

Full Length Research Paper

Evaluation of depression and anxiety on HIV/AIDS in-patient

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Since its discovery, the expansion of HIV/AIDS epidemic has been considered an issue of great concern. Even along the advances in treatment and the increase in life expectancy of patients, there are still several implications involved in the infection and its evolutionary process which need deeper studies. One of these implications is the combination between the impact of the disease and the mental disorders. The present study aims to evaluate the levels of depression and anxiety of HIV/AIDS in-patient and also searching a combination of these levels with the degrees of T-CD4 lymphocyte. The sample included 46 HIV/AIDS in-patient admitted to the Hospital of Infectious Diseases (Hospital de Infectologia) in São Paulo. The results have indicated the prevalence of depression and anxiety symptoms, mainly on women, and the non-combination between the T-CD4 classification and the level of symptomatology, besides the combination between these symptomatology. For future studies it is suggested to build simplified tracking tools, specifically designed for this population.

Key words: HIV, AIDS, depression, anxiety, T-lymphocyte.

INTRODUCTION

Since the 1980's, the HIV/AIDS appearance and epidemics expansion have been considered a matter of concern. Even with the advances in treatment and the increase of life expectancy of the ones infected, there are still many implications involved in the infection and its evolutionary process that require greater deepening. The epidemics have not only produced a large scale human tragedy, as also have been an important impact in the discussion of questions related to sexuality in diverse contexts, including those of greater resistance to the discussion of sexual practices and relationships between genders (Corrêa et al., 2008; Corrêa and Petchesky, 1996; Costa, 2009; Macrae, 1990; Zancan, 1999).

In the epidemics emersion, the individuals diagnosed with HIV/AIDS were part of specific groups and had homo/bisexual orientation characteristics, most adults, inhabitants of major cities, male gender and considered white. This panorama is considered to be different nowadays. According to a report by the Joint United Nations Program on HIV/AIDS, the number of HIV-

infected has been growing all over the world in 2008, reaching a number of 33.4 million people. This data represented an increase of 20% compared to year 2000 and prevalence three times bigger than in 1990. In 2008, there was an estimated increasing of 2.7 million new infections; however, it was also estimated that 2 million deaths occurred due to opportunistic diseases. These data have indicated that the epidemics have stabilized in many regions; however, the prevalence continued to increase in the Western Europe and Central Asia. Sub-Saharan Africa continues to be a region with higher numbers of new HIV infections, representing 71% (WHO, 2010).

A change in gender to the epidemics was also observed. Women nowadays represent one of the main affected groups (Sadock and Sadock, 2007); the world estimations indicate an increase of 50% in the number of infected women. In Latin America, for example, approximately 550 thousand women are HIV-infected. In Brazil, they represent 35% of the registered notifications (Andrade et al., 2006; Brasil, 2008). It is considered that the epidemics have been increasing among women and this is also occurring in other countries (WHO, 2010).

The Acquired immune deficiency syndrome (AIDS) is a disease that appears after the infection by the Human

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Immunodeficiency Virus (HIV), the virus attacks directly the defensive cells of the organism, in particular the T-CD4 Lymphocytes. It is characterized by an immunity disorder, resulting in a higher susceptibility to opportunistic infections and neoplasia. Regarding the transmission and infection those occur through intercourse, blood and blood derivatives, contact with sharp infected material and by vertical transfusion (Bowen et al., 1985).

The counting of T-CD4 Lymphocytes is considered an important mark on the prognosis of the HIV infection. In symptomatic and asymptomatic patients with a counting of T-CD4 Lymphocytes < 200 cells/mm³, it is suggested to initiate treatment with prophylaxis against opportunistic infections. Medication therapy is also indicated for individuals with T-CD4 Lymphocyte counting between 200 and 350 mm³ and elevated plasma viral charge (over 100.000 copies/mm³) with the intention of avoiding immunological and clinical deterioration, it is suggested to evaluate the clinical state of the patient (Brasil, 2008).

For a T-CD4 Lymphocyte counting over 350 mm³ in asymptomatic individuals, usually the beginning of the anti-retroviral therapy is not recommended; however, it is important to rethink this procedure in cases when the T-CD4 counting, reduces in a rhythm higher than 100 cells/mm³/year.

