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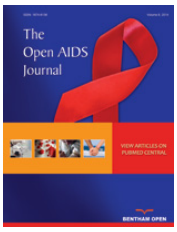

RESEARCH ARTICLE

Resilience and Life Expectations of Perinatally HIV-1 Infected Adolescents in France

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Abstract:

Background:

Resilience of perinatally HIV-infected youth in European countries is poorly studied. Life satisfaction and expectations for adulthood are rarely examined.

Objective:

This cross-sectional, descriptive study of a French cohort of 54 perinatally HIV-infected adolescents raised in France (age 14-20 years) aimed to (1) evaluate their psychosocial adjustment, (2) identify their expectations for adulthood and (3) delineate risk and protective factors associated with mental health, life satisfaction, and HIV-1 viral load level.

Method:

Medical evaluation, psychological semi-structured interview, and self-report questionnaires were used.

Results:

All the adolescents had been receiving Highly Active Anti-Retroviral Therapy (HAART) for 9 to 11 years and 2/3 were healthy with controlled viral load (<50 copies/mL). The majority had medium to high levels of life satisfaction. They viewed HIV as having only minor impact on their current daily life and had positive expectations for adulthood. However, 46% exhibited psychiatric symptomatology. Multivariable analysis showed that having a deceased parent and current worries about HIV were substantial risk factors for psychiatric symptoms. Having two living parents and being satisfied with life were protective factors for mental health. Good quality of caregiver-adolescent relationships and high life satisfaction were significant protective factors for controlled viral load.

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Conclusion:

These data indicate psychosocial resilience among perinatally HIV-1 infected adolescents with 10 years of HAART treatment. These findings demonstrate the influence of life satisfaction, parent's life status and quality of caregiver-adolescent relationships on resilience and health outcomes in these patients. We conclude that healthcare providers should attend to these factors.

Keywords: Family relationships, France, HIV-1 adolescents, Life satisfaction, Mental health, Psychological resilience, Vertical infectious disease transmission, Viral load.

INTRODUCTION

Highly Active Anti-Retroviral Therapy (HAART) has changed the HIV-1 infection from a terminal illness into a chronic condition with long-term stability, allowing most perinatally infected adolescents the transition into adulthood [1, 2]. Many of them have never experienced illness and live today with healthy parents. Therefore, their perceptions of the infection may be less negative than reported for adolescents before HAART was available. Studies of adolescents and young adults in this new context have yielded unclear findings regarding their psychosocial adjustment. Although studies have consistently demonstrated higher rates of psychiatric disorders in perinatally HIV-infected adolescents as compared to youth in the general population [3 - 10], variability in methods and culture across studies have detected numerous factors associated with emotional problems and well-being [3, 11 - 23]. To date studies have focused on risk for psychopathology. Little is known about protective factors that might contribute to psychosocial resilience in these youth as they mature and take on adult roles [3]. Finally, age at time of HAART introduction and differences in the number of years spent in good health may influence the adolescents' perceptions of their HIV status. Few studies of perinatally HIV-infected adolescents who experienced the two periods, before and after availability of HAART, have investigated the possible long-term negative impact of HIV stigma and past traumatic experience with the disease in these adolescents/young adults who have been healthy for the last 10 to 20 years. Nowadays this context becomes more and more familiar in developing countries such as Sub-Saharan Africa where access to HAART treatment has been widely available for the last 10 years. Children's and adolescents' perceptions of the virus and their resilience to treatment deserve major attention from health professionals in these countries [21 - 23]. National or local protocols for Pediatric HIV/AIDS Cohort Study enrolling young adult participants for long-term follow-up are developed in several countries [24, 25]. Some have been published but most of them are still at the stage of data collection at the present time [24].

Resilience of perinatally HIV-infected youth in European countries is poorly studied [19, 26, 27]. Life satisfaction and expectations for the future are rarely examined. We performed a cross-sectional study of psychosocial adjustment among perinatally HIV-infected adolescents living in France who were born approximately 10 years before HAART was introduced for children in France in 1996. This study aimed to (1) evaluate psychosocial adjustment, mental health functioning and life satisfaction in the adolescents, (2) identify their life expectations for the future, and (3) delineate both risk and protective factors associated with a) mental health, b) life satisfaction, and c) HIV-1 viral load (VL) level. This group of adolescents belongs to a generation of patients who will not exist any longer in developed countries since HAART has been widely provided to newborn children and their parents since 1996. Moreover, improved treatment of HIV-infected parents prevents their children from becoming orphans. Therefore the next generation of perinatally infected adolescents will have a different experience and profile than those described in our study. Today our findings may contribute to better understanding and earlier screening of mental health and life satisfaction in perinatally HIV-infected adolescents, allowing earlier referral to intervention programs to improve health outcomes, especially in developing countries where HAART is now available.

METHODS

Setting and Subjects

Patients born between June 1, 1986, and December 31, 1992, and currently obtaining medical care at the external clinics of the Pediatric Department of one hospital in Paris, France, were eligible for inclusion in the study. Patients with HIV acquired through sexual contact or blood transfusion were excluded. All participants were aware of their HIV status and the maternal route of transmission.

Procedures

Data were collected between June 2005 and December 2007, on the day of a routine clinical evaluation by their

pediatrician. Participants were interviewed by one trained clinical psychologist and completed several self-report questionnaires at the end of the interview. The psychologist had not previously met the adolescents. Socio-demographic and medical information was extracted from the medical record and completed by the pediatrician on standardized case report forms. Viral load, CD4%, Centers for Disease Control (CDC) stage, and antiretroviral therapy were assessed and recorded during the same time period, ±1.5 month, as the psychological evaluation. The 1994 Revised Classification System for Human Immunodeficiency Virus Infection in Children Less Than 13 years of Age was used with the following categories: N: No sign/symptom, A: Mild signs/symptoms, B: Moderate signs/symptoms, C: severe signs/symptoms [28].

Measures

Mental Health, Family Functioning and Caregiver-adolescent Relationships

Adolescents with sufficient psychiatric symptomatology to impair daily functioning were referred by the pediatrician to the psychiatrist for psychiatric evaluation and treatment. It was not possible to refer the parents or caregivers to the psychiatrist for evaluation. Therefore, psychiatric diagnosis in the caregiver was recorded as present only if both the pediatrician and the psychologist judged the caregiver's psychiatric symptoms to be associated with functional impairment.

Quality of family functioning and parent/caregiver-adolescent relationships were rated according to The Circumplex Model of Marital and Family Systems [29]. Family functioning was coded according to cohesion and flexibility criteria. Ratings for cohesion were: 1. disengaged/disconnected, 2. enmeshed, 3. cohesive. Ratings for flexibility were: 1. rigid, 2. chaotic, 3. flexibility, adaptability, managing conflicts. A final rating combining cohesion and flexibility criteria allowed to rate the family either as: "unhealthy/dysfunctional" or as "healthy/functional".

