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Original Research Article

Health and nutritional status of HIV infected children living in the orphanages of Rajamahendravaram, Andhra Pradesh, India

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ABSTRACT

Background: HIV infected orphan children are the most vulnerable and neglected group in the society. They are more susceptible to constant illness, malnutrition and social discrimination. Aim: To assess the health and nutritional status of HIV infected children living in the orphanages of Rajamahendravaram.
Methods: This was a community based cross-sectional study, conducted among the HIV infected children aged 1 to 15 years, living at two orphanages in Rajamahendravaram. Study subjects were selected by consecutive sampling method. A semi-structured schedule was used for the collection of data. Health status was assessed by a schedule for morbidity profile; Nutritional status was assessed by anthropometric measurements, clinical examination and by a schedule for dietary intake. Z scores were calculated using the anthropometric measurements of the study participants; WHO reference growth charts were used to assess the nutritional status. Results were presented as percentages, proportions, mean and standard deviation.
Results: Total 150 HIV infected children were enrolled in the study. The mean age of children was 9.28±2.88 years. 26% of children were born with birth weight <2.5 kg. Out of 150 children, 46.65% were underweight, 50% were stunted, and 22.6% were thin. The mean energy intake of HIV infected children indicates deficiency in comparison to reference standards of WHO.
Conclusions: Unhealthy condition and undernutrition is highly prevalent in HIV infected children living in orphanages. Hence, their needs are to be addressed and all efforts need to be directed at alleviating undernutrition and ill health.

Keywords: Children, HIV, Orphan, Orphanage, Undernutrition

INTRODUCTION

HIV/AIDS is a disease with greater impact on children living with HIV in terms of health, nutrition and social situation. It includes high infant and child morbidity and mortality rates, decreased life expectancy and also major cause to orphaning. At the end of 2018, it was estimated that worldwide approximately 37.9 million people were living with HIV; 54% of children living with HIV in low- and middle-income countries were receiving lifelong antiretroviral therapy (ART).[1] In India the total number of PLHIV is estimated at 21.40 lakhs (15.90-28.39 lakhs) in 2017, and children (<15 years) account for 0.61 (0.43-0.85) lakh. Among the states Andhra Pradesh has estimated PLHIV number of 2.70 lakhs.[2] The state accounts for an estimated 10% of the HIV and AIDS cases in India. Among HIV infected population, the HIV infected children constitute a great priority. In these

children, the disease and undernutrition, both affect immune function; and with lack of essential micronutrients it leads to nutritionally acquired immunodeficiency syndrome.[3] Undernutrition is highly prevalent in HIV infected children living in Orphanages. It is a common complication of HIV infection and AIDS in children. Nearly half of all India's children approximately 60 million are underweight, about 45% are stunted (too short for their age), 20% are wasted (too thin for their height, indicating acute malnutrition).[4] One in every three malnourished children in the world lives in India. An 'Orphan' is defined by the United Nations as a child who has 'lost one or both parents'. An estimated 13.4 million children and adolescents (0-17 years) worldwide had lost one or both parents to AIDS as of 2015.[5] Every 2.2 seconds a child loses a parent somewhere in the world. Orphanage is the name given to a residential institution that provides care and education to orphans. Lack of access to antiretroviral treatment, and the protracted and latent nature of HIV/AIDS mean that increasing numbers of children will have to spend much of their childhood years with an infected parent or as an orphan.[6] Parental illness or loss, permeates all aspects of a child and often changes their lives drastically, leading to their admission in Orphanages. Most of the children living with HIV were infected due to mother-to-child transmission, where the mothers become ill or die when the children are still very young, then they depend on a caregiver. If the children are very young, they will not understand the disease; and the steps they have to take is to stay healthy, to maintain healthy diet and to adhere to the treatment. So, the caregivers should take care of the needs of these children.

HIV is a chronic condition and HIV infected orphan children are the most vulnerable and neglected group in the society, susceptible to infections and undernutrition. Inspite of the seriousness of the problem, the number of studies conducted on health and nutritional status among HIV infected orphan children is still relatively inadequate; Hence there is a need for assessment of health and nutritional status among HIV infected children living in orphanages in order to identify the deficiencies, to treat early the disease condition, and to provide them the essential health education.

Objectives

To assess the health status of HIV infected children living in the orphanages. To assess the nutritional status among the HIV infected orphan children.

METHODS

It was a community based cross-sectional study. Study included HIV infected children of age group 1 to 15 years, living in the orphanages of Rajamahendravaram.