The asymptomatic patients with T-CD4 cells counting >500 cells/mm³ and elevated viral charge (>100.000 copies), must be clinically monitored in shorter periods, because an efficient and previous intervention must occur if the immune system worsens by a significant decrease of the T-CD4 count (Brasil, 2008).

The viral charge is a continuous variable, as the higher it is, higher will be the risk of progression of the disease and clinical deterioration of the patient; however, it usually decreases in response to the anti-retroviral medication or increases in case of resistance to the medication. After the deterioration of the T-CD4 cells and the increase of the viral charge because of the HIV, some organism systems become affected, including the neurological system (Everall et al., 1991).

According to Malbergier and Schoffel (2001), this syndrome is a subject of interest of the mental health professionals for two reasons: the tropism of HIV for the central nervous system, and the psychological impact of the diagnosis and the evolution of infection on individuals infected. They mention yet, the emerging of two big research areas derived from this interest.

Firstly, on the limits of psychiatry and neurology that maintains as a focus the clinical consequences of the action of HIV and other associated pathologies. Secondly, on the limits of psychiatry, psychology and social sciences, which investigative interest is in the psychological reactions, psychiatric complications of the infection and its social repercussions.

From this second research area, the studies that seek to understand the association between the impacts of the

disease with the psychiatric disorders could be highlighted. It is observed that the psychiatric disorders are common on the HIV-infected and not necessarily due to pre-existing conditions (Basu et al., 2005; Owe-Larsson et al., 2009). Among those disorders, the most related are depression and anxiety (Bayés, 1995; Stumpf et al., 2006). For frequent symptoms, some studies have mentioned guilt, irritability, imminent death feeling, fatigue, loss of control feeling, isolation, weight loss, abdominal discomfort, impulsiveness, heat sensation, fear of the situation getting worse, inability to relax and sleep changes (Cockram et al., 1999; Junqueira et al., 2008; Kagee and Martin, 2010; Malbergier and Schoffel, 2001; Schiavona and Pupulin, 2008).

However, a problematic is observed in the measurement and evaluation of those psychiatric situations and their symptoms. Malbergier and Schoffel (2001) consider that the virus makes changes in structures of the base nodes, thalamus and frontal lobe and this would cause motivation and humor disorders. So that, the appearance of symptoms is related to neurological conditions.

Nonetheless, the opportunistic diseases, the deterioration of the immune system and the use of substances during the treatment cause a series of physical discomfort, similar to the symptoms encountered in cases of depression and anxiety. This observation was mentioned in the research of Kalichman et al. (2000) in comparison to evaluation instruments. They have suggested that some instruments raised the scores in HIV-infected patients as including somatic symptoms.

In order to search for the association between the progression of the disease and the depression and anxiety, a large portion of the studies used the T-CD4 Lymphocytes counting and associate this result with psychological measurement instruments, diagnoses, among other assessment options.

These researches have mentioned a significant relationship between depression and anxiety to the measurements of the immune system (Burack et al., 1993; Evans et al., 1995; Goodkin et al., 1992; Leserman et al., 1997; Lu et al., 2009; Malbergier and Schoffel, 2001; Ulla and Remor, 2002; Zena-Castillo et al., 2009). However, despite this evident association, the results are still mixed and require better clarification, especially as to the methodology used (Evans et al., 2002a).

According to Ulla and Remor (2002) there are no doubts about the factors that have direct influence on the progression of the disease. The behavioral (habits and lifestyles), psychological (stress and confronting strategies) and social (social and familiar support) aspects are fundamental for the maintenance of the immune system. In addition to those conditions, besides the pharmacological therapy, a psychological intervention is intended to establish an individual adjustment and would also contribute to this maintenance. According to these authors the immune system when submitted to a high level of stress may result in a smaller immune

Table 1. Categorized distribution of lymphocyte T-CD4 per sex.

Category	Sex				Total (N=46)	
	Male (N=30)		Female (N=16)		N	%
	N	%	N	%		
Minimum (<200 mm ³)	23	76.7	13	81.3	36	78.3
Low (200 to 350 mm ³)	3	10.0	-	-	3	6.5
Moderate (350 to 500 mm ³)	2	6.7	-	-	2	4.3
High (over 500 mm ³)	2	6.7	3	18.8	5	10.9

competence and such measures would consequently contribute to an enhancement on the disease status.

