

**Avaliação da adesão à terapia antirretroviral em pacientes com AIDS**

Evaluation of adherence to antiretroviral therapy for AIDS patients

Evaluación de la adherencia a la terapia antirretroviral en pacientes con SIDA

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**Objective:** The objective of the present study was to evaluate adherence to antiretroviral treatment for AIDS patients. **Method:** This is a quantitative study, field, and descriptive, at Reference Center for infectious diseases in Natal/RN, from August 2010 to July 2011. Data were collected through medical records, interviews and the pharmacy dispensing records. **Results:** Participated in the study 402 patients, among whom (70.2%) were male, the mean age was 35 years, and 90.0 had been diagnosed of HIV infection between 1 to 5 years. It was observed that 30% of the patients adhered to treatment. **Conclusion:** The Adherence in the present study are lower than those recommended in the literature, to increase adherence to ART is essential to carry out strategies to increase awareness and user engagement.

**Descriptors:** Medication adherence; Antiretroviral therapy; HIV infections.

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## RESUMO

**Objetivo:** Avaliar a adesão ao tratamento antirretroviral de pacientes com AIDS. **Método:** Trata-se de um estudo transversal e descritivo, com abordagem quantitativa realizado em um Centro de referência de doenças infectocontagiosas em Natal/RN, no período de agosto de 2010 a julho de 2011. Coletaram-se os dados por meio dos prontuários, questionário, e registro de dispensação da farmácia. **Resultados:** Dos 402 pacientes estudados, 70,2% eram do gênero masculino, com média de 35 anos, e 90,0% apresentou tempo de contaminação de 1 a 5 anos. Observou-se que apenas 30% dos pacientes aderiram adequadamente ao tratamento. **Conclusão:** A adesão encontrada está aquém do preconizado na literatura, para aumentar a adesão à terapia antirretroviral (TARV) é indispensável a realização de estratégias de conscientização e envolvimento do usuário. **Descritores:** Adesão à medicação; Terapia antirretroviral de Alta atividade; Infecções por HIV.

## RESUMEN

**Objetivo:** Este estudio tuvo como objetivo evaluar la adherencia al tratamiento antirretroviral para pacientes con SIDA. **Método:** Estudio de carácter cuantitativo, campo, llevado a cabo en un centro de referencia para las enfermedades infecciosas en Natal/RN, de agosto 2010 a julio 2011. Se recogieron los datos a través de gráficos, cuestionarios y registros de farmacia dispensadora. **Resultados:** De los 402 pacientes estudiados (70,2%) eran varones, con una media de 35 años, y el 90,0% mostraron contaminación momento 1-5 años. Se observó que el 30% de los pacientes se adhirió al tratamiento. **Conclusión:** La adherencia se encuentra más baja que las recomendadas en la literatura, para aumentar la adherencia al tratamiento antirretroviral es esencial para llevar a cabo las estrategias para aumentar el conocimiento y la participación de los usuarios. **Descriptor:** Cumplimiento de la medicación; Terapia antirretroviral Altamente activa; Infecciones por VIH.

## INTRODUCTION

In the early 80s of last century, they began to identify the first cases of Acquired Immunodeficiency Syndrome (AIDS) in the world, and after more than two decades of the discovery of the human immunodeficiency virus (HIV), we still come across many challenges to understanding this epidemic.<sup>1</sup>

It is estimated that about 34 million (33.4 to 46 million) people worldwide are living with HIV. It is estimated also that 0.8% of adults aged 15-49 years worldwide living with this disease.<sup>2</sup>

In recent years, the availability of antiretroviral drugs has led to a significant decline in morbidity and mortality related to HIV/AIDS in Brazil and throughout the world. The resources available for treatment brings new challenges for understanding and coping with this disease.<sup>1</sup>

Thus, the emergence of antiretroviral therapy and access to treatment, had an impact on survival of HIV positive and became a disease considered highly lethal in a chronic nature of the disease, however, has not made AIDS a disease less of a concern.<sup>3</sup>

In Brazil, despite all the entrepreneurial activities developed by the National Program of Sexually Transmitted Diseases and AIDS in the last decade, a major public

health problem and a new challenge have been reported: Treatment failure, mainly related by non-adherence patient to antiretroviral Therapy (HAART).<sup>4</sup>

The lack of adherence to new medicines for AIDS, particularly protease inhibitors (PI), is regarded as one of the most threatening risks for the effectiveness of treatment, at the individual level, and to the spread of virus resistance in the collective plane.<sup>3</sup> This is because the new therapeutic regimens appear to require the individual to adhere to treatment, complex integration of knowledge, skills and acceptance, and other important factors related to the environment and care for the health.<sup>4</sup>

