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Aggression and impulsivity in AIDS patients: A comparative analysis with healthy individuals

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Abstract

This study examined and compared levels of aggression and impulsivity in individuals living with HIV/AIDS and healthy individuals. People with HIV face substantial psychological stress, social stigma, and limited social support, which can increase aggressive and impulsive behaviors. Aggression encompasses violent and socially inappropriate behaviors, while impulsivity refers to difficulties in behavioral control, delayed gratification, and appropriate emotional expression. Using a causal-comparative design, 120 HIV-positive individuals and 120 healthy participants from Kerman were recruited through simple random sampling. The Barratt Impulsiveness Scale (BIS-11) and the Impulsive/Premeditated Aggression Scale (IPAS) were employed to assess impulsivity and aggression. Results indicated that the HIV group had a higher mean total aggression score (M = 73.62, SD = 9.02) than the healthy group (M = 67.31, SD = 7.18). Impulsive aggression was 37.25 (SD = 6.24) versus 34.14 (SD = 5.92), and premeditated aggression was 36.37 (SD = 5.88) versus 33.07 (SD = 5.26) in the HIV and healthy groups, respectively. Total impulsivity was also elevated in HIV-positive participants (M = 80.67, SD = 5.82) compared to healthy individuals (M = 64.31, SD = 4.78). Subscales of cognitive, motor, and non-planning impulsivity were higher in the HIV group (26.59, 31.76, and 22.32) than in controls (20.40, 25.91, and 18.01). All differences were statistically significant ($P < 0.01$). These findings indicate that individuals living with HIV exhibit significantly higher aggression and impulsivity across all dimensions, likely influenced by psychological stress, cognitive deficits, and limited social support. The results highlight the need for comprehensive interventions targeting emotional regulation, problem-solving skills, and executive function improvement.

Keywords: Aggression, Impulsivity, HIV/AIDS, Executive Function, Psychological Stress

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Introduction

In modern societies, AIDS is considered one of the major social problems present in almost all countries, and various strategies have been proposed to combat it (1, 2). People living with HIV/AIDS experience substantial psychological pressure and often face difficult mental conditions, making them highly vulnerable (3). Due to negative social attitudes and inappropriate behaviors from society and even close associates, many individuals conceal their illness (4). AIDS is a disease in which physical pain represents only a small portion of the challenges faced by patients, while psychological and social problems constitute a much larger burden(5).

In Iranian society, AIDS is strongly associated with social stigma, particularly stereotypes related to sexual promiscuity (6). Although a large proportion of the population is aware that HIV transmission has multiple causes, these stigmatizing beliefs persist (7). Consequently, individuals living with HIV/AIDS encounter serious social and psychological difficulties, as they are often unable to express their condition openly, unlike patients with other chronic and incurable illnesses such as cancer or multiple sclerosis (8). As a result, they may be deprived of social support and empathy, leading to profound feelings of loneliness and isolation (9). Under such circumstances, it is expected that individuals with HIV/AIDS may exhibit higher levels of aggression and impulsivity compared to healthy individuals (10, 11).

Violence and aggression are complex and multidimensional aspects of human behavior, and simplistic explanations are insufficient (12). Aggression encompasses a wide range of behaviors, including violence, psychological disorders, and criminal acts (13). Severe aggression and violence are among the most persistent global social problems and are recognized as major threats to public health (14). Numerous studies have identified multiple biological, psychological, and social factors contributing to aggressive behavior (15). Understanding the interaction among these factors is essential for predicting aggression and developing effective interventions (16). Previous research has highlighted deficits in problem-solving and emotional regulation as mediating factors between impulsivity and aggression (17, 18).

Impulsivity is a multidimensional construct related to an individual's ability to inhibit or regulate behavior (19). It emerges when mechanisms responsible for controlling normal behavior fail to function effectively (20). Individuals with high impulsivity often have difficulty delaying gratification, experience heightened concern over immediate demands, and struggle to express emotions—particularly sexual emotions and aggression—in socially acceptable ways (21). Impulsivity may occur independently or alongside psychiatric disorders; however, it is frequently a core feature of several mental disorders, including personality disorders, bipolar disorder, and substance use disorders (22). Moreover, impulsivity has been associated with negative emotional states and emotional dysregulation, although it remains unclear whether impulsivity is a cause or a consequence of emotional disorders (23).

