ORIGINAL ARTICLE

Quality of life of HIV-infected children in Brazil

Calidad de vida de niños infectados con VIH en Brasil

Lílian O. Diniz, Jorge A. Pinto

Institutional Affiliation: HIV/AIDS Maternal, Adolescent and Infant Group, School of Medicine, Federal University of Minas Gerais, Belo Horizonte, Brazil.

Summary

Introduction. Quality of life (QoL) is an important consideration in the management of chronic progressive illnesses such as acquired immunodeficiency syndrome (AIDS). It provides the opportunity to understand the effects of disease and treatment to include their impact on physical, psychological and social functioning. We evaluated the QoL of HIV-infected children and established the association between QoL and CD4 cell counts, viral load, clinical status and antiretroviral therapy (ART).

Methods. QoL was assessed by the General Health Assessment for Children developed for PACTG 219 and examined domains of health perceptions, functional status, social and role functioning, health care utilization, symptoms and associated events. Children were divided into groups according to their AIDS status, viral load, CD4 and ART.

Results. One hundred seventy four children and adolescents were evaluated. Good scores were obtained in all domains. No difference was found in QoL scores among patients with different AIDS status. Patients with higher CD4 cell percentages had better QoL in health perceptions and symptoms domains. Low viral load was related to better QoL in social and role functioning. No relationship was found between ART and QoL. Patients receiving highly active antiretroviral therapy (HAART) showed similar QoL scores in comparison with those without HAART.

Conclusion. HIV children reached high scores in all QoL domains. CD4 and viral load presented positive association with some of the domains assessed. HAART was able to provide similar QoL compared to other treatment groups, pointing to a balance between clinical benefits and side effects of therapy.

Resumen

Introducción. La calidad de vida (QoL) es una consideración importante en el manejo de enfermedades progresivas crónicas como el síndrome de inmunodeficiencia adquirida (SIDA). Proporciona la oportunidad de entender el efecto de la enfermedad y el tratamiento en el impacto del funcionamiento físico, psicológico y social. En este estudio se evalúa la QoL de niños infectados con virus de inmunodeficiencia humana y la asociación entre QoL y células CD4+, carga viral, estadio clínico y tratamiento antirretroviral (TAR).

Métodos. La QoL fue medida por el instrumento Evaluación de Salud General para Niños (*General Health Assessment for Children*, GHAC) desarrollada por PACTG 219, el cual examina dominios de percepción de la salud, estatus funcional, función social y el rol en la misma, así como utilización de servicios de salud, síntomas y eventos asociados. Los niños fueron clasificados en grupos de acuerdo a su categoría de SIDA, carga viral, células CD4 y TAR.

Resultados. Se evaluaron 174 niños y adolescentes. Se obtuvieron buenos puntajes en todos los dominios. No se observaron diferencias en los puntajes de QoL entre pacientes en diferentes categorías de SIDA. Los pacientes con mayor porcentaje de células CD4+ tuvieron mejor QoL en los dominios de percepción de la salud y síntomas. No hubo asociación entre TAR y QoL. Los pacientes que recibieron el tratamiento antirretroviral altamente activo (TARAA) mostraron similares puntajes de QoL en comparación con aquellos sin TARAA.

Conclusión. Los niños con virus de inmunodeficiencia humana obtuvieron elevados puntajes en todos los dominios de QoL, células CD4 y carga viral, presentando asociación positiva con algunos de los dominios evaluados. El TARAA fue capaz de

Corresponding author: Jorge A. Pinto.
E-mail: jpinto@medicina.ufmg.br
Date of reception: 23-02-2009.
Date of acceptation: 24-03-2009.

Key words. Quality of life; HIV, pediatrics; acquired immunodeficiency syndrome.

proporcionar similar QoL, comparado a otros grupos de tratamiento, indicando un balance entre beneficios clínicos y eventos adversos de la terapia.

Palabras clave. Calidad de vida; virus de inmunodeficiencia humana, pediatría; síndrome de inmunodeficiencia adquirida.

