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Aggression and Impulsivity in Different Groups of Alcohol and Heroin Dependent Inpatient Men

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ÖZET:

Yatarak tedavi gören erkek alkol ve eroin bağımlısı iki grupta agresyon ve dürtüsellik

Amaç: Bu çalışmanın amacı alkol ve eroin bağımlılığı olan iki ayrı grupta agresyon ve dürtüselliğin değerlendirilmesidir.
Yöntem: Çalışmaya yatarak tedavi gören ardışık 94 alkol bağımlısı ve 78 eroin bağımlısı erkek hasta ile 63 sağlıklı kontrol alındı. Hastalar ve kontroller Buss-Perry Agresyon Ölçeği ve Barratt Dürtüsellik Ölçeği-11 ile değerlendirildi.
Bulgular: Alkol ve eroin bağımlılarında dürtüsellik ve agresyon düzeyi kontrol grubundan daha yüksek saptandı. Gruplar arasında farklılık göstermeyen tek alt ölçek sözel agresyondu. Agresyon ve dürtüselliğin şiddeti hem alkol bağımlılarını hem de eroin bağımlılarını kontrol grubundan ayırt ediyordu. Agresyon ve dürtüselliğin alt ölçekleri bağımsız değişken olarak alındığında yaş, düşmanlık ve motor dürtüselliğin alkol bağımlılarını; fiziksel agresyon ve planlanmamış dürtüselliğinin eroin bağımlılarını kontrol grubundan ayırt ettiği görüldü. Agresyon ve dürtüsellik düzeyleri alkol ve eroin bağımlılarını birbiriden ayırt etmemekle birlikte alkol ve eroin bağımlılarında agresyon ve dürtüselliğin farklı boyutları kontrol grubundan ayırt ediciydi. Sonuçlar değerlendirilirken çalışma grubunun tedavi arayışındaki erkek hastalardan oluştuğu ve çalışmanın kesitsel yapısının dürtüsellik, agresyon ve bağımlılık arasındaki nedensellik ilişkisinin tanımlanmasını engelleyeceği dikkate alınmalıdır.
Sonuç: Bulgular hem agresyon hem de dürtüselliğin madde bağımlılarının tedavisinde odaklanılması gereken önemli kavramlar olduğunu ve farklı madde bağımlılıklarında farklı alt boyutların dikkate alınması gerektiğini düşündürmektedir.

Anahtar sözcükler: alkol, agresyon, dürtüsellik, eroin

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ABSTRACT:

Aggression and impulsivity in different groups of alcohol and heroin dependent inpatient men

Objective: The aim of this study was to evaluate the aggression and impulsivity in two different groups of men with alcohol or heroin dependency.
Methods: Participants were consecutively admitted male alcohol (n=94) or heroin (n=78) dependent inpatients and healthy controls (n=63). Patients and healthy controls were investigated with the Buss–Perry Aggression Questionnaire and the Barratt Impulsiveness Scale, version 11.
Results: Aggression and impulsivity scores were higher among both the alcohol and the heroin dependent groups than the healthy controls. Verbal aggression was the only subscale, which did not show significant differences between groups. Severity of impulsivity and aggression discriminated both alcohol dependents and heroin dependents from healthy controls. When subscales of aggression and impulsivity were taken as independent variables, current age, hostility and motor impulsiveness discriminated alcohol dependents, whereas physical aggression and non-planning impulsiveness discriminated heroin dependents from healthy controls. Thus, although aggression and impulsivity did not discriminate alcohol and heroin dependents from each other, and both aggression and impulsivity discriminated these groups from healthy controls, different dimensions of aggression and impulsivity discriminated these groups from healthy controls. Our study sample being restricted to male treatment-seeking patients and the cross-sectional nature of the study,, which may interfere with the identification of causal relationships between impulsivity, aggression and substance dependency, must be taken into consideration, when assessing these results.
Conclusion: The results suggest that both aggression and impulsivity are important constructs on which to focus in the treatment of substance dependents, but different dimensions might be the center of attention for patients with different substances of dependence.