The quality of the relationships between parent/caregiver and the adolescent was coded as: 1. bad: with conflict, neglect, distrusting, no communication, disruption, 2. good: managing conflicts, caring, trusting, sharing information and feelings with each other, enhancing support and autonomy, 3. alternating good and bad. For data analysis, if the relationship was rated as alternating good and bad, it was coded as bad since it is known that opposite attitudes generate anxiety and confusion.

Family functioning and quality of parent/caregivers-adolescent relationships were discussed by the pediatrician and the psychologist who then agreed on scoring. Confidence in pediatricians' ratings was enhanced by their extensive knowledge of families since they had followed the adolescents and shared information with caregivers every 3 or 6 months for years from early infancy.

Psychological Interview

A semi-structured in-depth interview with the adolescent was developed for the study with a qualitative exploratory design to assess psychological aspects of the disease. Adolescents were queried regarding: (1) quality of family functioning and caregiver-adolescent relationships (2) HIV-related life stressors, (3) HIV-related worries and concerns, (4) difficulties with treatment if any, (5) romantic relationships, and (6) expectations for their future life as adults. Only open-ended questions were asked so that no answer could be suggested by the psychologist. The interview guide was approved by the research team. Free spontaneous answers were fully transcribed for future coding and analysis.

Family functioning and caregiver-adolescent relationships reported by the adolescents were coded in reference to The Circumplex Model of Marital and Family Systems previously described [29].

HIV-related life stressors reported by the adolescents were coded according to the 10 Elliott DeSorbo's categories [4]. In addition, the adolescents were asked whether the event was past (> 1 year) or recent (≤ 1 year), and whether or not the event was currently a source of distress. These items were also coded.

Content analysis was conducted to analyze answers to the following question: -Do you currently experience HIV-related worries and concerns, which ones?- Categories were created according to the contents identified and then listed from the most to the least frequent.

The same coding procedure was used to analyze the answers to the next question: -Do you have any difficulty with HIV treatment, which ones?-

Romantic relationships were defined as dating or having dated with a steady boy or girl friend for several weeks

regardless of having had sex with the partner. If the answer was positive, the adolescent was asked whether they had engaged in sexual activities. Only if the answer was yes, questions were asked about disclosure of HIV to the partner, safe practice using condom and safe guidelines in case of broken condom.

Expectations for their future life as adults were elicited with a non-intrusive and open-ended question: -What will be your life in the future when you are an adult?- For ethical purposes, specific questions were not addressed even when information in the answers was missing. Answers were coded into 3 categories: anticipation of specific studies and employment, personal life style, plan to have children or not, or plan to adopt.

Adolescent Self-report Questionnaires

Life satisfaction. Life satisfaction was assessed with a 10 point Visual Analog Scale. Adolescents selected the number which best described their current level of life satisfaction, with 10 indicating the highest level of satisfaction. This question was asked on purpose for all participants at the end of the interview. After the adolescents had indicated a number from 1 to 10, they were asked to give their reasons for the number selected. Then they were invited to state what would be required to approach number 10. Irrational wishes, if any, were encouraged to be said and were declared as deserving full consideration from the interviewer psychologist. The answers to these two secondary questions were expected to give very important and reliable qualitative insight information regarding how the adolescents felt, what their fundamental needs were and whether the latest were satisfied or uncompleted. Categories of answers were identified through content analysis.

Self-esteem. Adolescent self-esteem was assessed with the *Self-Esteem Inventory (SEI)* [30]. This self-report questionnaire consists of 58 items to which the patient indicates whether the statement is “like me” or “unlike me”. The items measure four domains: global self-esteem, familial satisfaction, peer relationships, school adjustment. An additional lie scale evaluates whether the respondent is trying to make the investigator think the respondent is perfect and has no problem. The validity and reliability of the French version has been well established and norms for a reference group of healthy French youth of similar age and gender to this sample have been published [31]. Mean scores and standard deviations for the reference group were compared to those of participants in this study.

Impact of HIV on daily life. The *Perceived Illness Experience Scale (PIE)* was developed by C. Eiser to assess how much cancer illness interferes with 10 areas of the adolescent’s daily living. Subscales include: Physical Appearance, Interference with Activity, Disclosure, School, Peer Rejection, Parental Behavior, Manipulation (use of illness to get something), Illness Preoccupations, Diet, and Parents’ Health [32, 33]. The PIE is composed of 40 items of which 4 have been modified and adapted for the HIV-infected population [34]. Each item is rated on a five-point scale and responses to items in each area are summed to create subscales. A higher score indicates greater negative impact of HIV status on a particular aspect of daily life. The PIE has demonstrated internal reliability and concurrent validity [32, 33].

Perceived Treatment. Perceived Treatment Inventory (PTI) [34] consists of 11 items derived from the *Beliefs about Medicine Scale (BAMS)* developed by Riekert KA [35]. The items describe adolescents’ perceptions regarding the extent to which treatment generates problems in four areas: (1) compliance (1 item), (2) fears and beliefs regarding adverse effects, both physical and psychological (3 items), (3) complications in day-to-day routines (4 items), and (4) family and social support (3 items). Each item is rated on a five-point (1-5) scale and responses to items in each area are summed to create subscores. The total score is the sum of all items. A high score means that treatment generates more serious problems in the four areas assessed.

Statistical Analyses

Variables were summarized as proportions for categorical variables and as the median and interquartile range (IQR) or the mean and standard deviation (SD) for continuous variables. We used the chi-square test or Fisher’s exact test to compare categorical variables, the Mann-Whitney test to study the association of one continuous variable and one categorical variable, T-tests to compare Coopersmith Self-Esteem scores between adolescents with HIV infection and the French reference group of healthy youth.

Univariable and multivariable logistic models were used to identify factors associated with psychiatric symptoms, life satisfaction, and level of VL in those under HAART. The following factors were considered: Gender; Parents' life status; Primary caregiver of adolescent; Being held back in school; Parents' country of origin; Caregivers' income; Caregiver-adolescent relationships; Psychiatric disorder in the parents/caregivers; Unresolved past HIV-related life stressors; HIV-related worries and concerns; Life expectations in the future; Psychiatric symptoms in the adolescent;

Life satisfaction. Statistical significance was set at $p<0.05$.Variables with univariable p values below 0.10 were then entered in backward multivariable logistic models. The SPSS software package version 18.0 for Windows (SPSS Inc., Chicago, IL, USA) was used for all analyses.

Ethics

The study was approved by the Institutional Review Board of Necker-Enfants Malades hospital. Adolescents and their legal guardians gave their assent/consent for participation.

RESULTS

Demographics and Medical Characteristics

Among 79 eligible adolescents, 58 gave their assent/consent to participate, representing 74% of those eligible; four of these dropped out prior to completing the study measures, leaving a final sample of 54 participants. No significant differences were found in terms of demographic and medical variables between the 58 adolescents enrolled and the 21 eligible subjects who declined participation (data not shown).

