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Pereira, M., Fialho, R., & Canavarro, M. C. (2014). Prevalence and correlates of emotional distress in HIV/HCV co-infection. *AIDS Care*, 26(Suppl.1), S56-S64. doi:10.1080/09540121.2014.906549

### Abstract

The mental health needs of patients who are co-infected with Hepatitis C virus (HCV) and Human Immunodeficiency virus (HIV) are increasingly addressed in medical settings. This study aimed at examining the prevalence and severity of emotional distress in a sample of HIV/HCV co-infected and HIV mono-infected patients and to examine their sociodemographic, clinical and psychosocial correlates. The Brief Symptom Inventory and the quality of life instrument WHOQOL-HIV-Bref were administered to a sample of 248 HIV/HCV co-infected patients and 482 HIV mono-infected patients. Thirty-nine (15.9%) HIV/HCV co-infected patients and 55 (11.6%) HIV mono-infected patients reported a T-score  $\geq 63$  for global severity index (GSI), indicative of a need for further psychological evaluation. Co-infected patients reported significantly higher scores on eight of nine dimensions of psychopathology. The larger differences were found on somatization, hostility, paranoid ideation, anxiety and the GSI. Among HIV/HCV patients, non-HAART treatment ( $\beta = -0.19$ ,  $p < 0.01$ ) and lower scores for independence ( $\beta = -0.24$ ,  $p < 0.01$ ) and spiritual ( $\beta = -0.31$ ,  $p < 0.001$ ) dimensions were significantly associated with higher emotional distress and accounted for 47.2% of the total variance. Among HIV mono-infected patients, being diagnosed for a longer time ( $\beta = 0.12$ ,  $p < 0.05$ ) and having lower scores on physical ( $\beta = -0.23$ ,  $p < 0.001$ ), social relationships ( $\beta = -0.11$ ,  $p < 0.05$ ), environmental ( $\beta = -0.17$ ,  $p < 0.01$ ) and spiritual ( $\beta = -0.21$ ,  $p < 0.001$ ) dimensions explained 39.4% of the variance of emotional distress. The findings suggest that co-infection with HCV may have an adverse effect on mental health and underscore the interplay of sociodemographic, clinical and psychosocial variables on emotional distress. Additionally, these data reinforce the need for tailored interventions to improve the overall well-being of both HIV and HIV/HCV patients.

**Keywords:** Co-infection; HCV; HIV; Emotional distress; Quality of life

## Introduction

Both HIV and Hepatitis C virus (HCV) infections are considered significant public health problems worldwide. Because of the overlapping pathways of transmission and risk factors, HIV and HCV co-infection (herein HIV/HCV or co-infection) is common, although its prevalence varies according to HIV risk group and geographical region (Averhoff, Glass, & Holtzman, 2012). HIV/HCV is of particular concern not only because it is associated with increased morbidity and mortality (Graham et al., 2001), but also because dual-diagnosed patients pose unique challenges for mental health providers (Silberbogen, Ulloa, Janke, & Mori, 2009). As most research has focused almost entirely on samples of HIV or HCV mono-infected patients, we know little about mental health of co-infected individuals. Therefore, understanding the emotional distress related to HIV/HCV is critical, given the existent evidence that mental health problems compromises adherence to antiretroviral treatment (Blashill, Perry, & Safren, 2011; Roux et al., 2013; Sherr et al., 2008) and adds complexity to treatment planning (Baillargeon et al., 2008).

The presence of emotional distress and psychological morbidity has been documented across multiple samples of HIV (e.g., Basta, Shacham, & Reece, 2009; Shacham, Basta, & Reece, 2008), HCV (e.g., Fontana et al., 2002; Schäfer et al., 2009) and HIV/HCV patients (e.g., Baillargeon et al., 2008; Braitstein et al., 2005; Grassi et al., 2002; Yoon et al., 2011). Yet, to our knowledge, no studies have assessed the prevalence of emotional distress among HIV/HCV patients. Research has shown that 3.5% to 19% of HIV-infected patients experience clinically significant psychological distress associated with the disease (Basta et al., 2009; Shacham et al., 2008). Among HCV patients, one study showed that 35% reported clinically significant psychological distress compared to an expected frequency of 10% in the general population (Fontana et al., 2002). Grassi et al. (2001) examined the prevalence of psychological morbidity associated with HIV (26.9%) and HCV (27.1%) among IDUs, but the difference was not significant.