To contribute with the mentioned perspective of the implications of the evolutionary process of the disease and study the association between its impacts with the psychiatric disorders, this study had the objective to evaluate the degrees of depression and anxiety in HIV/AIDS-infected hospitalized patients and seek for an association between these degrees and the level of Lymphocyte T-CD4.

METHODS

Participants

The sample was made up by 46 HIV/AIDS-infected patients, admitted in an infectology hospital in São Paulo. For composing the sample, the patients were selected as they entered in the hospitalization units. The patients with psychiatric alterations, neurological alterations and cognitive deficits, according to check-in information, did not take part on this survey. To participate on the survey, the patients were invited and informed about the objectives of sample collection and oriented about the Informed Consent Form before starting interview. After showing an interest in participating, the survey application was made individually by the researcher himself in an appropriate location.

Instruments

Socio - demographic questionnaire – Contains personal information referring to the individual's identification, such as name, age, sex, education level, profession, civil status, per capita income and information about children.

Research Schedule – Contains information about the clinical conditions of the individual, such as T-CD4, T-CD8, viral charge, diagnosis on admission, diagnosis on hospital discharge, time and number of hospitalization.

Beck Depression Inventory – BDI (Beck et al., 1961) – It is a self-report inventory that identifies the presence and intensity of symptoms on depression. The instrument was translated and validated to be used in Brazil, being one of the most used instruments both in researches and clinical use. It is composed by 21 groups of statements that vary from zero to three points (0=minimum of depression; 3=maximum of depression). The total score was obtained by adding the scores of the items and may vary from 0 to 63 points; as higher the total score is, as higher is the degree of depression presented by the individual. It is also described by cut-off points that characterize the degrees of depression, minimum 0–11; mild 2–19; moderate 20–35 and severe 36–63. Its application is made individually or in groups, being

indicated for clinical use in men and women from 17 to 80 years old. The studies with the inventory, have presented evidences of validity based on the content, the relationships with other variables and the internal structure (Alchieri et al., 2003; Cunha, 2001).

Beck Anxiety Inventory – BAI (Beck et al., 1988) – It is a self-report inventory that identifies the presence and intensity of anxiety symptoms. The instrument was translated and validated to be used in Brazil, and evaluates common characteristics of anxiety. It is composed of 21 statements evaluated by an individual scale series from zero to three points (0="it did not bother me much"; 3="Severely, I could barely stand it"). The total score is obtained by adding the scores of the items and varies from 0 to 63, the higher the total score, the higher is the individual's anxiety degree. The total score allows determining the degrees of anxiety using cut-off points, minimum 0–10; mild 11–19; moderate 20–30 and severe 31–63. Its application is individual or in group, being indicated for clinical use within men and women from 17 to 80 years old. The studies with inventories present evidences of validity based on the content, in the relationship with other variables and the internal structure (Alchieri et al., 2003; Cunha, 2001).

Procedures

Authorized by the Hospital to conduct the research there, and after the project's approval by the Research Ethics Committee, the survey was conducted on the 3rd, 5th, 6th and 8th units of an Infectology Hospital in São Paulo.

The sequence of application of the instruments follows as Socio-demographic questionnaire, BDI and BAI, and had a minimum duration of twenty minutes and maximum of forty minutes. The Research Schedule was filled out by the researcher, according to the information given on the patient's record. The Lymphocyte T-CD4 data of was categorized according to the Brazilian Ministry of Health (2008). In cases of data not found, visits were made to the institution's laboratory to fill in these missing results.

RESULTS

The male patients with 38 years old in average (SD=8.96; Min=21; Max=59), had a total of 65%. The civil statuses were 41% single, 30% married, 20% separated and 9% widow. The prevalent education level was from basic education to high school in 85% of the cases. Both sexes did not demonstrate statistically significant differences regarding education level ($\chi^2 [2;46]=2.617$; $p=0.27$).

For distribution of T-CD4 Lymphocytes, the sample average corresponded to 187.50 (SD=324.19; Min=1; Max=1675) (Table 1). Independently of the participant's sex, the tendency as to the T- CD4 degree on the sample is "minimum" ($\chi^2 [3, N=46]=70.00$; $p<0.001$).

Table 2. Number and percentage of patients divided by sex, according to the correspondence between T-CD4 classification and depression degrees.