Keywords: alcohol, aggression, heroin, impulsivity

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INTRODUCTION

During the last decade, there has been an increasing interest in the role of impulsivity and aggressiveness in substance use disorders (SUD). Impulsivity is a multifaceted construct that can be defined as a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others (1). A growing number of studies have confirmed a strong association between impulsivity and SUD; i.e. the level of impulsivity has been reported to be higher in alcohol (2), heroin (3), cocaine (4) and MDMA (3,4-methylenedioxy-N-methylamphetamine) (5) dependents than in non-substance-using populations.

Individuals who have high levels of impulsivity are at increased risk for substance experimentation, problematic substance use and inability to abstain from substance use (6-8). Additionally, impulsive individuals tend to begin using alcohol (9) and other substances at earlier ages and illicit drug use is more common among them (10). It has also been suggested that substance use might facilitate impulsivity by interfering with normal inhibitory controls (11). Nevertheless, impulsive individuals are more likely to engage in behaviors that can be dangerous to themselves or others, including driving recklessly, starting fights, shoplifting, perpetrating domestic violence and trying to hurt or kill themselves and also they are exposed to a higher risk of lifetime trauma and to substantial physical and psychosocial impairment (12,13). Impulsivity has also been found to be related to craving (14), suggested as a risk factor for relapse during an abstinence period (2,14,15) and may have a negative effect on the treatment outcome of patients with SUD (1,14). Finally recent studies have suggested that impulsivity is associated with suicide attempts (16) and self-injurious behaviors (17).

Aggression has been defined as an overt behavior, which intends to inflict damage on another individual. While aggressive acts are state phenomena, trait aggressiveness refers to a disposition to behave aggressively across various situations and over repeated occasions (18). Aggression levels have been reported to be higher in alcohol (19), heroin (20), cocaine (21) and MDMA (22) dependents than in nonsubstance-using populations. Early aggressive behavior is a predictor of later substance abuse (23,24) and it has been reported that trait aggression predicts the early development and onset of alcoholism (25). It has also been suggested that aggression is related to both acute and prolonged psychopharmacological effects of substances in patients with SUD (26), whereas others have suggested that high aggression levels in SUDs relative to controls were related to personality traits rather than psychopharmacological effects of substances (20). Nevertheless, a higher level of aggression was suggested to be associated with a poor treatment outcome as has been suggested for impulsivity (27). In addition, the association between aggression and craving (28) was explained by means of high levels of impulsivity (21). Finally, aggression has been found to be one of the risk factors for suicide attempts (29) and self-injurious behavior (30,31) in patients with SUD.

Neither impulsivity nor aggression is unidimensional, therefore it is complicated to identify their relationship (32). Some authors point out that impulsivity and aggression are expected to appear together on the phenotypic level, justifying the view that impulsive aggression is a single trait-like dimension (33). Others consider that impulsivity and aggression are two related but separate constructs and impulsivity should be accepted as a high-order phenotype preceding aggressive acts (32,34). In conclusion, there is a general consensus that impulsivity and aggression are closely related constructs but the nature of their relationship remains unclear and further studies are needed to clarify this issue.

Some studies have been conducted to evaluate the relationship of impulsivity and aggression with the preferred drug of abuse. Previous study using discount rates showed that heroin and cocaine abusers were more impulsive than alcoholics and

nonsubstance-using-controls (35). Bácskai et al. (36) have reported that heroin and alcohol dependents were more aggressive than marijuana dependents, but the difference between alcohol and heroin dependents failed to reach statistical significance. Studies have also pointed out that the structure of aggression (36) and impulsivity (37) differed on the dimensional level depending on the type of substance dependence, which may indicate the different psychopharmacological properties and behavioral functions of these substances. Although impulsivity showed no difference between heroin dependents with co-morbid cocaine dependency and without (38), the presence of multiple drug- abuse may also affect the results.

