

Original article

Predictors of Sexual Dysfunction in HIV-Infected Men

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SUMMARY

Aims: The prevalence of sexual dysfunction in people infected with human immunodeficiency virus (HIV) is higher than in those without this infection. Sexual dysfunction in HIV-infected people is associated with adverse outcomes. This study aimed to investigate the predictors of sexual function in people infected with HIV.

Material and Methods: This cross-sectional study was done at Behavioral disease counseling centers. Samples were taken from 186 HIV-infected men. Demographic variables were recorded. Sexual function and psychological status were assessed by the International Index of Erectile Function Questionnaire, the DASS-21 (Depression, Anxiety, Stress Scales), and the Domestic Violence Questionnaire. To examine the CD4 cells and hormonal profiles, blood samples were taken from each patient. The data were analyzed using the SPSS18 software.

Results: A multivariate analysis showed that hepatitis B infection ($P = 0.034$, OR = 9.6), smoking ($P = 0.026$, OR = 2.5), severe stress ($P = 0.04$, OR = 0.32) and severe depression ($P = 0.042$, OR = 6.9) were the predictors of sexual dysfunction in HIV-infected men.

Conclusion: This study showed that smoking, hepatitis B infection, severe depression, and severe stress could be predictors of sexual dysfunction in those men.

Keywords: depression, erectile dysfunction, human immunodeficiency virus, sexual dysfunction, stress

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INTRODUCTION

Since the onset of epidemic human immunodeficiency virus (HIV) infection, over seventy million people have got infected and about thirty-five million ones have died from it. In general, there were 38 million infected people by the end of 2019 (1). According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), the incidence of human immunodeficiency infection in Iran was 59,314 in 2019 and the number of new cases of HIV infection was 4,089 in 2019 (2). HIV infection is a disease associated with social stigma that causes physical and psychological problems, and endocrine and hormonal disorders are very common among the people infected by this disease, which are due to the unwanted effects of antiviral therapies or the virus-specific function. Among the undesirable outcomes of HIV infection, harm to sexual functions of men and women are also very common (3-5). Studies have reported a higher prevalence of sexual dysfunction among HIV-infected people compared to the general population (4, 6), the reason for which might be the fear of the risk of transmission, the stigma associated with HIV infection, forced use of condoms, changes in body image, and unpleasant conditions caused by HIV infection (3, 6-8). Sexual dysfunction in HIV-infected individuals is associated with low quality of life, unprotected sexual intercourses, and reduced adherence to highly active antiretroviral therapy (HAART) (9-11). By chronic suppression of viral load, HAART reduces the risk of disease transmission. As a result, the patients' non-adherence to treatment and unprotected intercourses will increase the likelihood of lower-than-optimal control of the viral load. Consequently, the increased concentration of the virus in vaginal discharge and semen leads to increased risk of HIV transmission. This may increase the risk of progression towards acquired immune deficiency syndrome (AIDS), unwanted pregnancies, increased probability of transmission of the disease from mother to fetus, developing opportunistic infections, cancers, and transmission of the virus among people in the community (7, 12, 13). Considering the adverse outcomes of sexual dysfunction in HIV-infected men, it is important to study the predictors of this disorder. Therefore, the present study aimed to determine the predicting factors of sexual function status in HIV-infected men.

MATERIALS AND METHODS

This cross-sectional study was carried out within December 2019 to March 2020 in behavioral disease counseling centers affiliated to Shiraz University of Medical Sciences, Iran, after receiving the Code of Ethics from the National Committee of Ethics in Biomedical Research, code IR.SUMS.REC.1397.386. The participants in this study were 186 Iranian men infected with HIV, who had been diagnosed with a rapid diagnostic test; then, the virus was confirmed with ELISA test with two kits of two different generations. They also had medical records in the centers. The individuals would enter the study if they were willing to; otherwise, they could withdraw at any stage of the study without any effects on their treatment processes.

