Adherence to antiretroviral therapy in children: a study of prevalence and associated factors

Adesão aos anti-retrovirais em crianças: um estudo da prevalência e fatores associados

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Abstract

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The survival of children with AIDS has increased considerably with the use of more effective antiretrovirals, but the benefits of this therapy are limited by the difficulty of adherence to the treatment. This cross-sectional study aimed to estimate the prevalence of non-adherence to antiretrovirals among children residents in Porto Alegre, Rio Grande do Sul State, Brazil, and identifying associated factors. There were 194 child caregivers interviewed. The technique utilized to evaluate adherence allowed the detection of lack of understanding of the prescribed antiretroviral regimens, as well as conscious loss of doses. Non-adherence was defined when the child had taken less than 80% of the prescribed medication during the 24h period prior to the interview. A general prevalence of non-adherence was 49.5%, which was higher than that estimated. The non-institutional caregivers had a prevalence rate of 55.7%, while the institutional caregivers had 22.2%. In multivariate analysis, the education of the caregiver was found to have a borderline association with the outcome. Institutionalized children and those taken care of by people with a higher educational level appeared to have more protection against non-adherence to antiretroviral therapy.

Anti-Retroviral Agents; Acquired Immunodeficiency Syndrome; HIV; Child

Introduction

The use of antiretrovirals in combined therapy has decisively altered the course of the HIV/AIDS infection epidemic. The antiretrovirals control the HIV infection, interfering with viral replication and thus drastically reducing the morbidity/mortality of AIDS [1,2].

On the international level, a longitudinal multi-centric study [3], and another cohort study [4], analyzed the survival of children infected with HIV before, and after, respectively, the utilization of protease inhibitors. On comparing these studies a significant reduction in child deaths can be observed after the surge in the use of protease inhibitors in the context of combined therapy. In Brazil, a cohort study retrospectively analyzed the survival of 1,150 HIV infected children under 13 years old. The study demonstrated a tendency for increased child survival in the period after which protease inhibitors were in ample use in the country [5].

Despite improvements in antiretroviral therapy and free access to these medications in Brazil, many patients are not benefited by the treatment. The effectiveness of retroviral therapy depends on high levels of adherence and the complexity of present antiretroviral regimens, together with the various associated side effects, and lack of adequate information about use of the medication, contributes to non-adherence [6]. In the case of children, the fact that they are dependent on

adult caregivers to follow the treatment, and that a child's palate makes them more prone to intolerance, present additional complications [7,8].

Self-reporting by patients and caregivers is one of the methods most commonly employed to measure levels of antiretroviral adhesion. Some studies have compared self-reporting questionnaires with more objective adherence measurements (such as HIV viral level, CD4 cell count, and plasma antiretroviral count) and found good agreement between self-reporting and objective measurement [9,10,11,12].

In Brazil, the first major study of antiretroviral adherence – a cross-sectional survey, was carried out in the State of São Paulo, published in 1999, and included 1,038 adult patient respondents to a structured interview. Those users that took at least 80% of the total antiretroviral medication in the manner prescribed for adults at the time of data collection were considered adherents. Of the group interviewed, 31% were considered non-adherents (95%CI: 0.28-0.34) [13].

Another study evaluated the effectiveness of treatment at different degrees of adherence and concluded that plasmatic viremia was undetectable in 81% of cases where use level was 95% or more of prescribed dosages, 64% in those individuals that took 90-94% of prescribed dosages, and 50% in cases that used 80-90% of the doses prescribed [14].

As there is a lack of literature about studies of child adherence, and factors relating to their caretakers interference with this adherence, the idea is, with the realization of the present study, to collaborate with teams of health professionals that do follow-up with AIDS infected children from 0-12 years of age, offering them information about adherence and risk factors with the objective of to orienting and making easier interventions that aid in antiretroviral treatment.