The 54 adolescents ranged in age from 14 to 20 ans. All of them had been living between 4 to 10 years before HAART introduction. Of them 63% had never been sick (N or A coding for CDC). At the time of psychological evaluation, 50 had been under HAART treatment since 1996 and were currently receiving HAART. Viral load was controlled (VL<50copies/mL) in 63%. Regarding the four others, treatment had been stopped between 1 to 3 years before the time of psychological evaluation because of poor adherence and 1 had never been treated. Of the 54 adolescents, 72% were living with at least 1 biological parent; 13% were orphaned by both parents, 43% by one parent, and both parents were living for 44%. Of the total group, 80% were native from France, 18% from Maghreb or Sub-Saharan Africa, and 2% unknown. School education was normal for age in 81%. Caregiver income was low in 50%, middle to high in the others. More details are presented in Table **1**.

Table 1. Socio-demographics and medical characteristics.

Variables	Total N=54
Gender - n (%)	
Male	23 (43%)
Female	31 (57%)
Age (years), median (range)	16 (14-20)
Parents HIV status - n (%)	
2 parents HIV+	18 (33%)
Mother HIV+, Father HIV-	25 (46%)
Mother HIV+, Father unknown	11 (20%)
Parents' life status - n (%)	
2 parents living	24 (44%)
1 parent deceased, 1 parent living	23 (43%)
2 parents deceased	7 (13%)
Primary caregiver of adolescent - n (%)	
Biological parent(s)	39 (72%)
Extended family	5 (9%)
Foster parents	7 (13%)
Institution	1 (2%)
Independent adolescent	2 (4%)
Family constitution - n (%)	
Family of origin without siblings	11 (20%)
Family of origin with siblings	29 (54%)
Reconstituted families with half siblings	14 (26%)
Caregiver income - n (%)	
Low	27 (50%)
Middle	20 (37%)
High	7 (13%)

(Table 1) contd.....

Variables	Total N=54
School level or Activity - n (%)	
Junior High School	19 (35%)
High School	19 (35%)
Trade school /vocational training	14 (26%)
Special education	2 (4%)
Employed	1 (2%)
Being held back in school - n (%)	
2 years held back or more	10 (19%)
normal range for age	44 (81%)
Native from - n (%)	
France	43 (80%)
Maghreb, Sub-Saharan Africa, others	10 (18%)
Unknown	1 (2%)
Parents native from - n (%)	
Europe, Maghreb, others	36 (67%)
Sub-Saharan Africa	18 (33%)
Centers for Disease Control* stage - n (%)	
N or A	34 (63%)
B or C	20 (37%)
Past severe medical event - n (%)	20 (37%)
Antiretroviral therapy – n (%)	50 (93%)
Viral load (copies/ml) - n (%)	
< 50	34 (63%)
≥ 50	20 (37%)
CD4% - n (%)	
≥ 25	30 (56%)
< 25	24 (44%)

*1994 Revised Classification

Ratings indicated that a psychiatric disorder associated with functional impairment was present in at least one parent/caregiver for 28 participants (52%). Twenty five (46%) of the adolescents had psychiatric symptomatology associated with functional impairment. Anxiety and major depression were the most frequent. Among the total group 4 (0,74%) were currently treated with medication prescribed by the psychiatrist. Types of psychiatric symptoms are presented in Table **2**.

Table 2. Family characteristics and adolescents' life stressors.

Variables	Total N=54
Psychiatric symptoms with impairment in the adolescents - n (%)	
Absent	29 (54%)
Present	25 (46%)
Type of psychiatric symptoms in the adolescents* - n (%)	42 (77%)
Anxiety	5 (9%)
Disthymic	7 (13%)
Major depression	9 (17%)
Mood disorder with hallucinations	3 (5%)
ADHD	1 (2%)
Conduct oppositional defiant	0 (0%)
Illicit substance use	0 (0%)
Psychiatric disorder in the parents/caregivers - n (%)	
No disorder	26 (48%)
> 1 disorder	28 (52%)
Type of psychiatric symptoms in the parents/caregivers	
Anxiety	16 (28%)
Depression	11 (20%)

(Table 2) contd.....

Variables	Total N=54
Behavioral and antisocial disorder	6 (11%)
Psychotic disorder with delirium/hallucinations	4 (7%)
Illicit substance use	1 (2%)
Family functioning (adolescent rating)	
Healthy/Functional	45 (84%)
Unhealthy/Dysfunctional	9 (16%)
Family functioning (pediatrician/psychologist rating)	
Healthy/Functional	42 (77%)
Unhealthy/Dysfunctional	12 (23%)
Caregiver-adolescent relationships (adolescent rating)	
Good	40 (74%)
Poor	14 (26%)
Caregiver-adolescent relationships (pediatrician/psychologist rating)	
Good	40 (74%)
Poor	14 (26%)
Past HIV-related life stressors - n (%)	
No	29 (54%)
Yes	25 (46%)
Type of past HIV-related life stressors** - n (%)	
Parent's death	14 (26%)
Mother severe illness	4 (7%)
Family problem (multiple separations, rejection)	4 (7%)
Fear of dying	3 (5%)
Rejection from others after disclosure	1 (2%)
Progression of the disease	1 (2%)
Unresolved past HIV-related life stressors - n (%)	14 (26%)
Recent HIV-related life stressors - n (%)	
No	40 (74%)
Yes	14 (26%)

*4 adolescents had been referred to a psychiatrist and were currently treated **some adolescents had several stressors

Psychological Adjustment and Life Expectations Based on Psychological Interview

Family functioning was rated as healthy and functional by 84% of the adolescents, with a 93% agreement with the paediatricians/psychologist ratings.

Caregiver-adolescent relationships were perceived as good by the adolescents in 74%, with a 100% agreement with the paediatricians/psychologist.

Half of the adolescents reported past or recent *HIV-related life stressors* (Table **2**). Death of a parent, reported by 31%, was the most common life stressor. Past (more than 1 year ago) HIV-related life stressors were reported by 46%. Among those, 26% perceived that they continued to be negatively affected by the past stressors.

The majority of adolescents (74%) reported one or more current *HIV-related worries or concerns*: disclosure of HIV-infection to others (39%), fear of transmitting HIV (33%), difficulty with treatment and follow up (30%), grief regarding their HIV status (28%), fear of disease progression and death (22%). Regarding their future life as adults, 4 adolescents (7%) reported worry that they would not marry and have children and 4 others (7%) feared they would be denied a job or a bank loan.

Approximately half (48%) of the adolescents reported having *difficulty with HIV treatment*. The most common difficulties (reported by 15) were psychological in nature and included feeling frustrated by pressure to take HIV medication year after year and anxious about the need to hide from their peers when they were taking medication. Side effects and inconveniences associated with treatment were reported by 9.

Responses to the clinical interview indicated that 37% had not experienced a *romantic relationship*, 39% had experienced one intimate relationship, and 24% had experienced several. Among the 34 adolescents having had a boy/girlfriend, only 9 had disclosed HIV. Of the 54 adolescents, 12 (5 girls and 7 boys, aged 14 to 19 years) had had sexual intercourse one or more times. Of those 12, 4 (3 girls and 1 boy) reported disclosure of HIV infection to the

partner; sexual practices were reported with use of a condom in 8 (6 boys and 2 girls), intermittent in 2, and unknown in 2. Four knew the guidelines in case of a broken condom and 6 others asked for this information. Overall, 13 of the 54 adolescents asked for safety guidelines in case of broken condom.

