

To Establish the Adequacy of Micro and Macro Nutrients Intake in Children Aged Between 6 and 23 Months Born to HIV Positive Mothers in Ampath Centre

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Abstract

HIV/AIDS is a disease that is now on focus in all parts of the world. The rate of increase in the number of children diagnosed with HIV is alarming. HIV infection in children can lead to poor weight gain, failure to thrive and generally poor health status leading to poor nutritional status. The main objective of the study was to establish the adequacy of nutrient intake amongst children born to HIV positive mothers. This was a longitudinal study of 302 infants aged between 6 and 23 months and whose mothers were attending Turbo AMPATH Health Centre. A pretested food frequency questionnaire and a 24 hour recall were the main data collection tools. A Nutrient Calculator was used to obtain mean Daily Intake and probability approach was used to determine adequacy of nutrient intake and was compared with Estimated Average Requirement (EAR). A total of 270 (90%) infants were studied and data obtained. Over three quarters of the mothers 211 (78.1%) were married and more than half 155 (57.4%) were housewives. A quarter of their spouses (for those married) 53 (25.1%) were businessmen. More than half of the mothers 187 (69.3%) had primary level of education. The mean age of the children was 14.1 months. Vitamin A and protein intake were significantly below the Estimated average Requirement ($P < 0.001$). Vitamin A was the highest in inadequacy in the diets followed by protein but the children were growing well and were within the normal range as the WHO standards for children of the same age. Researcher recommends interventions that will provide diets and foods rich in vitamin A.

Keywords: *Nutrient Intake, macro nutrients, micro nutrients, HIV/AIDS*

Introduction

HIV/AIDS is a disease that is now on focus in all parts of the world. The rate of increase in the number of children diagnosed with HIV is alarming (JUNPHS & WHO, 2006). The current concern should now focus on the rate at which HIV/ AIDS is increasing among the Kenyan population and the impact it has had on the life expectancy. The trend from 1990 to 2000 suggested that adult HIV/AIDS prevalence in Kenya would increase to about 14% of the adult population by the year 2005 and then stabilize at that level (Johnson & Way, 2006). The trend also revealed that the number of infected people in the population would have increased from about 2.2 million people in 2000 to 2.6 million by 2005 and to 2.9 million people by 2010. The Central Bureau of Statistics in Kenya estimated that without AIDS, life expectancy at birth would currently be about 65 years and in contrast, due to the large number of AIDS deaths, it is actually about 46 years and may decline to 45 years by 2010 (Johnson & Way, 2006). This indicates that 20 years of life expectancy have already been lost because of AIDS. However according to National Aids Control Council (NACC), Kenya recorded a drop in HIV prevalence from 6.1 percent in 2005 to 5.9 percent in 2006. By 2001, an estimated 264,000 children orphaned by AIDS were living in Rwanda, and life expectancy had declined from 54.9 to 37.6 years (Mirza, 2006).

Undernutrition in Kenya is a serious public health challenge currently. Malnutrition and micronutrient deficiencies and HIV are prevalent among the rural poor population. Nutritional deficiencies include protein and energy malnutrition, vitamin A deficiency, zinc and iron deficiencies. The drought and food insecurity in many parts of the country has worsened the situation and this ought to be addressed soonest (Beaton & Bengoa, 1976)

The greatest challenge for Kenya now is to provide support and intensive care to people living with HIV/AIDS and children exposed to HIV /AIDS. The government has initiated the care process by providing this care through a multi-sectoral national response to HIV/AIDS. This care entails provision of antiretroviral drugs, offering free Voluntary Counseling Testing (VCT) centers and nutrition care and support.

It is evident that Non Governmental Organizations have joined in the care support, management and treatment of HIV / AIDS and in providing programs like PMCTC in order to improve the health status of children born to HIV / AIDS mothers and ensuring a reduction in the transmission of the virus to the child either during pregnancy, delivery or through breast milk. One of such Program is the AMPATH (Academic Model Providing Primary Health Care) project which has over 16 sites in the western region of Kenya, Turbo being one of them. Researchers are now left with the challenge of assessing the adequacy of nutrient intake by children who are exposed to the HIV virus who have been exclusively breastfed for six months and are on complementary feeding. It is on this basis that the researcher intended to establish the adequacy of macronutrient and micronutrient intake of these children aged between 6 and 23 months born to HIV positive mothers attending Turbo Health Centre. This section should give attention to the importance of macro and micronutrient intake during HIV rather than the availability or lack of care. Problem statement

Recent global studies have showed that about 60% of all deaths, occurring among children aged less than five years in developing countries could be attributed to malnutrition (Faruque et al., 2008; Rice, Sacco, Hyder, & Black, 2000). This has made UNICEF, World Food Program and other NGO's to start programmes to supplement vitamin A in children in order to enhance their nutritional status. Inadequate intake of Micro nutrients particularly vitamin A, B, C is likely to lead to high levels of morbidity which in turn leads to poor nutritional status of the preschoolers (Kimmons et al., 2005). No comparative data is locally available on the nutritional status of exclusively breastfed infants born to HIV positive mothers and have been exclusively breastfed for six months and very little documentation on the status of those who are on replacement feeding with no breast milk. Knowledge of the adequacy of nutrient intake of these children born to HIV positive women will help the government and other stakeholders to offer proper support.