Methodology

This was a cross-sectional study using the most recent data. The sample comprises vertically infected children, 0-12 years of age, residing in Porto Alegre, Rio Grande do Sul, State, Brazil, who had been reported as AIDS cases by April 2001, were receiving antiretroviral treatment, and were scheduled for outpatient visits between February 1, and November 30, 2002 at pediatric infectology outpatient clinics at the Hospital de Clínicas [University Hospital], of the Hospital da Criança Santo Antônio [Santo Antônio Children's Hospital], of the Hospital da Criança Conceição [Conceição Children's Hospital], and the Serviço de Assistência Especializada em DST e AIDS [De-

partment for Specialized Care in STD/AIDS]. Together these outpatient clinics were responsible for treating around 200 AIDS infected children, corresponding to more than 90% of the pediatric AIDS cases in Porto Alegre during the time period studied, based on the records of the Secretary of Health of Rio Grande do Sul for patients registered in the Reportable Diseases Database (SINAN). Estimating a loss of 10%, samples were obtained for approximately 180 individuals.

With this sample size it is possible to test for ratios of prevalence of approximately 2.0 with a power equal, or superior, to 80%, an alpha error of 5%, estimating at 50% the exposition to any of the associated factors, and estimating the prevalence of non-adherence at 30%, being 40% non-adherents among the exposed, and 20% non-adherents, among those not exposed to any of the associated factors.

The target population of the study was the caregivers of the sampled children undergoing antiretroviral therapy. Caregivers were considered to be those who reported understanding the 24 hour-a-day regimen, and who were responsible for administering at least 50% of the doses of medication to the child.

The team of interviewers consisted of two psychologists and three nursing students in their last year of study. Before starting the study the interviewers were given a basic course about the antiretrovirals used to control the AIDS infection in children, as well as diet recommendations, and possible adverse effects, and additionally underwent exhaustive training in interviewing techniques and questionnaire completion.

A pilot study was carried out with 13 child caregivers attended by two of the healthcare providers, which would be included afterwards. The test study helped to perfect the questionnaire used in the interviews and to train the team of interviewers. The responses given by the caregivers included in the pilot study were not included in the sample.

Variables

The dependent variable in this study is a qualitative dichotomic "adherence/non-adherence" variable. The independent variables consist of characteristics that hypothetically could influence adherence/non-adherence: health service, age, sex of child, length of antiretroviral treatment, number of drugs used in the medication regimen, missing doses during previous week, difficulty in administering antiretrovirals, lack of team orientation, lack of consultation in the 6 month period previous to the interview, delay in monthly receipt of antiretrovirals, un-

derstanding of child's diagnosis by caregiver(s) and/or professionals at daycare/school, family problem(s), if the caregiver had a paying job outside the household, if the caregiver was responsible for taking care of another person(s), serology of caregiver, presence of HIV in caregiver, use of antiretrovirals by caregiver, if the caregiver had difficulty taking antiretrovirals, relationship between caregiver and child, caregivers educational level, family per capita income, and drug use by caregiver.

Family problems taken into consideration were: separation of the child's parents, death of a member of the nuclear family (mother, father, or siblings), job loss by father, mother, or other person helping sustain the family, or any other situation the caregiver considered to have weakened the family. Drug use by caretaker was use considered to be use of: alcohol, use of psychotropic medications without therapeutic indications, use of glue, ether or benzene, use of cannabis, and use of cocaine or heroin in powder form, inhaled, smoked (crack) or injected. Any type of alcoholic beverage ingested two or more times per week by the caregiver was considered as "drug use", as was the regular or sporadic use of any of the substances just described during the 12 month period preceding the interview.

Study tools

To measure adherence, a technique was adopted consisting of a structured interview and a box containing a sample of medications called the *medication kit*. The data collection instrument consisted of an interview form which was semi-structured into 46 questions, the majority of which were closed, but with some additional open questions. This instrument brought together data informed by the caregiver and the family, and the objective data obtained through the medical prescription, from the medical register, and computerized information from the System for the Logistical Control of Medications (SICLOM) supplied by the pharmacies that dispense the antiretrovirals. The *medication kit* consisted of a box which contained a sample of all the antiretroviral medications used by children up to 12 years old that are distributed by the Ministry of Health. Five *kits* were put together to attend the needs of the four locations where the study was carried out as well as for home interviews. The objective of this tool was to facilitate identification of antiretrovirals by the caregiver at the moment that he/she is describing the normal administration of these medications to the child.