Regarding their *personal living conditions in the future*, 44% of the adolescents expected to live with a partner of the opposite sex, 6% planned to live alone, 4% had mixed wishes, and 46% did not mention anything or did not know. A desire to have their own children by birth was spontaneously brought up by 48%, while 4% were willing to adopt, 7% had decided not to have children, 11% had mixed feelings or no opinion, and 30% did not mention having children. Among the 54 adolescents, 12 boys/girls (22%) feared mother-child transmission. Therefore, 6 of these adolescents did not plan to have children but the 6 others were determined to have children despite the risk. Among all the adolescents, 7 (13%) were aware of existing medical techniques to procreate with a partner safely; these seven were determined to have children. Regarding employment, 48 of the 54 adolescents expected to find productive work as adults, many at upper level jobs.

Psychological Adjustment Based on Questionnaires

Life Satisfaction

On the analog scale (1-10) of life satisfaction, none of the participants rated their satisfaction below 4. The mean rating was 7.05. According to the content analysis of the qualitative answers given to explain the number selected, numbers from 7 to 10 described the adolescents satisfied with their lives, numbers from 6 to 4 described the unsatisfied. The majority (63%) rated their life satisfaction between 7 and 10. In the clinical interview, adolescents with ratings of 8, 9 and 10 stated that they were quite satisfied with their lives and did not regard HIV as interfering with their lives. Adolescents with satisfaction ratings of 7 mentioned difficulties related to HIV or family but had developed strategies to cope with these problems and were relatively satisfied with their lives. Finally, those with ratings below 7 attributed their low satisfaction to HIV or to psychosocial vulnerabilities including mother's absence and loss of positive self-image (37%). To the question: -What would you need to approach number 10 and be very satisfied with your life?-, the 20 adolescents who had low life satisfaction expressed the following wishes: "to be not ill and tired, to be rid of the virus and the disease in order to live a normal life, to be untroubled and relaxed, self-confident as others, to have my mother alive and healthy".

Self-esteem

On the Coopersmith Self-Esteem Inventory (SEI), the mean±sd Total scores were significantly higher for adolescents with HIV (36.4±7.2) as compared to the published norms for French youth (33.35±8.97, $p<0.03$). In addition, ratings by adolescents with HIV were significantly higher than those of the French reference group, on the subscales for Peer Relations, 6.4±1.3 *versus*. 5.67±1.94, $p<0.03$; Family Satisfaction, 6.1±1.9 *versus* 4.92±, $p<0.01$; and School Adjustment, 4.8±2.0 *versus* 4.12±1.95, $p<0.03$. Adolescents with HIV did not differ significantly from the reference group on the subscale for Global Self-esteem, $p=0.47$. Responses on the Lie Scale were within normal range, indicating valid responding.

Impact of HIV on Daily Life

On the Perceived Illness Experience Scale (PIE), the perceived impact of illness was greatest on subscales representing HIV Disclosure, Illness Preoccupations, and Parent Health. However, even in these areas the average rating was below the midpoint on the rating scale, indicating that adolescents viewed the impact as modest. Ratings in the other areas indicated that the adolescents perceived only minimal impact of HIV on peer relations (rejection), school, parent behavior, activities, diet, or appearance.

Perceptions of Treatment

On the Perceived Treatment Inventory (PTI), adolescents reported some difficulty with medications, primarily related to interference with daily activities, but rated themselves as having good treatment adherence. They had low scores on the subcales Family/Social Support and Fears about Medication, indicating that these domains were not a source of difficulties.

Factors Associated with Psychiatric Symptoms

Univariable analysis showed that quality of caregiver-adolescent relationships, unresolved HIV-related life

stressors, current difficulty with treatment and uncontrolled viral load were statistically significant predictors of psychiatric symptoms at the p<0.05 level.

Multivariable analysis with all predictor variables in the model showed that the presence of psychiatric symptoms was significantly associated with having a deceased parent, current worries and concerns about HIV and a low life satisfaction (Odds ratio -OR:13.2, probability of a type error -p=0.010; OR:18.8, p=0.025; OR:34.4, p=0.001, respectively), (Table **3**).

Table 3. Univariable and multivariable logistic regression analysis of factors associated with psychiatric symptoms.

Variables	Univariable analysis			Multivariable analysis	
	Disorder Absent (n=29)	Disorder Present (n=25)	p-value	OR (95% CI)	p-value
Gender			**0.057**		
Male (n=23)	70%	29%			
Female (n=31)	42%	58%			
Parents' life status			**0.031**		
2 parents living (n=24) At least 1 parent deceased (n=30)	71% 40%	29% 60%		**1** **13.2 (1.9 - 93.4)**	**0.010**
Primary caregiver of adolescent			0.622		
Biological parents (n=39)	56%	44%			
Extended family (n=5)	60%	40%			
Foster parents/Institution/independent (n=10)	40%	60%			
Being held back in school			1.000		
Normal range for age (n=44)	55%	45%			
2 years held back or more (n=10)	50%	50%			
Parents' country of origin			0.394		
Europe, Maghreb, others (n=36)	58%	42%			
Sub-Saharan Africa (n=18)	44%	56%			
Caregivers' income			0.586		
Low (n=27)	48%	52%			
Middle/High (n=27)	59%	41%			
Caregiver-adolescent relationships (pediatrician rating)			**0.017**		
Good (n=40)	64%	36%			
Poor (n=14)	27%	73%			
Psychiatric disorders in the parents/caregivers			0.597		
No disorder (n=26)	58%	42%			
>1 disorder (n=28)	50%	50%			
Unresolved past HIV-related life stressors			**<0.001**		
No (n=40)	73%	27%			
Yes (n=14)	0%	100%			
HIV-related worries and concerns			**0.060**		
No (n=14) Yes (n=40)	79% 45%	21% 55%		**1** **18.8 (1.6 – 242.0)**	**0.025**
Difficulty with treatment			**0.010**		
No (n=25)	72%	28%			
Yes (n=25)	32%	68%			
Viral load			**0.049**		
<50 cp/ml (n=34)	65%	35%			
>50 cp/ml (n=20)	35%	65%			
Life satisfaction			**<0.001**		
Satisfied (n=34)	74%	26%		**1**	
Dissatisfied (n=20)	20%	80%		**34.4 (4.5 – 262.9)**	**0.001**

OR: Odds ratio; CI: Confidence interval; p-values<0.10 in the univariable analysis were included in the multivariable analysis

Factors Associated with Life Satisfaction

Unresolved past HIV-related life stressors, difficulty with treatment and uncontrolled viral load were statistically significant at the p<0.05 level in univariable analysis.

