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"Not so healthy, not so comfortable": health anxiety in people living with hiv and its relationship to quality of life and psychosocial functioning

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Abstract
People living with Human Immundeficiency Virus (PLWH) are often inclined to attribute their bodily sensations to HIV (Human Immundeficiency Virus) without considering those as malign or benign. Thus, it's thought that health anxiety may be high in these individuals. We aim to determine the levels of health anxiety in PLWH and its relation with quality of life and psychosocial functioning. : Total of 228 subjects were included in study. Health anxiety levels in HIV group were higher than control groups. SASS scores were not different than in Type-I DM group's scores, whereas the BDI, BAI, and GHQ scores were worse in the HIV group than in the other groups. There was a significant difference in the QoL between healthy controls and HIV group. CD4+ T lymphocyte count had the highest explanotory power for the psychometric scores. PLWH have higher health anxiety than controls. Even if psychosocial functioning and QoL are impaired in people with high health anxiety levels still CD4+ T lymphocyte count is strongest explanatory factor on almost every subscale. The disease itself seems to disrupt the quality of life and psychosocial harmony beyond the psychological picture it creates.

Keywords: Health anxiety, Quality of life, Psychosocial Functioning, HIV

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Introduction

Chronic HIV infection, which is associated with a deterioration in immune functions, is monitored in clinical practice at regular appointments of few months intervals with regular CD4+ T-lymphocyte counts and viral load tests(Barré-Sinoussi, Ross, & Delfraissy, 2013). Intense medical follow-up and the necessity of lifelong medication might be described as exhausting and abrasive by patients(Connors, Krentz, & Gill, 2017). From a psychological perspective, Lewis has stated in 1998 that having the thought of having a chronic disease can be more destructive than the disease itself(Lewis, 1998). HIV is not different from this either. Because of the biological effects of HIV and the effects of bad reflections formed by the perception of the public, as well as the negative self-remarks that the person internalizes, people living with HIV (PLWH) were found to have various comorbid psychiatric disorders(Whetten, Reif, Whetten, & Murphy-Mcmillan, 2008). Present studies in medical literature point out anxiety disorders and depressive disorders as psychiatric co-morbidities in PLWH(Demirel et al., 2018). Health anxiety, which is

classified in the anxiety disorder spectrum, is also frequently observed in individuals living with HIV (Brandt et al., 2017; Chandra, Desai, & Ranjan, 2005). Health anxiety can be described as being concerned about health status in circumstances where either a pathology is not present or it is disproportionate with the pathology's seriousness(Paul M. Salkovskis & Warwick, 1986). Health anxiety which is scrutinized under the headings of Somatic Symptom Disorder and Illness Anxiety Disorder in DSM-5 (American Psychiatric Association, 2013), is fundamentally found in every individual and could consistently decrease or increase, instead of being a clinical entity that is present or not. Health anxiety has been shown to increase compliance to treatment as well as poor treatment compliance can increase health anxiety to pathological level (Edo, Torrents-Rodas, Rovira, & Fernandez-Castro, 2012; Taylor, 2004). In one of the first publications about psychopathologies related to HIV, Miller et al. has reported that PLWH who search for the different evidences for the new problems such as opportunistic infections, have intense concerns about health and healthy nutrition(Miller, 1988). Thus, the health anxiety concept is not a new area for researchers interested in HIV.

Chronic diseases are known to affect the quality of life and psychosocial functionality; this situation is also valid for HIV (Hughes, Jelsma, Maclean, Darder, & Tinise, 2004). Recent studies emphasize that, regardless of socio-demographic characteristics, HIV infection causes psychological and social burdens in children(Das, Mukherjee, Lodha, & Vatsa, 2010). Not only impairment of physical or mental health and a possibility or development of a physical disability, but also regular medication, necessity of medical controls, changes in lifestyle, pain and body image disfiguration are among the reasons of quality loss(Juenger et al., 2002). From this point of view, we think that health anxiety may be one of the factors that impairs quality of life and psychosocial functionality by increasing the number of unnecessary doctor controls and needless drug use.