Logistics of data collection and adherence verification

The selection of subjects with criteria for inclusion in the study was carried out, based on pediatric clinic records, medical registers, and from interviews given at the end of medical consultations. The child caregivers selected for inclusion in the study who did not appear at the consultations were visited at their homes in which case, after agreeing to participate in the study, were interviewed at their homes.

Children that took less than 80% of the prescribed medicines in the 24 hour period preceding the interview were considered non-adherents.

The percentage of pills taken daily was calculated, using as the numerator the quantity of doses actually taken in the previous 24 hour period and as the denominator the quantity of doses prescribed for 24 hours of treatment. The quantity of doses taken in a 24 hour period was represented on the flowchart shown in Figure 1. This technique permitted the detection of losses from the lack of proper understanding of the prescribed scheme, as well as the conscious loss of doses through, for example, forgetfulness, absence of caregiver at time the medication was supposed to be administered, or because of lack of medication, among others.

Analysis

The data were processed using Epi Info (Centers for Disease Control and Prevention, Atlanta, U.S.A.) and SPSS 11.0 (SPSS Inc. Chicago, U.S.A.) statistical packages. The force of association between the diverse independent variables and outcome occurrence (non-adherence) was estimated by utilizing odds ratio (OR) with its respective confidence interval of 95% (95%CI). The significance of the findings was determined by a chi-square test.

To adjust for the effect of potentially confounding variables, a multivariable analysis (logistic regression) was utilized. The variables analyzed in this model were selected using the Wald method. Variables that were correlated to adherence/non-adherence during statistical analysis, shown in Table 1, were also excluded. The variable "use of antiretrovirals by caregiver" found to be associated with the variable "type of relationship/relative of caregiver to child", the main independent variable, was also excluded.

The level of significance adopted in the bivariate and multivariate logistic regression analysis was 0.5. In the multivariate analysis the values of p between 0.05 and 0.10 were considered of

Figure 1

Flowchart for calculating the number of doses effectively ingested/taken during 24 hours.
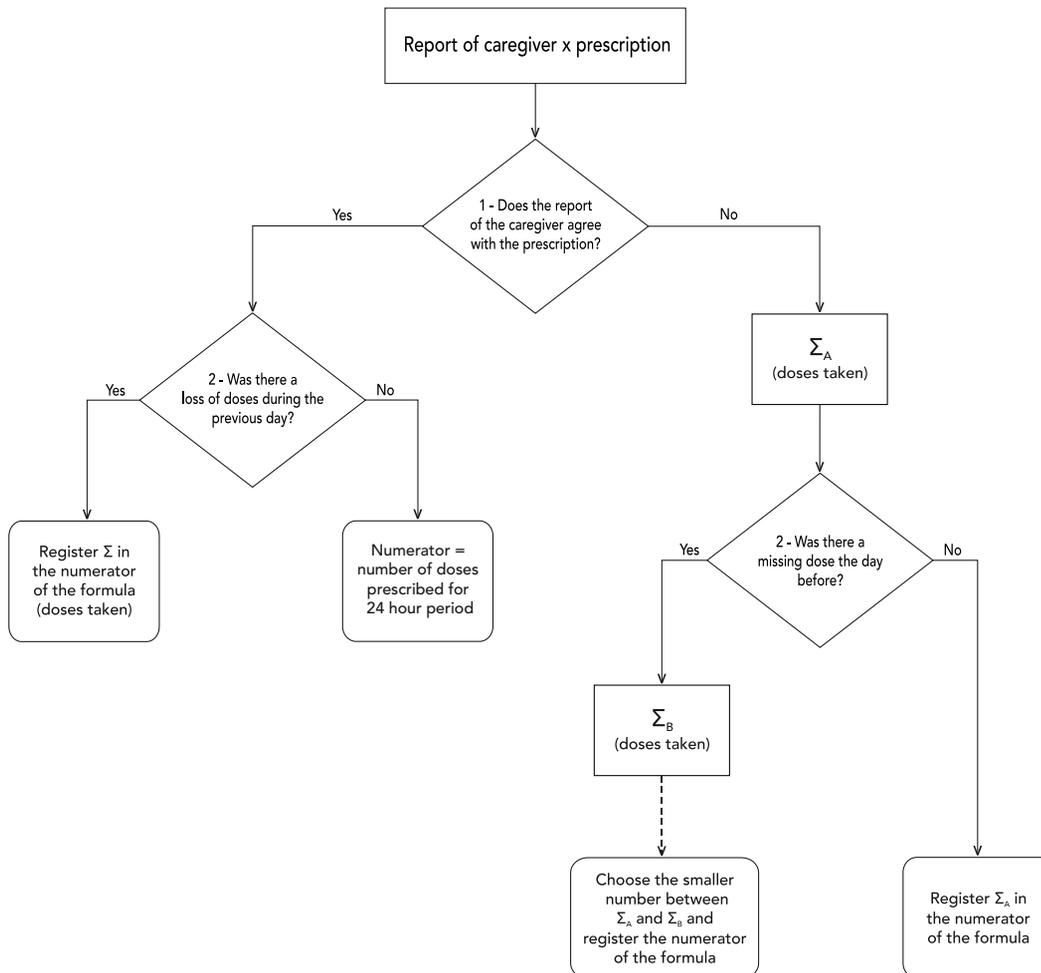
Σ = sum; Σ_A = sum of doses taken in accordance with doctor's prescription for 24 hours; Σ_B = sum of doses taken in the last 24 hours, discounting missing doses.

