption; on-site feeding –where food is prepared in a central place and the beneficiaries consume the meal or snack at the site.

**Immunization, Prophylaxis and ART**
All respondents in the study were immunized and those who had not completed the immunization programme expressed willingness to being fully immunized as required by the Kenya Expanded Programme of immunization. This information was collected from vaccination cards which were routinely provided by health facilities and clinics in Kenya on which vaccinations and other important health indicators are recorded. Eighteen percent of respondents were on prophylaxis especially septrin while nineteen percent of respondents were on 1st line or 2nd line medications of ARVs.

**Trends in provision of interventions**

The hospital records indicated that on average, in the year 2005; 60 children were attended to in the Mathare hospital on a monthly basis. However, since 2006, the number increased to 82 children on average, and has been growing since. In 2007, the average number reached 105.

**The nutrition and health status of the HIV infected children attending clinic at Mathare health centre.**
**Nutrition status**
The forms of nutrition status referred to in this study include stunting, underweight and wasting. Anthropometric measurements (age, height and weight) were compared to international (global) reference values for a healthy population as recommended by National Center for Health Statistics (NCHS). Data for the nutritional status of children was collected by measuring the height and weight of all the HIV infected children in the study. Data were collected with the aim of calculating three indices—namely, weight-for-age, height-for-age, and weight-for-height—all of which take age and sex into consideration. The study findings show that nineteen percent of the children were underweight; twenty two percent were stunted, while eleven percent of the children were wasted.

**Health status**
**Morbidity patterns**
The most frequent illnesses and symptom reported at the health centre were diarrhea (38%), loss of appetite (29%), cold (28%) followed by cough and fever respectively (table 4.4). The findings also indicate that majority of the children suffered from diarrhea and loss of appetite two weeks prior to the study. Most of the respondents when they were asked when their children fell sick if they sought medical attention from the doctors or qualified people, they said that some of the illness were not serious thus they would buy medicine from the chemist without prescription.

**The relationship between health and nutrition interventions, health status and nutrition status.**

There was a significant relationship between Nutritional counselling and nutrition status of children $X^2=12;df=4;p=0.043*$. There was also a relationship between food by prescription and nutrition status $X^2=8;df=3;p=0.048*$. Up-take of Prophylaxis and ART showed a significant relationship with presence of illness $X^2=21;df=5;p=0.032*$, $X^2=20;df=6;p=0.039*$ respectively, but not with nutrition status.

**DISCUSSION**

**Socio-demographic and socio- economic status of care-givers that influence access to interventions.**

Studies have consistently shown that educational attainment has a strong effect on health behaviours and attitudes (KDHS 2008/2009). Study findings indicate that marital status, mother's education and income level were significant factors that influenced access to interventions. In most cases, children who were being attended to at the centre, had both parents alive and present in the family unit. Such children were consistently taken for check - ups and it was evident they were responding well to the interventions. The majority of care givers having attained some level of formal education appreciated the importance of taking their children for clinic and follow-up services. They were also consistent in doing this, hence the positive results. The low levels of household incomes motivated care givers to take their children to the health centre, since it offered free or subsidized services. This finding rejects the null hypothesis that "The socio- demographic and socio-economic status among care-givers does not affect the provision of health and nutrition interventions among HIV infected children (Table 4.2).

**Nutritional and health interventions in place at Mathare Health Centre and the proportion of population accessing these interventions**

The findings show that the interventions at Mathare health centre included: nutritional counselling, micro-nutrient supplementation, food by prescription, immunization, ART and provision of prophylaxis. According to (NASCOP 2005) the government had a major challenge in the health sector, of providing more intensive services required for HIV care and treatment throughout the country. In 2005, nutrition was recognized as an important component of comprehensive HIV care, NASCOP established a nutrition unit, led by a nutritionist that supports training and provides materials (including nutrition assessment equipment, counseling materials, job aids) on food and nutrition components of HIV treatment and care to HIV facilities throughout Kenya and Mathare North health centre is one of the facilities.