The aim of this study is to investigate the effects of sociodemographic factors and some clinical markers related to disease prognosis on health anxiety, psychosocial functionality and quality of life in individuals living with HIV, and to see whether health anxiety impairs functionality and quality of life. To differentiate the psychological burden brought by the disease related clinical factors, another chronic disease, Type 1 DM, was included in the study as a control group in order. So that, it will be investigated whether the impact in the specified areas is related to the disease itself or the psychological burden it brings and, also, the need for psychiatric consultation will be explored

Method

In a cross sectional study design total of 236 subjects were recruited during the period of September 2017-March 2018 and differantiated in three groups; HIV group (n=72), type 1 DM group (n=64) and healthy controls (n=100). HIV group and type 1 DM group were consecutively formed by people who applied for their routine appointments in the Cerrahpasa Faculty of Medicine, Infectious Diseases Clinic and Endocrinology Clinic. Healthy individuals were chosen from relatives of outpatients' who applied to emergency service and were treated in green zone and taken as subjects after their permission to check their medical records. Eight individuals from healthy control group wanted to leave the study and withdrew their consents. Total of 228 individuals were included to study. All interviews were conducted face to face. We carried Structured Clinical Interview for DSM-5 Disorders out for making the major DSM-V axis I diagnoses, with healthy controls and patient groups(First, Williams, Karg, & Spitzer, 2015).

Data of the subjects collected including age, gender, marital status, employment, known or suspected route of transmission (when necessary), level of CD4 cell count and HbA1c levels. Interviews took approximately 120 minutes. CD4+ cell counts for HIV group and HbA1c levels for diabetic group were obtained through the records of last policlinic visit.

Inclusion criteria: a) Age 18 to 60, a confirmed diagnosis of HIV infection for at least 3 months, to be literate and mentally competent to answer questions for HIV group; bAge 18 to 60, presence of DM due to b) type 1, to be literate and mentally competent to answer questions for type 1 DM group; c)Age 18 to 60, to be literate and mentally competent to answer questions, to be free of a chronic disease for control group.

Exclusion criteria: To have a chronic mental illness (mental retardation, schizophrenia or other psychotic disorders, bipolar disorder or dementia) and to be hospitalized while about to be included in the research.

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Psychometric Scales

General Health Questionnaire (GHQ): GHQ was developed in 1979 by Goldberg and Hillier to analyze the anxiety and depression symptoms in non-psychiatric clinical settings(Goldberg & Hillier, 1979). Turkish validity and reliability study was made in 1996(Kılıç, 1996). In the same study, cut-off score was calculated as 4/5 for the 28-question form. GHQ was used for evaluating general psychological/psychiatric well-being. Higher scores indicate worse outcomes on anxiety and depression symptoms.

Health Anxiety Inventory - Short version: Health Anxiety Inventory (HAI) was developed particularly for cognitive and emotional evaluation of health anxiety on individuals with psychiatric and physical illnesses by Salkovskis et al.(P. M. Salkovskis, Rimes, Warwick, & Clark, 2002). Turkish validity and reliability study was made by Aydemir et al.(Aydemir, Kirpinar, Sati, Uykur, & Cengisiz, 2013). Neither do the studies nor the original form report a cut-off score. It is recommended to use in comparative groups. Higher scores indicate worse outcomes on health anxiety.

Short Form-36 (SF-36): SF-36 is a survey evaluating the health-related quality of life. It can be used on individuals applying to medical establishments with somatic and chronic illnesses. Turkish validity and reliability study was made in 1999 (Koçyiğ it, Aydemir, Ölmez, & Memiş , 1999). Evaluation of the survey is made by scoring according to specific instructions.

Social Adaptation Self-evaluation Scale (SASS): SASS was developed with the intention of evaluating the social functionality in both depressional and non-depressional/post-depressional well-being periods(Bosc, Dubini, & Polin, 1997). It was conceptualized as a 4-point Likert scale containing 21 items. A cut-off score wasn't determined. Higher scores indicate better adaptation and functionality. Turkish validity and reliability study was made in 2008(Akkaya et al., 2008).

Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI): Those inventories were developed by Beck in 1961 and 1988(A. T. Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Aaron T. Beck, Epstein, Brown, & Steer, 1988). Validity and reliability of BDI study was made in 1989 and those of BAI in 1998(Hisli, 1988; Ulusoy, Sahin, & Erkmen, 1998). For both scales, 21 questions are answered in 4-point Likert type. Highest possible score is 63, cutting score of Turkish form is determined as 17. Higher scores indicate severe anxiety and depression.