Introduction

Acquired immunodeficiency syndrome (AIDS) is a viral disease that leads to immune suppression. When it was first described, the disease was fatal, acute and had limited therapeutic options. After 26 years, researches resulted in discovery of new drugs that associated, could limit viral replication and improve patient's immune response. Actually it is possible to live better and longer with no manifestations of this disease or its associated opportunistic infections. AIDS has turned to be a chronic disease with better life expectancy.

Health related quality of life (QoL) has been an important concern between professionals dealing with human immunodeficiency virus (HIV) patients. As life expectancy increases, little is known about the real benefits that can occur in patient's QoL. It has been enthusiastically used by clinicians and researches. It is not a new concept, but in the last years has gained importance because of great medical advances in technology that can influence positively patient's well being.[1]

There is no agreement about the better definition of QoL. Some studies describe it as health, environment, financial structure, relationships, time to work and leisure. In medical literature it has been associated to satisfaction, well being, happiness, sense of life, functional status and social adjustment.[1,2] Patients living with chronic disease use to associate QoL to good relationships, safety, recreation activities, independency and capability of taking care of their selves.[3,4] The World Health Organization defines QoL as mental and social well being.[1]

Disease and treatment impact on health related QoL must be studied better. Highly active antiretroviral therapy (HAART) has been responsible for good results obtained in clinical and laboratory exams of patients living with the HIV, but little is known about its influence in QoL. Better life expectancy is sometimes confronted with adverse effects of these drugs. In children and adolescents it has an important influence because their immune system is still developing.[5]

Today, viral load and CD4 T lymphocytes count have been used as signals of disease progression but there are feel studies that point to its relation to changes in patient's QoL. Some studies show that the relationship between these aspects is not frequently explained.[6]

We studied the health related QoL of HIV children followed at a Reference Center for Treatment of Infectious Disease (CTR- Orestes Diniz, Federal University of Minas Gerais) in Belo Horizonte, Brazil. The aim of this study was to investigate the relationship between QoL, CD4 T lymphocyte counts, viral loads, AIDS status and antiretroviral therapy (ART) with special emphasis on HAART.

Methods

The study was performed between November 2003 and September 2004. HIV children from zero to 18 years and their parents were asked to participate and were included after an informed consent was signed. Socio-demographic variables obtained were age, gender, primary caregiver, education attainment, relationship of the questionnaire respondent to the participant. Children were classified according to their AIDS status (Centers for Disease Control HIV classification for children), viral load, CD4 T lymphocyte count and ART in use. Most of them had lab exams

obtained every three months. All this information was extracted from patient's chart at the day of interview. Patients were classified according to the following variables: 1. CDC/94 clinical classification: a) N + A (no symptoms or mild symptoms), b) B (moderate disease), c) C (advanced disease); 2. CD4 lymphocytes percentages: a) <15%, b) ≥ 15 and <25%, c) ≥ 25%; 3. Viral load: a) below or above the median value of viral load for this group of patients; 4. ART: a) none/two drugs, b) HAART with protease inhibitor (PI), c) HAART without PI.

QoL was assessed by parent, guardian or own children report (if older than eight years) using the General Health Assessment for Children (GHAC); an instrument developed for Pediatric AIDS Clinical Trials Group (PACTG 219), built on previous validated measures.[7,8] Questions referred to the last three months. QoL was examined in domains of health perceptions (part 1 and part 2), functional status, social and role functioning (part 1 and part 2), health care utilization, symptoms and associated events.

In health perception domain (part 1) child's health was rated in a 10-point scale from the very worst she/he ever felt to the very best she/he ever felt in physical, emotional and overall aspects. Part 2 referred to the presence of limitations on daily life rated as yes, no or sometimes.

The functional status domain addressed basic activities of daily living (eating/sleeping) and behavior problems (cannot pay attention/demands attention/strong temper/cries too much).

The role functioning domain was used to reflect specific school (part 1) and social (part 2) limitations. Health care utilization domain evaluated the need for health care provider assistance and the need for other drugs during the three months of study. The HIV symptoms scale examined 20 physical symptoms (pain/nausea, vomiting/diarrhea/rash/loss of appetite/headache). Caregivers were asked to rate the level of these symptoms in a 4-point scale.