In the case of patients with HIV/AIDS who use HAART it is associated with treatment failure, when the membership is 80%.<sup>1</sup> studies reinforce this finding, concluding that the desired maximum effects of antiretroviral treatment are obtained when reaches at least 95% adherence to the prescribed doses.<sup>5</sup>

The extent of adherence to treatment for people with HIV can be done through various methods, among which include the self-report, questionnaires, with the use of electronic monitors, pill counts, records on the withdrawal of the pharmacy drugs and markers biological CD4 + T-lymphocytes and viral load (VL).<sup>1</sup>

The self-reporting is now considered the most common method used in the monitoring of adherence to treatment in patients with AIDS, since it has advantages for being a low-cost technique that requires little time to be applied, and provide listening and discussion about the reasons and difficulties relating to missed doses and possible solutions to improve adherence to treatment.<sup>1</sup> Among the self-report, was created a multidimensional instrument of accession measure in Spain, called "Cuestionario para la Evaluación de la adhesión al Tratamiento Antiretroviral" (CEAT-HIV).<sup>6</sup> This questionnaire has emerged as measure of adherence to treatment, specific to HIV/AIDS infection, and since 2007, when it was validated in Brazil, has been widely used in adhesion studies antiretroviral therapy, and therefore chosen as an instrument for this research.

To increase the effectiveness of the control of accession may be associated self-report method to control dispensing pharmacy. This measure is based on the possibility that patients seeking their medication at the right time are more likely to correctly take them than those who even delay in the removal of your medicines.<sup>1</sup>

Given this current picture of AIDS, it is believed to be necessary studies in this area on the part of health professionals, especially nurses, who are the primary caregivers of people getting sick. It is clear, at first, that the discussion of adherence to antiretroviral therapy is complex because it involves, directly or indirectly, various aspects, such as the biological, emotional, psychological, and especially the family, which it requires nurses comprehensive care and continues to this patient.

Good adherence to therapy is therefore fundamental for the rehabilitation and stability of the patient with AIDS, this feeling, the existence of a public policy of universal access to antiretroviral medication in Brazil makes studies on adherence to ART are of great relevance to provide a better understanding of the problem and proper performance of the professional teams, to ensure good health and quality of life for people living with HIV/AIDS.<sup>6</sup>

This study was therefore aimed to assess adherence to antiretroviral treatment of AIDS patients.

## METHOD

This is a descriptive study with a quantitative approach, performed in a reference center for the treatment of infectious diseases, located in northeastern Brazil. It was used as inclusion criteria for selection of the sample: Patients with AIDS, over 19 years, of both sexes, with clinical and cognitive conditions to answer the questions of the study instruments, who agreed to participate voluntarily signing Informed Consent and Informed (IC), and who were already on ART for at least one year. They were excluded from the study, those who refused to participate voluntarily or who dropped out during the process.

The sample was chosen randomly among those who attended the pharmacy for receiving antiretroviral (ARV), was calculated a probability sample from the number of registered patients at the pharmacy of their health service. For this, we used the calculation for finite populations with a sample error of 5% and the reliability of 95%, thus constituting up a sample of 402 participants. The data collection period was set from August 2010 to July 2011, estimated time to reach the required sample.

The self-reporting method through the Brazilian adaptation of “Cuestionario to her evaluación de la adhesión al antiretroviral tratamiento” and attendance in receiving ARV, were used to assess adherence to antiretroviral therapy. This instrument addresses issues that demonstrate reasons that could help or hinder adherence to treatment, such as stopped taking the drug to feel better, worse, sad or depressed? What relation has with the prescriber? Use some strategy to remember and/or facilitate the administration of the medicine? Do you have any difficulty taking the drugs? The occurrence of adverse reactions influences the non-adherence to treatment?

The total score in that instrument is obtained by the sum of all items (minimum value 17, maximum value 89). If the raw score is from 80 to 89 points, patient is considered as strictly adhered between 75 to 79 has good adherence to treatment and less than 74 is categorized as little adherence.<sup>7</sup>

Complementary to this instrument was used with permission of the interviewees, the records, the registration form of pharmacy and the Logistics Management System of Medicines (SICLOM) of the Ministry of Health of Brazil.

The questionnaire was completed in the hospital, in a separate room, through interviews with patients coordinated by researchers. They were considered adherent patients who responded with optimistic and positive expectations regarding the treatment, who attended the pharmacy to receive ARVs every month during the survey period, which corresponded to score more than 74 points after the questionnaire evaluation.

The analysis of the information collected was performed using descriptive statistics with absolute frequencies and percentages.