Sex	BDI	CD4 classification								Total	
		Minimum <200 mm ³		Low 200 to 300 mm ³		Moderate 350 to 500 mm ³		High Over 500 mm ³			
		N	%	N	%	N	%	N	%	N	%
Male (χ^2 [9, N=46]=8.94; $p=0.443$)	Minimum	9	30.0	1	3.33	1	3.33	-	-	11	36.67
	Mild	4	13.33	1	3.33	1	3.33	-	-	6	20.0
	Moderate	8	26.66	-	0.0	-	0.0	2	6.66	10	33.3
	Severe	2	6.66	1	3.33	-	0.0	-	-	3	10.0
	Total	23	76.7	3	10.0	2	6.7	2	6.7	30	100,0
Female (χ^2 [3, N=46]=2.51; $p=0.474$)	Minimum	1	6.25	-	-	-	-	1	6.25	2	12.5
	Mild	3	18.75	-	-	-	-	-	-	3	18.8
	Moderate	7	43.75	-	-	-	-	2	12.5	9	56.3
	Severe	2	12.5	-	-	-	-	-	-	2	12.5
	Total	13	81.25	-	-	-	-	3	18.75	16	100,0

The average score in BAI instrument was 22.98 (SD=15.65; Min=1; Max=57) and 21.91 (SD=13.01; Min=1; Max=57) for the BDI. For both scales, numerical differences were noted between sexes, however, without significant difference, proven by the *t* Test analysis, BAI (t (44) =1.176; $p=0.245$) and BDI (t (44) =1.280; $p=0.207$). Next, the scores were transformed, according to the cut-off points of the degrees of depression and anxiety. There was no tendency as to the anxiety degree (χ^2 [3, N=46] =7.04; $p=0.071$) and depression degrees (χ^2 [3, N=46] = 9.30; $p=0.026$). When separating this result by sex, also no tendencies were found.

For correspondence of the classification of the lymphocyte counting with the depression symptomatology, 77% of the male patients and 81% of the female patients presented minimum lymphocyte counting, the depression degrees varied from minimum to severe. For low counting, 10% of the men had depression degrees on minimum, mild and severe. The moderate remained in 7% of men with minimum and mild degrees. As for the high counting, 7% of men presented only moderate depression degree, 19% of women presented minimum and moderate degrees. The results did not demonstrate statistically significant correspondence for any of the sexes; these results and the classifications were organized in Table 2.

In relation to the correspondence between the classification of the lymphocyte counting and the symptomatology of anxiety, 77% of men and 81% of women presented minimum lymphocyte counting, the anxiety degrees varied from minimum to severe. For low counting, 10% of men obtained moderate and severe anxiety degrees. The moderate counting grouped 7% of men with mild and moderate anxiety degrees. And in high counting, 7% of men presented only severe degree, for women, 19% remained in mild and severe anxiety

degrees. The results also did not demonstrate any statistically significant correspondence for any of the sexes; these results and the classifications were presented on Table 3.

Finally, for correspondence between the scores of the BAI and BDI instruments, the results presented moderate positive correlation, ($r=0.53$; $p<0.01$) without sex distinction. That represents a significant association between the symptomatology of depression and anxiety.

DISCUSSION

According to the orientations by the Ministry of Health (Brasil, 2008), patients with T-CD4 counting below 200/mm³ have tendencies of clinical complications due to the appearance of opportunistic infections and therefore, need prophylactic actions. Such condition was encountered in the sample, a high counting (78.3%) of hospitalized patients were observed with T-CD4 below 200/mm³. Certainly, it occurred due to a worsening on their clinical condition, those patients searched for hospitalization for prophylactic treatments. When it comes to patients with T-CD4 counting over 500 mm³, it was observed a low percentage (10.9%) on the hospitalization units. This data also refers to the orientations of the Ministry of Health (Brazil, 2008) when it suggests a closer follow-up, even with patients of high T-CD4 counting, such that hospitalization when the immune system is worsening may be early avoided.

Moderate degrees of symptomatology of depression and anxiety were observed in the sample, when evaluated by the average scores of the BDI and BAI instruments. When the scores were classified on the instruments, according to the cut-off points suggested by

Table 3. Number and percentage of patients divided by sex, according to correspondence between T-CD4 classification and anxiety degrees.