After explaining the research objectives, assessing the inclusion and exclusion criteria, and obtaining the written informed consent from the samples, the researchers firstly used a researcher-made questionnaire to collect the required data such as demographic information, fertility characteristics, history of diseases, surgery, drug use, tobacco use, drug abuse, alcohol consumption, number of sexual partners, contraception methods, status of condom use in sexual intercourses, status of sexual partner(s) in terms of HIV infection, and adherence to treatment in the last 6 months before participating in the study. Participants' sexual function was assessed by the International Index of Erectile Function (IIEF) Questionnaire whose validity and reliability were determined by Rosen et al. in 1997 (14). The 15-question questionnaire examined the men's sexual functions in 5 aspects of erection, orgasm, sexual desire, intercourse satisfaction, and overall satisfaction over the past 4 weeks based on a 6-point Likert scale of 0 - 5. The cut-off points for the whole scale and the subscales were respectively as follows: whole scale - 30, sexual desire - 4, erection - 12, orgasm - 4, intercourse satisfaction - 6, and overall satisfaction - 4. Participants' emotional states of depression, anxiety and stress were measured by the Depression, Anxiety, Stress Scales (DASS-21) whose validity and reliability had been determined by Antony et al. in 1998 (15). This 21-question questionnaire was based on 4-point Likert scale of 0 to 3 scores and dealt with the status of the subjects' depression, anxiety and stress in the past four weeks. Regarding depression,

a score of 0 - 9 showed normal, 10 - 13 was mild, 14 - 20 was moderate, 21 - 27 was severe, and the scores over 27 showed very severe depression. In terms of anxiety, the score from 0 - 7 was normal, 8 - 9 was mild, 10 - 14 was moderate, 15 - 19 was severe, and scores higher than 19 showed a very severe problem. Finally, in terms of stress, 0 - 14 was normal, 15 - 18 was mild, 19 - 25 was moderate, 26 - 33 was severe, and the scores higher than 33 indicated very severe stress (16). The information about the disease status including the elapsed time since diagnosis, the type of current treatment, and the type of treatment regimen were extracted from the patients' medical records. In this research, the men with HIV infection were taken 5cc blood samples by experienced laboratory staff once the questionnaires were being completed. The blood samples were sent to a specific laboratory, and the levels of testosterone, estradiol, progesterone, dehydroepiandrosterone sulfate, globulins bound to sex hormones, cortisol, thyroid stimulating hormone, and thyroxine were measured through ELISA, and the CD4 cell surface was also

measured using the flow cytometry by one of specific laboratory personnel. The data analysis was performed using the SPSS software, version 18. The Chi-square test was also used for comparing and evaluating the relationship between qualitative variables and sexual function, and the independent t-test was used to determine the difference between quantitative variables and the mean score of sexual function. In the next step, the variables that had a significant relationship with sexual function were entered into the logistic regression test. The significance level was considered lower than 0.05.

RESULTS

The mean age of the 186 samples in this study was 42.6 ± 6.8 years. Regarding marital status, 69.9% were married, 18.8% were single, 10.8% were divorced, and the spouses of 0.5% were dead. Only 6.5% of the men who participated in this study had high education, and 40.9% had income levels of less than 5000000 IRR monthly. Besides, the mean body

Table 1. Information on disease condition of the men with HIV infection (N = 186)

Variables	Number (%)
Disease stage (WHO classification)	
1	137 (73.7)
2	38 (20.4)
3	8 (4.3)
4	3 (1.6)
Number of CD4 cells (cells/mm ³)	
≤ 199	35 (18.8)
200 – 499	92 (49.5)
500 ≥	59 (31.7)
Receiving HAART*	
Yes	175 (94.1)
No	11 (5.9)
Type of antiretroviral drugs	
PI [†] use	2 (1.1)
NRTI [‡] + NNRTI [§] use	167 (94.5)
NRTI+PI use	6 (3.4)
Adherence to treatment	
< 90%	2 (1.1)
90 – 95%	2 (1.1)
> 95%	171 (97.7)

*HAART: Highly active antiretroviral therapy; †PI: Protease inhibitor;

‡NRTI: Nucleoside reverse transcriptase inhibitor; §NNRTI: Non-nucleoside reverse transcriptase inhibitor

Table 2. Frequency and percentage of sexual dysfunction in HIV-infected men using the International Index of Erectile Function (IIEF) Questionnaire and its domains (N = 186)

	Overall sexual function	Erection	Orgasm	Sexual desire	Intercourse satisfaction	Overall satisfaction
Cut-off points for dysfunction	≤ 30	≤ 12	≤ 4	≤ 4	≤ 6	≤ 4
Frequency (N)	98	105	146	105	125	86
Percentage (%)	52.7	56.5	78.5	56.5	67.2	46.2