The study was approved by the Ethics in Research of the Federal University of Rio Grande do Norte Committee under protocol number 129/2010 CAAE: 0146.0.051.000-10, and was funded by the Foundation will support research of Rio Grande do Norte (FAPERN).

## RESULTS AND DISCUSSION

### Sample characterization

As 12 patients did not meet the inclusion criteria and eight refused to participate in this research, amounted to a sample of 402 people. The average age was 35 years, ranging between 19 and 65 years of age. Males predominated by adding 70.2% of respondents.

When asked about the form of exposure to HIV, all claimed to have acquired the virus through sexual relations, their heterosexual majority. In relation to the time of infection, 90% had time of 1 to 5 years. In the group interviewed during the current treatment, 50% of patients used four ARV drugs and 40% of patients' three ARV drugs.

### Adherence to antiretroviral

In terms of age, it was found that 20% of patients aged 30 to 40 years, had a total adherence to the treatment, which characterized the age group with the largest membership in the search. It was also observed that male patients had a larger membership (20%) compared to females (10%), and that the time of diagnosis was an influencer factor, since 25% of patients in treatment, who attended the pharmacy every month, showed diagnosis time from 1 to 5 years, only 5% of patients over 10 years of diagnosis regularly adhered to treatment.

Regarding the intensity of side effects due to HAART, 50% of the patients considered the intense nothing, which has no side effects an obstacle to treatment adherence. In this context, 60% of respondents reported no difficulties to ingest the tablets and/or capsules, thus, the size of the tablets was not considered factor influencing nonadherence.

On the use of strategies to remember the medication time, 50% of respondents said they use some, such as services notes/phone tasks (15%), kitchen calendar (5%), warning in the refrigerator (10%), associated with the schedules of the meal (10%), family assistance (5%), and membership in the outward or return time work (5%). Regarding the

administration time, 50% reported that they are often used to take the medicine at the same time.

When asked about their opinion and conduct in relation to treatment, 62% of respondents considered themselves very doers of therapy. However, although they are considered loyal to treatment, only 30% of respondents attended every month for receiving ARV.

We observed a relationship between the drug regimen and adherence, as among patients who fully adhered therapy, 15% used: Lamivudine + Zidovudine and Efavirenz (AZT+3TC/EFZ) and 5% used: Fumarate, Lamivudine, atazanavir and ritonavir (TDF/3TC/ATV/RTV), showing that the amount of tablets can influence adherence, and prescription drugs can be combined an enabling strategy for compliance with therapy.

In this context, it was observed that 96% of patients reported having stopped taking the drug for ever forgetting or feel better, sad/depressed before the problems associated with the disease. While 96.6% reported having ever left to take a feel worse after the start of medication.

During the study period was possible to detect three cases of noncompliance, characterized by patients who only sought the pharmacy once the course of the research, which directly exemplifies the lack of adherence to ARV therapy.

And that because of the use of alcohol and the change of routine on weekends, 6% and 4% patients, respectively, reported not to use the drug during this period.

With regard to the relationship with the doctor, 90% of respondents said they maintain a good relationship as the infectious disease that meets 7% reported that this relationship can improve and 3% consider the relationship as regular.

It also contacted the information obtained from these patients on AIDS and ARV drugs still need to improve, as 50% of patients considered their unsatisfactory level of knowledge. The table 1 shows the measurement result of adherence to drug treatment, according to the results of CEAT-HIV test.

**Table 1** - Compliance to drug treatment of HIV carriers, according to the results of the CEAT-HIV test

Adherence	Rating	n	%
80-89	Stricted	48	12
75-79	Good	120	30
<74	Little	234	58
<b>Total</b>		<b>402</b>	<b>100</b>

The analysis of this sample showed similar data to other research 8-9 regarding the predominant age group (between 35 to 40 years), the prevalence of infection in males and the form of heterosexual transmission of the disease. Therefore, it is possible to observe a serious flaw with regard to the prevention of AIDS, due to the prevalence of transmission resulting from unprotected sex. These values are consistent

with another study, whose percentage found on this same form of HIV transmission was 64%.<sup>9</sup>

In relation to age, generally, adhesion increases with age, but above 75 years. Study shows an association between nonadherence and younger individuals as well as an increase in adhesion between more elderly individuals.<sup>6</sup>

It is worth noting that despite the prevalence of males, there is epidemiological trend of feminization of AIDS, mainly due to the increase in heterosexual transmission of HIV,<sup>8</sup> fact also observed in this sample.