The associated events domain studied the presence of 16 events in child's life such as hospitalization or death of their parents or friends, change of caregiver, financial difficulties, change of school and presence of a sick person at home.

Each domain was scored separately. Each score was transformed into a scale ranging from 0 to 100 points, with higher scores indicating better QoL. Descriptive statistics was used to characterize participants in the sample as a whole. QoL was initially compared between groups according to clinical, laboratorial and therapeutically aspects. Mean differences in QoL scores between groups were initially estimated by univariate followed by multivariate regression. Statistical analysis was processed by SPSS package v 8.0. P <0.05 was set as the criterion for statistical significance.

Results

From November 2003 to September 2004, 174 children were evaluated. The mean age was 6.8 years (0 to 17 years); 52.2% of participants were female and 77% were students. In most cases, questions were answered by the primary caregiver (124/174). Other people who answered were other parent (10), grandmother/father (10), brothers /sisters (two), friends (nine) and social workers (13). Six children (4%) from 13 to 17 years answered the questionnaire. Only 46 (27%) children were aware of the diagnosis of HIV.

Advanced clinical disease (C) was observed in 44% of children; 35% were classified as B, and 21% as A/N. At the QoL visit, 13.8% of patients had severe immune suppression (<15% CD4 T cells). Notably, no immune-suppression was observed in most children (58%) studied. We obtained viral loads ranging from <50 copies to 1 029 090 copies (6 log) but most of them were concentrated below 38.233 copies (4.5 log) (mean value). Only 14 children had viral loads above 100 000 copies (Table 1). One hundred and thirty one patients (75%) were receiving HAART and most of them (85/131) reported PI use; 43 patients (25%) didn't

receive HAART; 14 received double therapy and 29 didn't receive any drug (Table 2).

Health related QoL

Overall, good scores were obtained in all domains of the questionnaire and reflected good results in health related QoL (Table 3). The better mean score was obtained in "health care utilization" domain (93.6) showing that the need for medical care outside the Infectious Disease Clinic wasn't frequent. The worst score (58.9) was obtained in "social and role functioning domain (part 2)". Symptoms were all infrequent. The most important ones were cough, loss of appetite, skin problems and sneezing. Symptoms related to the gastrointestinal tract were usually present in only 5.7% of children and diarrhea was the most important of them.

No relation between clinical stage of disease and QoL was observed (P >0.05). Patients classified as AIDS did not show worst QoL when compared to other children. Higher percentages of CD4 T cells were related to better QoL in "general health (part 1 and 2)" and "symptoms" domains (P =0.03; 0.05 and 0.03) (Table 4). Patients that had the viral load below median value showed better QoL in "general health (part 2)" and "role and social functioning (part 2)" domains (Table 4). The overall scores of QoL did not differ according to treatment groups. Patients reporting HAART use did not have better scores compared to those who did not report. PI therapy also was not associated to changes in QoL (Table 4).

Table 1. Laboratory values of HIV children (CD4 T cell count and HIV-RNA viral load)

	CD4 T cell count (%)	HIV-RNA viral load (log)
Mean	8 859 (26.7)	38 233 (32)
Standard deviation	559.5	106 363
Median	774 (27.5)	8 103 (3.9)
Minimum	47 (1.6)	0 (0)
Maximum	4 832 (53)	1 029 090 (6)

HIV: human immunodeficiency virus

Table 2. Number of patients according to treatment groups

Treatment groups	No.	%
None/two drugs	43	24.7
HAART (non PI)	46	26.4
HAART (PI)	85	48.9
Total	174	100
HAART	**No.**	**%**
No	43	24.7
Yes	131	75.3
Total	174	100

HAART: highly active antiretroviral therapy; PI: protease inhibitor

Table 3. Description of quality of life domain scores

Score	General health (1)	General health (2)	Function at status	Social and role functioning (1)	Social and role functioning (2)	Health care utilization	Symptoms	Associated events
Mean	84.9	58.9	81.6	89.7	66.4	93.6	87.9	88.7
(SD)	(16.5)	(16.7)	(13.6)	(19.1)	(19.4)	(9.1)	(10.7)	(9.9)
Median	88.9	58.3	84.6	100	66.7	95	91.7	93.8
Min	25.9	0	30.8	0	0	60	4.3	50
Max	100	100	100	100	100	100	100	100