Previous empirical studies have reported elevated rates of psychological distress, including anger, hostility, and behavioral dysregulation, among people living with HIV/AIDS compared to the general population (24, 25). Several investigations have suggested that HIV-positive individuals exhibit higher levels of trait impulsivity, particularly in dimensions related to urgency and lack of premeditation, which in turn are associated with risk-taking behaviors such as unsafe sexual practices and substance use (26, 27). Furthermore, research has indicated that neurocognitive impairments related to HIV infection—especially those affecting executive functioning and frontal brain regions—may contribute to reduced behavioral inhibition and increased impulsive responses (28). However, findings across studies are not entirely consistent. While some studies report significantly higher aggression scores among

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HIV-positive individuals, others suggest that aggression is more strongly associated with comorbid conditions such as substance use disorders, depression, or antisocial personality traits rather than HIV status per se (29). Similarly, although impulsivity has frequently been linked to HIV transmission risk behaviors, fewer studies have directly compared impulsivity levels between HIV-positive individuals and matched healthy controls (30).

Based on existing research and the issues discussed, it appears that people living with HIV/AIDS are at a greater risk of psychological problems such as aggression and impulsivity compared to healthy individuals (31, 32). In the case of impulsivity and aggression among people with HIV/AIDS, the disease itself plays a central role and contributes to various social problems, including substance abuse, gambling, and personality-related difficulties (33,34). Negative societal attitudes toward individuals with HIV/AIDS further exacerbate their vulnerability to social harm and mental health problems (35). Therefore, the present study aims to demonstrate that the nature and level of aggression and impulsivity in people living with HIV/AIDS are significantly higher than those observed in healthy individuals. Accordingly, it is essential to systematically examine and compare aggression and impulsivity among people with HIV/AIDS and healthy individuals in the city of Kerman using precise and reliable research methods (36, 37).

Methodology

This 2024 study utilized an ex post facto, descriptive causal-comparative design to examine and compare levels of aggression and impulsivity between individuals living with HIV and healthy individuals.

Statistical Population

The statistical population consisted of people living with HIV/AIDS and healthy individuals residing in Kerman, Iran, in 2024.

Participants in the HIV-positive group were recruited from the Behavioral Diseases Counseling Center affiliated with Kerman University of Medical Sciences, which serves as the main referral center for HIV care and follow-up in the region. A list of registered patients who had active medical records during the study period was obtained after receiving ethical approval and institutional permission. Using this registry as the sampling frame, participants were selected through simple random sampling. HIV status was confirmed based on documented medical diagnosis in clinical records, including positive ELISA and confirmatory Western blot/PCR test results recorded by an infectious disease specialist.

Inclusion criteria for the HIV-positive group were: (1) confirmed HIV diagnosis for at least six months, (2) age between 18 and 60 years, (3) ability to read and write, and (4) willingness to participate in the study. Exclusion criteria included: (1) history of major psychiatric disorders such as psychotic disorders or bipolar I disorder based on medical records, (2) severe cognitive impairment, and (3) current substance intoxication at the time of assessment.

The control group consisted of healthy individuals selected from the general population of Kerman using simple random sampling from community health centers and public service registries. Individuals were matched with the HIV-positive group in terms of age and gender distribution as closely as possible. Inclusion criteria for the control group were: (1) age between 18 and 60 years, (2) no self-reported history of chronic medical illness, including HIV infection, and (3) no history of major psychiatric disorders. Individuals with a history of substance

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dependence or severe neurological disorders were excluded. HIV-negative status in the control group was determined based on self-report and absence of medical records indicating HIV infection.

Since the total number of individuals with HIV in Kerman was not specified, the sample size was determined based on a test power of 0.80, an effect size of 0.50, and a significance level of 0.05. According to Cohen's table, between 110 participants were selected for each group using the simple random sampling method.

Sample Size and Sampling Method

The sample size was determined using the formula for comparing two independent means:

$n = [2 \times (Z\alpha/2 + Z\beta)^2 \times \sigma^2] \div d^2$

Where $Z\alpha/2$ is the critical value for a 5% significance level, $Z\beta$ corresponds to a statistical power of 0.80, σ^2 is the population variance, and d is the expected difference between group means (effect size). Based on this calculation and to ensure sufficient reliability and generalizability, 120 participants were recruited for each group. Participants were selected using a simple random sampling method

Research Instruments

Barratt Impulsiveness Scale (BIS-11)

The eleventh edition of the Barratt Impulsiveness Scale (BIS-11) was developed by Professor Ernest Barratt to assess the multidimensional aspects of impulsivity. It includes 30 items rated on a 4-point Likert scale and measures three subscales: cognitive impulsivity, motor impulsivity, and non-planning impulsivity (disorganization/impulsivity). In addition to the subscale scores, a total impulsivity score is also computed.