The treatment time is not a variable consensus in the literature regarding the higher prediction accession. Patients who are treated less time, is more likely to not adhere to treatment compared to patients who are treated for longer. This can be explained by the fact that patients become more committed to follow the treatment from the moment they realize gains in their clinical condition, according to the medication.<sup>9</sup> In contrast, in this study, it was found that patients with time diagnostic one to five years have greater adhesion.

When dealing with drug therapy used, study reveals higher levels of adherence in patients using a maximum of three antiretroviral drugs (ARVs).<sup>10</sup> Other research also shows that, for each ingested tablet, the risk increases to non-adherence by 12% and is 3.2 times every 10 tablets added in therapy.<sup>11</sup> With technological advances made it possible to reduce number of daily pills, such as zidovudine and lamivudine combination (AZT+3TC) to facilitate adherence to treatment. The use of strategies to remember the medication time is also cited by patients in another study as a facilitator adhesion technique.<sup>12</sup>

The assessment of severity of side effects, a recent study conducted in the city of Toledo/PR showed that 42.3% of HAART users qualified as "nothing severe" side effects of therapy,<sup>12</sup> values close to those found in this sample. Research also shows that patients with HIV, more tolerate the side effects that patients with chronic illnesses less severe as hypertension or diabetes.<sup>13</sup> Corroborating this result, in a Brazilian study, the authors found that the absence of side effects increased by 7.6 times the risk of nonadhesion.<sup>14</sup>

Regarding the self-evaluation of patients about their membership, there is a tendency of them overestimate their loyalty to treatment during the self-report technique or even evaluation questionnaires, the same fact was reported in the study previous<sup>1</sup> and justified by the user's fear disappoint or displease health professionals, which can be explained by the phenomenon of social desirability.

In this study, some patients reported discontinue treatment because drinking alcohol. Alcohol can reduce adhesion because many people can stop taking their medication because they felt intoxicated because they have drunk, and fail to take medications to fulfill their social functions such as going to parties and bars, where you are offered drinks.<sup>15</sup> In in addition, alcohol can provide

risk behaviors such as use of other drugs and increase the frequency of depression.<sup>16</sup>

A study conducted in Marília (SP) found that non-adherent patients to antiretroviral therapy were 9.7 times more likely to stop taking the medication to drink alcohol than adherents, which corroborates the results found in this research.<sup>17</sup>

There is not yet defined relationship between sex and adherence to HAART, however, the literature indicates that women have higher numbers of absences from clinical and forget more often the medication doses than men, and this difference was explained by the fact that women need to manage family routines and child care, forgetting themselves. In addition, the same survey reveals that women tended two or more children are more compliant compared to that did not children.<sup>18</sup>

Regarding the affinity between the patient and the healthcare team, studies confirm the positive relationship between adherence and quality of care, especially the relationship with health.<sup>18</sup> professionals This is considered essential to treatment adherence having regard to the customer's perception of the competence of the professional, the quality and clarity of communication, the willingness of professionals to involve customers in decisions relating to the treatment, with the feeling of support, with satisfaction with staff and information suitable for the treatment and severity of side effects.

In this context, the high percentage of patients found in this study, with a poor knowledge about their clinical picture and therapy used, reflects a failure in the health service as the guidance and monitoring of the user. It is noteworthy, therefore, the fundamental role of staff to clarify and guide the patient regarding their clinical presentation, treatment, and all the issues surrounding his life from AIDS diagnosis.

Thus, the data obtained in this study showed a poor adherence to antiretroviral therapy among patients interviewed. This result is in line with other studies, governing the same subject from similar methodology.<sup>8,11</sup>

In this context, it is clear that a multidisciplinary approach is grounded in the care of these patients in order to overcome the compartmentalized service, focused only on medical and clinical approach. The link established between the team and the user facilitates the monitoring and adherence to service, making the patient feel safe, respected and has the confidence to express their doubts related to living with HIV and AIDS.<sup>8</sup>

## CONCLUSIONS

In the present study it was prevalent among respondents' males, and the transmission profile of the disease by sex, heterosexual and unprotected.

Furthermore, it became apparent through the report of patients, combination therapy contributes to adherence to therapy, and patients and less time of diagnosis were more faithful to the regimen at the same time, the side effects could

not be considered alone an influencer factor to low patient compliance to ARVs.

It is worth noting also the use of alcohol as a risk factor for non-adherence, and the good relationship with the doctor and the health team, as strong allies to continue the treatment and rehabilitation of patients with AIDS.

It can be concluded, therefore, that adherence found in this study is lower than those recommended in the literature to increase adherence to ART is essential that awareness strategies and user involvement are carried out, so that each patient recognizes the importance of following correctly the therapeutic regimen, linking directly a good adherence to a higher quality of life.