Among HIV/HCV patients, prior research on emotional distress has produced mixed findings. Grassi et al. (2002) revealed that HCV patients reported higher scores than HIV patients on several psychopathological dimensions, but only on somatization co-infected patients reported significantly higher scores. Similarly, Hilsabeck et al. (2003) found that co-infected patients reported a significantly

greater number of physical symptoms and hostility than did persons with HIV and HCV alone; however, no differences in anxiety and depression were identified. Baum et al. (2008) showed that co-infected patients reported more physical symptoms and depression than those infected with HIV only. Other studies also showed that co-infected patients reported significantly more symptoms of depression compared to patients with HIV only (Braitstein et al., 2005; Gillis et al., 2013; Yoon et al., 2011).

There is evidence that HIV/HCV co-infected and HIV mono-infected patients differ in sociodemographic, psychosocial and life situation variables (Backus, Boothroyd, & Deyton, 2005; Gillis et al., 2013), which can significantly impact patients' well-being. Thus, it is plausible that sociodemographic, clinical and different psychosocial domains, may contribute differently for co-infected and mono-infected patients' emotional distress. To our knowledge, as the combined contribution of these variables have not been studied, a better understanding of these factors among HIV and HIV/HCV patients might help mental health professionals plan and implement interventions based in each group's specific needs. Therefore, this is the first study examining the prevalence and severity of emotional distress of co-infected patients compared to patients with HIV only and to analyze the contribution of sociodemographic, HIV-related variables and QoL dimensions to the explanation of emotional distress of HIV/HCV patients.

## **Methods**

### **Participants**

The sample of this cross-sectional study consisted of 730 HIV-infected patients who contacted the main infectious diseases departments of 10 Portuguese hospitals. The sample was recruited by convenience sampling between September 2007 and July 2008. The recruitment procedures are presented in more detail elsewhere (Pereira & Canavarro, 2011). All participants were informed of the aims of the study, and those who accepted to participate provided written informed consent. The study protocol was reviewed and approved by the Ethics Committee at each participating institution.

Patients who did not complete the assessment protocol (> 20% of missing data;  $n = 54$ ) were excluded from the analysis. A total of 467 patients were excluded because they mentioned other co-infections (e.g., Hepatitis B, Syphilis) or other co-morbid illnesses (e.g., pulmonary tuberculosis,

diabetes, depression, asthma). In total, 248 (20.7%) HIV/HCV patients and 482 (40.3%) HIV mono-infected patients were included in the study.

### Measures

*Sociodemographic and HIV-related variables.* Information was gathered regarding gender, age, marital status, education, employment status, mode of HIV acquisition, HIV stage, CD4 count, year of diagnosis and highly active antiretroviral therapy (HAART).

*Psychopathological symptoms.* The Brief Symptom Inventory (BSI; Derogatis, 1993) is a 53-item self-reporting inventory of psychological distress. Respondents are asked to rate the extent to which each identified problem has caused discomfort in the past week on a 5-point scale ranging from “Never” (0) to “Very often” (4). The BSI measures nine symptom dimensions and three global indices. Raw scores were converted to T-scores with a mean value of 50 and a standard deviation (*SD*) of 10. The Global Severity Index (GSI), a summary index of emotional distress, was used as the primary outcome measure. Participants with subscale or GSI T-scores  $\geq 63$  were defined as having clinically significant emotional distress (Derogatis, 1993). A dummy variable was created to categorize individuals into one group if they had a T-score  $< 63$  and into a second group if they had a T-score  $\geq 63$  (“caseness”). The Cronbach’s  $\alpha$  ranged from 0.70 (Paranoid ideation) to 0.88 (Depression) among HIV/HCV patients.

