Impact of oral health on the quality of life of 3–6-years old HIV-infected children. Quality of life in HIV+ children

ABSTRACT

Aim The objective was to assess the impact of oral health on the quality of life of HIV-infected patients aged 3-6 years based on their caregivers’ perceptions.

Methods A questionnaire for measuring the perception and the instrument Early Childhood Oral Health Impact Scale (ECOHIS) were applied to 31 caregivers whose children were being treated in a public hospital.

Results The mean age of the children was 4.52 years (SD 1.22). The total ECOHIS score ranged from 0 to 26, with a mean value of 4.13 (SD 6.66). Seventeen children (54.8%) were found to have at least one impact: toothache (64.7%), herpetic gingivostomatitis (23.5%) or both (11.8%). Statistically significant difference was found between the ECOHIS score and presence of restored teeth, prior dental treatment, AIDS, and viral load. With respect to the caregivers’ perception, it resulted to be adequate, as those caregivers whose children had a greater number of decayed teeth and higher biofilm index also considered the oral health to be bad (P<0.001). However, the children’s general health was found to be good despite the worse immunological classification (P<0.017).

Conclusion The quality of life of the HIV-infected children has been negatively affected by the oral health.

Keywords: Child; HIV infection; Oral health; Quality of life.

Introduction

Children can be commonly affected by oral cavity problems such as caries, dental trauma, dental eruption, lesions and malocclusions [America/POM MAR, 2004]. All these problems may have a negative impact on the quality of life whenever pain, masticatory difficulties, appetite loss, weight loss, insomnia, behavioral changes, decreased school attendance, and physical restrictions are observed [Acs and Ng, 2002; Gift et al., 1992]. This negative impact can be more significant in HIV-infected children because oral lesions associated with immune condition and disease progression frequently affect them. Candidiasis, increased parotid gland, herpetic stomatitis, hairy leukoplakia, linear gingival erythema, and cervical lymphadenopathy are amongst the most common orofacial lesions [Chigurupati et al., 1996]. It is worth emphasising that the use of antiretroviral therapy by the children has been decreasing the prevalence of oral soft tissue lesions over the years.

Children represents a special group in which factors related to caries disease and gingivitis take part of their daily life which explains its high prevalence. Long-term use of sugary medications, change in the salivary flow due to medication use and/or salivary gland alterations [Ribeiro et al., 2002], diet rich in carbohydrates [Ribeiro et al., 2002; Souza et al., 1996], repeated hospitalisations [Ribeiro et al., 2002], poor oral hygiene [Souza et al., 1996], immune-suppression by HIV-infection [Castro et al., 2001] are amongst these factors.

Little is known about the difficulties and adverse factors that affect children living with HIV/AIDS in Brazil and their families, despite efforts to systematisation of experience relating to institutional care to that clientele, carried out by civil society organisations, many of them with government support and international agencies [America/POM MAR, 2004].

As there are few studies on the quality of life of HIV-infected children as well as on the relevance of the oral problems, the objective of the present article is to assess the oral health impact on the quality of life of 3-6 years old HIV-infected children.

Methods

The sample was conveniently selected and consisted of 31 caregivers whose HIV-infected children were being treated at an AIDS outpatient clinic of a public hospital. The study was approved by an Ethics Committee and an informed consent form was signed by the caregivers.

After filling the identification card, the caregivers were interviewed by one investigator who applied the questionnaire Early Childhood Oral Health Impact Scale (ECOHIS) [Pahel et al., 2007] in order to assess the impact of oral health on the quality of life of their children and families. This ECOHIS consists of 13 questions (Table 1) and has two main parts: part one is the child impact section and part two is the family impact section. The scale is scored using a simple Likert frequency type scale, with responses ranging from "Never" to 'Very often' (scores of 0–4). Item scores are simply added to create a total scale score which range of 0–52, with higher scores indicating greater impacts and/or more problems [Li et al., 2008]. In addition to the questionnaire, four questions were added in order to assess the caregiver’s perception of their children’s oral and general health (Table 4) of which three ones were used for validating the questionnaire for Brazilian children [Tesch et al., 2008].

Next, oral examination was performed to evaluate presence of carious lesion in dentine, restored teeth, early tooth loss, root residues, color changes in the superior...
anterior region, anterior open bite, biofilm index and presence of oral manifestations due to HIV infection. Data on clinical and immune classifications as well as on drug therapy were obtained from medical records.