Gender	BAI	CD4 classification								Total	
		Minimum <200 mm ³		Low 200 to 300 mm ³		Moderate 350 to 500 mm ³		High Over 500 mm ³			
		N	%	N	%	N	%	N	%	N	%
Male (χ^2 [9, N=46]=14.74; $p=0.098$)	Minimum	11	100.0	-	-	-	-	-	-	11	36.7
	Mild	5	83.3	-	-	1	16.7	-	-	6	20.0
	Moderate	3	60.0	1	20.0	1	20.0	-	-	5	16.7
	Severe	4	50.0	2	25.0	-	-	2	25.0	8	26.7
	Total	23	76.7	3	10.0	2	6.7	2	6.7	30	100.0
Female (χ^2 [2, N=46]=0.87; $p=0.649$)	Minimum	3	100.0	-	-	-	-	-	-	3	18.8
	Mild	3	75.0	-	-	-	-	1	25.0	4	25.0
	Moderate	-	-	-	-	-	-	-	-	-	-
	Severe	7	77.8	-	-	-	-	2	22.2	9	56.3
	Total	13	81.3	-	-	-	-	3	18.8	16	100.0

Cunha (2001), 57% of the male sample remained under the moderate degree for depression symptoms, while 69% of the female sample remained from moderate to severe. Even without a statistical tendency as to the depression degree on the sample, this result corroborated the prevalence of a higher existence of depression in women (Sadock and Sadock, 2007).

Besides, the prevalence on HIV-infected women seemed to be superior to the one encountered in men, according to bibliographic survey made by Stumpf et al. (2006). The same tendency also occurred on anxiety, 57% of men remained under moderate degree and 56% of women remained in severe symptomathological degree of anxiety. These data have also corroborated the prevalence of anxiety in women, superior to men (Andrade et al., 2006).

As most part of the patients maintained T-CD4 counting below 200 mm³, regular condition due to the data collection place, the distribution of classifications of T-CD4 was harmed when associated to degrees of depression and anxiety. This data suggested a non-association between T-CD4 classification with the degrees of symptomatology of depression and anxiety for men or women. Even when only one segment of the classification is evaluated, taking as an example the minimum (<200 /mm³), the symptomathological distribution is divided into different degrees.

This result was opposite to the studies that reinforce the association between the T-CD4 lymphocyte level with the symptoms of depression and anxiety, for example, the recent studies of Lu et al. (2009) and Zena-Castillo et al. (2009). Even with considerable evidences that the cell immunity measurements are changed in individuals with depression, anxiety or stress, in non HIV-infected, it is considered that the results have been mixed for HIV-infected (Evans et al., 2002a). In this study, the non-

association encountered has indicated to this direction.

Although many other studies have been matching a significant relation between depression/anxiety and the measurements of the immune system (Burack et al., 1993; Evans et al., 1995; Goodkin et al., 1992; Leserman et al., 1997; Malbergier and Schoffel, 2001; Ulla and Remor, 2002), it is considered that such differences on the results could be partially assigned to the methodological differences, such as the measurement form, follow-up period, the analyzed immunological differences, among others.

This discussion reinforces even more the need of a better understanding on the way the depression or anxiety can influence the progression of the disease and the mortality. As in this study, most of the others in literature focused the effects over immunity in HIV infection on the populations of T-CD4, using a short period of observation. In other studies that did not have the same characteristic (Evans et al., 2002b; Greeson et al., 2008), indicated that the focus on T-CD4 cells would not be the best, for they are early and quickly affected in HIV infection. This characterizes it as a less sensitive and unreliable measures to demonstrate over time the relation between depression/anxiety and the HIV infection.

As for the association between the symptomatology of depression and anxiety, it was also mentioned in surveys of HIV-infected patients, for example, the compilation made by Owe-Larsson et al., (2009). This is an expected result, first of all because of high rates of depression prevalence and anxiety on HIV-infected patients, secondly, because of the complex association between those symptomathologies (Elliott and Smith, 2006).

In this respect, Bayés (1995) mentions that in the cases of existence of depressive and anxious symptomathologies, the individual loses the capacity to deal with

the confrontational situations and consequently when facing diseases and hospitalizations may not have effective follow-up actions.

Thus, an alert is taken to the distinction during the diagnosis, as to propose interventions based on the patient's dynamics, consequently contributing to health and welfare, in addition to the continuity of the retroviral treatment.

