

## SHORT ARTICLE

**A study on the impact of supplementary nutrition and ART management on children with HIV/AIDS status attending an ART Centre**Dixit UR<sup>1</sup>, Bendigeri ND<sup>2</sup><sup>1</sup>Associate Professor, Department of Community Medicine, SDMCMSH, Dharwad – Karnataka; <sup>2</sup>Professor and Head, Department of Community Medicine, KBNIMS, Gulbarga, Karnataka

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E Mail ID: [urdixit@gmail.com](mailto:urdixit@gmail.com)**Citation**

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**Background:** AIDS has been killing large number of people. The rate of infection of young children is quite high yet they are the ones who are not proportionately covered under ART. Children are vulnerable to infections more compared to adults and if malnutrition co-exists it makes them more vulnerable. **Aims and objectives:** To assess the impact of ART treatment on immune status; to study the common opportunistic infections among the study group; to study the relationship between supplementary nutrition and opportunistic infection. **Materials and methods:** A secondary data was collected about 46 children. Informed consent was taken from the parents/guardians. Children were suggested to eat one extra meal and ground nuts and one egg thrice weekly. **Result:** There was significant increase in the CD4 count in these children ( $p < 0.01$ ) and the occurrence of opportunistic infections reduced significantly in those taking supplementary nutrition ( $p < 0.001$ ). In terms of opportunistic infections, skin infections were more common followed by tuberculosis and diarrhea. **Conclusion:** Supplementary nutrition reduces the opportunistic infections and also improves the immunity. However, the study needs to be done with more sample size.

**Key Words**

Supplementary nutrition; ART; Opportunistic infections

**Introduction**

Acquired Immunodeficiency Syndrome (AIDS) is a long term infection caused by HIV. Over the years it has spread wide and far killing around a million people annually.<sup>1</sup>The UNAIDS Global Report 2013 notes that only a third in sub-Saharan Africa and about a half in south East Asia are covered under antiretroviral therapy.<sup>2</sup>

Eight percent of global HIV-related deaths are from India. On an average, about 1200 children get infected daily. Of 25 people receiving treatment, only one is a child while one of every six deaths occurs in children.

This necessitates that pediatric HIV be studied vigorously and the impact of both pharmacological and non-pharmacological interventions be explored.

This study was done to know if supplementary nutrition has a role in improving immunity of the children as measured by proxy of occurrence of opportunistic infections. CD4 count measurement was also checked to see the level of changes with ART.

**Aims & Objectives**

1. To assess the impact of ART treatment on immune status.
2. To study the common opportunistic infections among the study group.
3. To study the relationship between supplementary nutrition and opportunistic infection.

## Material and Methods

The relevant data were collected about 46 child patients attending the ART Center, attached to a tertiary care hospital and accompanying parents/guardians, by a pretested, structured proforma with close ended questionnaire. Approximately 200-300 children attend the Center monthly. As a systematic random sampling method, every fourth case was included in the study. A due consent was taken before the data were collected. The CD4 count was estimated by flow cytometry. The data regarding CD4 was noted from the records. This was a cross sectional study. The data collected were analyzed and tabulated. The nature of data being secondary, ethical clearance was not required.

## Results

It was observed in this study that majority 32 (69.5%) of the affected children were boys while only 14 (30.5%) were girls. The male to female ratio in this study was 2.23. Boys are usually cared and brought to health care more often than girls. This may be a reason why boys were more in number.

Majority 25 (54.35%), of the HIV infected children were in the age group of 4–9 years. This was probably due to delayed manifestations or late diagnosis.

In this study it was observed that among the parents of the affected children majority 51 (55.5%) were illiterate. 21 (22.8%) have passed secondary schooling, 15 (16.4%) primary schooling, 3 (3.2%) PUC and 2 (2.1%) are degree holders.

It was observed that the HIV infection was more prevalent among illiterates, and was inversely proportional to the educational status. Education probably plays a crucial role in either control or prevention or both of the HIV pandemic.

In this study it was observed that majority of the parents, 44 (47.83%) were manual workers. Majority 32 (69.57%) of the mothers of these children were housewives.

In this study children of manual worker were most at-risk, probably due to their education and socio-economic status. Their socio-economic status makes these people to travel far and wide in search of occupation and staying away from home and in the course having unsafe sex is known entity for acquiring HIV infection.

In the study it was observed that majority of the parents 83 (90.2%) were HIV infected while only 9.8% are free from HIV. It points to the direct vertical

transmission, which was a proven way of HIV transmission.

In this study it was observed that majority 45 (97.8%) of the affected children have been breastfed. Out of them, 37 (82.2%) children have been breastfed up to two years and 8 (17.8%) up to one year. Only one case (2.2%) has never been breastfed.

In this study it was observed that majority of the parents, 56 (60.86%), were alive. Among the parents, 26 (56.6%) of fathers are alive and 30 (65.21%) of mothers are alive. This study observed that about 40% of the parents are dead. Amongst the parents, mortality was more in males compared to females. The difference however was not statistically significant ( $p > 0.05$ ).

It was observed that among affected children majority 34 (73.9%) belonged to class IV, while 10 (21.7%) belonged to class V and 2 (4.4%) belonged to class III of the socio-economic status (SES). There were none in this study belonging to socio-economic status class I or class II. The socio-economic status was stratified according to the modified B. G. Prasad's Classification, based on the per capita income.

It was observed in this study that majority 26 (56.5%) of the HIV positive children were delivered at home and 20 (43.5%) were delivered at institutions.