*Quality of life.* The WHOQOL-HIV-Bref (Canavarro & Pereira, 2012) is a 31-item self-reporting questionnaire that yields a multidimensional profile of scores across domains and facets. The WHOQOL-HIV-Bref consists of the following six domains: Physical, Psychological, Independence, Social Relationships, Environment, and Spirituality. Two additional items pertain to global QOL and general health. Individual items were rated on a 5-point scale, and each scale point was specified with a number and a verbal descriptor. Alpha reliability ranged from 0.60 (Spirituality) among HIV/HCV patients to 0.79 (Social relationships) among HIV mono-infected patients.

### Statistical analyses

The data were analyzed using the Statistical Package for Social Sciences (IBM SPSS 20.0). Descriptive statistics were first performed to explore the sample’s characteristics. A  $\chi^2$  analysis and a Student’s *t* test were conducted to compare the two groups on categorical and continuous variables,

respectively. A  $\chi^2$  analysis was also conducted to assess whether the two groups had statistically different proportions of individuals who met “caseness” on the BSI dimensions. Multivariate analysis of covariance (MANCOVA) was used to test for group differences in the psychopathological symptoms. The combined contribution of sociodemographic, HIV-related characteristics and QoL dimensions on emotional distress were evaluated by a hierarchical multiple regression (HMR) analysis, separately for HIV and HIV/HCV patients.

Effect sizes were calculated with the Cramer’s  $V$  for  $\chi^2$  test, Cohen’s  $d$  for Student’s  $t$  test, partial Eta squared ( $\eta_p^2$ ) for the ANOVA, and Cohen’s  $f^2$  for multiple regression (small effects: Cohen’s  $d \geq 0.20$ , Cramer’s  $V \geq .01$ , Cohen’s  $f^2 \geq 0.02$ ; medium effects: Cohen’s  $d \geq 0.50$ , Cramer’s  $V \geq .03$ , Cohen’s  $f^2 \geq 0.15$ ; large effects: Cohen’s  $d \geq 0.80$ , Cramer’s  $V \geq .05$ , Cohen’s  $f^2 \geq 0.35$ ) (Cohen, 1992). A  $p$ -value of 0.05 was set as the significance cut-off point.

## Results

### Participant characteristics

The sociodemographic and HIV-related characteristics of the participants are presented in Table 1. HIV/HCV patients were more likely to be male, younger, single, unemployed or not currently working, diagnosed with HIV for a longer time, and on HAART. Regarding HIV transmission, HIV/HCV patients were mostly infected through intravenous drug use (IDU) (68.8%), whereas HIV patients were mostly infected through sexual transmission (96.3%).

[INSERT\_TABLE\_1]

### Emotional distress

Regarding psychopathological symptoms, the results showed significant differences (Wilks’ Lambda = 0.96,  $F(9, 667) = 2.88$ ,  $p = 0.002$ ,  $\eta_p^2 = 0.037$ ). Follow-up tests showed significant differences for eight of nine dimensions. HIV/HCV patients reported significantly higher scores on all dimensions, with the exception of *Phobic anxiety*, as well as in the GSI. Table 2 displays the mean and 95% Confidence Intervals (CI) for psychopathological symptoms and the GSI.

[INSERT\_TABLE\_2]

### Cases and non-cases prevalence

Regarding caseness (an indicator of the need for further psychological evaluation), there were significant differences in the proportion of individuals in the two groups. Table 3 indicates the percentage of the sample that scored above the criteria for caseness ( $t \geq 63$ ). Compared to HIV mono-infected patients, a greater proportion of co-infected patients met caseness for *Somatization*, *Obsessions-compulsions*, *Depression*, and *Hostility*.