Statistical Analysis: First of all, in the descriptive statistics of the data, mean, standard deviation, median, frequency and ratio values were used to see how similar the three groups are. The distribution of the variables was measured by Kolmogorov-Smirnov test, skewness and kurtosis values. Levene's values were calculated for variance homogenity. Then one way ANOVA is used for the comparisons of descriptive statistics and scale scores between groups. When the conditions were not suitable for ANOVA, Mann-Whitney U test were used. Bonferroni correction was preferred for post-hoc tests. Chi-square test was used for the analysis of qualitative independent data. After the comparisons, multiple linear regression models are fitted to the data. The two main aims are to check whether any of the potential independent variables have significant explanatory power on the dependent variables (meaning they have significantly small p-Values) and what percentage of the variation in the dependent variables can be explained by the corresponding independent variables (indicated by the Adjusted R-squared Value). While creating the multiple linear regression models for each of the dependent variables specified above, the selection of independent variables was made by using the Best Subsets Regression Method.

This method fits all possible models that have all of the possible subsets of potential independent variables that were specified above. Best Subsets Regression fits 2P models, where P is the number of independent variables. After fitting all of the models, Best Subsets Regression then displays the best fitting model which provides the largest Adjusted R-squared Value as well as the independent variables that belong to the best fitting model. Considering the fact that the R-squared Value is a statistical measure that represents the proportion of the variance for a dependent variable that's explained by a set of independent variables in a regression model; a large R-squared value is always desired. The outliers for each model are detected by considering the Normal Q-Q Plot of the Standardized Residuals, the Cook's Distance. The detected outliers are excluded from the multiple linear regression models. Shapiro-Wilk Test was

conducted to check whether the residuals of the regression models are normally distributed. SPSS 22.0 software was used in the analysises

Results and Discussions

HIV group's average age was calculated as 35.3±10.0; 33.3% of which were females (n=24). Mean CD4+ T lymphocyte number was 649.99±282 cells/μL. Type 1 DM group's average age was calculated as 28.3±6.3; 35.9% of which were females (n=23) while for healthy controls age was 34.0±10.0 and 29 of them (31.5%) were female. Mean HbA1c value was 8.8± 1.2% in type-1 DM group. Between all study groups, we observed some significant differences in demographic variables, such as age. Type-1 DM group was younger than other two groups. Also, the percentage of married individuals in healthy group was greater than the HIV group. Fifty-six individuals out of 72 has opened up about their HIV status to their friends and relatives (78.8%). Mean age at the time of diagnosis with HIV infection was 32.1 ± 9.3. Additional info has been shown in the table 1.

Psychometric scale scores were compared with ANOVA. When the conditions were not suitable for ANOVA, Mann-Whitney U tests were used. There were significant differences between three groups in HAI, GHQ, BDI, BAI and SASS. Bonferroni correction showed that HIV group had the worst outcomes in HAI, GHQ and BDI. But BAI and SASS scores were not statistically different for DM and HIV group. In the HIV group, SF-36 subscales' scores were significantly lower than the healthy group but not statistically different from the Type-1 DM group, according to Bonferroni correction (see table 2). When multiple linear regression analysies assessed, it was seen that the R-squared values of the models are in the range of 0.46-0.67 in all scores except SF-36 Physical Functionality subscale.

We found that CD4 + T lymphocyte counts have profound effects on SASS and SF-36 scores. These two scores improve as the CD4+ T lymphocyte counts increases. Similarly, it was observed that HAI, BAI, BDI, GHQ scores were affecting SASS and SF-36 scores significantly. It is also seen that the relationship was negative between these scores. When socio-demographic datas are analyzed, it was seen that while female gender has negative effect on SF-36 General Health subscale, education period affects positively. Detailed information for the analysis is given in the table 3.

It is observed that the most important explanatory factor is CD4 + T lymphocyte count, especially in the models created by the scales (HAI, BAI, BDI, GHQ) that are effective on functionality and quality of life. There is a negative relationship. Although the effect of socio-demographic factors is relatively low, it was observed that female gender and unemployment increased HAI scores, while the duration of education have opposite effect. Besides, being married had a positive effect on general anxiety scores. Moreover, coming out to relatives about the disease seemed not to have a significant effect over the scores. The adjusted R-squared values in the model vary between 0.20-0.32. Detailed information for the analysis can be seen in Table 4.

