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PREVALENCE OF MALNUTRITION IN HIV INFECTED CHILDREN AND ITS CORRELATION WITH CLINICAL AND IMMUNOLOGICAL STAGING OF THE DISEASE

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ABSTRACT

Introduction and Aim: Malnutrition is an important comorbid condition in HIV and can be associated with increased risk of opportunistic infections and even interfere with response to ART. Aim of the present study was to evaluate the prevalence of malnutrition in HIV infected children and to its correlation with clinical and immunological staging of the disease. **Methodology:** This was a cross sectional observational study which included HIV positive children of below 15 years attending ART centre or pediatric department, GGH, KKD. For the enrolled children anthropometric data was taken and CD_4 count was done to all children. **Results:** The overall prevalence of malnutrition in HIV positive children was 79%. The prevalence of malnutrition was higher in females (84%), than in males (74%). There was fair correlation between nutritional status and clinical and immunological staging of the disease in children. **Conclusion:** The prevalence of malnutrition was high in HIV infected children of all age groups. Nutritional interventions started early in course of disease can delay the progression of disease.

KEYWORDS: HIV in children, Clinical and immunological staging , Malnutrition.

INTRODUCTION

Malnutrition is an important co-morbid condition in HIV as the same population that is vulnerable to HIV also has high prevalence of food insecurity.[1] Most of the children living with HIV are entirely banking on the assistance of surviving parents, grandparents or guardians for their care and support which further jeopardizes their nutrition. As a chronic infection HIV increases the energy expenditure, decreases food intake due to loss of appetite, causes malabsorption and loss of nutrients, thus predisposing to malnutrition.

As malnutrition is multi-factorial in causation and malnutrition per se is associated with immune suppression, the impact of malnutrition on HIV disease progression is difficult to study and the data is limited in this area. Earlier studies demonstrated that weight loss was associated with increased risk of opportunistic infections in HIV positive adults independent of their immune status. Malvy et. al., reported that weight loss plays a predictive role in HIV disease progression to AIDS, independent of CD_4 cell count.[2] Globally reports are showing that good diet is one of the simplest means of helping people living with HIV/AIDS and may even delay the progression of the deadly virus[3] (FAO, 2005). Boosting the immune system with balanced nutrition can help body to fight against the disease.

METHODOLOGY

The present study was a cross-sectional observational study conducted over a period of 18 months from 2009 December to 2011 May in the department of paediatrics, Govt. General Hospital, Kakinada. HIV positive children of less than 15 years of age, who presented to ART centre and paediatrics department, were included in the study. Children were assessed clinically and their anthropometry was recorded. CD_4 counts were done for all children and other investigations were done based on requirement. Eligible children were referred for ART initiation. IAP classification (weight for age) was used to grade the nutritional status. Clinical staging of HIV was done using the WHO clinical staging chart and immunological staging was based on CD_4 percentage.

Table I: - Age wise distribution of malnourished children.

S.no	Age group in years	No. of children	Malnourished children		
			Male	Female	Total
1	1 – 3	16	7	6	13(81%)
2	4 – 6	96	29	36	65(67.7%)
3	7 - 9	137	44	64	108(78.8%)
4	10 -12	143	54	63	117(81.8%)
5	13 – 15	50	27	19	46(92%)
	Total	442	161	188	349(78.9%)

Table II:-Nutritional status and who clinical staging of HIV positive children

Sr. No.	Nutritional status	Stage 1	Stage 2	Stage 3	Stage 4	Total
1	Normal	42(45%)	17(18.2%)	30(32.2%)	4(4.3%)	93
2	Pem - i	32(35.5%)	19(21.1%)	37(41.1%)	2(2.2%)	90
3	Pem - ii	28(26.4%)	23(21.6%)	51(48.1%)	4(3.7%)	106
4	Pem -iii	25(25.7%)	23(23.7%)	45(46.4%)	4(4.1%)	97
5	Pem - iv	6(10.7%)	22(39.2%)	25(44.6%)	3(5.3%)	56