The present study hypothesizes that, although impulsivity and aggression levels are expected to be higher in homogeneous groups of alcohol and heroin dependents than in healthy controls, the dimensions of impulsivity and aggression that are associated with alcohol and heroin dependents may differ. To our knowledge, this is the first study to evaluate these among Turkish male subjects with substance dependency, which is an important phenomenon in clinical settings.

METHODS

Participants

The study was conducted at the Bakirkoy Training and Research Hospital for Psychiatry, Neurology and Neurosurgery, Alcohol and Drug Research, Treatment and Training Center (AMATEM) in Istanbul between February 2011 and July 2011. The study was approved by the local ethical committee. Patients' written informed consent was obtained after the study protocol was thoroughly explained.

Ninety-four consecutively admitted male alcohol-dependent and seventy-eight consecutively admitted male heroin-dependent inpatients according to the DSM-IV diagnostic criteria were considered for participation in the study. Interviews with the study group were conducted after a detoxification period, i.e. 3-4 weeks after the last day of alcohol use and 2-3 weeks after the last day of heroin use. A healthy control group (n=63) was formed with selected male relatives of the patients who attended the general surgery outpatient department.

Instruments

Structured Clinical Interview for DSM-IV (SCID-I): The substance dependence section of the SCID-I (39) was applied to all patients by a psychiatrist, who was experienced with administration of this instrument (C.E.). The Turkish version of the instrument (40) was used in the present study.

Buss–Perry Aggression Questionnaire (AQ): Trait aggression was measured by the total score of the AQ and scores of the subscales including physical aggression, verbal aggression, anger, and hostility (PA, VA, A, H). Evidence for the scale's construct validity is available elsewhere (41). The Turkish version of the AQ, which was used in the present study, has been found to be valid and reliable in substance dependents (42).

The Barratt Impulsiveness Scale, version 11 (BIS-11): The BIS-11 (43) provides a measure of trait-impulsivity. The BIS-11 is a self-report questionnaire that asks participants to rate how often a series of statements applies to them. Cumulative scores range from 30 (low in trait-impulsivity) to 120 (high in trait-impulsivity). The BIS-11 is structured to assess long-term patterns of behavior and has been used to assess trait levels of impulsivity across a variety of populations, including substance-dependent individuals (44-46). The BIS-11 is comprised of three factors: motor (behavior), attentional (cognitive) and non-planning. Evidence for these factors has been found in samples of undergraduates, psychiatric inpatients and adult male prisoners (43). The Turkish version of the BIS, which was used in the present study, has been found to be valid and reliable (47).

Data Analysis

The statistical package SPSS™ 17.0 for Windows™ was used for all the analyses. Categorical variables were compared by means of chi-square statistics. We used a one-way Anova to compare the groups on continuous variables. Forward Logistic regression analyses were conducted when "healthy control / alcohol dependents" and "healthy control / heroin dependents" were dependent variables. In these analyses two models were used. In Model 1 independent variables were current age, severity of impulsivity measured with BIS-11 and aggression measured with AQ, whereas in Model 2 independent variables were current age and subscales of the BIS-11 and AQ. For all statistical analysis p values were considered significant at $p<0.05$.

RESULTS

The mean age of alcohol dependents was higher than the control group, whereas the age of heroin dependents was lower than the control group. The mean duration of education did not differ between groups. Age at first treatment and duration of substance abuse were higher in the alcohol dependent group than the heroin dependent group, whereas age of onset of substance use did not differ between the groups. The rate of being married was higher in the control group, rate of being divorced was higher in the heroin group and rate of being single was higher in the alcohol group. The rate of being employed was higher in the control group, whereas rate of being unemployed was higher in the heroin group and rate of being retired was higher in the alcohol group (Table 1).

Aggression and impulsivity scores were higher among the alcohol and heroin dependent groups than the healthy controls. Verbal aggression was the only subscale, which did not show any difference between groups (Table 2).

