Nutritional Status of HIV+ Pre-School Children in South Africa

Summary of unpublished research

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In paediatric AIDS, nutritional status seems to be of greater prognostic value than any particular opportunistic infection. A number of studies conducted amongst HIV infected children in South Africa have found underweight prevalence figures of 25-30%, and figures of 55-60% for stunting. These are much higher than the average percentages in a national survey conducted on children below 6 years of age, which indicated that 10% were underweight and 23% stunted.

In the Eastern Cape, where the prevalence of poverty, TB and HIV is amongst the highest in South Africa, a recent study set out to determine the impact of risk factors on the prevalence of malnutrition amongst HIV infected children. It was hoped that such information would assist decision makers in the formulation of optimal nutrition strategies to limit the impact of HIV/AIDS on the health of children.

The study took place at the immunology (outpatient) clinic at Livingstone Hospital, in the Eastern Cape, South Africa, between June and August 2003. One hundred and two HIV infected children, between the ages of 18
and 72 months, were included in the study. The children were on a standard regimen, receiving antibiotic (co-trimoxazole) prophylaxis, treatment of opportunistic infections, therapeutic dosages of Vitamin A every four to six months and a daily multivitamin supplement. None of the children received antiretroviral treatment, as such treatment did not form part of the government's protocol for treatment at the time of the study. The study was undertaken with the informed and written consent from each subject's parent/caretaker.

Socio-demographic and nutritional data were collected by trained, registered dietitians, assisted by a translator when necessary. This included anthropometric measurements of height and weight, mid upper arm circumference (MUAC) and triceps skinfold thickness.

Clinical assessment data, to determine the indices of morbidity, were collated with the assistance of registered health care professionals, which included a paediatrician and a registered nurse.

Table 1 Mean weight-for-age Z-scores associated with dietary characteristics and nutrition related complications

<table>
<thead>
<tr>
<th>Group 1</th>
<th>n (%)</th>
<th>mean WAZ</th>
<th>Group 2</th>
<th>n (%)</th>
<th>mean WAZ</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food insecurity</td>
<td>39 (38)</td>
<td>-1.99</td>
<td>Food security</td>
<td>63 (62)</td>
<td>-1.93</td>
<td>0.43</td>
</tr>
<tr>
<td>Mixed feeding at 6 weeks</td>
<td>37 (36)</td>
<td>-2.39</td>
<td>Breastfeeding at 6 weeks</td>
<td>28 (27)</td>
<td>-1.63*</td>
<td>0.03*</td>
</tr>
<tr>
<td>Mixed feeding at 6 months</td>
<td>38 (37)</td>
<td>-2.14</td>
<td>Weaning diet at 6 months</td>
<td>50 (49)</td>
<td>-1.88</td>
<td>0.21</td>
</tr>
<tr>
<td>Mixed feeding at 12 months</td>
<td>7 (6)</td>
<td>-3.13</td>
<td>Weaning diet at 12 months</td>
<td>86 (85)</td>
<td>-1.92</td>
<td>0.001*</td>
</tr>
<tr>
<td>Decreased food intake (symptom-related)</td>
<td>69 (68)</td>
<td>-2.18</td>
<td>No anorexia, nausea, vomiting, sore mouth</td>
<td>33 (32)</td>
<td>-1.5</td>
<td>0.01*</td>
</tr>
<tr>
<td>Chronic diarrhoea</td>
<td>38 (37)</td>
<td>-2.37</td>
<td>No chronic diarrhoea</td>
<td>64 (63)</td>
<td>-1.71</td>
<td>0.01*</td>
</tr>
<tr>
<td>HIV SymptomaticHIV Symptomatic</td>
<td>44 (43)</td>
<td>-2.4</td>
<td>Asymptomatic</td>
<td>56 (55)</td>
<td>-1.59</td>
<td>0.005*</td>
</tr>
<tr>
<td>TB Symptoms</td>
<td>27 (26)</td>
<td>-3.86</td>
<td>No TB symptoms</td>
<td>73 (74)</td>
<td>-2.12</td>
<td>0.001*</td>
</tr>
<tr>
<td>Use of garlic</td>
<td>28 (27)</td>
<td>-2.02</td>
<td>No use of garlic</td>
<td>74 (73)</td>
<td>-1.93</td>
<td>0.39</td>
</tr>
<tr>
<td>Use of African potato</td>
<td>22 (21)</td>
<td>-1.8</td>
<td>No use of African potato</td>
<td>80 (79)</td>
<td>-2.00</td>
<td>0.28</td>
</tr>
</tbody>
</table>