Conclusion

There is still much to comprehend about HIV infection. Especially about the psychological impacts caused by the disease and its associations. In this study, the permanent prevalence of symptoms of depression and anxiety, mostly in women, the non-association between the T-CD4 classification with the degrees of depression and anxiety symptomatology for men or women, besides the association between these symptomathologies in HIV-infected patients, need more clarification.

From the limitations, the evaluation of depression and anxiety made by symptomatic instruments was considered fragile. Thus, even if the individual has these symptoms, they were not necessarily diagnosed. Besides, important variables that influence depression and anxiety, like medications, hospitalization time, disease progression and NK (natural terminators) and T-CD8 lymphocyte counting were not considered.

And finally, despite the diverse diagnostic strategies and measurement instruments available, it is suggested for future studies the construction of simplified tracking tools, specially designed for the HIV-infected population, considering also the gender. Once the use of substances is frequent and some of the symptoms of the disease overlap symptoms of depression and anxiety, the development of this kind of instrumental should be capable to reliably distinguish and guide the conduction of the treatment in a specific way once the diagnosis is given.

REFERENCES

- Alchieri JC, Noronha APP, Primi R (2003). Reference Guide: Psychological Tests Marketed in Brazil. New York: Psychologist.
- Andrade LHSG, Viana MC, Silveira CM (2006). Epidemiologia dos transtornos psiquiátricos na mulher. *Rev. Psiquiatr. Clín.* 33: 43-54.
- Basu S, Chwastiak LA, Bruce RD. (2005) Clinical Management of Depression and Anxiety in HIV-Infected Adults *AIDS* 19: 2057-2067.
- Bayés R (1995). *Sida y psicología*. Barcelona: Martinez Rocca.
- Beck AT, Epstein N, Brown G, Steer RA (1988). An inventory for measuring clinical anxiety: psychometric properties. *J. Consult. Clin. Psych.*, 56: 893-897.
- Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh G (1961). An inventory for measuring depression. *Arch. Gen. Psychiatry* 4: 53-63.
- Bowen DL, Lane HC, Fanci AS (1985). Immunopathogenesis of the acquired immunodeficiency syndrome. *Ann. Intern. Med.*, 103: 704-709.
- Brasil (2008). *Recomendações para Terapia Anti-retroviral em Adultos Infectados pelo HIV*. Ministério da Saúde, Secretaria de Vigilância em Saúde, Programa Nacional de DST e Aids. Brasília: Ministério da Saúde.
- Burack JH, Barrett DC, Stall RD, Chesney MA, Ekstrand ML, Coates TJ (1993). Depressive symptoms and CD4 lymphocyte decline among HIV-infected men. *JAMA*, 270: 2568-2573.
- Cockram A, Judd FK, Mijch A, Norman T (1999). The evaluation of depression in inpatients with HIV disease. *Aust. NZ J. Psychiat.*, 33: 344-352.
- Corrêa S, Petchesky R (1996). Direitos sexuais e reprodutivos: uma perspectiva feminista. *Physis*. 6: 147-177.
- Corrêa S, Petchesky R, Parker R (2008). *Sexuality, health and human rights*. New York: Routledge.
- Costa AM (2009). Participação social na conquista das políticas de saúde para mulheres no Brasil. *Ciênc Saúde Coletiva*. 14: 1073-1083.
- Cunha JA (2001). *Manual of the Portuguese version of Beck scales*. New York: Psychologist
- Elliott CH, Smith LL (2006). *Anxiety and Depression Workbook For Dummies*. Indianapolis, Indiana: Wiley.
- Evans DL, Leserman J, Perkins DO, Stern RA, Murphy C, Tamul K, Liao D, Van der Horst CM, Hall CD, Folds JD (1995). Stress-associated reductions of cytotoxic T lymphocytes and natural killer cells in asymptomatic HIV infection. *Am. J. Psychiat.*, 152: 543-550.