This finding partially agrees with the null hypothesis that "The nutrition and health interventions in place at Mathare health centre are not adequate for HIV infected children" whereas immunization and Vitamin A supplementation were being given to all the children, prophylaxis was being given to a small proportion, yet the government had recommended that all who are HIV infected or exposed should be given this intervention.

**Determine the nutrition and health status of the HIV infected children attending clinic at Mathare health centre.**

The study findings of underweight children was high compared to the national figure, the stunting level was low while the wasting levels were high compared to the national figure, figure 4.3 (KDHS, 2008/2009). Reductions in length or height of HIV-positive children are common,

and poor growth (slow weight gain or decreasing weight) is often apparent even before opportunistic infections or other AIDS symptoms appear.

The malnutrition figures are almost close to those of the national figure thus accepting the null hypothesis that "the nutrition and health status of the HIV infected children attending clinic at Mathare health centre is poor".

**Relationship between health and nutrition interventions, health status and nutrition status.**
There was a significant relationship between nutritional counselling and nutrition status of children. There was also a relationship between food by prescription and nutrition status. Up-take of Prophylaxis and ART showed a significant relationship with presence of illness but not with nutrition status. This agreed with a study done in Zambia, where antiretroviral therapy and once-daily co-trimoxazole prophylaxis reduced mortality among HIV-infected children by six fold, yielding results comparable with those recorded in high-income settings (Walker *et al*., 2007). This finding therefore rejected the null hypothesis that there was no significant relationship between health and nutrition interventions, health and nutrition status among HIV infected children attending Mathare health centre.

**Conclusion**
Nutrition and Health interventions adopted by the government have been implemented in the health facilities as established by the study. However, there is need for the government to ensure accessibility to these interventions so that its recommendations can be adhered to. The nutrition and health status of the HIV infected children attending clinic at Mathare health centre was poor since the malnutrition figures were almost close to those of the national figure. There was a significant relationship between nutritional counselling and nutrition status of children. There was also a relationship between food by prescription and nutrition status. Up-take of Prophylaxis and ART showed a significant relationship with presence of illness but not with nutrition status.

**Recommendation**
There is need to assess the success of the interventions by identifying relevant indicators which can be used to monitor the effects of the interventions on the health and nutritional status of the respondents. There was significant relationship between nutritional counselling and nutrition status. Due to its affordability, the coverage of this intervention should be extended to enable easier access to all HIV infected children.