[INSERT\_TABLE\_3]

### Regression analyses

The combined contribution of sociodemographic, HIV-related variables and QoL dimensions on emotional distress, was assessed by two separate HMR analyses (Table 4). Each model consisted of three blocks: Block 1 included sociodemographic variables; Block 2 included the HIV-related characteristics; Block 3 included the QoL dimensions. Given the expected association between the Psychological dimension and emotional distress, this dimension was excluded from the regression models. There was no indication of multicollinearity among the independent variables (VIF < 2.95; Tolerance > 0.34).

Among co-infected patients, in the final model, the Independence and Spirituality dimensions accounted for 38.8% of the total variance,  $F(15, 212) = 12.65, p < 0.001$  (the effect size attributable to the addition of QoL dimensions [Cohen's  $f^2$ ] was 0.73). Lower scores on these dimensions were significantly related to higher emotional distress. Among HIV patients, the Physical, Social, Environmental and Spiritual dimensions accounted for 35.4% of the additional variance in emotional distress,  $F(15, 424) = 18.36, p < 0.001$  (Cohen's  $f^2 = 0.58$ ). Lower scores on these dimensions were associated with higher emotional distress.

[INSERT\_TABLE\_4]

## Discussion

Research has demonstrated that underlying HIV infection weakens the immune response to hepatitis C (Boesecke, Mauss, & Rockstroh, 2010). Accordingly, if one of the main purposes of health care is also to improve mental health, then it is important to understand the effect of a dual infection on emotional distress. Therefore, this study was designed to examine the prevalence and severity of

emotional distress in a sample of HIV/HCV co-infected and HIV mono-infected patients, and to explore their sociodemographic, clinical and psychosocial correlates.

Main findings of this study suggest that emotional distress in HIV and HIV/HCV patients includes not only depression but also a wide range of psychopathological symptoms. Although depressive symptoms are considered the most frequent psychopathological symptoms, patients in both groups scored high on all dimensions of the BSI. Additionally, findings demonstrate that across all BSI dimensions, scores for eight of nine dimensions were significantly higher among co-infected patients, even after controlling for covariates. These findings are in disagreement with a prior study (Hilsabeck et al., 2003) that did not find differences in anxiety and depression. By contrast, these results are supported by earlier studies that found higher somatization or somatic concerns (Grassi et al., 2002; Hilsabeck et al., 2003), depression (Baum et al., 2008; Braitstein et al., 2005; Yoon et al., 2011) and hostility (Hilsabeck et al., 2003) among co-infected individuals. Therefore, the current study replicates and extends (by reporting on multiple psychopathological dimensions) prior work in this field.

In this study, clinically significant emotional distress was detected in 13.1% of the sample. The proportion was 15.9% among HIV/HCV patients and 11.6% among HIV mono-infected patients. These values are similar to those reported by studies with patients infected with HIV only (Basta et al., 2009; Shachman et al., 2008), but significantly lower than those reported by studies of patients with HCV (Fontana et al., 2002). Additionally, the proportion of patients with HIV/HCV who met caseness for somatization, depression, obsession-compulsions and hostility was significantly higher than that reported by HIV mono-infected patients. Although this study does not provide data on HCV treatment, it is possible that these findings may be attributable to the psychiatric effects of HCV treatment, particularly those associated with interferon-based treatment. These symptoms may be related to either HIV or HCV, antiviral treatments, medication side-effects, or a combination of these factors. Indeed, somatization, anger and hostility may be relevant symptoms in the context of HCV (Dan et al., 2007; Loftis et al., 2013). Furthermore, there is evidence that interferon-based treatment may aggravate depressive symptoms (Fried et al., 2002; Raison et al., 2005), including among co-infected patients (Laguno et al., 2004). These findings may have important implications for the pre-treatment

assessment of co-infected patients who are to be informed and educated about disease(s)-related symptoms of psychological distress. Thus, it may be possible to early define the type of support that may be needed (e.g., psychotherapy, pharmacologic, etc.).