Internal consistency of the BIS-11 has been reported as 0.80, 0.82, and 0.83 in samples of offenders, undergraduate students, and psychiatric patients, respectively, indicating good reliability. The scale also demonstrates a strong correlation with the Eysenck Impulsivity Questionnaire (38).

Impulsive/Premeditated Aggression Scale (IPAS)

The IPAS consists of 30 items, asking respondents to recall their behavioral reactions during the previous six months. Each item helps identify whether a person demonstrates impulsive aggression or premeditated (intentional) aggression. Items 1–18 measure impulsive aggression, while items 19–30 assess premeditated aggression. Responses are scored based on the proportion of positively endorsed items ("I completely agree" or "I agree"), except for items 5 and 8, which are reverse-scored. Classification is determined by the higher mean score on one of the two subscales. If the two mean scores are equal, classification is not possible. Principal component analysis with varimax rotation confirmed the presence of two distinct factors: impulsive aggression and premeditated aggression. In this study, prior to full implementation, the IPAS was administered to a pilot group of individuals from the Narcotics Anonymous Forum in Rafsanjan. Cronbach's alpha values of 0.78 (impulsive aggression), 0.82 (premeditated aggression), and 0.80 (total aggression) were obtained. Moreover, a significant correlation (r = 0.75) was found between the IPAS and the Buss–Perry Aggression Questionnaire, further supporting its validity.

Data Analysis

All analyses were conducted using SPSS version 25 .The collected data were analyzed using descriptive and inferential statistical methods. Initially, descriptive statistics including means and standard deviations were calculated for all variables, including total and subscale scores of aggression and impulsivity. To test the assumptions of parametric analyses, Levene's test was conducted to assess the homogeneity of variances for both aggression and impulsivity variables. Homogeneity was confirmed for all measures

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($p > 0.05$). For group comparisons, independent-samples t-tests were employed to examine differences between HIV-positive and healthy participants in total aggression, subtypes of aggression (impulsive and premeditated), total impulsivity, and subscales of impulsivity (cognitive, motor, and non-planning/disorganization). Statistical significance was determined at the 0.01 level.

Results

In this section, the results of the analysis of the data have been provided. First, the descriptive report of information and then the final results obtained then aggression and impulsivity as well as aspects of each in the sample group with AIDS and the normal sample group have been provided.

Table 1 presents the demographic characteristics of the study participants. The HIV-positive and healthy groups each included 120 individuals. The mean age was 36.4 ± 7.8 years in the HIV group and 35.9 ± 8.1 years in the healthy group, with no significant difference between groups ($t = 0.46$, $p = 0.64$). Gender distribution was also similar, with males comprising 60% of the HIV group and 58% of the healthy group ($\chi^2 = 0.11$, $p = 0.74$). Education level, employment status, marital status, and place of residence were evenly distributed across groups, with all comparisons showing non-significant differences ($p > 0.05$).

The mean duration since HIV diagnosis was 5.3 ± 3.1 years for the patient group, while this variable was not applicable to the healthy group. Overall, these results indicate that the HIV-positive and healthy groups were demographically well-matched. This homogeneity ensures that any observed differences in aggression and impulsivity are unlikely to be influenced by baseline sociodemographic factors, thereby supporting the internal validity of the study.

Table 1. Demographic Characteristics of HIV-Positive and Healthy Participants

Variable	HIV Group (n = 120)	Healthy Group (n = 120)	Test Statistic	p-value
Age (years), mean ± SD	36.4 ± 7.8	35.9 ± 8.1	t = 0.46	0.64
Gender, n (%)			$\chi^2 = 0.11$	0.74
- Male	72 (60%)	70 (58%)		
- Female	48 (40%)	50 (42%)		
Education Level, n (%)			$\chi^2 = 0.59$	0.74
- High school or lower	35 (29%)	30 (25%)		
- Diploma/Associate	50 (42%)	55 (46%)		
- Bachelor's or higher	35 (29%)	35 (29%)		
Employment Status, n (%)			$\chi^2 = 0.97$	0.33
- Employed	68 (57%)	75 (63%)		
- Unemployed	52 (43%)	45 (37%)		
Marital Status, n (%)			$\chi^2 = 1.12$	0.57
- Single	42 (35%)	40 (33%)		
- Married	68 (57%)	70 (58%)		
- Divorced/Widowed	10 (8%)	10 (9%)		
Residence, n (%)			$\chi^2 = 0.08$	0.78
- Urban	90 (75%)	88 (73%)		
- Rural	30 (25%)	32 (27%)		
Duration Since HIV Diagnosis (years), mean ± SD	5.3 ± 3.1	N/A	—	—

