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The Association Between Mental Health of HIV Patients and Antiretroviral Medication Adherence

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Abstract

Background: Various factors, like mental disorders, may affect the desire for medication and adherence in HIV/AIDS patients.
Objectives: The present study aimed to determine levels of neurotic disorders and associations of disorders level and Highly Active Antiretroviral Therapy (HAART) medication adherence in HIV/AIDS patients.
Materials and Methods: Finally, 150 patients of Behavioral Disease Counseling Center of Shiraz were selected by a convenience method and were evaluated by Symptom Checklist-25 (SCL-25) and Medication Adherence Questionnaire (MAQ). Chi-square, Kruskal-Wallis, Mann-Whitney U tests were, Spearman's correlation coefficient and logistic regression were used to analyze the data by using SPSS-20 ($P < 0.05$).
Results: Seventy-eight percent of patients had normal mental health status. Also, 83% had very good medication adherence. Female gender, single or divorced, and working in temporary and low-income jobs were associated with decreased mental health status. Higher age and education were associated with increased adherence. Anxiety was the most common and effective disorder. Decreased mental health' status was shown to reduce drug adherence.
Conclusions: Treatment of mental disorders, particularly anxiety, can be one of the most effective ways to increase drug compliance in HIV/AIDS patients.

Keywords: Medication Adherence, Mental Disorders, HIV, Antiretroviral Therapy, Highly Active

1. Background

For those who suffer from some diseases, arbitrary discontinuation of medication may lead to the recurrence of the disease or even death; hence, medication adherence has always been an indispensable necessity, and its ensuring has been a major challenge in health policy-making (1). Medication adherence is of crucial importance for those who receive antiretroviral therapy (ART), as it has both preventive and therapeutic properties for HIV/AIDS treatment (2). Identifying factors that affect medication adherence can help physicians to address the underlying causes of low adherence, which in turn translates into an improved treatment process. Among different factors that result in low adherence, it appears that psychological factors are the most important known factor affecting medication adherence. According to studies conducted in Iran, medication adherence among Iranians is 60.4 - 69.4% (3), and some reported adherence and non-adherence of 34.4% and 64.5%, respectively (4). However, the measured adherence depends on several factors, including research setting and applied tools.

Several studies reported low levels of adherence to treatment among HIV positive patients and suggested that it can be increased by psychological consultations intended to address depression and anxiety (5, 6).

Patients' psychological motivation to continue treatment is a crucial factor. Patients may lose their interest in completing treatment for reasons such as mental disorders, desire for suicide, depression, and fear of treatment stages (7). On the other hand, numerous scientific reports confirmed that mental disorders like borderline personality disorder, mood disorders, and anxiety disorder are common among this group (8). Psychiatric patients have low levels of medication adherence, and their possibility of medication withdrawal is very high (9).

The extent to which this adherence is based on the current mental state of patients can be evaluated from two perspectives. First, the mental state of these individuals depends on the experienced conditions, which may lead to medication adherence or withdrawal. Second, the in-

cidence or improvement of psychological diseases during the HIV patient treatment can increase or decrease the tendency to the highly active ART (HAART) medication adherence.

2. Objectives

The present study intended to: (1) determine the mental state of HIV+ patients, (2) determine the rate of medication adherence in HIV+ patients, and (3) determine the association between types and level of mental disorder and rate of antiretroviral medication adherence in patients.

3. Materials and Methods

Following a cross-sectional design, the current study was conducted at the Behavioral Disease Counseling Center of Shiraz. The final sample size was calculated as 150 subjects following similar studies with a confidence interval of 95% (4), with special emphasis on medication adherence. Informed written consent was obtained from all participants, which was tuned by the Vice-Chancellor for Research of the Shiraz University of Medical Sciences. All patients were included in the study, except for the people who had completed the questionnaire.

3.1. Ethics

Before asking participants to fill the data collection tools, all participants were asked to fill the written informed consent. In addition, all principles of the Helsinki declaration and its further amendment were followed. The study was approved by the Medical Ethics Committee on Human Research of Shiraz University of Medical Sciences (code: IR.SUMS.REC.1398.550), without the need to record IRCT.

According to one study, very good medication adherence was defined as the use of over 97% of medications prescribed by a physician for HIV/AIDS treatment (10); and mental disorder was determined based on the participants' score in the Symptom Checklist-25 (SCL-25).

3.2. Research Tools

3.2.1. Symptom Checklist-25 (SCL-25)

It is a 25-item checklist intended to assess mental disorders in both healthy and HIV/AIDS cases. This checklist is scored on a five-point Likert scale, ranging from "Never" to "strongly". It has 8 subscales, namely somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobia, paranoia, and Psychoticism. A Cronbach's alpha of 0.97 is reported for this checklist (11).