In multivariable analysis, a higher risk of low life satisfaction was associated with psychiatric symptoms and being 2 years held back in school as compared to having good mental health and being in normal range for age in school (OR:13.0, p=0.044; OR:41.3, p=0.001), (Table **4**).

Table 4. Univariable and multivariable logistic regression analysis of factors associated with life satisfaction.

Variables	Univariable analysis			Multivariable analysis	
	Satisfied (n=34)	Dissatisfied (n=20)	p-value	OR (95% CI)	p-value
Gender			0.169		
Male (n=23)	74%	26%			
Female (n=31)	55%	45%			
Parents' life status			0.396		
2 parents living (n=24)	71%	29%			
At least 1 parent deceased (n=30)	57%	43%			
Primary caregiver of adolescent			0.505		
Biological parents (n=39)	64%	36%			
Extended family (n=5)	80%	20%			
Foster parents/Institution/independent (n=10)	50%	50%			
Being held back in school			**0.028**		
Normal range for age (n=44)	70%	30%		**1**	
2 years held back or more (n=10)	30%	70%		**13.0 (1.1 - 156.0)**	**0.044**
Parents' country of origin			0.233		
Europe, Maghreg, others (n=36)	69%	31%			
Sub-Saharan Africa (n=18)	50%	50%			
Caregivers' income			0.398		
Low (n=27)	56%	44%			
Middle/High (n=27)	70%	30%			
Caregiver-adolescent relationships (pediatrician rating)			0.108		
Good (n=40)	69%	31%			
Poor (n=14)	47%	53%			
Psychiatric disorders in the parents/caregivers			1.000		
No disorder (n=26)	62%	38%			
>1 disorder (n=28)	64%	36%			
Unresolved past HIV-related life stressors			**0.003**		
No (n=40)	75%	25%			
Yes (n=14)	29%	71%			
HIV-related worries and concerns			0.208		
No (n=14)	79%	21%			
Yes (n=40)	58%	43%			
Difficulty with treatment			**0.007**		
No (n=25)	84%	16%			
Yes (n=25)	44%	56%			
Viral load			**0.010**		
<50 cp/ml (n=34)	76%	24%			
>50 cp/ml (n=20)	40%	60%			
Psychiatric symptoms that affect function			**<0.001**		
Absent (n=26)	86%	14%		**1**	
Present (n=28)	36%	64%		**41.3 (4.7 - 363.7)**	**0.001**

OR: Odds ratio; CI: Confidence interval; p-values<0.10 in the univariable analysis were included in the multivariable analysis

Factors Associated with VL Level in 50 Treated Adolescents

Unresolved past HIV-related life stressors, difficulty with treatment, and psychiatric symptoms in the adolescents were statistically significant predictors of viral load level at the $p<0.05$ level.

In multivariable analysis, a higher risk of uncontrolled VL (> 50 copies/mL) was found for adolescents who experienced poor caregiver-adolescent relationships and poor life satisfaction (OR:4.9, p=0.032; OR:5.5, p=0.015), (Table **5**).

Table 5. Univariable and multivariable logistic regression analysis of factors associated with viral load level in 50 adolescents under HAART treatment.

Variables	Univariable analysis			Multivariable analysis	
	<50 cp/ml (n=33)	>50 cp/ml (n=17)	p-value	OR (95% CI)	p-value
Gender			0.386		
Male (n=22)	59%	41%			
Female (n=28)	71%	29%			
Parents' life status			1.000		
2 parents living (n=23)	65%	35%			
At least 1 parent deceased (n=27)	67%	33%			
Primary caregiver of adolescent			0.778		
Biological parents (n=37)	65%	35%			
Extended family (n=5)	80%	20%			
Foster parents/Institution/independent (n=8)	63%	38%			
Being held back in school			0.242		
Normal range for age (n=41)	71%	29%			
2 years held back or more (n=9)	44%	56%			
Parents' country of origin			0.121		
Europe, Maghreb, others (n=34)	74%	26%			
Sub-Saharan Africa (n=16)	50%	50%			
Caregivers' income			0.779		
Low (n=27)	59%	41%			
Middle/High (n=23)	67%	33%			
Caregiver-adolescent relationship			**0.008**		
Good (n=36)	78%	22%		**1**	
Poor (n=14)	36%	64%		**4.9 (1.1 - 21.0)**	**0.032**
Psychiatric disorders in the parents/caregivers			0.242		
No disorder (n=24)	75%	25%			
≥1 disorder (n=26)	58%	42%			
Unresolved past HIV-related life stressors			**0.021**		
No (n=37)	76%	24%			
Yes (n=13)	38%	62%			
HIV-related worries and concerns			1.000		
No (n=12)	67%	33%			
Yes (n=38)	66%	34%			
Difficulty with treatment			**0.072**		
No (n=25)	80%	20%			
Yes (n=25)	52%	48%			
Psychiatric symptoms that limit function			**0.036**		
Absent (n=26)	81%	19%			
Present (n=24)	50%	50%			
Life satisfaction			**0.004**		
Satisfied (n=32)	81%	19%		**1**	
Dissatisfied (n=18)	39%	61%		**5.5 (1.4 - 21.8)**	**0.015**

OR: Odds ratio; CI: Confidence interval; p-values<0.10 in the univariable analysis were included in the multivariable analysis

DISCUSSION

The primary, unexpected finding of this study was that the majority of perinatally HIV-1-infected adolescents reported medium to high life satisfaction. They acknowledged HIV-related life stressors and concerns but viewed HIV as having only minor impact on their peer relationships, school, and participation in other activities. Importantly, they had positive perceptions of their future as reflected in their expectations for employment, romantic relationships, and children of their own in adulthood. In contrast with the general beliefs of many healthcare providers, these adolescents expressed positive perceptions of their lives.

Despite these positive perceptions, nearly half of the adolescents had psychiatric symptoms. This finding is similar to findings of other studies of perinatally HIV-infected adolescents [5, 7, 11, 17, 18, 36 - 39], and of studies reported on adolescents with other chronic medical conditions [37, 40]. The rate of psychiatric symptomatology was higher compared to the French general population [41 - 43]. Important differences were found in rates and types of psychiatric disorders between our population and other studies of perinatally HIV-infected adolescents [7, 10, 16, 18, 37, 38]. In earlier studies the dominant psychiatric disorders were anxiety, ADHD, behavioral, and mood disorders. In our sample, depression and anxiety were the most common. Very few adolescents in our study met criteria for mood disorder, hallucinations, or ADHD. No adolescent in our study had symptoms of behavioral disorder or substance abuse. The percentage of adolescents who received medication or psychosocial interventions were comparable to that reported for studies in the USA [11, 38].

Viral load level was significantly associated with psychiatric symptoms in univariable analysis ($p= 0.049$) but not in multivariable analysis. No gender differences were found in psychiatric symptoms in our study population, similar to Kovess-Masfety who studied 2424 French college students [44]. This finding is interesting to note given that Angst [45] and Chan Chee [42], respectively, found a higher rate of major depressive disorder in women than in men in a large European study, and in a national cross-sectional study of 7110 French teenagers.