Justification

Infants born to HIV-positive women have lower birth weights related to a lower gestational age and high viral loads. Good supply of nutrients and an appropriate infant feeding option depends on the mother's individual circumstances, including her health status and the local situation. HIV infection in children can affect nutrients intake, and absorption, failure to thrive and generally poor health status leading to poor nutritional status

At six months, if replacement feeding is still not acceptable, feasible, affordable, sustainable and safe, continuation of breastfeeding with additional complementary foods is recommended, while the mother and baby continue to be regularly assessed. Breast milk should only be stopped once replacement feed is nutritionally adequate and safe. Researchers are now left with the challenge of assessing the nutrient intake of the children born to HIV positive mothers and have been exclusively breastfed for six months and are introduced to replacement feeds and stopped breast milk

Infants and young children need additional nutrients. Nutrient loss can be accelerated by sickness like diarrhea, sweating and fever. One of the leading causes of death among children in developing countries is Protein Energy Malnutrition (PEM). This type of malnutrition is as a result of inadequate intake of nutrients from proteins, vitamins and minerals. Children who are already malnourished can suffer from protein energy malnutrition as rapid growth and or diseases increases the need for more proteins and essential minerals (Appoh & Krekling, 2005)

Objective

To determine the adequacy of micro and macro nutrients intake in children aged between 6 and 23 months born to HIV positive mothers attending Turbo AMPATH Centre.

Assumption of the study

The children were exclusively breastfed for 6 months before they were started on replacement feeding.

Methodology

The study was carried out in Eldoret West District in Rift Valley Province, Kenya. The exact location of the study site was Turbo AMPATH Health Center. Turbo is located in Turbo constituency and is approximately 35 kilometers from Eldoret along Eldoret - Bungoma road. The Health Centre accommodates approximately 5,000 HIV/AIDS patients of which approximately 1000 are 2 years.

A descriptive longitudinal design was used. From already existing data, subjects were recruited from their clinic files at Turbo AMPATH clinic records office. Once enrolled, each subject was followed for a period of six months. The contact points were at baseline, first follow up and second follow up visits at an interval of three months.

The study population was infant aged between 6 and 23 months born to HIV positive mothers attending Turbo AMPATH Health centre.

Sample Size

The following Fisher's formula was used to determine the sample size:

$$n = \frac{Z^2 pq}{d^2}$$

Where

n = the desired sample size

Z = Score at the respective

confidence level d = Amount of tolerance on p

p = prevalence of underweight in children of HIV infected women (27%-AMPATH records)

Taking;

$$Z = 1.96$$

$$d = 0.05$$

$$p = 0.23$$

$$q = 1 - p = 0.77$$

$$n = \frac{1.96^2 (0.23) \times 0.77}{(0.05)^2}$$

$$n = 272$$

Adjusting for loss to follow-up of 10% the sample size becomes 299

Simple random sampling technique was employed in the selection of the children. A computer software (excel) was used to randomly select 299 children for the study based on their unique identifiers.

Only children aged between six and 23 months whose mothers were HIV positive and attending Turbo AMPATH Health Centre. The infants did not have to be HIV positive as the researcher did not determine their status.

Children below 6 months and above 23 months of age and their mothers were excluded from the study. Also children with serious and chronic diseases like cancer, heart diseases were also excluded from the study as these conditions have adverse effects on the nutritional status of the children and needed special care and management. The medical history of the child was checked on the Child's AMPATH card by the researcher and research assistants and by asking the mother if the child was suffering from any of the conditions.

Study tools and pretesting

Social Economic Status Questionnaire and dietary intake tools were used to collect the data. Dietary intake was assessed through use of a food Frequency Questionnaire and 24 hour recall method at baseline and after every three months for a period of six months (at three contact points). Trained personnel took these measurements

Prior to this, pretesting was conducted using 30 questionnaires at the AMPATH Centre Eldoret to test data collection tools.

Nutrient intake

Interview schedules were done to collect information on food intake. A food frequency questionnaire was used to assess the average daily food intake based on commonly consumed foods in the region. A list of foods were read to the mother and probed if her child ate any of them. If child ate, how often did she/ he eat the food and how much in each time? If a food was eaten that was not on the food list, a provision for an addition was provided on the questionnaire. A 24 hour recall was also used so as to determine the approximate amount of food consumed by the child for the last 24 hours (1 day). The mother was asked to recall atleast everything that her child ate for the last 24 hours from the time the researcher was administering the questionnaire recalling backwards in hours. Each mother was also asked if the eating pattern of the child for those past 24 hours were usual or unusual and if the child had been sick and if so, if the sickness affected food intake of the child. These assessments were done after every three months during the six months period. Mothers were interviewed and probed on behalf of their children.