3.2.2. Adherence Questionnaire in Patients with Chronic Diseases

This 40-item questionnaire has been designed and standardized by Seyed Fatemi et al. (2018) at Gorgan University to measure seven factors in medication adherence: intention to treat; the desire to participate in therapy; ability to adapt; the combination of treatment with life; medication adherence; commitment to medication; and uncertainty about treatment. The medication adherence determines based on the total score, as follows: a score of 0 - 25 is defined as weak, 26-50 as medium, 51 - 74 as good, and 75 - 100 as very good. Its reliability is evaluated by the test-retest technique. Also, its internal consistency is confirmed with a Cronbach's alpha of 0.92 (10).

Statistical analysis was administered using SPSS version 20. Statistical significance was considered when P-value < 0.05. All study variables were evaluated in terms of normal distribution, and the distribution of all quantitative variables was abnormal. Chi-square, Kruskal-Wallis, and Mann-Whitney U tests were used to test the qualitative variables. The correlation of the quantitative variables was investigated using Spearman's correlation coefficient. The association between main quantitative variables, including medication adherence and mental state, was evaluated using the logistic regression, with s cut-off value of 75% for medication adherence using the logistic regression test.

Logistic regression analysis was performed to investigate the association between the medication adherence and mental state in patients with HIV/ AIDS by considering a cut-off rate of 5% for medication adherence and considering variables of age, marital status, employment status, and the transmission way of HIV/AIDS in the univariate analysis. Statistical significance was considered when P-value < 0.2.

4. Results

4.1. Demographic Data

In the present study, 58 (38.7%) participants were male, with a mean age of 43.5 ± 9.6 years; and 91 (60.7%) were female, with a mean age of 40.6 ± 7.05 years. Six (2%) participants were under 20 years and over 60 years. The minimum and maximum age of HIV diagnosis were 4 and 67 years, respectively.

Also, the mother language of 118 (78.6%) participants was Farsi. All of the participants were Muslim. Only 6 (4%) participants had a college education. Except for 15 (10%) patients, all of them were educated in Shiraz or its suburbs. Seventy-seven (31%) were single or divorced, and 86 (58%) were unemployed. Sixty-eight (98%) of female participants

and 3 (1.5%) of male participants were infected through sexual intercourse. Furthermore, 48 (95.5%) males and 2 (4.5%) females were infected through intravenous injection.

4.2. Findings

4.2.1. Determinants of Mental State

As shown in Table 1, only somatization and interpersonal sensitivity (*) were significantly different between males and females.

According to the results of the SCL25, 78% of patients had normal mental health status, 21% had morbidity, and 1% had psychosis. Moreover, their difference was significant (P-value = 0.002), and the prevalence of the disorder was slightly higher in females than males (mean rank of 56.81 for males and 77.91 for females), which can be attributed to the difference between items of "somatization" and "interpersonal sensitivity" ($P \leq 0.05$).

The general mental state of patients showed a significant difference in marital status (P-value= 0.012) and employ status (P-value = 0.008). Married and employed participants had better status than other groups. In all items, the somatization (P-value = 0.023) disorder was significantly higher in married participants. Obsessive-compulsive disorder (OCD) (P-value = 0.016) and anxiety (P-value = 0.026) were significantly depended to job. For other items, there was no significant difference concerning overall mental state.

4.2.2. Medication Adherence

In the present study, 82.7% of respondents had very good medication adherence, 12.7% good, and 0.7 moderate, and none of them had low adherence. The difference between males and females was not statistically significant (P-value = 0.613).

The percentage of medication adherence was significantly different between various age groups (P-value = 0.024) and different levels of education (P-value = 0.024), so that the higher the age or education, the higher was the adherence. For other items, there was no significant difference concerning the medication adherence.

4.2.3. The Association Between Mental State and Medication Adherence

According to the findings, there was an inverse correlation between medication adherence and the overall mental state (r = -0.269, P-value = 0.002).

Some psychological items such as OCD (r = -0.291), depression (r = -0.175), anxiety (r = -0.227), phobia (r = -0.335), paranoia (r = -0.232), and Psychoticism (r = 0.251) were significantly correlated with medication adherence. Furthermore, there was a significant negative association between three levels of adherence and total psychological score ($P < 0.05$). As the association was inverse, it can be argued that the higher the total score of mental state, the lower will be the score of all scales (at a normal level), which causes increase adherence (Table 2).

Logistic regression analysis was used to analyze the association between compliance with drug adherence and mental status in patients with HIV/ AIDS. A cut-off value of 75% was considered for the adherence. Confounders such as age, marital status, employment status, and the roots of transmission were also considered, which had a P-value < 0.2 in the univariable analysis. A significant association was found between compliance and mental status, which means a positive association between mental state the chance of adherence (more than 69%) (OR = 0.31; CI 95%, 0.10-0.94; P-value = 0.040) (Table 3).