SD: standard deviation; Min: minimum; Max: maximum

Table 4. QoL domain scores according to the clinical stage of HIV infection (CDC), lymphocyte T CD4 cell percentage, HIV-RNA viral load and antiretroviral therapy

Questionnaire domain			No.	Mean score (SD)	P
General health (1)	Clinical stage	N + A	36	83.3 (16.9)	0.07
		B	62	88.8 (13.4)	
		C	76	82.6 (18.1)	
	Lymphocyte T CD4 cell percentage	<15%	24	79.3 (2.4)	0.03
		≥15% e < 25%	49	82.1 (17.3)	
		≥25%	101	87.6 (14.5)	
	HIV-RNA viral load	< median value	87	8.5 (15.8)	0.63
		≥median value	87	84.3 (1.2)	
	Antiretroviral therapy	None/two drugs	43	85.4 (16.9)	0.38
		HAART (PI)	46	87.5 (11.3)	
		HAART (non-PI)	85	83.3 (18.5)	
General health (2)	Clinical stage	N + A	36	58.7 (16.4)	0.76
		B	62	60 (16)	
		C	76	58 (17.5)	
	Lymphocyte T CD4 cell percentage	<15%	24	57.6 (15.9)	0.05
		≥15% e < 25%	49	54.4 (19.4)	
		≥25%	101	61.3 (15)	
	HIV-RNA viral load	< median value	87	61.4 (14.4)	0.04
		≥median value	87	56.3 (18.4)	
	Antiretroviral therapy	None/two drugs	43	56.7 (19)	0.38
		HAART (PI)	46	61.5 (15.9)	
		HAART (non-PI)	85	58.5 (15.8)	
Functional status	Clinical stage	N + A	36	82.4 (12.9)	0.31
		B	62	83.3 (11.5)	
		C	76	79.9 (15.3)	
	Lymphocyte T CD4 cell percentage	<15%	24	7.8 (15.7)	0.17
		≥15% e < 25%	49	79.2 (15.8)	
		≥25%	101	8.3 (11.6)	
	HIV-RNA viral load	< median value	87	81.6 (14.6)	0.96
		≥median value	87	81.7 (1.5)	
	Antiretroviral therapy	None/two drugs	43	79.6 (14.7)	0.51
		HAART (PI)	46	82.8 (11)	
		HAART (non-PI)	85	82 (14.2)	
Social and role functioning (1)	Clinical stage	N + A	29	90.3 (16.5)	0.97
		B	48	89.3 (20.2)	
		C	56	89.8 (19.7)	
	Lymphocyte T CD4 cell percentage	<15%	18	87.7 (26.9)	0.66
		≥15% e < 25%	36	88 (21)	
		≥25%	79	91 (16.1)	
	HIV-RNA viral load	< median value	71	92.6 (13.6)	0.06
		≥median value	62	86.4 (23.6)	
	Antiretroviral therapy	None/two drugs	33	90.6 (17.4)	0.96
		HAART (PI)	40	89.5 (20.1)	
		HAART (non-PI)	60	89.5 (19.6)	
Social and role functioning (2)	Clinical stage	N + A	36	68.5 (13.6)	0.72
		B	62	66.6 (19)	
		C	76	65.35 (22)	
	Lymphocyte T CD4 cell percentage	<15%	24	65.2 (26.8)	0.31
		≥15% e < 25%	49	63.2 (19.5)	
		≥25%	101	68.7 (17.2)	