borderline significance, increasing the weight of association measured by odds ratio [15].

Ethical considerations

The research project was approved by the Ethics Committees of the four institutions that developed the study. The caregivers that agreed to participate signed the Informed Consent Form.

The research results were presented in an aggregated form, without identifying the cases included in the study, rigorously obeying the principles of ethics and protecting participant secrecy.

Results

The minimum sample size was of 180 caregivers. Of the 202 children scheduled for a medical consultation during the data collection period, 8 were lost, 7 cases did not appear for consultation and their addresses were not found, and one institutionalized child was adopted by foreigners

Table 1

Prevalence of non-adherence and crude odds ratio (OR), according to selected variables. Porto Alegre, Rio Grande do Sul State, Brazil, 2002.

Characteristics	n	Non-adherence		OR	95%CI	p
		f	%			
Missing doses during previous week						
Yes *	47	34	72.3	1.00		
No	147	62	42.2	0.28	0.13-0,60	< 0.001
Total	194	96				
Difficulty in administering antiretrovirals						
Yes *	101	57	56.4	1.00		
No	93	39	41.9	0.56	0.30-1.02	0.06
Total	194	96				
Lack of orientation by the healthcare team						
Yes *	27	15	55.6	1.00		
No	167	81	48.5	0.75	0.31-1.83	0.64
Total	194	96				
Missing consultation in the last six months						
Yes *	66	42	63.6	1.00		
No	128	54	42.2	0.42	0.22-0.80	0.007
Total	194	96				
Delay in procuring monthly antiretrovirals **						
Yes *	123	72	58.5	1.00		
No	66	21	31.8	0.33	0.17-0.65	< 0.001
Total	189	93				

* Category of reference for calculation of odds ratio, confidence interval, and p value;

** The five cases whose registries informed by the System of Medication Logistics Control (SICLOM) were not found at the dispensing pharmacies were excluded from analyses.

during the period. Consequently the final sample consisted of 194 caregivers effectively located and interviewed, a number 7.8% higher than the initial estimate of 180.

Data collection was only concluded at each health service provider when there were no more new cases with criteria for participation in the study. The only exception to this occurred at Hospital da Criança Santo Antônio when collection was interrupted because installations were being moved to another building.

Healthcare services were identified randomly with the letters A, B, C, and D. Thus, of the total sample of participating caregivers, 86 (44.3%) were caregivers for children accompanied by provider A, 56 (28.9%), by provider B, 19 (9.8%), by provider C, and 33 (17%), by provider D.

As far as the location where the interviews took place; 153 (78.9%) were carried out at the health service provider and 41 (21.1%) at the child's home.

The children studied were between 11 months and 12 years old, with a mean age of 6 years; 102 (52.6%) were female. In reference to length of antiretroviral treatment, the mean observed was 40 months; 129 children (66.5%) were using a scheme with three or more drugs, and 65 (33.5%) with two drugs. Concerning the relationship between caregiver and child: 92 (47.4%) were biological parents; 26 (13.4%) adoptive or foster parents; 40 (20.6%) other relatives; and 36 (18.5%) were institutional caregivers.