Data Management and Analysis

Completed questionnaires were coded by the researcher. Demographic data were entered in a computerized database designed in Epidata. Nutrient calculator was used to calculate the dietary data for the infants and to obtain mean daily nutrient intake. Mean daily nutrient intakes were compared to EAR to establish energy, protein, iron, zinc and vitamin A adequacy.

Ethical Consideration

The proposal was presented to the Institutional Research and Ethical Committee of Moi University for ethical clearance. Permission was granted by Turbo Health Center (AMPATH) to allow for such activity to be carried out in their institution. The study dealt with sensitive issues about children exposed to HIV /AIDS hence confidentiality was ensured by coding the answers and no names of the subjects were written on the data collection tool. The researcher only knew the details of the research. Mothers or guardians signed informed consent forms on behalf of children willing to participate in the research.

Results

Socio-demographic characteristics

A total of 270 (90%) infants completed the study. More than three quarters of the mothers 211(78.1%) were married and more than half 155(57.4%) were housewives. A quarter of their spouses (for those married) 53(25.1%) were businessmen. For those employed, 41(35.6%) were earning between kshs1-999 while 43(16.8%) of their spouses were earning above Kshs 5,000. More than half of the mothers 187(69.3%) had primary level of education and 108(40.6%) had double roomed houses and only 40(15.1%) were paying rent. The common mode of communication was mobile phone 179(66.3%). In terms of gender of infants, 148(54.8%) were female. Their mean age (months) was 14.1±5.7.

Table 4.1: Social demographic characteristics of the mother of children in the study

Characteristic	N (%)
Gender of the child	122(45.2)
Male	
Female	148(54.8)
Marital status	
Single	32(11.9)
Married	211(78.1)
Div/Separated	25(9.3)
Widowed	2 (0.7)
Income level in Kenya shillings (Mother)	
1-999	41(15.6)
1000-2999	21(8.0)
3000-4999	21(8.0)
Above 5000	10(3.9)
None	169(64.5)
Income level in Kenya shillings (Spouse)	
1-999	33(12.9)
1000-2999	29(11.3)
3000-4999	29(11.3)
Above 5000	43(16.8)
None	122(47.7)

Level of education (Mother)	
None	7 (2.6)
Primary	187(69.3)
Secondary	64(23.7)
Tertiary	12(4.4)
Type of house	
Temporary	134(50.2)
Semi-permanent	106(39.7)
Permanent	27(10.1)
Size of house	
Single	57(21.4)
Double	108(40.6)
3 rooms and above	101(38)
Mean age of children in months	14.1

Micronutrient and macronutrient intake

As indicated in figure 4.4 in all the three time points, vitamin A had the highest percentage of inadequate intake followed by protein. None of the participants had inadequate intake of iron or zinc in all the three contact points.

Figure 4.4 Percentage inadequate nutrient intake (based on Estimated Average Requirement) at the three contact points

Discussion

Micro and macro nutrients intake

Assessing the probability of nutrient adequacy adds value to the food and nutrition monitoring systems in developing countries, where energy intake is the most important indicator of food security (Mirmiran et al, 2006). The study found out that in all the three time points, vitamin A had the highest percentage of inadequate intake followed by protein. None of the participants had inadequate intake of iron or zinc in all the three time points. Studies show that severe malnutrition in HIV-exposed children can be reversed with hospital and home-based therapeutic feeding, though the time to recovery is longer than with uninfected children. Studies also indicate that periodic vitamin A supplementation reduces morbidity and mortality in HIV-exposed children and improves their growth. Periodic vitamin A supplementation in HIV-exposed children reduces illness and death and improves growth (Piwoz 2004a). This section needs to provide the implication of the findings. Explain the findings of the study.

Limitation of the study

There would have been some minimal form of interview bias during the study but this was reduced by conducting an induction training on the research assistants and probing the subjects so as to minimize errors. Also issues of recall bias where some foods eaten by the child may have not been remembered by the mother or a child ate something at her neighbor and the mother might not be aware. This was minimized by probing the mother.

Conclusion and Recommendation

Conclusion

In conclusion, this study documents that Vitamin A was the highest in inadequacy in the diets followed by protein and the children's diets were adequate in zinc and iron. The study should also give the basic findings of the nutrient intake before nutrient inadequacies for the information to be useful and comparable to other studies

Recommendation

Based on these findings, the study recommends;

- Non-Governmental Organization including AMPATH and the Ministry of Health to emphasize on programs that address micro and macronutrient intake in their research.
- Periodic vitamin A supplementation should be adhered to strictly and foods rich in Vitamin A should be given to children
- Food can be diversified by increasing energy density and providing micronutrient supplementation or fortification.

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