Discussion

Considering the sociodemographic data among the HIV, Type-1 DM and healthy controls, groups with similar fundamental characteristics except for the age and marital status were studied in this research. In comparison with healthy controls, it was observed that HIV group had worse HAI, GSA, BDI, BAI, and SASS scores. HAI, GHQ, BDI scores were significantly higher in HIV group compared to Type-I DM group while psychiatric support rate, BAI and SASS scores were not significantly different. A worse profile of PLWH in terms of these measurements is probably due to the characteristic of HIV as an "acquired" disease. A previous study showed a significant correlation between negative self-image and personalized stigma and depression and anxiety levels(Rao, Kekwaletswe, Hosek, Martinez, & Rodriguez, 2007). Furthermore, the image of the infection can be more destructive than the disease itself(Lewis, 1998). This is probably why health anxiety is more dominant in the HIV group. The perception of HIV, even though it is manageable disease like Type-I DM, may make it more malignant in psychiatric terms than Type-I DM. At this point, we can interpret the different outcomes of SASS in two groups with medication styles. According to previous papers, twice-to-four times a day insulin injection can be the reason of depression and difficulties of adaptation so that may be the reason of insignificant difference between these two groups(Heller et al., 2017).

When the quality of life subscales were examined, no significant difference was found between the HIV group and the type-I DM group. In the literature, there are data indicating that many chronic diseases disrupt quality of life(Burckhardt, Woods, Schultz, & Ziebarth, 1989; Eiser & Morse, 2001). In the comparison with healthy controls, the quality of life scores in the HIV-positive group were significantly

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low except pain scores. A regular treatment, frequent doctor checks, frequent laboratory tests, regular investigations in terms of drug side effects and disruptions in work and social life created by those may be responsible for this difference. The lack of significant difference in the pain subscale may indicate that it should be reassessed whether DSM-5 should be competent about health anxiety. Pain is the most common somatic symptom in non-clinical healthy individuals in some studies (Barsky, Peekna, & Borus, 2001; Muñoz et al., 2005). In this context, a model of health anxiety, which may be affected by periodic changes and may show different intensity in terms of symptoms and which has a linear continuity rather than existent/non-existent dichotomy, may explain the absence of a difference in pain.

When linear regression analysis of the data of PLWH is examined, the Adjusted R-squared values are that are mostly between 0.54 - 0.67 and the independent variables HAI, BAI, BDI, GHQ scores and CD4+ T lymphocyte counts are almost always present in the models and have extremely small and significant p-Values. This means that these five factors have very high explanatory powers for the quality of life and functionality levels of PLWH.

Except for the negative effect of female gender on the overall health perception, almost no demographic characteristics or psychiatric treatment status on SASS and SF-36 scores seem to be effective. When a second regression analysis is performed with BAI, BDI, HAI and GHQ scores as dependent variables, the importance of sociodemographic factors becomes evident. We found that female gender had a significant effect on health anxiety ($p = 0.02065$). In the literature, there are publications supporting the fact that symptoms related to anxiety and depression in HIV group are seen more in female gender (Cochran & Mays, 1994; Turner-Cobb et al., 2002).

It is observed that being married has a significant effect on the BAI and GHQ scores ($p=0.04780$; $p=0.04693$). We can say that being married can be equated with more social and emotional support in certain areas. Although marriage does not seem to reduce health anxiety, we see that overall anxiety is reduced. There are publications in the literature that contain compatible findings (Kagee & Martin, 2010; Marwick & Kaaya, 2010).

We found that being unemployed has significant effect on HAI scores ($p=0.00373$). Possibly, ability to work means a better health status in individuals' minds. In a study by Blalock et al., data indicating that having a job increases the quality of life is presented and this study also shows that the number of CD4 + T lymphocytes in the working group is higher and the viral load is lower (Blalock, McDaniel, & Farber, 2002). Furthermore, it might also important that social security system in the country functioning just for currently employed people. Because of that situation actively working people's access to healthcare is much easier.

It is thought that the way of transmission can often be a rough estimate of the individuals. However, against our expectations, we did not observe a significant difference between individuals with different transmission ways.