Table 3. Univariate analysis for sexual dysfunction (according overall sexual function using IIEF) in men living with HIV

Variables	Sexual dysfunction (N = 98)	No sexual dysfunction (N = 88)	P value
Educational level N (%)			
Primary School	37 (19.8)	24 (12.9)	0.03
Secondary school	29 (15.6)	36 (19.4)	
Academic education	32 (17.2)	28 (15)	
Occupation N (%)			
Unemployed	9 (4.8)	2 (1.1)	0.007
Employed	5 (2.7)	-	
Self employed	84 (45.2)	86 (46.2)	
Monthly income N (%)			
< 5000000 IRR	49 (26.3)	27 (14.5)	0.02
5000000 - 15000000 IRR	43 (23.1)	50 (26.9)	
> 15000000 IRR	6 (3.2)	11 (5.9)	
Disease N (%)			
Hepatitis C	76 (40.8)	62 (33.3)	0.27
Hepatitis B	9 (4.9)	2 (1.1)	0.046
Psychiatry disorder	27 (14.6)	19 (10.2)	0.21
Smoker N (%)	72 (38.7)	51 (27.4)	0.026
	Mean ± SD	Mean ± SD	
BMI [†] (Kg/m ²)	22.5 ± 3.8	23.7 ± 4.1	0.04
Duration of HIV infection (Years)	8.9 ± 4.1	7.1 ± 4.1	0.004
Stress	24.3 ± 12.3	20.5 ± 11.2	0.03
Anxiety	16.1 ± 11.4	12.1 ± 9.7	0.01
Depression	19.7 ± 14.4	15.5 ± 11.5	0.03
Violence	49.1 ± 18.7	57.7 ± 7.1	< 0.001

BMI: body mass index

mass index (BMI) of the men was 23 ± 3.9 kg/m². In the HIV-infected men, the mean time of diagnosis and treatment was 8 ± 4.2 and 4.8 ± 2.6 years, respectively, and about two thirds of them were smokers (n = 123, 66.1%) and 18 participants (9.7%) used alcohol.

The information on the disease status of the samples is presented in Table 1. The incidence of comorbidities that could potentially cause sexual dysfunction was low. Four (2.2%) participants were suffering from cardiovascular disease, one person

(0.5%) had hypertension, and one individual (0.5%) had diabetes. In addition, one (0.5%) and 4 (2.2%) of the participants were under treatment with antihypertensive and cardiovascular drugs, respectively.

In the present study, the mean score of the men's total sexual function index was 29.5 ± 8.6 , and 52.7% of the men with HIV infection reported an overall sexual dysfunction (Table 2).

Regarding the univariate analysis, there was a significant difference between the overall sexual function scores of the men with and without sexual dysfunction, in terms of their education levels, occupations, monthly income, BMI, duration of time since HIV diagnosis, smoking, hepatitis B infection, stress, anxiety, depression, and violence (Table 3).

The variables associated with sexual function were used in logistic regression in order for their predicting role to be determined. The multivariate analysis showed that hepatitis B infection ($P = 0.034$, OR = 9.6), smoking ($P = 0.026$, OR = 2.5), severe stress ($P = 0.04$, OR = 0.32), and severe depression ($P = 0.042$, OR = 6.9) were among the predictors of sexual dysfunction.

DISCUSSION

The aim of this study was to determine some predictors of sexual function in HIV-infected men. This study showed a high prevalence of overall sexual dysfunction (57.2%) in the Iranian men with HIV infection. The results of this study are consistent with those of the study by Pinzone et al. in Italy carried out on 109 HIV-infected men indicating 58% of sexual dysfunction (7). The main cause of sexual dysfunction in HIV-infected men could be associated to psychological effects (feeling guilty, depression, anger, and fear of transmission to sexual partner), physical changes (changes in body image), inflammation and atherosclerosis caused by HIV infection (3, 9, 17, 18). Pathophysiology of sexual dysfunction is complex and involves psychological, endocrine and vascular-neural factors (8, 19 - 22). The univariate analysis in this study showed that overall sexual dysfunction had a statistically significant relationship with education level, occupation, income level, BMI, time duration since diagnosis of HIV infection, smoking, hepatitis B infection, stress, anxiety, depression, and violence. However, the multivariate analysis showed that only hepatitis B infection, smoking, severe stress, and severe depression were predictors of overall sexual dysfunction. Several