Table 4. Continuous

Questionnaire domain			No.	Mean score (SD)	P
	HIV-RNA viral load	< median value	87	69.3 (17)	0.05
		≥median value	87	63.6 (21.3)	
	Antiretroviral therapy	None/two drugs	43	68.2 (17.7)	0.50
		HAART (PI)	46	68.1 (13.9)	
		HAART (non-PI)	85	64.7 (22.6)	
Health care utilization	Clinical stage	N + A	36	95.4 (6.5)	0.41
		B	62	93.1 (8.6)	
		C	76	93.1 (10.4)	
	Lymphocyte T CD4 cell percentage	<15%	24	9.5 (10.5)	0.82
		≥15% e < 25%	49	92.9 (9.7)	
		≥25%	101	93.9 (8.6)	
	HIV-RNA viral load	< median value	87	94.3 (8.5)	0.28
		≥median value	87	92.8 (9.6)	
	Antiretroviral therapy	None/two drugs	43	94.5 (8)	0.26
		HAART (PI)	46	94.8 (8.4)	
		HAART (non-PI)	85	92.4 (9.8)	
Symptoms	Clinical stage	N + A	36	88.8 (9.4)	0.30
		B	62	89.2 (1.9)	
		C	76	86.5 (1.1)	
	Lymphocyte T CD4 cell percentage	<15%	24	84 (14.1)	0.03
		≥15% e < 25%	49	8.4 (11.5)	
		≥25%	101	89.6 (9.1)	
	HIV-RNA viral load	< median value	87	88.4 (9.6)	0.60
		≥median value	87	87.5 (11.8)	
	Antiretroviral therapy	None/two drugs	43	87.5 (12.6)	0.86
		HAART (PI)	46	8.6 (9.2)	
		HAART (non-PI)	85	87.8 (10.6)	
Associated events	Clinical stage	N + A	36	89.5 (10,6)	0.86
		B	62	88.6 (9.6)	
		C	76	88.5 (10)	
	Lymphocyte T CD4 cell percentage	<15%	24	8.4 (11.4)	0.19
		≥15% e < 25%	49	89 (3)	
		≥25%	101	89.4 (9.8)	
	HIV-RNA viral load	< median value	87	88.1 (11)	0.39
		≥median value	87	89.4 (8.8)	
	Antiretroviral therapy	None/two drugs	43	88.5 (9.8)	0.58
		HAART (PI)	46	90 (9.3)	
		HAART (non-PI)	85	88.2 (10.4)	

HAART: highly active antiretroviral therapy; PI: protease inhibitor; HIV: human immunodeficiency virus

Multivariate analysis

Multivariate regressions found an association between higher CD4 T cells count and better QoL in "general health (part 1)" and "symptoms" domains. No association was observed in "general health (part 2)" as was seen in univariate regression. Patients having lower viral loads had better results in "role and social functioning (part 2)" but not in "general health (part 2)" in multivariate models. Clinical stage of disease and therapy did not show any association with QoL in multivariate regression, as was observed in univariate analysis (Table 5).

Discussion

Evaluation of health related QoL in children living with HIV showed favorable results in all questionnaire domains. Mean scores varied between

58.9 and 93.6 with the highest value (100) being reached in all domains. The same questionnaire was used in HIV children in the United States of North America by Storm et al.[9] and high mean scores were also obtained in the analysis (80.3-91.3). There are few studies about QoL in HIV children and few instruments of analysis. The instrument "GHAC" was first used by PACTG with similar results being obtained in Brazilian children. We identified it as an important instrument of study of HIV children's QoL.

The lowest score (66.4 points) was obtained in "social and role functioning (part 2)" domain reflecting difficulties in childhood activities and relationships present in general social life. It can be held by the stigma of disease and also by physical limitations associated. In the other side, the better scores obtained at "health care utilization" domain showed us that the look for medical care outside the outpatient clinic was not frequent. Patient's routine visits performed every three months were probably the main reason for the absence of significant health problems in these children.

Some studies have shown that the prevalence of pain in HIV children is similar to that observed in children living with cancer.[7] Our study did not find pain as an important symptom reported by this population. Besides, overall symptoms were not frequent. The most described ones were cough, sneezing, loss of appetite and skin problems. These symptoms can easily be observed in health children too, and probably does not have relation to the HIV infection or adverse events related to drugs prescribed. The most frequent symptoms that are observed in patients receiving PI, like abdominal pain or diarrhea, were not frequent in these children. The same happened to neurological symptoms that usually are associated to the non-nucleoside transcriptase inhibitor (NNTRI) intake.