We see that 77.8% of the group mentioned the diagnosis at least one of their relatives or family members. In the literature, there are studies showing that people living with HIV have various advantages in many areas after opening up to their relatives: increase in social support, closer relationship with the partner, better and better perception of self-image, improvement of depressive symptoms, improvement of functionality and quality of life, better adaptation to treatment, and even increase in the number of CD4 + T lymphocyte was among the many other benefits (Parsons, VanOra, Missildine, Purcell, & Gómez, 2004; Vyavaharkar et al., 2011). Our data showed inconsistent results with the literature on this issue. Opening up to relatives did not provide better scores in any area. Most of our patients came alone to the outpatient clinics where they were referred to our study. Although they probably opened up to their relatives, we thought that they wanted to manage the disease process on their own and we attributed the ineffectiveness of opening to the relatives in our study to this fact.

We have seen that CD4+ T lymphocyte count has nearly significant effect on SASS and on SF-36, it is significant explanatory factor on almost every subscale. This count is also found as the most important explanatory factor on HAI, BAI, BDI, GHQ; both indirectly and directly affects the quality of life and social cohesion. Considering that CD4+ T lymphocyte count is one of the basic health indicators for PLWH, it can be predicted that this count should have some psychological effects on people. In the literature, there are studies suggesting that the number of CD4+ T lymphocytes has an impact on many

psychiatric symptoms; in addition, the same relationship can be established in the opposite direction, for example, depression may have a negative effect on the number of CD4 + T lymphocyte (Burack et al., 1993; Murphy, Wilson, Durako, Muenz, & Belzer, 2001). Current studies in the literature also indicate a negative correlation between the number of CD4 + T lymphocyte and quality of life (Gill et al., 2002).

Considering all this, the disease itself seems to disrupt the quality of life and psychosocial harmony beyond the psychological picture it creates. Hence, although there are some worse results in HIV group than Type 1 DM in areas such as depression and health anxiety in the statistical analysis, we see that there is no difference between the two groups in terms of quality of life and psychosocial functionality scores. Possibly, the psychological effects caused by the disease are not as effective as the disease itself, but they also have an additional effect on the deterioration of the quality of life and psychosocial functionality.

The base advantage of this research was being the first study in medical literature that measured the level of health anxiety of the PLWH alongside its involvement in quality of life and psychosocial functionality. However, there were some limitations. The first limitation of this research was regarding the sample size and male/female ratio. The male/female ratio of the people living with HIV in the country is given as 3.58. However, patients who applied to Cerrahpasa Faculty of Medicine, Department of Infectious Diseases outpatient clinic HIV gender ratio close to 2 and this ratio was preserved while the patients were being chosen. Second limitation was being unable to include the stigmatization factor to the research. The stigmatization and the self-stigmatization have to be taken in account while working with HIV groups. Another limitation is that bidirectional analysis could not be performed due to the establishing of layered model while the statistical model was created. For this reason, as an example, we have not been able to evaluate the impact of quality of life on anxiety. Lastly, economic background of the subjects is not included in the study and it is an another limitation of our study.

One of the most important results of this research was that the health anxiety levels were found higher in PLWH compared to the healthy control group and the Type-1 DM group. However, we found that CD4 + T lymphocyte counts are still the most important factor. CD4+ T lymphocyte count directly affects the quality of life and psychosocial functionality, as well as anxiety levels, depressive symptoms, and general health perception and this is likely to cause further impair of functionality and quality of life.

In this context, we want to draw attention to the importance of standard counseling with psychiatry for health anxiety. Referring to the psychiatry clinic for evaluation of the patient, especially in the case of low CD4+ T lymphocyte counts, seems essential for the multidisciplinary approach. Also, it is believed that additional studies regarding the effectiveness of this counseling or how to perform it to the different groups are required.

Conclusions

PLWH have higher health anxiety than controls. Even if psychosocial functioning and QoL are impaired in people with high health anxiety levels still CD4+ T lymphocyte count is strongest explanatory factor on almost every subscale. The disease itself seems to disrupt the quality of life and psychosocial harmony beyond the psychological picture it creates.