Estimate of non-adherence

The estimated non-adherence in children included in the study was that of 49.5% (95%CI: 41.5-56.5), which corresponded to 96 non-adherent children among the 194 children under analysis. Classifying the sample into non-institutionalized (158), and institutionalized children (36), it can be observed that the prevalence of non-adherence in the first group was that of 55.7% while in the second it was significantly lower, 22.2%, with OR = 0.23; 95%CI: 0.09-0.56 and p < 0.001.

Bivariate analysis

Among the health service providers, the group of children who were accompanied by provider A presented the lowest level of non-adherence, 41.9%, followed by provider D, with 45.5%, and provider B, with 55.4%. The biggest discrepancy in prevalence was demonstrated by provider C, a 73.7% non-adherence, with p = 0.06.

The variables of sex, treatment length, and number of antiretroviral drugs used by the child, did not present significant statistical importance in relation to non-adherence outcomes.

In Table 1, significant statistical associations can be observed with the following outcomes: "no incidence of dosage loss in the previous week", with p < 0.001; "no incidence of missing a medical consultation / interview in the previous 6 months", with p = 0.007; and "no delay in procuring monthly antiretrovirals", with p < 0.001. Among the group of caregivers that said they had no difficulty in administering antiretrovirals there was observed an association with a significant statistical threshold, with p = 0.06. In the variable, difficulty in administering antiretrovirals, no association with the outcome was observed.

In the variables shown in Tables 2, 3, and 4, the group of institutionalized children was categorized separately because their caregivers were professionals and therefore characteristics of an individual or family nature, such as personal health or socioeconomic status, were not applicable.

In the variables concerning the social situation of the caregiver and/or the family, among non-institutional caregivers , a statistically significant association to outcome was only observed for the variable "caregiver responsible for other person(s)", with p = 0.001. However, observing the odds ratios and confidence intervals, it was verified that being an institutionalized child was a protective factor respecting all variables shown in Table 2.

Table 3 shows analytical results of the variables related to the health of the caregiver. In the variable "use of antiretrovirals by caregiver", a

Table 2

Prevalence of non-adherence and crude odds ratio (OR), according to variables related to the social situation of the caregiver and/or the family. Porto Alegre, Rio Grande do Sul State, Brazil, 2002.

Characteristics	n	Non-adherence		OR	95%CI	p
		f	%			
Relatives know the diagnosis						
Yes *	124	65	52.4	1.00		
No	34	23	67.6	1.90	0.80-4.57	0.11
Institutionalized child	36	8	22.2	0.6	0.10-0.66	
Professionals at daycare/school know diagnosis						
Yes *	46	22	47.8	1.00		
No	45	23	51.1	1.14	0.46-2.82	
Non-attendance	67	43	64.2	1.95	0.85-4.52	< 0.01
Institutionalized child	36	8	22.2	0.31	0.10-0.91	
Family problem(s)						
Yes *	87	53	60.9	1.00		
No	71	35	49.3	0.62	0.31-1.23	0.14
Institutionalized child	36	8	22.2	0.18	0.07-0.48	
Caregiver works outside domicile						
Yes *	44	23	52.3	1.00		
No	114	65	57.0	1.21	0.57-2.58	0.59
Institutionalized child	36	8	22.2	0.26	0.09-0.77	
Caregiver responsible for caring for other person(s)						
Yes *	105	66	62.9	1.00		
No	53	22	41.5	0.42	0.20-0.87	0.01
Institutionalized child	36	8	22.2	0.17	0.06-0.44	
Total	**194**	**96**				

* Category of reference for calculation of odds ratio, confidence interval, and p value.

Table 3

Prevalence of non-adherence and crude odds ratio (OR), according to variables related to the caregiver's health situation. Porto Alegre, Rio Grande do Sul State, Brazil, 2002.