Our results extend the literature by showing that anxiety and depression do not necessarily prevent adolescents with HIV-infection from participating in normal activities or having moderate to high life satisfaction. Two thirds had already had a boy/girlfriend and almost a quarter were sexually active, similar to perinatally HIV-infected adolescents of the same age in the United States [46, 47]. Our data also show that having two living parents and no worry about HIV were protective factors for mental health. Prevention programs in countries with high rates of perinatal infection should encourage long-term adherence to treatment in the parents to foster their offspring's resilience and well-being. Anxiety and depression were most common for those adolescents with a deceased parent. Loss of a parent is a significant stressor for any child and should alert health care providers to increased risk for psychiatric symptoms, suggesting for HIV-infected youth the possibility of poor adaptation to HIV. It is conceivable that counseling at the time of parental death would improve long-term mental health outcomes and HIV adaptation in perinatally HIV-infected adolescents. We also found that life satisfaction was associated with mental health. Self-report of life satisfaction is rarely considered in studies of perinatally HIV-infected adolescents. Future research is needed to assess whether low life satisfaction is a significant factor for any child and should alert healthcare providers to increased risk for psychiatric symptoms.

The satisfaction with life experienced by adolescents in our study was better than anticipated and may be due in part to high level of social and medical support provided to HIV affected families in France [48]. Everyone in France, even those who are unemployed, has equal access to medical services, and financial support is provided by public welfare agencies to ensure adequate housing and means for primary daily needs including access to public transportation. Adolescents' perception of their infection, 10 years after HAART availability, was certainly less negative and stressful than previously observed. A large number of the adolescents had never been seriously ill and had one or two parents alive and healthy at the time of the study. Less than one third of the adolescents were unsatisfied with their lives. Caregiver income was not associated with life satisfaction in the adolescents although 50% belonged to low caregiver income families. They significantly experienced more psychiatric symptoms and were 2 years or more held back in school compared to those who considered themselves as satisfied with life. Even with our small sample of 50 patients, multivariable analysis showed that viral load level was associated with life satisfaction. Further studies with a larger sample would be of interest to estimate the impact of life satisfaction on viral load in comparison with other confounding variables. These results suggest that resilience to treatment and psychological well-being in our population were influenced by mental health and life satisfaction. Replication of these results in other populations across different countries is warranted and may influence national health policies to improve health outcomes.

The cross-sectional design of our study precludes inferences regarding causal relations among study variables. Nonetheless, our multivariable analyses provide clues to factors that may influence health outcomes. For example, low life satisfaction was associated with significantly greater odds of psychiatric symptoms and uncontrolled VL (VL>50 copies/mL). This finding highlights the need to refer the adolescents at risk for psychiatric symptoms to mental health specialists for complete assessment and targeted interventions follow up. Poor caregiver-adolescent relationships was also associated with significantly uncontrolled VL. As previously shown in Malee [13] and Wang [20] data, this finding highlights again the importance of addressing family relationships in the treatment of perinatally HIV-infected youth.

Strengths and Limitations

A strength of this study was the use of multiple methods and sources of data including the medical record, pediatrician/psychologist ratings, qualitative interviews with a psychologist, and self-report questionnaires supporting confidence in the validity of our data. In addition, we evaluated family relationships and psychosocial factors that might contribute to resilience. Findings from our qualitative interviews provide the healthcare community with data on the transition of perinatally HIV-infected adolescents into adult life. To our knowledge, ours is the first report on how those adolescents view their future.

Although sociodemographic and medical data in our study did not differ between the adolescents assessed and the non assessed, resilience of 26% of the eligible population could not be assessed. It is a limitation which requires some prudence in the comments of our results. Psychiatric symptoms were not assessed by a psychiatrist in all patients, but only in those referred by the pediatrician. Small size of the sample is another limitation and prohibited inclusion of additional potential confounding variables in our analyses. Our study population is a snapshot of perinatally infected adolescents who had not received HAART treatment in early infancy and who had been receiving it for 9 to 11 years. Therefore they differ from the adolescents who were sick before HAART availability and from those in the future who will have been under HAART treatment for their entire life. Our patients benefited from regular high quality medical care supported by a high level of psychosocial welfare services available in France. For these reasons, our results may not be generalizable to other countries nor reproducible in the future as HAART treatment evolves. More than one third of our study sample had AIDS and were severely ill in infancy. Today they are doing well and are satisfied with life. We can anticipate that newborn children who receive HAART treatment since birth will be even more resilient because they as well as their parents will be in good health. Absence of illness in the children and in the parents should positively impact the parents' and the children's mental health and their psychological well-being. We assume that these families should also have better parent-child relationships than those described in our study population since they should remain asymptomatic until adolescence and adulthood. Long-term treatment adherence will be crucial to support this projection. Future research is required to assess this optimistic hypothesis.

CONCLUSION

Our findings deliver new information about a group of French perinatally HIV-infected adolescents who had been living for 4 to 10 years without HAART availability. Although not applicable anymore in the United States and European countries due to the prevention of mother to child transmission of the virus, today many perinatally HIV-infected adolescents are still found living in developing countries and, as in our population, were deprived of HAART treatment for several years. Our findings could therefore provide valuable information regarding predictors of mental health and viral load in settings with high rates of perinatal infection. Today many health care professionals still assume that perinatally HIV-infected adolescents are severely psychologically affected by the disease. Our data present a more nuanced picture of their well-being and positive vision of their future as adults.

Our results showed that good caregiver-adolescent relationships were associated with controlled viral load. Future research should assess the assumption that perinatally HIV-infected adolescents in developing countries, when under HAART for several years, and when living with continuous good quality caregivers, can overcome past HIV-life stressors and view their lives with positive perceptions. Possible impact of environmental-cultural cofactors may mitigate resilience in the adolescents, however.

It is notable that a single item measure of life satisfaction was significantly associated with psychiatric symptoms, and uncontrolled VL. If this finding is replicated with larger samples, the self-rating of life satisfaction might be a promising tool used across cultures in clinical interviews to pre-screen mental health, psychological well-being and possibly adherence to treatment. Administration and interpretation of the life satisfaction rating scale do not require competence of a specialist in psychology. In developing countries, healthcare providers may be under-staffed with

psychologists or psychiatrists. A pre-screening of resilience by non psychologist healthcare professionals is feasible and could be an improvement in patient care. Similar to the pain analogic scale, the self rating analogic scale of life satisfaction is used worldwide in several therapy programs as a measure of the progression of the therapy over time. This life satisfaction rating could also be used to measure the progression of family based prevention or an intervention aiming to improve psychological well-being of perinatally HIV-infected youth.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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REFERENCES

[1] Mofenson LM, Cotton MF. The challenges of success: adolescents with perinatal HIV infection. J Int AIDS Soc 2013; 16: 18650. [PMID: 23782484]

[2] Antiretroviral Therapy Cohort Collaboration. Life expectancy of individuals on combination antiretroviral therapy in high-income countries: a collaborative analysis of 14 cohort studies. Lancet 2008; 372(9635): 293-9. [http://dx.doi.org/10.1016/S0140-6736(08)61113-7] [PMID: 18657708]