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Table 1 <Comparison of Sociodemographic Variables between 3 Groups>

		HIV (n=72)	Type-1 DM (n=64)	Healthy Controls (n=92)	
		Mean±SD or number (%)			p-F (when necessary)
Age		35.3±10.0	28.3±6.3	34.0±10.0	p*=0.000 F=11.030 (Bonferroni Correction p^{b1}=0.000 p^{b3}=0.001)
Sex	Female	24 (33.3)	23 (35.9)	29 (31.5)	p**=0.847
	Male	48 (66.7)	41 (64.1)	63 (68.5)	
Marrital Status	Married	15 (20.8)	23 (35.9)	49 (53.3)	p^{m1} =0.146 p^{m2}<0.000
	Single	47 (65.3)	34 (53.1)	36 (39.1)	
	Divorced	10 (13.9)	7 (10.9)	7 (7.6)	
Duration of education		12.8 ± 4.4	12.5 ± 3.8	13.1 ± 3.8	p*=0.724 F=0.323
Employment status	Employed	52 (72.2)	43 (67.2)	78 (84.8)	p**=0.062
	Unemployed	20 (27.8)	21 (32.8)	14 (15.2)	
Psychiatric support	Yes	19 (26.4)	11 (17.2)	18 (19.6)	p**=0.381
	No	53 (73.6)	53 (82.8)	74 (80.4)	

p* ANOVA p value, p** chi-square p value,
p^{b1} Bonferroni p value for HIV group vs Type-1 DM group, p^{b3} Bonferroni p value for Type-1 DM group vs healthy group
p^{m1} Mann-Whitney U p value for HIV group vs Type-1 DM group,
p^{m2} Mann-Whitney U p value for HIV group vs healthy group

Table 2. Comparison of the psychometric scales' scores between 3 groups

	HIV Group (n=72)	Type-1 DM Group (n=64)	Healthy Controls (n=92)		
	Mean±SD or number-%			p and F values	Bonferroni Correction
Health Anxiety	22.1 ± 9.5	14.8 ± 7.8	11.4 ± 4.7	p<0.0001 F=43.038	p^{b1}<0.0001 p^{b2}<0.0001 p^{b3}=0.015
GHQ	8.4 ± 7.8	4.9 ± 4.6	2.4 ± 3.2	p<0.0001 F=23.859	p^{b1}=0.001 p^{b2}<0.0001 p^{b3}=0.02
BDI	15.7 ± 12.3	9.9 ± 7.3	7.0 ± 5.4	p<0.0001 F=20.982	p^{b1}<0.0001 p^{b2}<0.0001 p^{b3}=0.110
BAI	13.9 ± 10.9	10.5 ± 8.7	7.3 ± 6.0	p<0.0001 F=11.926	p^{b1}=0.076 p^{b2}<0.0001 p^{b3}=0.041
SASS	40.4 ± 9.3	43.1 ± 6.2	44.7 ± 4.9	p<0.0001 F=8.023	p^{b1}=0.069 p^{b2}<0.0001 p^{b3}=0.055
SF-36 subscales					
Physical Fucntioning	86.3 ± 16.0	89.9 ± 13.0	91.4 ± 9.6	p=0.037 F=3.337	p^{b1}=0.294 p^{b2}=0.034 p^{b3}=1.000
Role limitations due to physical health	72.9 ± 37.2	77.0 ± 33.1	87.4 ± 17.9	p=0.006 F=5.276	p^{b1}=1.000 p^{b2}=0.006 p^{b3}=0.094
Role limitations due to emotional problems	58.8 ± 44.6	70.1 ± 39.1	82.6 ± 22.4	p<0.0001 F=9.173	p^{b1}=0.194 p^{b2}=0.0001 p^{b3}=0.094
Energy/fatigue	49.4 ± 22.2	53.9 ± 19.9	69.7 ± 15.6	p<0.0001 F=25.703	p^{b1}=0.511 p^{b2}=0.0001 p^{b3}=0.0001
Emotional Well-being	58.3 ± 18.2	59.0 ± 16.0	73.7 ± 13.6	p<0.0001 F=24.990	p^{b1}=1.000 p^{b2}=0.0001 p^{b3}=0.0001
Social Functioning	69.7 ± 25.2	75.9 ± 18.6	82.1 ± 18.0	p=0.001 F=7.262	p^{b1}=0.240 p^{b2}=0.001 p^{b3}=0.210
Pain	77.6 ± 23.1	76.4 ± 16.0	80.6 ± 15.7	p=0.332 F=1.107	----
Table 1. Comparison of sociodemographic variables between 3 groups	51.6 ± 22.3	51.4 ± 17.9	77.0 ± 13.9	p<0.0001 F=54.873	p^{b1}=1.000 p^{b2}=0.0001 p^{b3}=0.0001

p for One Way ANOVA,
p^{b1} Bonferroni p value for HIV group vs Type-1 DM group,
p^{b2} Bonferroni p value for HIV group vs healthy group,
p^{b3} Bonferroni p value for Type-1 DM group vs healthy group