The results presented in Table 2 show the mean and standard deviation of aggression and its components in the normal and HIV-positive groups. As shown, the mean scores of impulsive aggression were higher in the HIV-positive group (M = 37.25, SD = 6.24) compared to the normal group (M = 34.14, SD = 5.92). Similarly, the mean score of intentional aggression was greater among individuals with HIV (M = 36.37, SD = 5.88)

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than in the normal group (M = 33.07, SD = 5.26). In terms of total aggression, participants with HIV obtained higher mean scores (M = 73.62, SD = 9.02) compared to normal participants (M = 67.31, SD = 7.18). Overall, these findings indicate that individuals with HIV exhibited higher levels of impulsive aggression, intentional aggression, and total aggression than the normal group (Table 2).

Table 2. Mean and standard deviation of scores of aggression and its components in the sample groups

Index / Scale	With HIV		Normal	
	Mean	SD	Mean	SD
Impulsive aggression	37.25	6.24	34.14	5.92
Intentional aggression	36.37	5.88	33.07	5.26
Total aggression	73.62	9.02	67.31	7.18

The results presented in Table 3 show the mean and standard deviation of impulsivity and its dimensions in the normal and HIV-positive groups. As shown, the mean score of cognitive impulsivity was higher in the HIV-positive group (M = 26.59, SD = 3.17) compared to the normal group (M = 20.40, SD = 3.19). Similarly, motor impulsivity was greater among individuals with HIV (M = 31.76, SD = 2.75) than in the normal group (M = 25.91, SD = 3.27). In terms of disorganization impulsivity, participants with HIV obtained higher mean scores (M = 22.32, SD = 3.51) compared to normal participants (M = 18.01, SD = 3.42). Overall, the total impulsivity score was considerably higher in the HIV-positive group (M = 80.67, SD = 5.82) than in the normal group (M = 64.31, SD = 4.78). These findings indicate that individuals with HIV exhibit higher levels of cognitive, motor, and disorganization impulsivity, as well as total impulsivity, compared to healthy individuals (Table 3).

Table 3. Mean and standard deviation of scores of impulsivity and its dimensions in the sample groups

Index / Scale	With HIV		Normal	
	Mean	SD	Mean	SD
Cognitive	26.59	3.17	20.40	3.19
Motion	31.76	2.75	25.91	3.27
Disorganization	22.32	3.51	18.01	3.42
Total	80.67	5.82	64.31	4.78

Based on the Levine test results for investigating the assumption of homogeneity of variances, the value obtained (F = 1.15) in the level higher than (0.05) is significant. Therefore it can be said that a significant difference between the two groups variance does not exist and there is the assumption of homogeneity of variances in the aggression variable. T test results also show that the amount of (t = 7.54) with degree of freedom (df = 38) at the level of (0.01) is meaningful and as a result with 99% certainty we can say that there is a significant difference between aggression of AIDS patients and normal

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sample. According to the obtained result, the hypothesis is confirmed (Table 4).

Table 4. The result of t-test to compare the mean of overall aggression

	Levin test		Independent t-test result		
Index	F	Sig	t	df	Sig
Amount	1.15	0.24	7.54	38	P<0.01

Based on the Levine test results for investigating the assumption of homogeneity of variances, the value obtained (F = 0.97) in the level higher than (0.05) is significant. Therefore it can be said that a significant difference between the two groups variance does not exist and there is the assumption of homogeneity of variances in the impulsivity variable. T test results also show that the amount of (t = 10.12) with degree of freedom (df = 38) at the level of (0.01) is meaningful and as a result with 99% certainty we can say that there is a significant difference between impulsivity of AIDS patients and normal sample. According to the obtained result, the hypothesis is confirmed (Table 5).

Table 5. The result of t-test to compare the mean of overall impulsivity

	Levin test		Independent t-test result		
Index	F	Sig	t	df	Sig
Amount	0.97	0.32	10.12	38	P<0.01

Discussion

The present study aimed to evaluate and compare the nature of impulsivity and aggression in people with AIDS versus a normal sample. The tt-test results indicated a significant difference in aggression levels, confirming the hypothesis. This finding is consistent with previous research (35, 23, 37). Impulsivity is a multi-dimensional trait related to the ability to inhibit or adjust behavior, manifesting when regulatory mechanisms fail. Impulsive individuals struggle with delaying satisfaction, are often preoccupied with immediate demands, and face problems in socially appropriate emotional expression, especially regarding aggression (17).