Severity of impulsivity and aggression discriminated both alcohol dependents (Table 3) and heroin dependents (Table 4) from healthy controls. Also older age discriminated alcohol dependents from healthy controls (Table 3). When age, subscales of aggression and impulsivity were taken as independent variables, instead of total scores of aggression and impulsivity, hostility and motor impulsiveness discriminated alcohol dependents (Table 3), whereas physical aggression and non-planning impulsiveness discriminated heroin dependents from healthy controls (Table 4).

Table 1: Comparison of sociodemographic variables between groups

	Healthy Control		Alcohol		Heroin				
	n=63	%	n=94	%	n=78	%	F		P
Age (mean±sd)	35.24	11.54	44.04	9.18	31.03	8.80	40.03		<0.001*
Duration of education (mean±sd)	9.59	3.58	9.40	3.49	8.95	2.87	0.72		0.49
Age onset of substance use (mean±sd)	-	-	18.78	5.56	20.19	5.59	t=-1.66		0.10
Age at first treatment (mean±sd)	-	-	39.04	9.73	26.45	7.72	t=9.46		<0.001
Duration of substance abuse (mean±sd)	-	-	25.27	10.06	10.83	8.52	t=10.03		<0.001
							χ^2	df	P
Marital status							35.15	4	<0.001
Married	37	58.7	47	50.0	27	34.6			
Divorced, Widow, Separate	22	34.9	16	17.0	40	51.3			
Single	4	6.3	31	33.0	11	14.1			
Employment status							54.33	6	<0.001
Without employment	13	20.6	24	25.5	40	51.3			
With employment	39	61.9	25	26.6	17	21.8			
Part time	7	11.1	16	17.0	16	20.5			
Retired	4	6.3	29	30.9	5	6.4			

*Alcohol > Control > Heroin

Table 2: Comparison of scale scores between groups

	Healthy Control (n=63)		Alcohol (n=94)		Heroin (n=78)			
Scale scores	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**	**sd**	**F**	**p***
Buss-Perry Aggression Scale	30.56	13.56	44.54	20.72	45.27	19.98	13.39	<0.001
Physical aggression	6.60	4.50	10.29	6.56	12.26	6.70	15.07	<0.001
Verbal aggression	7.24	3.54	8.35	4.10	8.71	3.49	2.84	0.061
Anger	8.18	5.11	11.38	6.57	11.40	6.48	6.24	0.002
Hostility	8.54	5.62	14.52	6.98	12.91	7.47	14.86	<0.001
Barratt Impulsiveness Scale -11	58.81	9.20	69.34	11.03	67.82	10.03	21.78	<0.001
Attentional Impulsiveness	15.32	3.26	17.34	3.73	16.87	3.71	6.18	0.002
Motor Impulsiveness	19.19	4.31	24.07	4.73	22.80	4.44	22.55	<0.001
Non-planning Impulsiveness	24.30	4.75	27.93	4.96	28.15	4.35	14.52	<0.001

*Alcohol and Heroin groups> Control group

Table 3: Discriminators of alcohol dependency from healthy controls in logistic regression forward (Wald) when age, subscales of aggression and impulsivity were independent variables

	B	S.E.	Wald	df	p	Odds Ratio*	95% C.I.for EXP(B)
Model 1 (Nagelkerke R^2=0.53)							
Age	0.130	0.025	26.405	1	<0.001	1.139	(1.084-1.197)
Barratt Impulsiveness Scale -11	0.104	0.025	16.821	1	<0.001	1.110	(1.056-1.167)
Aggression Questionnaire	0.035	0.014	5.829	1	0.016	1.035	(1.007-1.065)
Model 2 (Nagelkerke R^2=0.57)							
Age	0.128	0.025	25.139	1	<0.001	1.136	(1.081-1.194)
Hostility	0.139	0.038	13.777	1	<0.001	1.150	(1.068-1.238)
Motor Impulsiveness	0.225	0.055	16.817	1	<0.001	1.252	(1.125-1.394)

Model 1= Age, total scores of aggression and impulsivity were independent variables
Model 2= Age, subscales of aggression and subscales of impulsivity were independent variables
*Adjusted Odds Ratios for multivariable models