5. Discussion

Medication adherence is an important issue that is under the influence of several individual or social factors such as psychological structure and type of psychological status. The present study aimed to determine the mental state of HIV/AIDS patients. According to the findings, 21% of patients had morbidity, and 1% had a psychotic disorder. A study reported that about 30% of patients received psychiatric treatment, which corresponded to 78% of patients' mental health (4). The results also indicated no significant difference between medication adherence in those with and without psychiatric treatment (P-value = 0.27). Some field studies indicated that those who received ongoing training in resilience, dealing with problems, social communications, how to cope with illness as well as medication consultation, medication adherence, and so on had better mental health. The above findings are consistent with those reported by Fawzi (2016), Johnsson et al. (2013), and Olley et al. (2004) (12-14).

Also, female's mental state was slightly more unstable than males, which can be attributed to the focus of SCL25 on neurotic axes and the higher prevalence of disorders among females (15). The difference was due to a significant difference in interpersonal sensitivity and somatization in both genders. As HIV diagnosis is associated with increased psychosomatic state and even may cause hypochondria, and since females are at enhanced risk of such states, the Somatization was higher in women. Furthermore, because of social problems such as stigma and discrimination in HIV cases, the interpersonal sensitivity scale was more appropriated for data collection (16). Concerning the HIV transmission method and patients' mental state, there was no significant difference in the total scores of individuals; however, there was a significant difference between somatization and interpersonal sensitivity scales.

Table 1. Mental Health of HIV Patients by Gender

Scale	Frequency (%)	Frequency (%) in Sex	
		Male	Female
Somatization			
Normal	98 (65.3)	46 (79.31) *	52 (57.77) *
Pathologic	49 (32.70)	10 (17.24)	38 (42.22)
Psychotic	2 (1.3)	2 (3.44)	0
Obsessive-compulsive			
Normal	99 (65.3)	43 (76.78)	56 (62.22)
Pathologic	98 (66)	12 (21.42)	26 (28.88)
Psychotic	4 (2.7)	1 (1.78)	3 (3.3)
Interpersonal sensitivity			
Normal	43 (28.7)	25 (43.1) *	18 (20) *
Pathologic	90 (60)	29 (50)	60 (66.66)
Psychotic	16 (10.7)	4 (6.89)	12 (13.33)
Depression			
Normal	79 (52.7)	36 (62.06)	43 (47.77)
Pathologic	57 (38)	15 (25.86)	41 (45.05)
Psychotic	13 (8.5)	7 (12.6)	6 (6.59)
Anxiety			
Normal	110 (73.3)	43 (74.13)	67 (74.44)
Pathologic	33 (22)	13 (22.41)	20 (21.97)
Psychotic	6 (4)	2 (3.44)	3 (33.3)
Phobia			
Normal	133 (88.7)	53 (91.37)	80 (87.91)
Pathologic	15 (10)	4 (6.98)	10 (10.98)
Psychotic	2 (1.3)	1 (1.72)	1 (1.09)
Paranoia			
Normal	90 (60)	38 (65.51)	52 (57.77)
Pathologic	30 (20)	16 (27.58)	31 (34.06)
Psychotic	25 (16.7)	4 (6.89)	7 (7.69)
Psychoticism			
Normal	122 (81.3)	46 (80.70)	76 (84.44)
Pathologic	24 (16)	9 (15.78)	14 (15.55)
Psychotic	2 (1.3)	2 (3.5)	0

Based on the findings, widows/widowers, those who were divorced, and those with temporal marriage, and unemployed people had worsened mental state; Nevertheless, those working in the public sector had better mental health state, which is consistent with studies by Horowitz (2004) and Paul & Moser (2009) and DSM5 report (2013) (17-19).

As mentioned before, our study also intended to determine the rate of medication adherence, and it was found that a majority of patients had a very good (a level of 75 - 100%) medication adherence (9). Some studies with a similar research design reported that those with less than 90% or 95% of adherence had continuous drug use (4, 20). The current study was based on a questionnaire that contained four levels of adherence (i.e., very good, good, moderate, and weak). Using a cut-off value of > 90% for adherence

Table 2. Adherence Rates Base on Mental Status of Patients

Psychological Scales	Level of Adherence		
Somatization			
Normal	83	11	1
Pathologic	41	4	0
Psychotic	0	2	0
Obsessive-compulsive			
Normal	78	8	1
Pathologic	30	7	0
Psychotic	2	2	0
Interpersonal sensitivity			
Normal	38	5	0
Pathologic	73	9	1
Psychotic	12	3	0
Depression			
Normal	68	6	1
Pathologic	47	8	0
Psychotic	8	3	0
Anxiety			
Normal	98	8	1
Pathologic	19	9	0
Psychotic	6	0	0
Phobia			
Normal	113	13	1
Pathologic	10	3	0
Psychotic	1	1	0
Paranoia			
Normal	80	5	0
Pathologic	38	8	1
Psychotic	6	4	0
Psychoticism			
Normal	105	10	1
Pathologic	17	6	0
Psychotic	1	1	0

level, none of the participants had very good adherence, as the highest adherence score was 89. Also, 82% of participants had good medication adherence. A number of researchers believed using a categorization of adhered and non-adhered decreases the success rate (i.e., < 5%), due to various reasons, which results in social stigma.