Characteristics	n	Non-adherence		OR	95%CI	p
		f	%			
Serology of caregiver						
Positive *	91	53	58.2	1.00		
Negative	31	14	45.2	0.59	0.24-1.45	
Unknown	36	21	58.3	1.00	0.43-2.36	0.42
Institutional caregiver	36	8	22.2	0.20	0.08-0.54	
Presence of HIV infection						
Yes *	36	25	69.4	1.00		
No	55	28	50.9	0.46	0.17-1.20	
Serology negative or unknown	67	35	52.2	0.48	0.9-1.23	0.17
Institutional caregiver	36	8	22.2	0.13	0.04-0.41	
Use of ARV						
Yes *	53	24	45.3	1.00		
No	38	29	76.3	3.89	1.42-10.93	
Serology negative or unknown	67	35	52.2	1.32	0.60-2.91	0.01
Institutional caregiver	36	8	22.2	0.35	0.12-0.98	
Difficulty in taking ARV						
Yes *	22	11	50.0	1.00		
No	31	13	41.9	0.72	0.21-2.49	
Doesn't use	38	29	76.3	3.22	0.92-11.60	0.02
Serology negative or unknown	67	35	52.2	1.09	0.38-3.18	
Institutional caregiver	36	8	22.2	0.29	0.08-1.03	
Total	194	96				

ARN: antiretroviral

* Category of reference for calculating crude odds ratio, confidence interval, and p value.

statistically significant association was observed between caregivers who were not taking antiretrovirals and non-adherence outcomes, with p = 0.01. Being an institutional caregiver was a protective factor respecting all the variables in this table, with the exception of "difficulty in taking antiretrovirals" (95%CI: 0.08-1.03).

Prevalence of non-adherence according to main variables: bivariate and multivariate analyses

Table 4 presents bivariate and multivariate (highlighted in the table) analyses for the variables that remain in the logistic regression model.

The variables; "missing doses in the previous week"; "difficulty in administering antiretrovirals"; "missing consultation in the last 6 months"; and "delay in procuring monthly antiretrovirals", were not included in the logistic regression model because it was concluded during the development of the analysis that they were correlated with non-adherence outcomes In the same way,

the variable, "use of antiretrovirals by caregiver", was not included in the final model because it was understood that it had a correlation with another very important variable for the study, "relationship (relative-guardian) of child to caregiver".

In Table 4 it can be observed that the variable "degree of relationship to child of the caregiver" presented a tendency for protection against non-adherence when the caregiver was not directly related to the child, that is, when the caregiver was a foster or adoptive mother or father, or professional. Multivariate analysis confirms protection when the caregiver is a professional, with p < 0.001.

As far as the "educational level of caregiver" is concerned, it was observed through bivariate analysis that the higher the level of education, the greater the tendency for protection against non-adherence, especially significant when the caregiver had a secondary school education or higher, or was an institutional professional, both cases with p < 0.01. In multivariate analysis the group of professional caregivers maintained the

Table 4

Prevalence of non-adherence and crude and adjusted odds ratios (OR), according to selected variables. Porto Alegre, Rio Grande do Sul State, Brazil, 2002.

Characteristics	n	Non-adherence		Crude			Adjusted		
		f	%	OR	95%CI	p	OR *	95%CI	p
Degree of relation/parentage									
Biological mother or father **	92	54	58.7	1.00			1.00		
Relative	40	24	60.0	1.06	0.46-2.41		1.17	0.53-2.59	0.70
Foster or adoptive mother or father	26	10	38.5	0.44	0.16-1.17	< 0.001	0.51	0.19-1.31	0.16
Institutional caregiver	36	8	22.2	0.20	0.07-0.3		0.12	0.04-0.34	< 0.001
Total	194	96							
Educational level									
Up to 4 years **	58	38	65.5	1.00			1.00		
5 to 8 years	66	37	56.1	0.67	0.30-1.48		0.72	0.33-1.59	0.42
Secondary/College	34	13	38.2	0.33	0.12-0.85	< 0.01	0.38	0.14-1.07	0.07
Institutional caregiver	36	8	22.2	0.15	0.05-0.43				
Total	194	96							
Per capita income *									
≤ R$67.38 **	84	53	63.1	1.00			1.00		
> R$67.38	72	35	48.6	0.55	0.28-1.10	< 0.01	0.86	0.40-1.85	0.70
Institutional caregiver	36	8	22.2	0.17	0.06-0.44				
Total	192	96							
Drug use									
Use **	88	51	58.0	1.00			1.00		
No use	70	37	52.9	0.81	0.41-1.61	< 0.01	0.77	0.39-1.50	0.44
Institutional caregiver	36	8	22.2	0.21	0.08-0.54				
Total	194	96							