Table 4: Discriminators of heroin dependency from healthy controls in logistic regression when subscales of aggression and impulsivity were independent variables

	B	S.E.	Wald	df	p	Odds Ratio*	95% C.I.for EXP(B)
Model 1 (Nagelkerke R^2=0.29)							
Aggression Questionnaire	0.032	0.013	5.850	1	0.016	1.033	(1.006-1.060)
Barratt Impulsiveness Scale -11	0.071	0.023	9.371	1	0.002	1.073	(1.026-1.123)
Model 2 (Nagelkerke R^2=0.34)							
Physical Aggression	0.149	0.039	14.783	1	<0.001	1.161	(1.076-1.253)
Non-planning Impulsiveness	0.147	0.047	9.818	1	0.002	1.159	(1.057-1.271)

Model 1= Age, total scores of aggression and impulsivity were independent variables
Model 2= Age, subscales of aggression and subscales of impulsivity were independent variables
*Adjusted Odds Ratios for multivariable models

DISCUSSION

Consistent with our hypothesis, severity of impulsivity and aggression were higher among alcohol and heroin dependent groups than healthy controls. Our findings were similar to previous studies showing higher impulsivity scores in alcohol dependents (2) and heroin dependents (38) compared to the general population. Our data also confirmed the literature that has reported higher levels of aggression to be associated with alcohol (19,36) and heroin (20,36) dependence. Verbal aggression (VA) was the only subscale which did not show any difference between groups, which may suggest that the aggression is more acceptable when it is verbally performed in Turkish society as has been reported in some other cultures (48). There seems to be a cultural influence on moral

codes concerning verbal aggressive acts (49) and cultural differences may have played an important role in this finding. Also in a previous study VA was perceived as hostility in Turkish substance dependents (42). Severity of impulsivity and aggression discriminated both alcohol dependents and heroin dependents from healthy controls. Beside the severity of aggression and impulsivity, older age also discriminated alcohol dependents from healthy controls, whereas age was not a discriminator for the heroin group, probably because the mean age of heroin dependents was close to the mean age of controls.

One of the interesting findings of the present study was that although aggression and impulsivity did not discriminate alcohol and heroin dependents from each other, different dimensions of aggression and impulsivity discriminated alcohol dependents (hostility-H and motor impulsivity-MI) and heroin dependents (physical aggression-PA and non-planning impulsivity-NPI) from healthy controls. Different dimensions of impulsivity and aggression may result in a preference for a different kind of substance, and long term abuse of different kinds of substances may have a facilitative effect on different dimensions of these constructs. Some authors have argued that different psychopharmacological properties and behavioral functions of substances contribute to differences in the severity or structure of aggression (36) and impulsivity (35,37). A previous study has reported that heroin and cocaine abusers were more impulsive than alcoholics and normal controls, whereas heroin and cocaine abusers did not differ from one another and alcoholics did not differ from controls (35); in this study sample selection bias for alcohol dependents may have contributed to the similarity between the alcohol dependents and controls. Another study has reported that pure heroin dependents were relatively impulsive on behavioral tasks, and the profile in heroin users was quantitatively similar to the profile observed in a homogeneous group of alcohol dependents (50). Bácskai et al. (36) has reported that heroin and alcohol dependents did not vary in aggression levels but it was argued that the findings might have been altered by the relative heterogeneity of the groups, since the alcohol dependent group was inpatient and the heroin dependent group was outpatient and the gender distribution was unbalanced between the groups. Consistent with these findings, in the present study, which included homogeneous groups of heroin and alcohol dependent male inpatients, aggression and impulsivity levels did not discriminate alcohol and heroin dependents from each other.