HIV children in Brazil are more frequently found in families living in social and economical difficulties. Besides, parents health is also a problem because they usually are infected with HIV too. Some of these children have already lost their parents and are living with friends, other relatives

Table 5. Multivariate analysis

Questionnaire domain	Groups	P	Questionnaire domain	Groups	P
General health (1)					
	Clinical stage	0.92	Social and role functioning (2)	Clinical stage	0.70
	CD4 T percentage	0.01		CD4 T percentage	0.63
	HIV-RNA viral load	0.91		HIV-RNA viral load	0.05
	ART	0.48		ART	0.25
General health (2)	Clinical stage	0.71	Health care utilization	Clinical Stage	0.53
	CD4 T percentage	0.23		CD4 T percentage	0.93
	HIV-RNA viral load	0.11		HIV-RNA viral load	0.19
	ART	0.83		ART	0.21
Functional status	Clinical stage	0.18	Symptoms	Clinical stage	0.28
	CD4 T percentage	0.11		CD4 T percentage	0.01
	HIV-RNA viral load	0.53		HIV-RNA viral load	0.84
	ART	0.17		ART	0.28
Social and role functioning (1)	Clinical stage	0.96	Associated events	Clinical stage	0.92
	CD4 T percentage	0.75		CD4 T percentage	0.06
	HIV-RNA viral load	0.08		HIV-RNA viral load	0.19
	ART	0.66		ART	0.99

HIV: human immunodeficiency virus; ART: antiretroviral therapy

or in primary care institutions. All these facts contribute to the presence of stress in children's daily life and were evaluated in the study questionnaire as "associated events". Some studies have shown that negative events have been associated to health problems (clinical intercurrences and worst immune response) in patients living with HIV, resulting in a decrease in their QoL.[10] Howland et al.,[10] observed that 47% of children living with HIV showed some stressful event in their life in the last year. The presence of these events was associated to worst immunity results. Our study found an association between "associated events" and lower CD4 lymphocyte counts (<15%) but it was not significant (P >0.05). Stressful events were not important as determinants of worst laboratory or clinical results in this population.

Evaluation of QoL of children according to the clinical stage of disease was not able to show any difference between these groups. Patient classified as living in advanced stages had the same QoL than those living with no symptoms attributable to the HIV infection. We observed that the presence of symptoms during the exact period described at the questionnaire can be associated to worst results in QoL, but the same does not happen with the clinical stage of disease because it refers to patient's whole life. It was already observed in other studies and can explain the lack of association found in our study between the HIV clinical classification and quality of life.[11] Bing found that patients with HIV living with no symptoms had more difficulties when facing for the first time the clinical problems related to HIV infection, when compared to those in advanced stages of disease.[11]

Some studies have shown a positive association between better results in QoL and higher CD4 T cell counts, with special emphasis given to physical aspects of QoL. Gaughan et al.[7] found the report of pain more frequent in patients with advanced immune-suppression (CD4 <15%) compared to patients with normal levels of CD4 T cell counts. We observed a positive association between better CD4 T cell counts and the domains of QoL that described "general health (part 2)" and "symptoms", in multivariate analysis. Storm et al.[9] showed a positive association obtained in domains of "general health", "symptoms" and "social and role functioning" (P =0.04, 0.01 and 0.01) in the United States of North America. Gill et al.[12] described the same relation between CD4 T lymphocyte count, "physical function" and "health perceptions" in adults living with HIV. Even studies that found a weak association between a better immune response and a better QoL showed that it's favorable in some items of the questionnaire related to "pain" and "general health".[13] The alteration that HIV provokes in patients immune system destroying CD4 lymphocytes cells seems to have a negative influence in patient's physical QoL but no influence in emotional aspects of daily living.

Patients with lower viral loads showed better results in QoL on "general health" and "role and social functioning" domains at initial analysis, but at multivariate analysis this association was not observed in "general health" domain anymore. There are only few studies about the association between viral load and QoL, especially in children. Some found a positive association in physical aspects of the questionnaire in adults and others showed that a positive influence exists only when undetectable viral loads are reached.[12,14] In our study we observed that patients with lower viral loads had better scores in social aspects of life. It is probable that HIV children reaching good responses in viral load take this as an encouragement to improve their social lives.