The list of all HIV infected children, aged 1 to 15 years was obtained from the registers of the orphanages.

Sampling method

There are 2 registered orphanages for HIV infected children in Rajamahendravaram, both were included in the study; the study subjects were selected by consecutive sampling method. Sample size was 150 children.

Inclusion criteria

Children between 1 to 15 yrs of age, irrespective of their gender; registered and living in the orphanage for more than 6 months; willing to participate in the study were included.

Exclusion criteria

Children suffering from severe sickness and unable to respond; mentally retarded, non-cooperative and not willing to participate; children whose records were incomplete; children who were not available for interview during 3 successive visits to orphanage were excluded from the study.

Study period

The study was conducted for two months from October 2018 to December 2018.

Study tools

Semi structured schedule, infantometer, stadiometer, salter scale and bathroom weighing scale were used for the measurement of variables; Mouth mirror and flash light were used for the clinical examination of the variables.

Ethical approval

Ethical approval was obtained from Institutional ethics committee, and necessary permission was obtained from concerned authorities of the orphanages.

Data collection

There are two registered orphanages for HIV infected children in Rajahmahendravaram. A total of 150 children were enrolled for the study. Each orphanage was approached; the purpose of the study and the process involved in the study was explained to the authorities and caregivers of the orphanages; required permission was obtained from the concerned authorities. On the assigned date, the orphanage was visited, written informed consent was obtained from caregivers for all study participants, and assent to participate in the study was given directly by children in the appropriate age groups. First, data regarding age, sex, religion, caste, original place of residence and duration of stay in the orphanage was collected from the social records; Birth history and WHO clinical staging was obtained from the medical records of

the orphanage. After collection of socio demographic data, the study subjects were invited to participate in the study; interview was conducted in a room within the premises of the orphanage. The study participants were explained about the purpose and procedure of the study, and were assured about the anonymity and confidentiality of the information shared by them. Information was obtained by applying semi-structured schedule method. Health status was assessed by a schedule for morbidity profile; Nutritional status was assessed by anthropometric measurement, clinical examination and schedule for dietary intake. A predesigned, prevalidated and pretested semi structured schedule was used to collect information regarding orphan status, reason for admission in the orphanage, education, morbidity profile and dietary intake. Information regarding dietary intake was obtained by a dietary assessment tool, which includes a structured interview on foods consumed on the previous day (24 hour dietary recall method); and also by a food groups frequency schedule on the frequency of intake of food groups in a month. For children between 1 to 4 years of age, data was recorded as per the information given by the caregiver. After interview each study participant was subjected to anthropometric measurement and clinical examination in a room with good day light. Height was measured with infantometer for children less than 2 years; with stadiometer for children more than 2 years, in cm to the nearest 1 cm. Weight was measured with salter scale for children less than 2 years; with bathroom weighing scale for children more than 2 years, to the nearest 100 gm. weighing tools were regularly standardized with known standard weights. Z scores were calculated using the anthropometric measurements of the study participants and WHO reference growth charts were used to assess their nutritional status. Mouth mirror and flash light was used for clinical examination of the study participants.

Data analysis

The obtained data was analyzed by using the SPSS software, version 20. Results were presented as percentages, proportions, mean and standard deviation.

RESULTS

In the present study out of total 150 HIV infected orphan children 53.33% were boys, and the mean age was 8.6±2.78 years; 46.67% were girls, and the mean age was 9.97±2.88 years. Majority (53.33%) of study participants were between 6 to 10 years of age group, and higher proportion of children (83.33%) were living in the orphanage for more than one year. 9.46% of children stated that they had never been to school. As per religion wise distribution, majority (63.33%) were Hindus. Data collected from social records of orphanage revealed that more than half of the children (53.33%) were from urban area. Among the total study participants 33.33% were double orphans, and 30% of children were admitted in the orphanage due to social discrimination (Table 1).

Birth history of HIV infected children showed that 26% of them were born with birth weight <2.5 kg and majority (83.33%) were born in hospital setup. 76.67% of children depended on artificial feeds in the first six months of their life (Table 2). Morbidity profile represents that 64% of children were in WHO clinical stage 1, 60% had illness in the last six months, and 30% had history of diarrhea. Majority (77.33%) of children stated that they were on ART for more than 12 months (Table 3).

Anthropometric measurements showed that 46.65% of HIV infected children were underweight, and it is higher in boys than girls; in half (50%) of the study participants stunting was observed, whereas it is more in girls compared to boys. Wasting was observed in 22.6% of study participants (Table 4).