In the present study H and MI discriminated alcohol dependents, whereas PA and NPI discriminated heroin dependents from healthy controls. Dimensions of aggression that discriminated the dependent groups were consistent with the previous study, which reported that higher PA and VA were associated with heroin dependency whereas higher H and A were associated with alcohol dependency (36). Taken together with our findings, these data may suggest probable relationships between PA and heroin dependency and between H and alcohol dependency. PA in the community has been found to be more common in men than women and has been reported to be associated with substance abuse (51). In another study a complex association was reported between alcohol use and PA both in inpatient alcohol dependents and the general population. At a lower severity of alcohol use the clinical sample showed a substantially higher severity of PA than the control sample, but at a higher severity of alcohol use the control sample displayed a higher score of PA compared to the clinical sample (52). Among the dimensions of trait aggression, H was found to predict cigarette and marijuana use for females, and later drinking and hard drug use for both genders (24) and marijuana smoking in an epidemiological study (53).

The present study showed that the MI dimension of impulsivity, which can be defined as acting without thinking, on the spur of the moment, with lack of thoughtfulness (54),

discriminated the alcohol dependent group from controls. MI was reported to be a predictor of binge drinking among 293 drinkers in a previous study (55); thus it can be suggested that there is a stronger association between alcohol use disorders and MI rather than other dimensions of BIS. MI with AI also has been shown to most closely explain the high rates of PA found in alcohol-dependent men (56). Elevated MI was also associated with younger age of dependence onset in cocaine dependents (57). Consistent with the previous study (37), the NPI dimension of impulsivity, which can be defined as a tendency to choose a small more immediate reward over a larger more delayed reward and centered on the "present orientation" with a "lack of planning for the future and foresight" (54), discriminated heroin dependents from controls in the present study. In the previous study NPI also predicted marijuana use among heavy drinkers (58). These findings may suggest that NPI is characteristic of drug dependents rather than alcohol dependents. Finally, in a recent study impulsivity was higher both in drug users and in their siblings than controls, whereas while drug users differed from controls on all three subscales of the BIS-11, siblings differed from controls only with respect to NPI (59). This may indicate that NPI exits before drug exposure while the MI and AI components are exacerbated by drug exposure (60).

Previous studies have postulated that impulsivity and aggression were distinct features of certain personality disorders (i.e. cluster B personality disorders) (61,62), which are highly comorbid with SUDs (63). Moeller et al. (45) also pointed out the fact that high impulsivity levels in cocaine dependents was independent from antisocial personality disorder (ASPD), while high aggression levels were related to the presence of ASPD. H was suggested to be an indicator of passive aggressive personality disorder, whereas PA was a significant predictor of ASPD (61). Moreover MI and NPI were reported to be discriminators of borderline personality disorder in this study (61). The similarity between subscales that are indicators of personality disorders in this study and the subscales that discriminated alcohol (H and MI) and heroin (PA and NPI) dependents in the present study is remarkable. One can speculate that the associations between impulsivity and aggression with alcohol and heroin dependency found in the present study may be via personality disorders. Nevertheless, since personality disorders were not investigated in the present study, which may be considered as one of the limitations in the study, it is not possible to comment on this subject.

The present study had several other limitations. First of all, self-reported measures were used to investigate aggression and impulsivity instead of objective behavioral laboratory measures. It has been suggested that impulsivity might directly interfere with the completion of the questionnaires themselves, such that the impulsive subject may give less consideration to responses than the non-impulsive subject. Another limitation was the cross-sectional nature of our study that interfered with the identification of causal relationships between impulsivity, aggression and substance dependency. Other factors that may play a role in this relationship such as childhood trauma or personality disorders, as mentioned before, were not evaluated in the present study. Also all the patients were male and the study group was restricted to a treatment-seeking population; thus it was not possible to generalize the present findings to non-treatment groups. Finally, the cross-sectional design of the present study does not allow the assessment of causality. Nevertheless, at the minimum, these findings suggest that impulsivity and aggression are constructs closely related to alcohol and heroin dependency. Our findings represent a step forward in understanding the relationships between these variables and point out that both aggression and impulsivity are important constructs on which to focus in the treatment of substance dependents, but different dimensions should be center of attention for patients with different substances of dependence.

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