*Significant difference to the 95% confidence interval

**Findings**

**Nutritional status**
The children in the sample (mean age 40.7 months) had a mean weight-for-age Z-score (WAZ) of -1.96 (SD=1.57), a mean height-for-age Z-score (HAZ) of -2.48 (SD=1.6) and a mean weight-for-height Z-score (WHZ) of -0.66 (SD=1.53). Although half (50.9%) of the children were underweight (WAZ < -2) and 58.8% were stunted (HAZ < -2), only 21.5% had a WHZ below -2. Eight children (7.8%) were severely malnourished (WHZ < -3). Twelve subjects (11.7%) had a MUAC below the cut-off value of 12.5 cm.

**Food intake**

Retrospective data on food intake, summarised in table 1, showed that only 28 (27%) of the children were exclusively breastfeeding at six weeks of age, while 28 children (27%) were formula fed and 37 children (36%) had received a combination of breast milk and other feeds (mixed-feeding). A history of mixed-feeding in infants below 12 months of age was associated with significantly worse mean WAZ scores, than the other feeding options.

Food insecurity was reported by 39 (38%) of the children’s carers interviewed. No significant differences in the mean WAZ scores was demonstrated between the food secure and food insecure groups. However, classification of symptomatic HIV and the presence of TB signs were associated with a significantly lower WAZ.

The vast majority of the children (99%, n=100) had received multivitamin supplementation since birth. However, their nutritional status, and especially the mean WAZ scores, were worse than data published from other studies on HIV infected preschool children in other parts of the country.

Data on the use of alternative complementary therapies indicated that 20 to 30 percent of the sample received products like garlic, lemon and the African Potato (Hypoxix). No significant difference in the mean WAZ scores was found between the groups making use of such products and those who were not.

**Indices of morbidity**

Nearly half (43%) of the children were categorised by the paediatrician as HIV symptomatic, while twenty seven children (26%) either were on TB treatment or presented with signs of TB on the day of screening. A decreased
food intake due to anorexia, nausea, vomiting, sore mouth or dysphagia was reported in sixty-nine children (68%), while 38 children (37%) suffered from chronic diarrhoea. Both decreased food intake and chronic diarrhoea were significantly associated with a poorer mean WAZ score (p<0.05). The sample suffering from chronic diarrhoea had a significantly lower WHZ score than those without (p<0.01).

**Discussion**

At many primary health care services and at dedicated HIV clinics, weight is the only recorded measurement obtained from HIV+ children. The high prevalence of stunting, as demonstrated in this study, suggests that many children may be adapting to a chronic state of illness.

Nutrition intervention in the form of macronutrient food supplementation, only takes place in those children who clinically appear to be severely malnourished. The stunting in the majority of the sample may create the false perception with most health professionals that the children's nutritional status is acceptable. A large group which is vulnerable with low WAZ scores, but relatively good WHZ scores, may therefore be missed. The study indicates that in the absence of comprehensive nutrition assessment, simple markers, like the presence of chronic diarrhoea and loss of appetite, can be used to refer these patients for a more detailed nutritional screening to determine whether they qualify for nutrition intervention in the form of supplementation.

Education forms the cornerstone of preventative therapy and it is vitally important that parents/caretakers receive comprehensive and accurate information. Patients seen by the health care providers must be given health education at antenatal clinics regarding infant feeding and the dangers of early mixed feeding, especially if infants are HIV positive. Alternative remedies are currently aggressively being promoted in the popular media in preference to sound nutrition practices, which is contributing to a great deal of uncertainty amongst health care workers about alternative complementary therapies. This study indicated no nutritional benefits are derived from such practices. Nutritional management of disease complications, in particular diarrhoea and anorexia need to be addressed, as these variables indicated a significant relationship with malnutrition and wasting.

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5. As confirmed by Enzyme-linked immunosorbent assays.