# TABLES AND FIGURES

Table 4.1: Socio economic and Socio-demographic characteristics

| | | N | Percent |
|---|---|---|---|
| | Male | 45 | 37.5 |
| | Female | 55 | 82.5 |
| Sex of children | Total | 120 | 100 |
| | < 18 years | 12 | 10 |
| | 18-30 years | 95 | 79.2 |
| | > 30 years | 13 | 10.8 |
| Age of Mother | Total | 120 | 100 |
| | 0-11 months | 57 | 47.5 |
| | 12-24 months | 26 | 21.7 |
| | 25-36 months | 22 | 18.3 |
| | 37-60 months | 15 | 12.5 |
| Age of child | Total | 120 | 100 |
| | Married | 80 | 66.7 |
| | Single | 28 | 23.3 |
| | Widow /separated | 12 | 10.0 |
| Marital status | Total | 120 | 100 |
| | | | |
| | 1 | 22 | 18.3 |
| | 2 | 48 | 40 |
| | 3 | 41 | 34.2 |
| | >4 | 9 | 7.5 |
| No of children | Total | 120 | 100 |
| | Self employed | 51 | 42.5 |
| | Employed | 5 | 4.2 |
| | Unemployed | 64 | 53.3 |
| Occupation | Total | 120 | 100 |
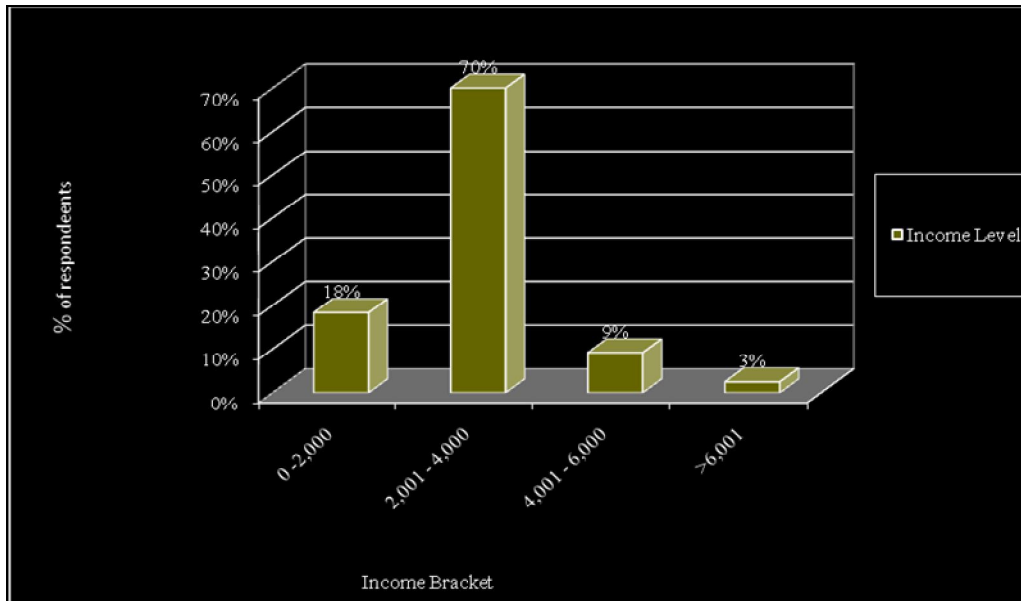
Figure 4.1 Income level of the respondents
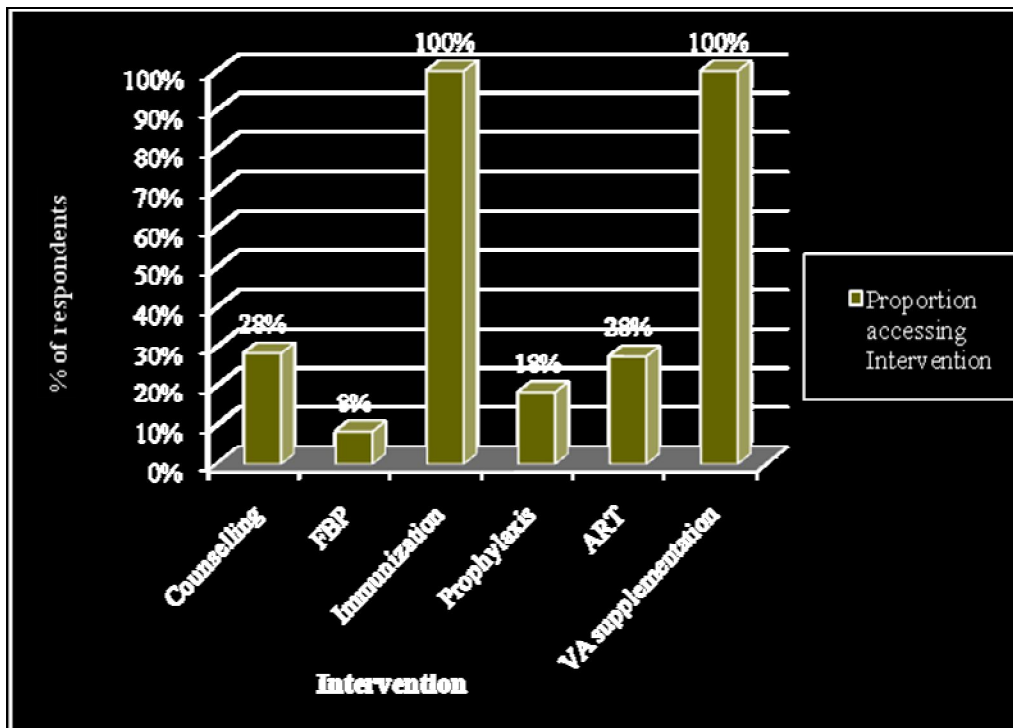