Table 3 <Multiple Linear Regression Analysis of Associations between SASS Scores, QoL Scores and Psychometric Scales, Sociodemographic Variables>

	SASS	Physical functionality	Role limitations due to physical health	Role limitations due to emotional problems	Energy/ fatigue	Emotional Well-being	Social Functioning	Pain	General Health
Gender (ref. woman)	-	-	-	-	-	-	-	t=1.010 p=0.317	t=-5.066 ***p<0.0001***
Duration of education	-	t=0.188 p=0.85165	-	-	-	t=-0.346 p=0.730	t=0.664 p=0.50888	-	-
Employment status (ref. unemployed)	-	-	-	-	-	-	-	-	t=2.909 ***p=0.0051***
Psychiatric support (ref. not taking)	-	t=-1.562 p=0.12381	-	-	-	-	-	-	-
Supposed transmission way (ref. sexual)	t=1.306 p=0.19638		-	-	-	-	-	-	-
CD4+ T lymphocyte count	t=1.799 ***p=0.07702***	t=2.028 ***p=0.04719***	t=2.071 ***p=0.042898***	-	t=2.192 ***p=0.03224***	t=1.670 ***p=0.100***	t=2.546 ***p=0.01343***	-	t=1.935 ***p=0.0578***
HAI	-	-	t=-2.933 ***p=0.004830***	t=-1.933 ***p=0.058003***	-	t=-1.020 p=0.312	-	-	-
BAI	-	t=-2.743 ***p=0.00808***	t=-3.709 ***p=0.000474***		-	-	-	-	t=-2.208 ***p=0.0311***
BDI	t=-4.104 ***p=0.00012***	t=-2.632 ***p=0.01087***	t=-2.758 ***p=0.007802***	t=-2.805 ***p=0.006806***	t=-3.510 ***p=0.00086***	t=-5.948 ***p<0.0001***	t=-3.797 ***p=0.00034***	t=-2.842 ***p=0.006***	t=-2.205 ***p=0.0314***
GHQ	t=-1.182 p=0.24177	t=-2.469 ***p=0.01653***	-	t=-3.668 ***p=0.000527***	t=-4.661 ***p<0.0001***	-	t=-2.325 ***p=0.02344***	t=-2.532 ***p=0.014***	t=-2.135 ***p=0.0369***
Adjusted R-squared	***0.5433***	***0.2207***	***0.4691***	***0.5416***	***0.6717***	***0.6142***	***0.5461***	***0.4554***	***0.6063***

Table 4 <Multiple Linear Regression Analysis of Associations between HAI, BDI, BAI, GHQ Scores and Sociodemographic Variables, CD4+ T Lymphocyte Count>

	HAI	BDI	BAI	GHQ
Gender(ref. woman)	t=2.379 p=0.02065	-	-	-
Age	t=1.173 p=0.24545	t=1.316 p=0.193084	t=1.638 p=0.10623	-
Age at diagnosed with HIV infection	t=-1.530 p=0.13143	t=-1.851 p=0.06892	t=-1.955 p=0.05500	-
Duration of education	t=-1.995 *p=0.05074*	t=-1.126 p=0.26456	-	-
Marriage status (divorced)	t=-1.901 p=0.06231	-	t=0.400 p=0.69061	t=1.909 p=0.06078
Marriage status (married)	-	-	t=-2.018 *p=0.04780*	t=-2.026 *p=0.04693*
Employment status(ref. unemployed)	t=3.022 *p=0.00373*	-	-	-
Disclosure to relatives/friends (ref. yes)	-	t=-1.414 p=0.16230	-	-
Psychiatric support (ref. not taking)	-	-	-	t=-1.366 p=0.17679
CD4+ T lymphocyte count	t=-3.535 *p=0.00081*	t=-3.737 *p=0.00041*	t=-3.169 *p=0.00235*	t=-2.811 *p=0.00654*
Adjusted R-Squared	*0.3175*	*0.2572*	*0.2031*	*0.2177*

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