* Family income per capita (in Reais) was categorized after the median for that particular sample, two cases were excluded from the logistic regression because of missing information;

** Category of reference for calculating odds ratio, confidence interval, and p value.

association with the outcome, with p < 0.001, while the caregivers with secondary school or higher presented an association of borderline significance, with p = 0.07.

In the variables, "per capita family income" and "drug consumption by caregiver" no association was found between non-adherence and the category "non-institutional caregiver". Bivariate analysis of these two variables revealed that when the caregiver was an institutional professional there was a statistically significant protection association, with the non-adherence outcome (p < 0.01). This same association, however, did not remain in multivariate analysis.

Discussion

The study found an estimated prevalence of non-adherence to antiretroviral treatment in children residing in Porto Alegre of 49.5%. This prevalence was initially estimated to be 30%, based on a Brazilian study of adult patients carried out by Nemes et al. [13]. Another more recent study, also with Brazilian adults, found a non-adherence prevalence of 43.1%, closer to that found in the present study [7]. Non-adherence in children, analyzed in international studies, showed prevalences of 30% [12] and 26% [16].

The child's health service provider seems to influence non-adherence, as the prevalence of non-adherence was different at the four facilities. Taking as a reference the children attended at facility A. the children attended at facility C presented a greater non-adherence risk, but this association did not show any statistical significance. Nemes et al. [13] encountered unequal adherence among health service providers that attended patients, constituting the second variable to explain adherence in that study.

Characteristics of the children, such as "sex" and "age", did not seem to have any influence on adherence to antiretrovirals, neither did aspects related to treatment such as "time of use", and

"number of drugs composing the therapeutic regimen".

The variables "missing doses during previous week", "difficulty in administrating antiretrovirals", "missed consultation in the 6 months prior to interview", and "delay in procuring monthly antiretrovirals" through their correlation with non-adherence can be considered indicative of low adherence. The occurrence of one or more of these situations during the follow-up of the child can elicit the precocious interference of the health team to solve the problem of non-adherence to antiretrovirals. In this sense the professionals should also pay close attention to those cases in which a caregiver is responsible for other children or dependent adults which, because of additional responsibilities, may make the caregiver unable to adequately take care of an HIV infected child.

As far as the situation of the caregiver in regard to HIV infection, the fact of him/her being negative or positive without presenting symptoms of the disease seemed to induce a certain protection from non-adherence in the child. However a situation in which the caregiver was seropositive for HIV and is not under antiretroviral treatment seemed to increase the child's risk of non-adherence. It is possible that a caregiver's experience taking antiretrovirals or the acceptance and/or treatment of his/her own disease brings a better adherence to the child's treatment. Perhaps the majority of those caregivers who informed that they were not utilizing antiretrovirals, had, in reality, had had their use indicated by a doctor but either did not believe in the efficacy or necessity of treatment, or were unable to adhere to their own treatment. This posture of rejection or not believing in the efficacy/necessity of medication in the treatment of their own disease could have a negative reflection in the adherence to the treatment of the child under their care. Thus when the caregiver is HIV seropositive the health team should pay attention to how he/she takes care of his/her own health as this may mirror how the child's health is taken care of. In a study carried out by Gibb et al. [16], in which it was investigated whether the caregiver used antiretrovirals or not, the authors found no significant association with this variable and adherence.

The variables "type of relationship/relative of caregiver to child" and "educational level of caregiver" were the ones that better explained adherence to antiretrovirals in this study.

The children cared for by their biological mothers or fathers and those cared for by other relatives achieved better adherence when compared to those taken care of by a foster or adoptive mother or father, but multivariate analysis did not demonstrate a significant statistical association between these categories. It is important that the team that treats the child be aware of the quality of the relationship between the caregiver and the child. It is not rare, in these cases, that the caregiver is a relative that possibly has taken over the care of the child more because of the imposition of a situation, such as advanced AIDS or the death of the biological parents, than of his/her own free will. All the same, when the caregiver is a professional from an institution where the child is sheltered, the protection of this child against non-adherence is evidenced in a logistic regression model. None of the studies reviewed compare adherence between institutionalized and non-institutionalized children.