Table III:-Nutritional status and immunological category of HIV positive children

Sr. No.	Nutritional status	Mean CD_4%	Insignificant cd_4 >25%	CD_4 15-25%	Severe CD_4 <15%	Total
1	Normal	28	72 (77%)	16(17.2%)	5(5.4%)	93
2	I	26.95	63(70%)	16(17.8%)	11(12%)	90
3	II	26.1	72(67.92%)	21(19.8%)	13(12%)	106
4	III	24.25	59(60.82%)	27(27.8%)	11(11%)	97
5	IV	22.7	31(55.35%)	13(23.2%)	12(21.4%)	56

RESULTS

442 HIV Seropositive children were enrolled in the present study. 224 (50.6%) of them were girls and 218 (49.4%) were boys. The mean age of presentation was 8.63 years. 3.6% of children were below 3 years and 45% of them were above 10 years of age. The prevalence of underweight was 79% The prevalence of severe PEM (grade III and IV) was 34.6% (153 out of 442). 161 out of 218(74%) males and 188 out of 224(84%) females were malnourished. Using Fischer exact test two trailed P value was calculated as 0.010 which is highly significant. Age wise prevalence of PEM was given in table I. 81%, 67%, 78%, 81.8% and 92% of children in the age groups of < 3 years, 4-6 years, 7-9 years, 10-12 years and 13-15 years were malnourished. The prevalence of underweight in the under 5 children was 70%.

Table II shows the correlation between WHO clinical staging and nutritional status of HIV positive children. 45% children with normal nutritional status were asymptomatic (clinical stage I) whereas only 10.7% of children with grade IV PEM were asymptomatic. As the nutritional status deteriorated more number of children were in clinical stage 3 and 4. This difference is statistically not significant as the P value is 0.4795.

The mean CD4 % was 21.2, 28.8, 27.6 and 21.9 in children of <3 years, 4-5 years, 6-10 years and 11-15 years respectively. Table III shows the correlation between immunological and nutritional status of HIV infected children. The mean CD4 % was 28 in children with normal nutrition and it was 22.7 in children with grade IV PEM. This difference is statistically

significant with P value < 0.05. 5.4% of children with normal nutrition had severe immune suppression whereas 21.4% of children with grade IV PEM had severe immune suppression.

DISCUSSION

The overall prevalence of malnutrition in the present HIV infected population was 79% and in under- 5 children was 70%. This is much above the national average of 48% underweight reported by NFHS-3.[4] Prevalence of underweight in the present study was higher than that reported in studies from other parts of India, which varied from 60-63%.[5,6,7] Reports from Africa showed much lower prevalence (14%) of under-weight among HIV infected children.[8] There is statistically significant difference in the prevalence of malnutrition in males and females which is cause of concern.

Malnutrition has a major impact on the outcome of HIV disease as it not only increases mortality but also results in an impaired response to anti-retroviral therapy.[9] It was observed that response to treatment of malnutrition was similar to that observed in HIV uninfected children stressing the need for early nutritional intervention.

The prevalence of malnutrition was high in children under the age of 3 years and above 10 years. The high prevalence of malnutrition in younger children may be due to combination of lack of breast feeding or inadequate complementary feeding and immunological immaturity in young children.

High prevalence of malnutrition in children above 10 years can be explained by progression of disease. CD_4 % at different age groups showed similar results. The mean CD_4 % was lowest in children of < 3 years and above 10 years.

Immune status and clinical staging showed fair correlation with malnutrition in the present study. As the nutritional status deteriorated, more number of children were found to be in clinical stage 3 and 4 and severe immune suppression. Priyadarshini et. al., from Chennai also showed that there is fair correlation between CD_4 % and malnutrition.[5]

Even though there is fair correlation between clinical staging, immune status and malnutrition, the presence of severe malnutrition could not be used to predict the severity of disease accurately. This is because 11 % of children with grade IV PEM were asymptomatic and 4 % of children with normal nutrition were in clinical stage 4. 56 % of children with

grade IV PEM had CD_4 counts > 25% whereas 5.4 % of children with normal nutrition showed severe immune suppression. (i.e., CD_4 % < 15%).