HAART was first described as an effective way to reach better immunological and viral results in patients living with HIV. A better QoL is also expected as a result of the clinical and laboratorial improvement obtained. To obtain good results, is necessary to improve adherence to a considerable number of pills or syrups that sometimes have a bad taste, and take it in strict timetables. Some studies have shown that clinical benefits can some-

times be obscured by the adverse effects of treatment.[15] Multiple regimens that are now used in most HIV patients have adverse effects that can take days or years to appear, but when present, can lead to the interruption of treatment and contribute to the disruption on QoL.[15] Diabetes, hyperglycemia, dyslipidemia and fat loss have been described in patients taking antiretroviral drugs. HAART was seen as a hope in reaching a better well being for patients with HIV, but the results are not always favorable. The evaluation of QoL is an important field of study due to the complex interaction between the benefits of drugs and the difficulties inherent to multiple regimens.

In the pre-HAART era bad QoL was associated to clinical intercurrences as consequence of immune-suppression. After HAART was introduced it has been associated to the adverse effects of drugs. However, it is necessary to remember that only drug effects can not be responsible for the impaired QoL of these patients; other aspects of their life like the way each patient deals with HIV have an important influence too.[14]

Gaughan et al.[7] observed that patients in use of PI did not have a marked reduction in pain complaints after the introduction of HAART. Storm et al.[9] evaluated children in the United States of North America and also did not observe changes in QoL between patients living with HIV in different ART groups. We did not observe in our study that children taking antiretroviral drugs had worst/better QoL than those that did not take it. We also did not notice that adverse effects related to drugs were important in "symptoms" domain of the questionnaire, showing that these children had not an impaired QoL due to difficulties related to treatment.

Good results in QoL were observed in all treatment groups; a balance between benefits and difficulties in patients treated leaded to a Qol similar to the one observed in children who did not need to take drugs. Multiple treatments brought benefits to children who really needed it, and they were able to obtain good results in QoL as children in less advanced stages of disease. If to these patients were given antiretroviral drugs too, they probably would have shown a worsening in their QoL due to the adverse effects that would not be balanced by the clinical benefits of therapy.

Few studies have shown an increase in QoL of patients living in an advanced stage of disease who were treated with protease inhibitors. The same has not been observed in asymptomatic patients because the difficulties due to therapy reduced their QoL without bringing any benefits in a short period of observation.[16] Gill observed that patients that had physical problems at the beginning of therapy could benefit from treatment because the positive influence obtained on clinical and laboratory aspects supplanted the adverse effects of drugs.[12] Nieuwkerk et al.[16] also showed an improving in QoL of symptomatic patients compared to asymptomatic ones after the beginning of treatment, and emphasizes that therapy should not be started early in asymptomatic patients.[15] It is also described that 70% of patients taking multiple drugs for occupational exposure to HIV have drug intolerance compared to 11% of infected patients.[12]

Another point of interest is the comparison between PI and NNTRI and their influence in QoL. Some studies have shown that NNTRI have the advantage of an easier prescription, lower number of drugs and a better taste. It is also associated with few gastrointestinal effects when compared to PI.[14,17,18] Others have described that therapy with PI are more effective in obtaining the suppression of viral load an increasing the number of lymphocytes T CD4 count leading to a better QoL of these patients.[19] In our study we did not observe any difference in QoL of children treated under different antiretroviral schemes. The best choice of therapy for a child living with HIV is the one that achieves together with a good viral suppression and immunological result, an improvement in clinical aspects of daily life. Besides, the treatment should be simple as possible to improve adherence without influencing badly their QoL.

In our study we found that the analysis of clinical and laboratorial aspects of children living with HIV together with a study of their QoL can lead to a more accurate definition of their health. It also can help health care providers dealing with HIV children to understand the complexity of this disease and its influence in patient's lives in physical, emotional and social aspects. Larger numbers of studies in children are necessary to shed more light on this important issue.