In this study, the amount of variance in emotional distress explained by both sociodemographic and HIV-related variables was relatively small, in both HIV/HCV (8.4%) and HIV mono-infected patients (4%). The contribution of QoL dimensions to the emotional distress of HIV and HIV/HCV patients accounted for the major variance of emotional distress (35.4% and 38.8%, respectively). Among HIV/HCV patients, the strongest predictors of increased emotional distress were lower scores on Independence and Spirituality. These findings may be related to the specific facets of these dimensions. For instance, independence includes aspects such as dependence on medication/treatments. In this context, although antiviral treatments have greatly improved morbidity and decreased the mortality associated with these infections (Quirishi et al., 2003; Vogel & Rockstroh, 2009), the complexity of these treatments and its side-effects may be a marker for more severe emotional distress. For both co-infected and mono-infected patients, lower spirituality was significantly related to increased emotional distress. These findings may also relate to the contents of this dimension, which assesses aspects such as spirituality, death and dying, guilt, and fear and concerns about the future. It is possible that persons who are faced with a diagnosis of life-threatening illness(es) are confronted with their own mortality, experience their lives as disrupted and thus experience greater psychological distress. These findings are consistent with the literature suggesting an association between spirituality/religiosity and decreased mental health (Cotton et al., 2006; Phillips, Mock, Bopp, Dudgeon, & Hand, 2006) and support their importance in the lives of patients. As the role of spirituality/religiosity in the context of HCV and HIV/HCV has been largely unexplored, future research addressing these issues is warranted, as it may be helpful to taking a more holistic approach to patient-centered care.

Among co-infected patients, being on HAART was associated significantly with lower emotional distress. There is evidence that HAART-induced immune reconstitution may reverse the unfavorable course of hepatitis C in patients with advanced HIV disease (Vogel & Rockstroh, 2009) and that patients on HAART have lower liver-related mortality (Quirishi et al., 2003). In this vein,



liver disease progresses especially in patients with CD4 count below 200 cells/mm<sup>3</sup>. Therefore, as CD4 count increases on HAART (Boeseck et al., 2010), this may impact the course of liver disease and thus influence patients' mental health.

Similarly, among HIV mono-infected patients, emotional distress was significantly associated with lower scores on physical, social, environmental and spiritual dimensions. These findings provide further support to the reports that suggest an association between physical indicators such as energy, fatigue, sleep disturbances, and mental health status (e.g., Barroso & Voss, 2013; Chen et al., 2013; Phillips et al., 2006) among HIV patients. Furthermore, there have been several reports of social dimensions related to increased well-being (Cohen, 2004; Gordillo et al., 2009). This association between lower scores on the social relationships domain (which includes items such as social support and social inclusion) and higher emotional distress may be related to experiences of stigmatization and lower social support perceived by patients, which is consistent with those findings. Indeed, the perceived stigma that is often associated to HIV may be a significant driver of social isolation and reduced closeness in relationships and may thus contribute to higher psychological distress. Likewise, the association between environmental dimensions and emotional distress may be explained by constraints of the social environment and economic circumstances of patients. This domain concerns the individual's satisfaction related to the different spheres of his life and, most notably, economic conditions, housing needs, leisure, and access to services. We expect that patients who are more dissatisfied with their environment and experience greater financial difficulties may have fewer opportunities for engaging in leisure activities and have poorer access to services, which may lead to increases in emotional distress.

A number of limitations should be acknowledged. First, potential limitations imposed by the convenience sample and the cross-sectional study design limit the generalizability of these results. The cross-sectional design excludes inferring causality among the variables. Further longitudinal studies should be undertaken to determine the direction of the associations. Second, it is possible that variables that were not assessed could explain further variance in emotional distress. Because this study involves secondary data analysis, no data were collected on the method of HCV transmission, lifetime IDU status, and HCV antiviral treatment. This seems justified, however, in view of the aim of

the initial project, which focused almost exclusively on HIV-related variables. Finally, by including only patients without any comorbidity, we might have selected individuals who were less likely to report emotional distress and thus we might have introduced bias into the study. Despite these limitations, this study contributes significantly to the scarce literature on the mental health of HIV/HCV co-infected patients.