The data were analysed by using a SPSS Program. In order to evaluate the mean ECOHIS values and the caregiver’s perception in relation to the data obtained, Student’s t test, Mann-Whitney’s test, and Spearman’s correlation coefficient were used at 5% statistical significant.

Results

Thirty-one caregivers were interviewed, with the great majority being female (87.1%) and 58.1% being the mothers. The mean age of the respondents was 32.55 years (SD=8.10), and 22 were unemployed. Most of the respondents have not completed secondary school.

The mean age of the children was 4.52 years (SD=1.22), and 54.8% were girls. The great majority of them were going to school or nursery school. With respect to oral hygiene habits, 11 children brushed their teeth by themselves, 9 were helped by their caregivers, 10 had their oral hygiene performed by the caregivers, and 2 had no oral hygiene at all. Only 6 children used dental floss, and a diet rich in sucrose was reported by 18 caregivers.

Twenty-nine (93.5%) respondents reported that they had been already instructed about oral hygiene.

With respect to the impact of oral health on the children’s quality of life, the total ECOHIS score ranged from 0 to 26 (mean 4.13; SD 6.66). The confidence rate for the ECOHIS questionnaire was evaluated by using internal consistency, and a satisfactory result was obtained for the 13 questions analysed (Cronbach’s $\alpha = 0.89$). Table 1 shows the mean scores obtained for each question. Seventeen (54.8%) children had at least one impact, which ranged from 0 to 13. The caregivers cited tooth pain (64.7%), recurrent gingival stomatitis (23.5%) or both. If only questions on children are considered (items 1-9), 17 (54.8%) presented at least one impact resulting from oral problems. On the other hand, questions on family (items 10-13) indicated some impact in 8 (25.8%) cases.

The mean ECOHIS score for girls was lesser (3.76) than that for boys (4.57), but no statistical significance was found (Student’s test; $P>0.05$). It was also observed the ECOHIS score was not influenced by caregiver’s gender (Student’s test; $P>0.05$), family income, child’s age (Pearson’s correlation coefficient; $P>0.05$) or caregiver’s educational level (Spearman’s correlation coefficient; $P>0.05$).

Table 2 shows the results obtained from the clinical examination and their relationship with ECOHIS total mean score. The mean number of teeth affected by oral manifestations is the following: teeth with carious lesions (3.55, SD=4.13), teeth with cavity lesions in dentin (2.42, SD=3.24), teeth with restorations (0.29, SD=0.74), prematurely lost teeth (0.29, SD=0.74), teeth with color change in the superior-anterior region (0.23, SD=0.50), and root residues (0.48, SD=1.57). Nevertheless, these results had no influence on the ECOHIS total mean score (Pearson’s correlation coefficient; $P>0.05$).

Twenty-one children (67.7%) had already been submitted to dental treatment, including restorations and extractions. A statistically significant relationship was

<table>
<thead>
<tr>
<th>Question</th>
<th>% (n)</th>
<th>Mean Scores (SD)</th>
</tr>
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<tbody>
<tr>
<td>1. Has your child ever felt pain in his/her teeth, in the mouth or jaws?</td>
<td>48.4 (15)</td>
<td>1.06 (1.29)</td>
</tr>
<tr>
<td>2. Has your child ever had difficulty drinking hot or cold drinks due to problems with his/her teeth or dental treatment?</td>
<td>19.3 (6)</td>
<td>0.35 (0.76)</td>
</tr>
<tr>
<td>3. Has your child ever had difficulty eating certain foods due to problems with his/her teeth or dental treatment?</td>
<td>35.5 (11)</td>
<td>0.77 (1.15)</td>
</tr>
<tr>
<td>4. Has your child ever had difficulty pronouncing any word due to problems with his/her teeth or dental treatment?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5. Has your child ever missed daycare, nursery school or regular school due to problems with his/her teeth or dental treatment?</td>
<td>12.9 (4)</td>
<td>0.19 (0.54)</td>
</tr>
<tr>
<td>6. Has your child ever had difficulty sleeping due to problems with his/her teeth or dental treatment?</td>
<td>12.9 (4)</td>
<td>0.29 (0.78)</td>
</tr>
<tr>
<td>7. Has your child ever been irritable or moody due to problems with his/her teeth or dental treatment?</td>
<td>12.9 (4)</td>
<td>0.29 (0.78)</td>
</tr>
<tr>
<td>8. Has your child ever avoided smiling or laughing due to problems with his/her teeth or dental treatment?</td>
<td>6.4 (2)</td>
<td>0.13 (0.50)</td>
</tr>
<tr>
<td>9. Has your child ever avoided speaking due to problems with his/her teeth or dental treatment?</td>
<td>3.2 (1)</td>
<td>0.06 (0.36)</td>
</tr>
<tr>
<td>10. Have you or anyone in your family ever been bothered due to problems with his/her teeth or dental treatment?</td>
<td>12.9 (4)</td>
<td>0.32 (0.83)</td>
</tr>
<tr>
<td>11. Have you or anyone in your family ever felt guilty due to problems with his/her teeth or dental treatment?</td>
<td>12.9 (4)</td>
<td>0.42 (1.12)</td>
</tr>
<tr>
<td>12. Have you or anyone in your family ever missed work due to problems with his/her teeth or dental treatment?</td>
<td>12.9 (4)</td>
<td>0.26 (0.73)</td>
</tr>
<tr>
<td>13. Has your child ever had problems with his/her teeth or had dental treatment that weighed heavily on family finances?</td>
<td>3.2 (1)</td>
<td>0.06 (0.36)</td>
</tr>
</tbody>
</table>