On clinical examination of the study participants it was observed that 40% of children had poor general appearance, 36.67% had marked angular stomatitis, and majority (90%) had teeth discoloration (Table 5). Dietary assessment by 24-hour recall method indicates that major part of the energy intake is from cereal based grains (59.01%) (Table 6). Food groups frequency schedule reflects that cereals were consumed daily by all children. Non vegetarian food was consumed monthly once by majority (92.66%) of study participants (Table 7).

Table 1: Socio-demographic characteristics of study participants.

Variables	N (%)
Age (years)	
1-5	15 (10)
6-10	80 (53.33)
11-15	55 (36.67)
Gender	
Male	80 (53.33)
Female	70 (46.67)
Duration of stay in the orphanage	
6 months to1 year	25 (16.67)
>1 year	125 (83.33)
Educational level	
Never been to school	14 (9.46)
Primary	114 (77.03)
Secondary	20 (13.51)

Continued.

Variables	N (%)
Caste	
OC	55 (36.67)
BC	50 (33.33)
SC	35 (23.33)
ST	10 (6.67)
Religion	
Hindu	95 (63.33)
Christian	55 (36.67)
Muslim	0
Others	0
Place of residence	
Rural	70 (46.67)
Urban	80 (53.33)
Orphan status	
Maternal orphans	55 (36.67)
Paternal orphans	10 (6.67)
Both parents alive	35 (23.33)
Double orphans	50 (33.33)
Reason for admission in orphanage	
Social discrimination	45 (30)
Parents not alive	50 (33.33)
Poverty	35 (23.33)
Education	20 (13.33)

Table 2: Birth history of study participants.

Variables	N (%)
Place of delivery	
Home	25 (16.67)
Hospital	125 (83.33)
Type of delivery	
Normal vaginal delivery	120 (80)
Caesarean section	30 (20)
Birth weight (kg)	
<2.5	39 (26)
≥2.5	111 (74)
Type of feeding	
Breast feeding	30 (20)
Artificial feeding	115 (76.67)
Mixed feeding	5 (3.33)

Table 3: Morbidity profile of the study participants.

Variables	N (%)
Illness in the last 6 months?	
Yes	90 (60)
No	60 (40)
Type of illness	
Cough and cold	70 (46.67)
Fever	85 (56.67)
Pneumonia	31 (20.67)
Diarrhoea	45 (30)
Skin infection	25 (16.67)
Other	35 (23.33)
Hospitalization in the last 1 year	
Yes	40 (26.67)
No	110 (73.33)

Continued.

Variables	N (%)
WHO clinical staging	
Stage 1	96 (64)
Stage 2	29 (19.33)
Stage 3	23 (15.33)
Stage 4	2 (1.34)
On ART	
Yes	120 (80)
No	30 (20)
ART duration	
<12 months	34 (22.67)
≥12 months	116 (77.33)
Loss of appetite	
Yes	45 (30)
No	105 (70)
Oral thrush	
Yes	45 (30)
No	105 (70)
Constipation	
Yes	30 (20)
No	120 (80)
Bloating sensation/heart burn	
Yes	35 (23.33)
No	115 (76.67)

Table 4: Anthropometric classification of undernutrition among HIV infected children according to gender.

Undernutrition indicators	N=n1+n2 (%)	Boys n1 (%)	Girls n2 (%)
Under weight (weight for age)			
Mild (>-2SD to <-1SD)	42 (27.99)	20 (47.62)	22 (52.38)
Moderate (>-3SD to <-2SD)	20 (13.33)	14 (70)	6 (30%)
Severe (<-3SD)	8 (5.33)	6 (75)	2 (25)
Total	70 (46.65)	40 (57.14)	30 (42.86)
Stunting (height for age)			
Mild (>-2SD to <-1SD)	48 (32)	20 (41.66)	28 (58.33)
Moderate (>-3SD to <-2SD)	20 (13.33)	12 (60)	8 (40)
Severe (<-3SD)	7 (4.67)	4 (57.14)	3 (42.85)
Total	75 (50)	36 (48)	39 (52)
Wasting (weight for height)			
Moderate (>-3SD to <-2SD)	22 (14.62)	12 (54.55)	10 (45.45)
Severe (<-3SD)	12 (7.98)	7 (58.33)	5 (41.67)
Over weight (+1SDto+2SD)	0	0	0
Total	34 (22.6)	19 (55.88)	15 (44.12)

Table 5: Clinical examination profile of study participants.