[3] Mellins CA, Malee KM. Understanding the mental health of youth living with perinatal HIV infection: lessons learned and current challenges. J Int AIDS Soc 2013; 16: 18593. [http://dx.doi.org/10.7448/IAS.16.1.18593] [PMID: 23782478]

[4] Elliott-DeSorbo DK, Martin S, Wolters PL. Stressful life events and their relationship to psychological and medical functioning in children and adolescents with HIV infection. J Acquir Immune Defic Syndr 2009; 52(3): 364-70. [http://dx.doi.org/10.1097/QAI.0b013e3181b73568] [PMID: 19668083]

[5] Gaughan DM, Hughes MD, Oleske JM, Malee K, Gore CA, Nachman S. Psychiatric hospitalizations among children and youths with human immunodeficiency virus infection. Pediatrics 2004; 113(6): e544-51. [http://dx.doi.org/10.1542/peds.113.6.e544] [PMID: 15173535]

[6] Mellins CA, Elkington KS, Bauermeister JA, *et al.* Sexual and drug use behavior in perinatally HIV-infected youth: mental health and family influences. J Am Acad Child Adolesc Psychiatry 2009; 48(8): 810-9. [http://dx.doi.org/10.1097/CHI.0b013e3181a81346] [PMID: 19564801]

[7] Mellins CA, Brackis-Cott E, Leu CS, *et al.* Rates and types of psychiatric disorders in perinatally human immunodeficiency virus-infected youth and seroreverters. J Child Psychol Psychiatry 2009; 50(9): 1131-8. [http://dx.doi.org/10.1111/j.1469-7610.2009.02069.x] [PMID: 19298479]

[8] Murphy DA, Moscicki AB, Vermund SH, Muenz LR, Networ AM. Psychological distress among HIV(+) adolescents in the REACH study: effects of life stress, social support, and coping. J Adolesc Health 2000; 27(6): 391-8. [http://dx.doi.org/10.1016/S1054-139X(00)00158-0] [PMID: 11090741]

[9] Williams PL, Leister E, Chernoff M, *et al.* Substance use and its association with psychiatric symptoms in perinatally HIV-infected and HIV-affected adolescents. AIDS Behav 2010; 14(5): 1072-82. [http://dx.doi.org/10.1007/s10461-010-9782-0] [PMID: 20725774]

[10] Nachman S, Chernoff M, Williams P, Hodge J, Heston J, Gadow KD. Human immunodeficiency virus disease severity, psychiatric symptoms, and functional outcomes in perinatally infected youth. Arch Pediatr Adolesc Med 2012; 166(6): 528-35. [http://dx.doi.org/10.1001/archpediatrics.2011.1785] [PMID: 22312169]

[11] Gadow KD, Angelidou K, Chernoff M, *et al.* Longitudinal study of emerging mental health concerns in youth perinatally infected with HIV and peer comparisons. J Dev Behav Pediatr 2012; 33(6): 456-68. [http://dx.doi.org/10.1097/DBP.0b013e31825b8482] [PMID: 22772819]

[12] Howland LC, Gortmaker SL, Mofenson LM, *et al.* Effects of negative life events on immune suppression in children and youth infected with human immunodeficiency virus type 1. Pediatrics 2000; 106(3): 540-6. [http://dx.doi.org/10.1542/peds.106.3.540] [PMID: 10969100]

[13] Malee KM, Tassiopoulos K, Huo Y, *et al.* Mental health functioning among children and adolescents with perinatal HIV infection and perinatal HIV exposure. AIDS Care 2011; 23(12): 1533-44. [http://dx.doi.org/10.1080/09540121.2011.575120] [PMID: 21702707]

[14] Mellins CA, Smith R, ODriscoll P, *et al.* High rates of behavioral problems in perinatally HIV-infected children are not linked to HIV disease. Pediatrics 2003; 111(2): 384-93. [http://dx.doi.org/10.1542/peds.111.2.384] [PMID: 12563068]

[15] Benton TD. Psychiatric considerations in children and adolescents with HIV/AIDS. Child Adolesc Psychiatr Clin N Am 2010; 19(2): 387-400, x.
[http://dx.doi.org/10.1016/j.chc.2010.02.004] [PMID: 20478506]

[16] Gadow KD, Chernoff M, Williams PL, *et al.* Co-occuring psychiatric symptoms in children perinatally infected with HIV and peer comparison sample. J Dev Behav Pediatr 2010; 31(2): 116-28.
[http://dx.doi.org/10.1097/DBP.0b013e3181cdaa20] [PMID: 20110828]

[17] Lam PK, Naar-King S, Wright K. Social support and disclosure as predictors of mental health in HIV-positive youth. AIDS Patient Care STDS 2007; 21(1): 20-9.
[http://dx.doi.org/10.1089/apc.2006.005] [PMID: 17263655]

[18] Wood SM, Shah SS, Steenhoff AP, Rutstein RM. The impact of AIDS diagnoses on long-term neurocognitive and psychiatric outcomes of surviving adolescents with perinatally acquired HIV. AIDS 2009; 23(14): 1859-65.
[http://dx.doi.org/10.1097/QAD.0b013e32832d924f] [PMID: 19584705]

[19] Bomba M, Nacinovich R, Oggiano S, *et al.* Poor health-related quality of life and abnormal psychosocial adjustment in Italian children with perinatal HIV infection receiving highly active antiretroviral treatment. AIDS Care 2010; 22(7): 858-65.
[http://dx.doi.org/10.1080/09540120903483018] [PMID: 20635250]

[20] Wang B, Li X, Barnett D, Zhao G, Zhao J, Stanton B. Risk and protective factors for depression symptoms among children affected by HIV/AIDS in rural China: a structural equation modeling analysis. Soc Sci Med 2012; 74(9): 1435-43.
[http://dx.doi.org/10.1016/j.socscimed.2012.01.007] [PMID: 22405505]

[21] Toska E, Gittings L, Hodes R, *et al.* Resourcing resilience: social protection for HIV prevention amongst children and adolescents in Eastern and Southern Africa. Afr J AIDS Res 2016; 15(2): 123-40.
[http://dx.doi.org/10.2989/16085906.2016.1194299] [PMID: 27399042]

[22] Jani N, Vu L, Kay L, Habtamu K, Kalibala S. Reducing HIV-related risk and mental health problems through a client-centred psychosocial intervention for vulnerable adolescents in Addis Ababa, Ethiopia. J Int AIDS Soc 2016; 19(5)(Suppl. 4): 20832.
[PMID: 27443267]

[23] Mitchell J, Wight M, Van Heerden A, Rochat TJ. Intimate partner violence, HIV, and mental health: a triple epidemic of global proportions. Int Rev Psychiatry 2016; 28(5): 452-63.
[http://dx.doi.org/10.1080/09540261.2016.1217829] [PMID: 27599188]