Given the complexity of the clinical management of dual infections (Kottlil, Pollis, & Kovacs, 2004), our findings make identifying the diversity of factors that increase emotional distress (particularly those that are potentially modifiable) an important step toward improving mental health. In situations in which these factors are present, these results could assist mental health providers in planning and implementing more tailored and effective interventions in medical settings. In this context, psychological interventions incorporating cognitive-behavioural components are particularly useful, given the existent evidence supporting their effectiveness in reducing anxiety (Clucas et al., 2011) and depression (Sherr, Clucas, Harding, Sibley, & Catalan, 2011), and enhancing coping with HIV disease (Harding, Liu, Catalan, & Sherr, 2011). To conclude, the screening and treatment of psychopathological symptoms in co-infected patients may improve their health status and allow more patients to be safely treated with specific treatments for HCV and, thus, to maximize the likelihood of a successful treatment course.

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Table 1

*Sociodemographic and HIV-related characteristics of participants (N = 730)*

	HIV/HCV	HIV	$\chi^2$	Cramers' V
	<i>n</i> (%)	<i>n</i> (%)		
Gender			20.07***	0.19
Male	202 (81.5)	302 (62.7)		
Female	46 (18.5)	180 (37.3)		
Marital status <sup>a</sup>			9.52*	0.11
Single	131 (52.8)	198 (41.3)		
Married/co-habiting	71 (28.6)	173 (36.1)		
Separated/divorced	41 (16.5)	90 (18.8)		
Widowed	5 (2.0)	18 (3.8)		
Employment status			6.32*	0.09
Employed	112 (45.2)	265 (55.0)		
Not currently working	136 (54.8)	217 (45.0)		
Route of infection <sup>a</sup>			187.45***	0.51
Sexual intercourse with man	17 (7.1)	219 (46.0)		
Sexual intercourse with woman	50 (20.8)	144 (30.3)		
IV Drug use	165 (68.8)	93 (19.5)		
Blood products	6 (2.5)	10 (2.1)		
Unknown	2 (0.8)	10 (2.1)		
On HAART <sup>a</sup>			7.58**	0.10
Yes	208 (83.9)	359 (74.9)		
No	40 (16.1)	120 (25.1)		
HIV stage			4.29	0.08
Asymptomatic	175 (70.9)	346 (72.1)		
Symptomatic	30 (12.1)	45 (9.4)		
AIDS	41 (16.6)	79 (16.5)		
Unknwon	1 (0.4)	10 (2.1)		
CD4+ count <sup>a</sup>			5.50	0.09
< 200 cells/mm <sup>3</sup>	63 (25.6)	91 (19.1)		
201 e 499 cells/mm <sup>3</sup>	105 (42.7)	201 (42.1)		
> 500 cells/mm <sup>3</sup>	78 (31.7)	185 (38.8)		
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>t</i>	Cohen's <i>d</i>
Age	38.75 (6.54)	41.19 (10.01)	3.47**	0.29
Education	7.84 (3.29)	7.92 (4.19)	0.28	0.02
Time since HIV diagnosis	9.07 (4.76)	7.10 (5.03)	-5.08***	0.40
CD4 T cell count	399.47 (267.32)	449.56 (280.99)	2.31*	0.18

<sup>a</sup>The *ns* of these variables do not add up to 730 due to missing values.\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$



Table 2

*Descriptive statistics on psychopathological symptoms (adjusted for covariates)<sup>a</sup>*