It was observed in the present study that none of the mothers had received perinatal ART.

Data regarding CD4 count was available only for 16 children. The average CD4% at the beginning of the ART among these 16 children was 11.46% which increased to 24.41% after 6 months. There was a significant improvement in the CD4% after ART for more than 6 months ( $p < 0.01$ ).

In the present study it was observed that skin lesions are the commonest opportunistic infections among HIV positive children with 20 (43.4%) being affected. Other opportunistic infections like chronic diarrhea and tuberculosis were present with equal frequency, with 10 (21.7%) children being affected (Figure 1).

In this study it was observed that most of the affected children, 22 (47.8%) had mild anemia; 15 (37.8%) children had moderate anemia. In 4 (8.7%) children Hb level was less than 8g/dl and 5 (10.9%) children had Hb in the normal range of  $>12$  g/dl. Most of the affected HIV children were having mild anemia.

In the study it was observed that out of 6 children who received supplementary nutrition, 4 (67%) had no opportunistic infection. For children receiving

supplementary nutrition, Z score was 10.41. Supplementary nutrition was only in terms of extra meal being eaten by the children at home and an advice to eat more of ground nuts, milk and one egg at least thrice weekly. It is evident from table 3 that those children on supplementary nutritive foods are likely to have far lesser prevalence of the opportunistic infections compared to other children. Every one of those who were not given any supplementary nutrition suffered from one or the other opportunistic infections. Most of these children were suffering from protein-energy malnutrition (PEM). This observation was statistically highly significant.

**Discussion**

Providing supplementary nutrition can reduce the prevalence of opportunistic infections. Also long term adherence to ART improves the immunity as seen by the significant rise in the CD4 count.

UNICEF has documented that food insecurity and HIV/ AIDS link is bidirectional, with either of them worsening the other one. It identifies nutrition, both therapeutic and supplementary to be one of the key solutions for fighting HIV/AIDS. In this context, this study also points towards the favorable result with supplementary nutrition in improving immunity and reducing opportunistic infections.(3)

As per Davidson’s, CD4 count should be done once every six months or so and it should be accompanied with viral load measurement in people on ART. But this could not be done in this study.(4)

Perinatal ART reduces of the transmission of HIV infection from mother to child from 20-25% to as much as 2% if breastfeeding is not done.<sup>1</sup>It is necessary to deliver most of the HIV positive pregnant women at institutions and put them on maximally suppressive ART, so that HIV transmission to the off spring can be either prevented or minimized (5)

**Conclusion**

➤ Children receiving supplementary nutrition along with ART had statistically significantly less opportunistic infection. Skin lesions were

commonest opportunistic infection followed by tuberculosis and chronic diarrhea.Children, who were put on ART, had significant improvement in their CD4 count level.

**Recommendation**

➤ Apart from CD4 count, nutrition also plays a role in improving the immunity level of children. However, a study with robust data should be done to provide any advocacy suggestions.

**Limitation of the study**

1. The duration of the study and sample size was small hence a general opinion cannot be formulated.
2. Difficulty in communication due to communication barriers (especially psychological and cultural and in few cases only the child used to come to collect the drugs, hence) accurate information may not be collected in some cases.

**Relevance of the study**

That the nutrition also possibly helps in improving the immunity status of the children apart from being on ART.

**Authors Contribution**

1<sup>st</sup> Author: Data collection, write up & analysis, 2<sup>nd</sup> author: Design, analysis.

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**Tables**

**TABLE 1TABLE SHOWING THE INFORMATION REGARDING THE DEATH OF THE PARENTS DUE TO HIV INFECTION AMONG THE CHILDREN ATTENDING THE ART CENTER**

Parents	Dead		Alive		Total
	Numbers	%	Numbers	%	
<b>Mother</b>	16	34.78	30	65.22	46

<b>Father</b>	20	43.48	26	56.52	46
<b>Total</b>	36	39.13	56	60.87	92

$\chi^2 = 0.411, df=2; p=0.522$

**TABLE 2** TABLE SHOWING THE AVERAGE CD4 % IN THE BEGINNING AND AFTER 6 MONTHS OF TREATMENT IN THE CHILDREN ATTENDING THE ART CENTER

Serial No.	CD4 count in %	
	At the beginning of ART	After 6 months of ART
1.	6.3	19.33
2.	3.45	18.14
3.	9.75	29.33
4.	12.97	25.48
5.	12.09	16.39
6.	8.77	19.49
7.	31.58	32.8
8.	10.8	28.8
9.	18.3	31.4
10.	7.2	15.7
11.	9.74	25.4
12.	10.8	19.3
13.	10.2	20.3
14.	12.1	22.4
15.	9.5	30.6
16.	9.9	35.7
<b>Mean CD4 %</b>	11.46%	24.41%

Z score=8.3, p<0.01

**TABLE 3** TABLE SHOWING THE RELATIONSHIP BETWEEN OPPORTUNISTIC INFECTIONS AND SUPPLEMENTARY NUTRITION GIVEN TO THE CHILDREN INFECTED WITH HIV ATTENDING THE ART CENTER

Supplementary Nutrition	Opportunistic infections		Total
	Present	Absent	
<b>Not Given</b>	40	0	40
<b>Given</b>	2	4	6
<b>Total</b>	42	4	46

$\chi^2 = 29.30, df=1, p<0.001;$

**Figures**

**FIGURE 1** PIE CHART SHOWING DISTRIBUTION OF OPPORTUNISTIC INFECTIONS IN HIV POSITIVE CHILDREN