[24] Tassiopoulos K, Patel K, Alperen J, *et al.* Following young people with perinatal HIV infection from adolescence into adulthood: the protocol for PHACS AMP Up, a prospective cohort study. BMJ Open 2016; 6(6): e011396.
[http://dx.doi.org/10.1136/bmjopen-2016-011396] [PMID: 27288383]

[25] Weijsenfeld AM, Smit C, Cohen S, *et al.* Virological and social outcomes of HIV-infected adolescents and young adults in the Netherlands before and after transition to adult care. Clin Infect Dis 2016; 63(8): 1105-12.
[http://dx.doi.org/10.1093/cid/ciw487] [PMID: 27439528]

[26] Dollfus C, Le Chenadec J, Faye A, *et al.* Long-term outcomes in adolescents perinatally infected with HIV-1 and followed up since birth in the French perinatal cohort (EPF/ANRS CO10). Clin Infect Dis 2010; 51(2): 214-24.
[http://dx.doi.org/10.1086/653674] [PMID: 20536367]

[27] Macassa E, Burgard M, Veber F, *et al.* Characteristics of HIV-infected children recently diagnosed in Paris, France. Eur J Pediatr 2006; 165(10): 684-7.
[http://dx.doi.org/10.1007/s00431-006-0091-6] [PMID: 16799798]

[28] Centers for Disease Control and Prevention. 1994 revised classification system for human immunodeficiency virus infection in children less than 13 years of age. MMWR Recomm Rep 1994; 43(RR-12): 1-19.

[29] Olson DH, Gorall DM. Normal family processes: growing diversity and complexity. New York, NY: Guildford Press 2003; pp. 514-48.

[30] Coopersmith S. Self-esteem InventoryPalo Alto. CA: Consulting Psychologists press 1981.

[31] Coopersmith S. L'inventaire d'Estime de Soi. Paris: Edition du Centre de Psychologie Appliquée 1984.

[32] Eiser C, Havermans T, Craft A, Kernahan J. Development of a measure to assess the perceived illness experience after treatment for cancer. Arch Dis Child 1995; 72(4): 302-7.
[http://dx.doi.org/10.1136/adc.72.4.302] [PMID: 7763060]

[33] Eiser C, Kopel S, Cool P, Grimer R. The Perceived Illness Experience Scale (PIE): reliability and validity revisited. Child Care Health Dev 1999; 25(3): 179-90.
[http://dx.doi.org/10.1046/j.1365-2214.1999.00116.x] [PMID: 10349517]

[34] Funck-Brentano I, Dalban C, Veber F, *et al.* Evaluation of a peer support group therapy for HIV-infected adolescents. AIDS 2005; 19(14): 1501-8.
[http://dx.doi.org/10.1097/01.aids.0000183124.86335.0a] [PMID: 16135904]

[35] Riekert KA, Drotar D. The beliefs about medication scale: developments, reliability and validity. Clin Psychol Med Settings 2002; 9: 177-84.
[http://dx.doi.org/10.1023/A:1014900328444]

[36] Kapetanovic S, Wiegand RE, Dominguez K, *et al.* Associations of medically documented psychiatric diagnoses and risky health behaviors in

highly active antiretroviral therapy-experienced perinatally HIV-infected youth. AIDS Patient Care STDS 2011; 25(8): 493-501.
[http://dx.doi.org/10.1089/apc.2011.0107] [PMID: 21745118]

[37] Mellins CA, Brackis-Cott E, Dolezal C, Abrams EJ. Psychiatric disorders in youth with perinatally acquired human immunodeficiency virus infection. Pediatr Infect Dis J 2006; 25(5): 432-7.
[http://dx.doi.org/10.1097/01.inf.0000217372.10385.2a] [PMID: 16645508]

[38] Chernoff M, Nachman S, Williams P, *et al.* Mental health treatment patterns in perinatally HIV-infected youth and controls. Pediatrics 2009; 124(2): 627-36.
[http://dx.doi.org/10.1542/peds.2008-2441] [PMID: 19596734]

[39] Scharko AM. DSM psychiatric disorders in the context of pediatric HIV/AIDS. AIDS Care 2006; 18(5): 441-5.
[http://dx.doi.org/10.1080/09540120500213487] [PMID: 16777635]

[40] Alvin P, Marcelli D. Médecine de l'adolescent. Paris: Masson 2005.

[41] Verger P, Guagliardo V, Gilbert F, Rouillon F, Kovess-Masfety V. Psychiatric disorders in students in six French universities: 12-month prevalence, comorbidity, impairment and help-seeking. Soc Psychiatry Psychiatr Epidemiol 2010; 45(2): 189-99.
[http://dx.doi.org/10.1007/s00127-009-0055-z] [PMID: 19381424]

[42] Chan Chee C, Guignon N, Delmas MC, Herbet JB, Gonzalez L. Estimation of prevalence of depressive episodes in French adolescents. Rev Epidemiol Sante Publique 2012; 60(1): 31-9.
[http://dx.doi.org/10.1016/j.respe.2011.08.065] [PMID: 22178202]

[43] Kovess-Masfety V, Husky MM, Keyes K, *et al.* Comparing the prevalence of mental health problems in children 6-11 across Europe. Soc Psychiatry Psychiatr Epidemiol 2016; 51(8): 1093-103.
[http://dx.doi.org/10.1007/s00127-016-1253-0] [PMID: 27314494]

[44] Kovess-Masfety V, Leray E, Denis L, Husky M, Pitrou I, Bodeau-Livinec F. Mental health of college students and their non-college-attending peers: results from a large French cross-sectional survey. BMC Psychol 2016; 4: 20.
[http://dx.doi.org/10.1186/s40359-016-0124-5] [PMID: 27098291]

[45] Angst J, Gamma A, Gastpar M, Lépine JP, Mendlewicz J, Tylee A. Gender differences in depression. Epidemiological findings from the European DEPRES I and II studies. Eur Arch Psychiatry Clin Neurosci 2002; 252(5): 201-9.
[http://dx.doi.org/10.1007/s00406-002-0381-6] [PMID: 12451460]

[46] Frederick T, Thomas P, Mascola L, *et al.* Human immunodeficiency virus-infected adolescents: a descriptive study of older children in New York City, Los Angeles County, Massachusetts and Washington, DC. Pediatr Infect Dis J 2000; 19(6): 551-5.
[http://dx.doi.org/10.1097/00006454-200006000-00012] [PMID: 10877172]

[47] Wiener LS, Battles HB, Wood LV. A longitudinal study of adolescents with perinatally or transfusion acquired HIV infection: sexual knowledge, risk reduction self-efficacy and sexual behavior. AIDS Behav 2007; 11(3): 471-8.
[http://dx.doi.org/10.1007/s10461-006-9162-y] [PMID: 17028994]

[48] Blanche S, Mayaux MJ, Veber F, *et al.* Separation between HIV-positive women and their children: the French prospective study, 1986 through 1993. Am J Public Health 1996; 86(3): 376-81.
[http://dx.doi.org/10.2105/AJPH.86.3.376] [PMID: 8604763]