	HIV/HCV ( <i>n</i> = 248)	HIV ( <i>n</i> = 482)	<i>F</i>	$\eta_p^2$
	Mean (95% CI)	Mean (95% CI)		
Somatization	51.93 (50.55-53.31)	48.71 (47.77-49.65)	12.71***	0.018
Obsessions-Compulsions	51.64 (50.27-53.00)	48.77 (47.83-49.70)	10.24**	0.015
Interpersonal sensitivity	51.45 (50.08-52.83)	48.90 (47.96-49.83)	8.08**	0.012
Depression	51.37 (49.98-52.76)	48.99 (48.04-49.94)	6.82**	0.010
Anxiety	51.80 (50.42-53.18)	48.81 (47.87-49.75)	10.98**	0.016
Hostility	51.90 (50.51-53.29)	48.87 (47.93-49.82)	11.09**	0.016
Phobic anxiety	50.33 (48.95-51.71)	49.47 (48.53-50.41)	0.91	0.001
Paranoid ideation	51.81 (50.41-53.21)	48.77 (47.82-49.72)	11.03**	0.016
Psychoticism	51.08 (49.72-52.45)	49.07 (48.14-50.00)	5.06*	0.007
Global Severity Index (GSI)	51.90 (50.53-53.27)	48.69 (47.76-49.62)	12.92***	0.019

<sup>a</sup> Multivariate analysis adjusted for gender, age, marital status, employment status, time since HIV diagnosis, route of infection and HAART medication.

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

Table 3

*Proportion of the sample meeting criteria for caseness*

	Overall	HIV/HCV	HIV	$\chi^2$	Cramer's V
	(N = 730)	(n = 248)	(n = 482)		
	n (%)	n (%)	n (%)		
Somatization	86 (11.8)	40 (16.1)	46 (9.5)	6.83**	0.10
Obsessions-Compulsions	94 (13.0)	42 (16.9)	52 (10.8)	5.52*	0.09
Interpersonal sensitivity	96 (13.6)	40 (16.1)	58 (12.0)	2.14	0.05
Depression	102 (14.0)	44 (17.7)	58 (12.0)	4.40*	0.08
Anxiety	94 (13.0)	40 (16.1)	54 (11.2)	3.58	0.07
Hostility	97 (13.3)	43 (17.3)	54 (11.2)	5.35*	0.09
Phobic anxiety	71 (9.7)	23 (9.3)	48 (10.0)	0.09	0.01
Paranoid ideation	80 (11.0)	34 (13.7)	46 (9.5)	2.91	0.06
Psychoticism	92 (12.6)	36 (14.5)	56 (11.6)	1.25	0.04
Global Severity Index (GSI)	94 (13.1)	39 (15.9)	55 (11.6)	2.54	0.06

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

Table 4

*Hierarchical regression analysis for variables associated with emotional distress in HIV/HCV co-infected patients and HIV mono-infected patients*

Variable	HIV/HCV patients			HIV patients		
	<i>t</i>	$\beta$	$\Delta R^2$	<i>t</i>	$\beta$	$\Delta R^2$
Step 1			0.040			0.023
Age	-1.53	-0.10		-1.69	-0.08	
Gender	-1.65	-0.12		-1.51	-0.07	
Education	-0.07	-0.01		-1.26	-0.06	
Employment status	1.28	0.09		1.31	0.06	
Marital status	0.78	0.05		0.06	0.00	
Step 2			0.044			0.017
CD4+ T cell count	-0.82	-0.06		-1.50	-0.08	
HIV stage	0.19	0.02		0.39	0.02	
IDU	0.86	0.06		0.61	0.03	
Time since HIV diagnosis	1.17	0.12		2.33	0.12*	
HAART	-2.71	-0.19**		0.07	0.00	
Step 3			0.388			0.354
Physical	-1.05	-0.06		-4.24	-0.23***	
Level of independence	-2.80	-0.24**		-1.00	-0.06	
Social relationships	-1.76	-0.14		-2.00	-0.11*	
Environment	-0.62	-0.05		-3.13	-0.17**	
Spirituality	-5.02	-0.31***		-4.46	-0.21***	

*Note:* Gender [0 = Female; 1 = Male]; Employment status [0= Employed; 1 = Unemployed or not currently working]; Marital status [0 = Living alone; 1 = Living with partner]; HIV stage [0 = Asymptomatic; 1 = Symptomatic/AIDS]; IDU [0 = No; 1 = Yes]; HAART [0 = No; 1 = Yes].

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$