The socio-economic situation of non-institutional caregivers was evaluated through the variables "educational level" and "family income per capita". In bivariate analysis, protection respecting the risk of non-adherence was observed among children taken care of by people with a better socio-economic situation. Among the two variables, the one that demonstrated this protection better was the educational level of caregiver, as a protective factor against non-adherence, with an apparent dose-response effect. In the category "secondary school/college", taking as a reference the lower level –"up to four years completed", a statistically significant association was observed with non-adherence. In the adjusted analysis, educational level had a borderline association with non-adherence for the category "secondary school/college". This association suggests that the better the educational level of the caregiver is, the less the risk of non-adherence to antiretroviral treatment for the child. It is possible, however, that a wider social class indicator that associates income and education could better show risk for those strata less favored.

In adult patient adherence studies, social and economic characteristics are evaluated as predictors of adherence to antiretrovirals. For example, North American studies report a significant association between non-adherence and ethnic minorities, in this case, of Hispanic and African origins [17]. In studies of children the authors did not find association with ethnicity [12,16]. Some of these studies pointed out a significant association of education and income level with adherence to antiretrovirals [7,13].

In relation to the consumption of alcoholic beverages and/or psychotropic drugs by the caregiver, a significant association among non-institutional caregivers was not found in this study. There is no consensus among the studies

reviewed about the influence of consumption of alcoholic beverages and other psychotropic drugs on the prevalence of non-adherence [13,18].

On reviewing studies about antiretroviral adherence, we found there are no standards of conduct in the measurement of adherence variables, nor even consensus about what cut-off defines adherence or non-adherence, facts which impede comparing different populations studied.

Factors for antiretroviral non-adherence risk among children are still poorly examined in published literature. The international studies that deal with these factors are carried out in developed countries, contributing little to universal parameters, if one is trying to have a vision of the social and economic differences between those countries, and developing countries, such as Brazil.

Final considerations

Although, in Brazil, there is a treatment policy that guarantees free access to antiretrovirals to patients infected with HIV and AIDS, this study uncovered a surprisingly high level of non-adherence (49.5%) to medication in the population of children included in the study.

Children cared for in a family environment presented a higher risk than institutionalized children. The segments with a higher level of non-adherence corresponded to those in which the children's caregivers had a low educational level, were not biological parents, and did not have official custody of the child.

The identification of these factors can orient the health teams, whose actions should implement interventions that have the objective of minimizing non-adherence among children and must place a stronger emphasis on monitoring those caregivers who present the major risk characteristics described in this study.

Resumo

A sobrevida de crianças com AIDS teve um aumento considerável com o emprego de anti-retrovirais mais efetivos, porém os benefícios dessa terapêutica são limitados pela dificuldade na adesão ao tratamento. Este estudo transversal teve como objetivo estimar a prevalência da não-adesão aos anti-retrovirais entre crianças residentes em Porto Alegre, Rio Grande do Sul, Brasil, e identificar os fatores associados. Foram entrevistados 194 cuidadores de crianças. A técnica utilizada para aferir a adesão permitiu detectar tanto as perdas por falhas no entendimento do esquema anti-retroviral prescrito quanto das perdas conscientes de doses. Foi definida como não-aderente a criança que ingeriu menos de 80% das doses prescritas para 24 horas no dia anterior à entrevista. A prevalência geral da não-adesão encontrada foi de 49,5% superior à estimada. Considerando os tipos de cuidadores não-institucionais e institucionais, no primeiro, a prevalência foi de 55,7% e, no segundo, de 22,2%. Na análise multivariável, a escolaridade do cuidador apresentou associação limítrofe com o desfecho. As crianças institucionalizadas e as cuidadas por pessoas com melhor escolaridade parecem estar mais protegidas da não-adesão aos anti-retrovirais.

Anti-Retrovirais; Síndrome de Imunodeficiência Adquirida; HIV; Criança

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