FBP- Food by prescription, ART- Antiretroviral Therapy, VA- Vitamin A
Figure 4.2 Proportion of children accessing intervention

Table 4.2 Illness and symptoms with nutrition implication

| Health condition | | N | % |
|---|---|---|---|
| **Illness** | Malaria | 15 | 12.5 |
| | Cold | 34 | 28.3 |
| | Pneumonia | 16 | 13.3 |
| | Cough | 21 | 17.5 |
| | Tb | 2 | 1.7 |
| | | | |
| **Symptoms** | Diarrhoea | 46 | 38.3 |
| | Fever | 20 | 16.7 |
| | Loss of appetite | 35 | 29.2 |
| | Sore mouth | 17 | 14.2 |

Table 4.3. Relationship between income, marital status and education level with uptake of intervention

| | Provision of Intervention |
|---|---|
| Education | $X^2$=13 df=2 p=0.07 |
| Occupation | $X^2$=16 df=3 p=0.06 |
| Marital | $X^2$=20 df=2 p=0.08 |

Table 4.3 shows the relationship between up-take of services, nutrition status and presence of illness

| Variable | Nutrition status | Presence of illness |
|---|---|---|
| Up-take of services | | |
| Nutrition counseling | $X^2$=12;df=4;p=0.043* | $X^2$=16;DF=9;P=0.086 |
| FBP | $X^2$=8;df=3;p=0.048* | $X^2$=20;df=6;p=0.059 |
| Prophylaxis | $X^2$=14;df=3;p=0.065 | $X^2$=21;df=5;p=0.032* |
| ART | $X^2$=18;df=3;p=0.064 | $X^2$=20;df=6;p=0.039* |

FBP- Food by prescription, ART- Antiretroviral Therapy, *- significant relationship at p = 0.05.
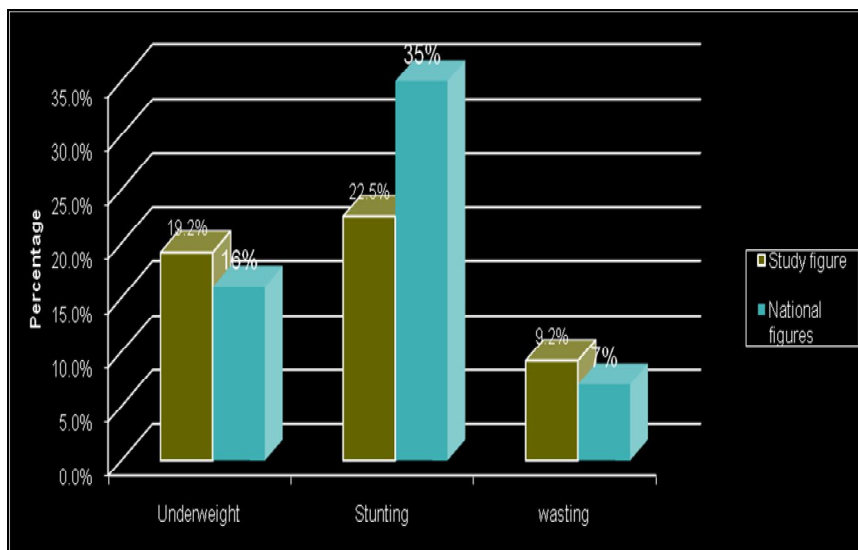


Figure 4.3 Study malnutrition figure compared to national figure

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