Clinical signs	Category	N (%)
General appearance	Good	60 (40)
	Fair	25 (16.67)
	Poor	60 (40)
	Very poor	5 (3.33)

Continued.

Clinical signs	Category	N (%)
Hair	Normal	115 (76.67)
	loss of luster	30 (20)
	Discoloured and dry	5 (3.33)
	Sparse and brittle	0
Eye discharge	Absent	125 (83.33)
	watery	25 (16.67)
	Mucopurulent	0
Lips	Normal	120 (80)
	Angular stomatitis	30 (20)
	Mild	19 (63.33)
	Marked	11 (36.67)
Gums	Normal	130 (86.67)
	Bleeding	20 (13.33)
	Pyorrhoea	0
	Retracted	0
Teeth	Absent	5 (3.33)
	Chalky	100 (66.67)
	Pitting	45 (30)
	Discoloured	135 (90)
Skin	Normal	110 (73.33)
	Loss of luster	35 (23.33)
	Dry and rough	4 (2.67)
	Hyperkeratosis	1 (0.67)
Bones	Normal	150 (100)
	Rickets	0

Table 6: Dietary intake (food consumption) by study participants (24 hours recall method).

Food group	Mean energy intake/ day (kcal/day)	Percentage (%)
Cereal based grains	1245	59.01
Vegetables	66	14.76
Legume grains	47	2.46
Egg	56	6.56
Meat	32	4.92
Fruits	26	4.09
Fats and Oils	115	2.46
Sugar	58	5.74
Total	1645	100

Table 7: Frequency of consumption of food groups by study participants.

Food group	Frequency			
	Daily N (%)	**Weekly N (%)**	**Monthly twice N (%)**	**Monthly once N (%)**
Pulses and legumes	0	145 (96.67)	5 (3.33)	0
cereals	150 (100)	0	0	0
Milk and milk products	119 (79.33)	31 (20.67)	0	0
Green leafy vegetables	0	145 (96.67)	5 (3.33)	0
fats and oils	80 (53.33)	70 (46.67)	0	0
meat, fish and poultry	0	1 (0.67)	10 (6.67)	139 (92.66)

DISCUSSION

In the present study majority (53.33%) of HIV infected children were between the age group of 6 to 10 years. The probable cause may be vertical transmission from mother to child. The mean age of study participants was 9.28±2.88 years. A study conducted by Swetha et al found that the mean age of children was 9.2 years, which is consistent with the present study finding.[7] School going period is very crucial period for every child as it is the

dynamic period of growth and development during which the child undergoes emotional, physical, mental and social changes. On the other side it is also considered as the period during which the foundations of good health and sound mind can be laid for the later life period. The present study revealed that 9.46% of children had never been to school, this can be attributed to their health condition, and also may be due to lack of care and support by the caregivers towards these children. The study finding is similar to a study conducted by Ji et al, which reported that although all the children were at school age, 11.7% of children were not attending school.[8] Religion wise distribution of HIV infected children shows that out of the total 150 children in the study, 63.33% were from Hindu background, this may be due to Hindu dominated study area. Area of residence serves as a proxy for various factors at community level, including behavioural factors, environmental factors, and availability of health care and support services. As per the data on original place of residence, it was observed that majority of children were from urban area; the reason may be occupation, life style factors and habits of their parents. 43.34% of children had history of single parent care, later placed in the orphanage; the reason may be HIV infected parent, social discrimination or their poor economic status. A study conducted by Ji et al reported that in 15.0% of families, at least one parent had died, which is of less percentage than the present study; The reason for the difference was only those families that had children between the age of 6 and 18 years were included in the study.[8]

In the present study 30% of children were admitted in the orphanage due to social discrimination, the reason behind may be the HIV related stigma and discrimination towards them and their families. Birth history of study participants revealed that 26% of children were born with low birth weight. Similar findings were observed in a study conducted by Sunguya et al.[9] The reason for low birth weight may be maternal HIV infection or preterm delivery. Maternal HIV infection leads to higher rates of maternal opportunistic infections, which are associated with fetal growth retardation leading to smaller size and low birth weight babies.[10]

Regarding morbidity profile of the study participants, the present study shows that 60% of children had history of illness during the last 6 months. This finding is supported by a study conducted by Mon et al which reported that nearly half of the children had a history of illness within last 6 months.[11] In the present study most common illnesses reported were cough, cold, pneumonia, diarrhoea and skin infections; 30% of children had history of diarrhoea, in contrast to this finding was a study done by Bachou et al, which reported that 38% children had diarrhoea, the reason for difference was the study was done among severely malnourished and hospitalized children in Uganda.[3] It was also observed that majority (64%) of children were in clinical stage 1, this finding is in contrast with the study finding reported by Shet et al, which found that stage 1 and 2 constituted 69%.[12]

In the present study all HIV infected children were registered for ART but 20% of them responded that they were not on ART on the day of interview, the possible cause may be ART pill burden; and lack of care, counselling and support from caregivers leading to poor drug compliance. On clinical examination, it was observed that the study participants had different clinical signs like poor general appearance, lusterless hair and skin, watery eye discharge, angular stomatitis, bleeding gums and teeth discoloration; all these visible signs are suggestive of malnutrition.