TABLE 1 - ECOHIS questionnaire.
observed between this finding and the ECOHIS score (Student’s test; P=0.049), since patients who had never been treated before showed a mean total score of 1.90, whereas those who had been treated showed 8.80.

The treatment length of HIV infection ranged from less than 1 to 6 years, and 41.8% of the children have been under treatment for 1 year or less. This finding was shown to have no relation to ECOHIS score (Student’s test; P>0.05). The patients’ medical data can be observed in Table 3, although it was not possible to obtain such information regarding four children.

The caregivers’ perception of their children’s oral and general health was also evaluated (Table 4). Children whose caregivers perceived a poor oral health in comparison to other children had a greater number of decayed teeth and a higher biofilm index as well (Spearman’s correlation coefficient; P<0.001). The relationship between child’s oral health/well-being and number of decayed teeth was also observed (Spearman’s correlation coefficient; P<0.031). With respect to the caregiver’s perception of the child’s general health, it was observed that children presenting lower immune response and higher viral load were those whose caregivers thought they had good health in comparison to other children (Spearman’s correlation coefficient; P=0.017 and P=0.015). Such a perception was correlated with AIDS presence, advanced stage of the HIV infection (Mann-Whitney’s test, P>0.05) or clinical classification (Spearman’s correlation coefficient; P>0.05).

Discussion

With the advent of highly active antiretroviral therapy (HAART), HIV/AIDS has been reclassified from an acute, fatal disease to a chronic medical condition. As a result, traditional disease endpoints have shifted from solely prolonging survival to consideration of quality of life in conjunction with sustained health and routine clinical monitoring of health markers [De Boer et al., 1996].
Advances in medical care and treatment have changed the way those living with HIV and treatment providers view the disease, and its more acute versus long-term consequences. Therefore, assessment of health-related quality of life has become increasingly important when making treatment decisions and evaluating efficacy, especially for paediatric populations with HIV, whose ongoing adjustment to disease and treatment with increased longevity is now unknown [Garvie et al., 2009].

In order to measure the possible impacts of oral cavity problems on children’s quality of life, the questionnaire ECOHIS was developed by Pahel et al. [2007], and they observed that oral disease and related treatment experience were found to measurably affect the oral health-related quality of life.

In 2008, Tesch et al. made cultural adjustments in the questionnaire, which was found to have good psychometric properties, being considered a reliable and valid instrument for Brazilian children. In the results of our study the validation process indicated that Chronbach’s alpha was 0.89 for the whole scale, and Li et al. [2008] found 0.82, which means that we had a satisfactory result.

Although the concept of oral health-related quality of life emphasizes that the patient evaluation should be performed based on his/her perception [Low et al., 1999], the present study used information from caregivers because the children were too young to provide reliable and valid data. And considering parents’ central role in ensuring the well-being of young children, it is important to explore their perceptions about the oral health [Talekar et al., 2005a]. Some authors believe that 3-6-years-old children have difficulty in verbalising their emotions and feelings and suggest that the questionnaire should be completed by their caregivers in order to assess their children’s quality of life [Low et al., 1999; McGrath et al., 2004; Pahel et al., 2007]. In this age group, the child has a close relationship with the caregivers. As a result they can provide useful information on the impact of the disease on the child’s quality of life as well as on the family. Such a relationship is even more important for chronic patients, who often receive more attention because of their systemic condition. In the present work, however, it should be pointed out that the majority of the respondents were the mothers of the children, since they are used to accompanying them and providing oral hygiene, food, and medication.