The study showed that age is a cornerstone of medication adherence. That is, the higher the age, the more the medication adherence. Therefore, medication non-adherence or poor adherence, which occurs at very young ages, is risky behavior, which is consistent with the study by Barclay et al. (2007) (21). Some studies reported poor adherence at older ages (22) among those who suffered from neuropsychiatric disorders. As it is not in line with the findings of the present study, mainly because our center did not admit any case with neurological disorders during the study period. A similar association was found concerning the variable of education. So that, the higher the educa-

Table 3. Association Between Mental Health and Adherence Using Logistic Regression

	OR	CI 95%		P Value
		Lower	Upper	
Mental health status	0.316	0.105	0.947	0.04*
Age				
10 - 30	1			0.602
31 - 40	0.379	0.013	110.197	0.574
41 - 50	10.305	0.046	360.840	0.876
51 - 60	20.512	0.001	0.001	0.998
61 - 90	10.813	0.001	0.001	0.999
Marital status				
Single	1			0.285
Married	40.996	0.629	390.677	0.128
Divorced/ widowed	20.247	0.258	190.545	0.463
Job status	1			0.098
Self-employed	10.126	10.150	100.762	0.037*
Employed	30.915	0.001	0.001	0.999
Unemployed	60.797	10.277	30.618	0.025*
Roots of transmission				
Sex	1			0.834
Drug injection	0.859	0.147	50.021	0.866
Medical transmission and tattoo	0.001	0.001	00.001	1.000
Unknown	30.745	0.345	40.654	0.278
Mother	70.420	0.001	00.001	1.000

tion, the higher the medication adherence, which is consistent with studies by Reisner (2009) and Murphy (2010) (23, 24).

The third aim of the current study was to investigate the association between mental state and medication adherence. According to the association between total score and mental state and each mental scale with medication adherence, a significant association was found between total score and eight items of psychological scales (i.e., obsessive-compulsive, anxiety, depression, phobia, and Psychoticism) and medication adherence. In other words, the higher the total score of mental state, the lower will be the score of the abovementioned scales, and the more the medication adherence, the higher the adherence level. In other words, those with a better mental state have higher medication adherence. Furthermore, the multivariate analysis of variance indicated that anxiety was the most important factor among 8 items of mental disorders. In the existence of anxiety, other psychological factors had lower effects on medication adherence. The findings of the present study are consistent with those reported by DiMatteo, Lepper, and Croghan (2000), Valente (2003), Safren et al. (2004), and Ingersoll (2004) (25-28).

5.1. Conclusion

The findings of the present study are not consistent with those reported by several previous studies that investigated the effectiveness of psychological factors that affect medication adherence in those who suffer from HIV/AIDS. The current study also investigated the impact of neurotic factors in medication adherence in HIV patients, using a pathological questionnaire. In general, gender, marital status, and employment could affect mental health in a way that female gender, being single or divorced, and having temporary and low-income jobs were associated with lower levels of mental health.

On the other hand, age and education had an impact on medication adherence. So that the higher the age and education, the higher the medication adherence. Hence, it can be argued that almost all psychological items could affect medication adherence. Therefore, psychological treatment should be a top priority in HIV/AIDS infected cases

that suffer from mental disorders. Among the treatment of neurotic disorders, the treatment of anxiety disorders is at the forefront of treatment.

5.2. Limitations

The limitations of the present study are as follows: (1) Sometimes, people's desire decreased for cooperation because of the problems of HIV. (2) Patients were usually in a hurry and there was not enough time for questioning. (3) Access to both sexes and in the same demographic situations was not possible.

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Footnotes

Authors' Contribution: Mohammadreza Heydari was responsible for the study concept and design, acquisition of data, drafting the manuscript, administrative, technical, and study supervision, and final proof of the manuscript. Morteza Mehraeen was responsible for the study concept and design, acquisition of data, drafting the manuscript, administrative, technical, and study supervision, and final proof of the manuscript. Parisa Keshani was responsible for Conceptual Design and technical and study supervision, statical analysis, and final proof of the manuscript. Marjan Faghih was responsible for statistical analysis and interpretation of the data, critical revision of the manuscript for intellectual content, and final proof of the manuscript.

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