In the present study 46.65% of HIV infected children were underweight, and 50% were stunted indicating that undernutrition is highly prevalent among study participants; The study findings are similar to a study conducted by Swetha et al, which reported that 46.8% of children were underweight and 59.7% were stunted.[7] In a study conducted by Padmapriyadarsini et al stunting was observed in 58% of HIV infected children, which is comparable to the present study finding.[13] Genderwise distribution reveals that stunting prevalence is high among girls, which indicates chronic undernutrition; The probable cause may be sex preference and unbalanced care of children based on their sex. It was observed that prevalence of wasting is 22.6 %, this finding is consistent with a study conducted by Kapavarapu et al, which reported wasting in 27% of children.[14] The underlying cause for undernutrition in the study subjects might be due to low birth weight, lack of breastfeeds in early life, early weaning from breast, inadequate supplementary feeding, loss of passive immunity from mother, inadequate diet in terms of quantity and quality leading to recurrent infections and poor nourishment.

Regarding dietary intake by 24 hour recall method, it was found that major part of the energy intake was contributed by cereal based grains (59.01%), and the mean energy intake (1645 kcal/day) of the children per day was lower than that of the daily requirement recommended by WHO.[15] The study finding is dissimilar to a study conducted by Shiau et al, which reported mean energy intake of 1341 kcal/day, which is lower than the present study finding, the reason behind is the difference in the age, energy requirements and food habits of the study participants.[16] On the whole the consumption of food groups by the children is less, this may adversely affect the nutrient absorption and metabolism resulting in failure to meet nutritional needs, leading to decreased immunity and increased susceptibility to opportunistic infections, which may lead further to undernutrition. The probable cause for low energy intake may be inadequate and poor quality of food offered in the orphanage, same dietary menu being followed for years, ART pill burden or sickness in children resulting in refusal of feeds.

Regarding frequency of consumption of food groups by the children, it was observed that all children (100%) consume cereal based grains daily, where as 92.66% responded that they consume non vegetarian foods like meat, fish and poultry monthly once, which indicates that protein intake is less among study participants; In contrast to this finding was a study conducted by Martín-Cañavate et al, which reported consumption of meat, fish and poultry three times a week.[17] In the present study low frequency of intake of non-vegetarian food groups might be due to lack of financial aid; lack of care and support from orphanage authorities and caregivers; and primary caregiver is not the mother but caregiver of the orphanage; and also may be due to ART intake.

Limitations of the study

The present study was done on a small sample; possibility of recall bias and social desirability bias cannot be ruled out. The nutritional status was assessed by clinical, anthropometric and dietary intake assessment; Biochemical assessment was not done due to time and monetary constraints. Due to logistical reasons we were only able to obtain data on 1-day 24-hour recall as opposed to the preferred 3-day 24-hour recall.

CONCLUSION

Unhealthy condition and undernutrition is highly prevalent in HIV infected children living in the orphanages. Underweight is high among boys than girls whereas stunting prevalence is high among girls indicating chronic undernutrition. Mean energy intake per day and frequency of food groups consumption by the children is less than the recommended requirements by WHO. Hence, their needs are to be addressed, and all efforts need to be directed at alleviating undernutrition and ill health of HIV infected children living in the orphanages.

Recommendations

Health and nutritional status of HIV infected children living in the orphanages is unsatisfactory. Hence, there is a need to focus on preventive measures like health education. In this aspect the caregivers should be counselled on child care and support; and should be trained regularly to impart health education regarding adequate food intake and ART compliance. There should be health and nutritional assessment of the children at regular intervals, followed by timely interventions as per their needs. Social marketing of fortified and nutritious food products, and supplements specially designed for HIV infected children should be encouraged. Adequate nutrition should be integrated with the management of HIV infection. Financial assistance for provision of food supplements to malnourished children in the orphanage homes has to be supported by government and NGOs in order to meet the demands of the HIV infected children.

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