In spite of the fact that the study was carried out in a reference center for treatment of HIV-infected children, the sample consisted of 31 children only. This sample size should not be considered small as it is very difficult to select children presenting with specific systemic condition in this age group. Other studies involving older HIV-infected patients also had relatively small samples, such as Thöni et al. [2006] with 23 children.
In studies with healthy children, Tesch et al. [2008] have noted that all the children had at least one impact, and Talekar et al. [2005b] have observed this in 76.8% of the sample. Our study observed 54.8% of children with this finding. During the interviews the caregivers appeared to be more concerned about the general health than the oral health as a result of the HIV infection, thus placing less importance on their quality of life. All the children had been maternally infected, and most of the mothers stated that they feel guilty, causing them to have a greater interest for their children. It was also observed that caregivers did not promote the oral health to improve and control the general health of their children.

According to the caregivers, pain and masticatory difficulties were the highest impacts and had the highest individual mean score as well. Tesch et al. [2008] have found that irritation was one of the most cited impact. Only four caregivers cited irritation due to oral problems. Li et al. [2008] found that pain and irritation were the most cited impacts. And Pahel et al. [2007] found that pain and take time off from the family member work were the most cited items.

Amongst the impacts, the majority of caregivers reported tooth pain and recurrent herpetiform stomatitis. The prevalence of lesions caused by herpes in HIV-infected children is common. These recurrent, chronic, painful lesions affect the mucous membrane and are usually accompanied by fever and lymphadenopathy [Ramos-Gomez et al., 1999]. In the present work a few caregivers reported that their children’s quality of life was affected by the presence of oral lesions. This may be the result of the drug therapy used in HIV-infected patients, which has been reducing the oral manifestations over the years as well as improving the quality of life. The prevalence of oral manifestations was not significant as most patients presented with lymphadenopathy (N=17) and a few ones (N=4) with parotid hypertrophy. It was observed that children presenting with lymphadenopathy had ECOHIS score higher than that from children without such a lesion. On the other hand, children with parotid hypertrophy had lower ECOHIS scores compared to children without this oral manifestation. The presence of parotid hypertrophy has been related to a slower progression of HIV infection [Ramos-Gomez et al., 1999].

White spot lesion and cavitated enamel lesion were not considered oral manifestations in the present study because the former can be reverted and both cause no impact on the child’s and family’s life [Tesch et al., 2008].

As no caregiver reported dental trauma as being the cause of tooth absence, missing teeth were thought to be the result of extraction due to early tooth decay. By considering cavity lesions, restoration, early tooth loss, and root residues, the mean number of decayed teeth was relatively high (3.55) compared to that (2.1) found by Tesch et al. [2008]. Although the results showed that oral condition of HIV-infected children was worse than that of healthy children, the ECOHIS mean score (4.13) was similar to that (4.0) found by Tesch et al. [2008]. Moreover, most of the caregivers considered the oral health of their children similar to that of others at the same age.

It was also observed that patients who had previously received dental treatment showed ECOHIS scores lower than that of patients who had their teeth temporarily or definitely restored (P<0.05). Therefore, curative treatment such as tooth restoration of cavity lesions or extraction of very decayed teeth has not been effective in improving the quality of life. It is indispensable that dental treatment allies with oral health programmes so that caries disease can be prevented from occurring repeatedly. These patients usually present with new caries lesions despite already being treated, thus entering a repetitive restoratove cycle.

In the present study it was noted that patients with worsened systemic condition, which is characterised by clinical and immune classification as well as by AIDS presence, had a smaller impact on oral health as they had lower ECOHIS scores. This might be explained by the fact that caregivers pay more attention to their children due to the disease severity. Or, still, the symptoms of HIV-infection may be overcoming the problems caused by oral manifestations, thus corroborating the Maslow’s Hierarchy of Needs, which states that individuals give priority to their physiological needs for survival [Maslow, 1943].

The caregivers were also asked about their children’s oral and general perception. It was observed an adequate perception of oral health, but the same was not true regarding general health. Symptoms involving the oral cavity are more easily perceived and visualised by both patients and caregivers compared to systemic disease.

HIV infection is a chronic disease and both child and family have to live together with it, thus making it more difficult to perceive the problems inherent to such a disease.

**Conclusion**

The present study has demonstrated that almost half of the HIV-infected children had their quality of life affected by oral manifestations, mainly due to carious lesions. Therefore, oral health programmes should be specifically established for this population.

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