- Evans DL, Mason K, Bauer R, Leserman J, Petitto J (2002a). Neuropsychiatric manifestations of HIV-1 infection and AIDS. In: Davis K.L., Charney D., Coyle J.T., Nemeroff C., editors. *Neuropsychopharmacology: The Fifth Generation of Progress*. New York: Raven Press. pp. 1281-1300.
- Evans DL, Ten Have TR, Douglas SD, Gettes DR, Morrison M, Chiappini MS, Brinker-Spence P, Job C, Mercer DE, Wang YL, Cruess D, Dube B, Dalen EA, Brown T, Bauer R, Petitto JM (2002b). Association of Depression With Viral Load, CD8 T Lymphocytes, and Natural Killer Cells in Women With HIV Infection. *Am. J. Psychiat.*, 159: 1752-1759.
- Everall IP, Luthert PJ, Lantos PL (1991). Neuronal loss in the frontal cortex in HIV infection. *Lancet*, 337: 1119-1121.
- Goodkin K, Fuchs I, Feaster D, Leeka J, Rishel DD (1992). Life stressors and coping style are associated with immune measures in HIV-1 infection: A preliminary report. *Int. J. Psychiat. Med.*, 22: 155-172.
- Greeson JM, Hurwitz BE, Llabre MM, Schneiderman N, Penedo FJ, Klimas NG (2008). Psychological distress, killer lymphocytes and disease severity in HIV/AIDS. *Brain Behav. Immun.*, 22: 901-911.
- Junqueira P, Bellucci S, Rossini S, Reimão R (2008). Women living with HIV/AIDS: sleep impairment, anxiety and depression symptoms. *Arq. Neuro-Psiquiatr.*, 66: 817-820.
- Kagee A, Martin L (2010). Symptoms of depression and anxiety among a sample of South African patients living with HIV. *AIDS Care*, 22: 159-165.
- Kalichman SC, Rompa D, Cage M (2000). Distinguishing between overlapping somatic symptoms of depression and HIV disease in people living with HIV/AIDS. *J. Nerv. Ment. Dis.*, 188: 662-670.
- Leserman J, Petitto JM, Perkins DO, Folds JD, Golden RN, Evans DL (1997). Severe stress, depressive symptoms, and changes in lymphocyte subsets in human immunodeficiency virus-infected men: a 2-year follow-up study. *Arch. Gen. Psychiat.*, 54: 279-285.
- Lu SH, Tang XP, Deng XL, Chen WL, Hu RX (2009). Relationship between psychological distress and T lymphocyte in HIV/AIDS patients. *Zhonghua Shi Yan He Lin Chuang Bing Du Xue Za Zhi*, 23: 23-25.
- Macrae E (1990). The construction of equality: sexual identity and political opening in Brazil. Campinas, UNICAMP Publisher.
- Malbergier A, Schoffel AC (2001). Tratamento de depressão em indivíduos infectados pelo HIV. *Rev. Bras. Psiquiatr.*, 23: 160-167.
- Owe-Larsson B, Sall L, Salamon E, Allgulander C (2009). HIV infection and psychiatric illness. *Afr. J. Psych.*, 12: 115-128.
- Sadock JB, Sadock VA (2007). *Mood Disorders*. In: Sadock J.B., V.A. Sadock, editors. *Compendium of psychiatry, behavioral science and clinical psychiatry*. New York: Artmed, pp. 572-629.
- Schiavona AP, Pupulin ÁRT (2008). Depression, Anxiety, Hopelessness and suicidal ideation in HIV patients. *Rev. Mental Health*, 10: 18-26.
- Stumpf BP, Rocha FL, Proietti ABFC (2006). Viral infections and depression. *J. Bras. Psiquiatr.*, 55: 132-141.
- Ulla S, Remor EA (2002). Aspects Psiconeuroimunologia and HIV Infection: Fact or Fiction? *Psicol. Reflex Crit.*, 15: 113-119.

WHO (2010). Global report: UNAIDS report on the global AIDS epidemic 2010. Geneva, Switzerland: World Health Organization.

Zancan LF (1999). Moral dilemmas in health policy: the case of AIDS. One approach to bioethical perspective. Rio de Janeiro: National School of Public Health, Oswaldo Cruz Foundation.

Zena-Castillo D, Mezones-Holguin E, Valdiviezo-Garcia G, La-Chira-Alban A, Rodríguez-Morales AJ, Dickson-Gonzalez S (2009). Impact of hospital-associated anxiety and depression on the CD4 counts of naive HIV/AIDS patients from locations in Northern Peru. *Int. J. Infect. Dis.*, 13: e75-76.