Our study shows that malnutrition is highly prevalent at all ages and all stages of HIV disease in children in our area. Studies from Tanzania reported that fortified food not only improved nutritional status but also the CD_4 cell counts. Improvement in CD_4 count can slow down the progression from HIV infection to AIDS.[10] Studies from Tanzania had also shown that supplementation with RUTF for at least 4 months has a potential to improve nutritional status of HIV positive children under ART.[11] To ameliorate high undernutrition rate the government and other development partners should establish the WHO endorsed RUTF intervention at the same pace as ART programmes, as followed in countries like Tanzania.

CONCLUSION

Malnutrition is highly prevalent among HIV infected children in India in all age groups and severity of malnutrition correlates well with clinical and immunological deterioration. Nutritional interventions started early in HIV infected children delay the disease progression, ensure optimal response to ART and thus reduce the morbidity. Longitudinal studies are to be carried out in India to evaluate the impact of nutritional supplements on CD_4 % in HIV infected children.

REFERENCES

1. S. Gillespie, R. Greener, A. Whiteside, and J. Whitworth, “Investigating the empirical evidence for understanding vulnerability and the associations between poverty, HIV infection and AIDS impact,” AIDS, 2007; 21(7): S1–S4.
2. Malvy D, Thiebaut R, Marimoutou C, Dabis F, Group d’Epidemiologie Clinique du Sida en Aquitaine. Weight loss and body mass index as predictors of HIV disease progression to AIDS in adults. Aquitaine Cohort, France, 1985-1997. J Am Col Nutr. 2001; 20(6): 609–615.
3. FAO (2005). The benefits of good nutrition for people and families living with HIV/AIDS.[http://www.fao.org/documents/show_cdr.asp?_ url/file=/DOCREP/005/ye00/y4168e03.htm]. Site visited on 19/10/2005.
4. NFHS-3, January 2009, http://www.nfhsindia.org/anfhs3 .html.
5. S. R. Shah, M. S. Tullu, and J. R. Kamat, “Clinical profile of pediatric HIV infection from India,” Archives of Medical Research, 2005; 36(1): 24–31.

6. S. R. Shah, M. S. Tullu, and J. R. Kamat, “Clinical profile of pediatric HIV infection from India,” Archives of Medical Research, 2005; 36(1): 24–31.
7. S. R. Daga, B. Verma, and D. V. Gosavi, “HIV infection in children: Indian experience,” Indian Pediatrics, 1999; 36(12): 1250–1253.
8. M. R. Berger, C. Fields-Gardner, A. Wagle, and C. B. Hollenbeck, “Prevalence of malnutrition in human immunodeficiency virus/acquired immunodeficiency syndrome orphans in the Nyanza province of Kenya: a comparison of conventional indexes with a composite index of anthropometric failure,” Journal of the American Dietetic Association, 2008; 108(6): 1014–1017.
9. S. Rajasekaran, L. Jeyaseelan, N. Ravichandran, C. Gomathi, F. Thara, and C. Chandrasekaran, “Efficacy of antiretroviral therapy programme in children in India: prognostic factors and survival analysis,” Journal of Tropical Pediatrics. In press.
10. Theobald C. E. Mosha, Jamila S. A. Mwankemwa, and Henry S. Laswai , Bennink, R. Maurice, ”Utilization of fortified bean-maize composite meal to improve the nutritional and immune status of HIV+ children in Morogoro, Tanzania,” Tanzania Food and Nutrition Journal p.9-23.
11. Bruno F Sunguya, Krishna C Poudel, Linda B Mlunde, Keiko Otsuka, Junko Yasuoka, David P Urassa, Namala P Mkopi and Masamine Jimba “Ready to Use Therapeutic Foods (RUTF) improves undernutrition among ART-treated, HIV-positive children in Dar es Salaam, Tanzania” Sunguya et al. Nutrition Journal 2012; 11: 60 http://www.nutritionj.com/content/11/1/60.