Regarding nursing, and the whole multidisciplinary team, we suggest the implementation of strategies for counseling the patient with AIDS, so that there is an increased awareness of each in relation to the disease, treatment and possible side effects, decreasing surprises and preparing each patient for effective membership.

## REFERENCES

1. Polejack L, Seidl EMF. Monitoramento e avaliação da adesão ao tratamento antirretroviral para HIV/aids: desafios e possibilidades. *Ciênc Saúde Coletiva*. 2010; 15(1):1201-8.
2. 2012 country progress reports [online database]. Geneva, UNAIDS, 2012. acesso: 01 mar 2014. Disponível :[http://www.unaids.org.br/documentos/UNAIDS\\_GR2012\\_em\\_en.pdf](http://www.unaids.org.br/documentos/UNAIDS_GR2012_em_en.pdf).
3. Waidman MAP, Bessa JB, Silva FLC. Viver com aids e sofrer psiquicamente. *Rev Rene*. 2011; 12(1):173-80.
4. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Programa Nacional de DST e Aids. Recomendações para terapia Antirretroviral em Adultos e Adolescentes Infectados pelo HIV. Brasília: Ministério da Saúde; 2009.
5. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Programa Nacional de DST e AIDS. Manual de adesão ao tratamento para pessoas vivendo com HIV e AIDS/Ministério da Saúde, Secretaria de Vigilância em Saúde, Programa Nacional de DST e AIDS. Brasília: Ministério da Saúde; 2010.
6. Saldanha JS, Andrade CS, Beck ST. Grau de adesão ao tratamento com anti-retrovirais entre indivíduos HIV positivos atendidos no Hospital Universitário de Santa Maria. *Saúde Santa Maria*. 2009; 35(1):4-9.
7. Remor E, Milner-Moskovics J, Preussler G. Adaptação brasileira do "Cuestionario para Evaluación de la Adhesión al Tratamiento Antiretroviral". *Rev Saude Publica*. 2007; 4(5):685-94.
8. Romeu GA, Tavares MM, Carmo CP, Magalhães KN, Nobre ACL, Matos VC. Assessment of adherence to antiretroviral therapy for patients with HIV. *Rev Bras Farm Hosp Serv Saúde*. 2012; 3(1):37-41.
9. Blatt CR, Citadin CB, Souza FG, Mello RS, Galato D. Assessment of adherence to antiretroviral drugs in a municipality in southern Brazil. *Rev Soc Bras Med Trop*. 2009; 42(2):131-6.
10. Silva ALCN, Waidman MAP, Marcon SS. Adesão e não-adesão à terapia anti-retroviral: as duas faces de uma mesma vivência. *Rev bras. enferm*. 62 (2). 2009.
11. Resende RC, Podestá MHMC, Souza W, Barroso TO, Vilas boas OMGC, Ferreira EB. Adesão ao tratamento antirretroviral de pacientes vivendo com HIV/AIDS atendidos pelo Sistema Único de Saúde. *RUVRV*. 2012; 10(2):186-201.
12. Lorscheider JA; Geronimo K; Colacite J. Estudo da adesão à terapia antirretroviral para HIV/aids de pacientes atendidos no município de Toledo/PR. *Acta Biom Bras*. 2012. 3(1):41-51.
13. Gomes RRFM, Machado CJ, Acurcio FA, Guimaraes MDC. Pharmacy records as an indicator of non-adherence to antiretroviral therapy by HIV-infected patients. *Cad Saúde Pública*. 2009; 25(3):495-506.
14. Colombrini MRC, Lopes MHBM, Figueiredo RM. Adherence to the antiretroviral therapy for HIV/AIDS. *Rev Esc Enferm USP*. 2006 ;40(4):576-81.
15. Rego SRM, Rego DMS. Associação entre uso de álcool em indivíduos com AIDS e adesão ao tratamento antirretroviral: uma revisão da Literatura. *J Bras Psiquiatr*. 2010; 59(1):70-3.
16. Hendershot CS, Stoner SA, Pantalone DW, Simoni JM. Alcohol use and antiretroviral adherence: review and meta-analysis. *J Acquir Immune Defic Syndr*. 2009; 52(2):180-202.
17. Ilias M, Carandina L, Marin MJS. Adesão à terapia antirretroviral de portadores do vírus da imunodeficiência humana atendidos em um ambulatório da cidade de Marília. *Rev. Baiana Saúde Pública*. 2011;35(2):471-84.
18. Felix G, Ceolim MF. The profile of women with HIV/AIDS and their adherence to the antiretroviral therapy. *Rev Esc Enferm USP*. 2012. 46(4):884-91.

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