References

1. Neto J, Ferreira C. Qualidade de vida como medida de desfecho em saúde. Rev Med Minas Gerais. 2003; 13: 42-6.
2. Cowdery J, Pesa J. Assessing quality of life in women living with HIV infection. AIDS Care. 2002; 14: 235-45.
3. Brady M. Treatment of human immunodeficiency virus and its associated complications in children. J Clin Pharmacol. 1994; 34: 17-29.
4. Warschburger P, Landgraf J, Petermann F, et al. Health-related quality of life in children assessed by their parents: Evaluation of the psychometric properties of the CHQ-PF50 in two German clinical samples. Qual Life Res. 2003; 12: 291-301.
5. NICHD, EPI. "Estudo de observações prospectivas de crianças expostas ao HIV e infectadas pelo HIV em unidades clínicas dos países da América Latina e do Caribe". 2002.
6. Lindsey J, Hughes M, McKinney R, et al. Treatment-mediated changes in human immunodeficiency virus (HIV) type 1 RNA and CD4 counts as predictors of weight growth failure, cognitive decline, and survival in HIV-infected children. J Infect Dis. 2000; 182: 1385-93.
7. Gaughan D, Hughes M, Seage III G, et al. The prevalence of pain in pediatric human immunodeficiency virus/acquired immunodeficiency syndrome as reported by participants in the Pediatric Late Outcomes Study (PACTG 219). Pediatrics. 2002; 109: 1144-52.
8. Gortmaker S, Lenderking W, Clarck C, et al. "Development and use of a pediatric quality of life questionnaire in AIDS clinical trials: reliability and validity of the general health assessment for children". In: Drotar D, editor. Measuring health related quality of life in children and adolescents; Implications for research and practice. Mahwah, NJ: Laurence Erlbaum Associates; 1998. p. 219-35.
9. Storm D, Boland M, Gortmaker S, et al. Protease inhibitor combination therapy, severity of illness and quality of life among children with perinatally acquired HIV-1 infection. Pediatrics. 2005; 115: 173-82.
10. Howland L, Gortmaker S, Mofenson L, et al. Effects of negative life events on immune suppression in children and youth infected with human immunodeficiency virus type 1. Am Acad Pediatr. 2000; 106: 540-6.
11. Bing E, Hays R, Jacobson L, et al. Health-related quality of life among people with HIV disease: Results from the Multicenter AIDS Cohort Study. Qual Life Res. 2000; 9: 55-63.
12. Gill C, Griffith J, Jacobson D, et al. Relationship of HIV viral loads, CD4 counts, and HAART use to health-related quality of life. J Acquir Immune Defic Syndr. 2002; 30: 485-92.
13. Arpinelli F, Giovannil V, Rafaelle B, et al. Health-related quality of life in asymptomatic patient with HIV: Evaluation of the SF-36 health survey in Italian patients. Pharmacoeconomics. 2000; 18: 63-72.
14. Carrieri P, Spire B, Duran S, et al. Health-related quality of life after 1 year of highly active antiretroviral therapy. J Acquir Immune Defic Syndr. 2003; 32: 38-47.
15. Nieuwkerk P, Gisolf E, Reijers M, et al. Long-term quality of life outcomes in three antiretroviral treatment strategies for HIV-1 infection. AIDS. 2001; 15: 1985-91.
16. Nieuwkerk P, Gisolf E, Colebunders R, et al. Quality of life in asymptomatic -and symptomatic HIV infected patients in a trial of ritonavir/saquinavir therapy. AIDS. 2000; 14: 181-7.
17. Fumaz C, Tuldrá A, Ferrer J, et al. Quality of life, emotional status and adherence of HIV 1 -infected patients treated with efavirenz *versus* protease inhibitor- containing regimens. J Acquir Immune Defic Syndr. 2002; 29: 244-53.
18. Negredo E, Cruz L, Paredes R, et al. Virological, immunological, and clinical impact of switching from protease inhibitors to nevirapine or to efavirenz in patients with human immunodeficiency virus infection and long-lasting viral suppression. HIV AIDS. 2002; 34: 504-10.
19. Cohen C, Revicki D, Nabulsi A, et al. A randomized trial of the effect of ritonavir in mantaining quality of life in advanced HIV disease. AIDS 1998; 12: 1495-502.