studies have reported high levels of depression and other psychological states in people with HIV infection (7, 23, 24). The results of this study showed that the overall sexual function score was lower in the subjects with mental disorders such as depression and stress. This observation highlights the effect of psychological factors on sexual health. Shacham et al. showed that HIV-infected men with depression symptoms had a lower overall sexual function than those without symptoms of depression. Several other studies are also in line with the results of the present study (17, 23). Smoking is known as a risk factor for sexual dysfunction even in people without HIV infection, and many studies focused on the impact of nicotine on sexual dysfunction, as the incidence of this problem was higher in smokers compared to non-smokers, which is consistent with the results of our study (25 - 27). The reason for this association could be the atherosclerosis caused by smoking (28, 29). Contrary to the results of the present study, in the study by Bouhrel et al. in Tunisia, there was no significant relationship between smoking and sexual function. This inconsistency in the results could be due to the difference in the amounts of nicotine contained in the cigarettes used by the two societies (24). The results of our study indicated that hepatitis B infection could predict sexual dysfunction. According to the research by Carabez et al. on the assessment of the knowledge and fear of the men with hepatitis B infection, it seems that the reason for such a relationship could be the fear of the risk of HIV transmission from the infected person to his spouse or sexual partner, affecting the sexual function of the HIV-infected men (30).

This study is one of the first studies carried out in Iran to investigate the predictors of sexual function and not only erectile dysfunction in HIV-infected men. In addition, the present study also examined the predictive status of sex hormones such as cortisol, progesterone, sex hormone-binding globulin, dehydroepiandrosterone sulfate, testosterone, follicle-stimulating hormone, luteinizing hormone, thyroid stimulating hormone, thyroxine, and estradiol.

One limitation of this study was the lack of a specific questionnaire for people with human immunodeficiency virus infection to assess stress, depression and anxiety in such individuals.

Another limitation was that this study did not consider a risk prediction model for the estimation of

an absolute risk of all causes of sexual dysfunction in HIV-infected men because a cohort study is ideal for this issue.

CONCLUSION

In conclusion, more than half of the men with HIV infection were suffering from sexual dysfunction. The results of this study showed that in those men, the factors such as smoking, hepatitis B infection, severe depression, and severe stress could predict sexual dysfunction.

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical Statement

The present study protocol was conducted after receiving the Code of Ethics from the National Committee of Ethics in Biomedical Research (Approval ID: IR.SUMS.REC.1397.386). This study was conducted in accordance with the principles of the Declaration of Helsinki.

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Prediktori seksualne disfunkcije kod muškaraca zaraženih HIV-om

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SAŽETAK

Ciljevi. Prevalencija seksualne disfunkcije kod ljudi inficiranih virusom humane imunodefijencije (HIV) veća je nego kod onih bez infekcije. Seksualna disfunkcija kod osoba inficiranih HIV-om povezana je sa negativnim ishodom. Cilj studije bilo je ispitivanje prediktora seksualne disfunkcije kod osoba zaraženih HIV-om.

Materijal i metode. Ova studija preseka urađena je u savetovalištim za bihevioralne bolesti. Uzorci su uzeti od 186 muškaraca zaraženih HIV-om, a uzete su i demografske varijable. Seksualna funkcija i psihološki status procenjivani su primenom upitnika *International Index of Erectile Function*, DASS-21 (skale za procenu depresije, anksioznosti i stresa), kao i upitnika *Domestic Violence*. Za ispitivanje CD4 ćelija i hormonalnih profila uzeti su uzorci krvi od svakog bolesnika. Podaci su analizirani u programu SPSS18.

Rezultati. Multivarijaciona analiza pokazala je da su infekcija hepatitis B virusom ($P = 0,034$; OR = 9,6), pušenje ($P = 0,026$; OR = 2,5), ozbiljan stres ($P = 0,04$; OR = 0,32) kao i teška depresija ($P = 0,042$; OR = 6,9) bili prediktori seksualne disfunkcije kod muškaraca zaraženih HIV-om.

Zaključak. Ova studija pokazala je da pušenje, infekcija hepatitis B virusom, teška depresija, kao i ozbiljan stres mogu biti prediktori seksualne disfunkcije kod ovih muškaraca.

Ključne reči: depresija, erektilna disfunkcija, virus humane imunodefijencije, seksualna disfunkcija, stres