In people with HIV, both impulsivity and aggression were found to be higher than in the normal population. A two-way relationship between these behaviors and AIDS incidence has been confirmed, although causality remains unclear. Impulsivity is linked to various conditions, including ADHD, antisocial personality disorder, and higher disease risk (39).

Significant differences were also found in impulsivity scores between AIDS patients and the normal sample, confirming the hypothesis. This aligns with findings from (40, 41, and 42). When studying patient populations, deficits in social problem-solving become apparent (43). Research on aggressive youth demonstrates they produce fewer, weaker, and more aggressive solutions to problems, often leading to physical and mental health issues (44). Aggressive patients tend to use less “alternative thinking” and rely more on verbal and physical aggression over non-aggressive controls (45, 42). Some psychologists accept a relationship between impulsivity and aggression, though mediator variables like routine problem-solving ability may be involved. Shure and Spivack (46), pioneers in this area, suggested that improving routine problem-solving skills can reduce impulsivity and maladaptive behavior. Deficits in information processing correlate with aggression (47, 45). Furthermore, chronic illnesses like AIDS may increase aggression risk in individuals already prone to information processing defects (48) .

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The neurobiological underpinning of poor impulse control in HIV is increasingly linked to impairments in Executive Functions (EF). Deficits are consistently observed across key domains such as working memory, planning, and cognitive flexibility, even in patients receiving stable antiretroviral therapy (49, 50). These EF deficits represent a core feature of HAND that directly impacts behavioral regulation (51). Specifically, impaired cognitive flexibility, as evidenced by increased perseverative errors on tasks like the Wisconsin Card Sorting Test (WCST), illustrates an inability to shift away from an established, often aggressive, response pattern when the context demands change (52). This cognitive rigidity (53) means that individuals may remain locked into maladaptive social strategies, failing to generate alternative, non-aggressive solutions to interpersonal conflicts.

The expression of aggression in the context of HIV is significantly modulated by psychosocial variables. High levels of perceived chronic stress and deficiencies in social support systems have been shown to significantly amplify the link between underlying cognitive impulsivity and overt aggressive behavior (54). When the inherent difficulty in inhibiting responses (as suggested by (55) is coupled with poor emotional regulation stemming from the disease burden, the risk for negative behavioral outcomes escalates (56). Furthermore, the high comorbidity rates of mood disorders like depression and anxiety within the HIV population interact complexly with neurocognitive deficits, often leading to pervasive behavioral dysregulation (57). Thus, successful management strategies must move beyond simple symptom control; integrated treatment plans incorporating cognitive remediation alongside emotional regulation training are necessary for sustained improvement (58, 59). Finally, the necessity of accounting for pre-existing factors, such as a history of substance use which independently contributes to both EF decline and aggressive tendencies, must be emphasized in clinical assessment (60).

A limitation of this study stems from the nature of self-reporting questionnaires, where participants may answer favorably (social desirability bias), especially regarding aggression denial. Accessing cooperative AIDS patients was difficult. The results are generalizable only when compared with people with AIDS who have no other physical diseases.

Conclusion

The present study demonstrated that individuals living with HIV/AIDS exhibit significantly higher levels of aggression and impulsivity compared to healthy individuals. Specifically, HIV-positive participants scored higher in total aggression, as well as in both impulsive and premeditated aggression subtypes. Similarly, total impulsivity and all its dimensions—cognitive, motor, and non-planning/disorganization—were elevated in the HIV group. These differences were statistically significant ($P < 0.01$) and cannot be attributed to demographic factors, as the groups were well-matched in age, gender, education, employment, marital status, and residence. The findings suggest that psychological stress, social stigma, reduced social support, and potential neurocognitive deficits associated with HIV contribute to increased impulsive and aggressive behaviors. These results underscore the importance of comprehensive interventions targeting emotional regulation, problem-solving skills, and executive function improvement to mitigate behavioral dysregulation in this population. Overall, this study highlights the critical need for integrating psychological and neurocognitive support into the care of people living with HIV/AIDS to improve both mental health outcomes and social functioning.

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Authors' Contributions

Yalda Rezazadeh Kermani contributed to data collection, literature review, and manuscript drafting. Noshirvan Khezri Moghadam supervised the study, designed the research framework, and critically revised the manuscript. All authors read and approved the final version of the manuscript.

Consent for Publication

This manuscript does not include any personal or identifiable data from participants.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests related to the content of this article.

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