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Tattooing and Its Relationship with Impulsivity in Substance Use Disorder

Madde Kullanım Bozukluğunda Dövme Özellikleri ve Dövmenin Dürtüsellik ile İlişkisi

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ABSTRACT

Objective: To investigate the rate of tattooing, tattoo characteristics, the relationship between tattoo properties, and impulsivity levels in patients with substance use disorder (SUD).

Methods: Four hundred patients with an SUD diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders were included. All the patients were given a sociodemographic data form and the Barratt Impulsivity Scale-11. The sizes of the patients' tattoos were measured at their longest widths and lengths with a precision caliper and recorded in centimeters (cm^2).

Results: Of the 400 patients, 340 (85%) presented primarily for the treatment of opiate use disorder and 60 patients for the treatment of other substance use disorders. The mean age of all the patients was 29.46 $\pm$ 8.80 years, and 379 (94.8%) patients were men and 21 (5.2%) were women. A total of 181 (45.4%) patients had tattoos. The most common tattoo location was the arm (81.77%), the most common tattoo type was text (62.98%), and the most common reason for tattooing was aesthetic concerns (29.83%). No significant relationship was found between the number and size of the tattoo and impulsivity levels. There was no significant difference between the impulsivity levels of patients with and without tattoos. The rate of heroin use, intravenous heroin use, and vascular-transmitted disease were significantly higher in patients with tattoos than in patients without tattoos.

Conclusion: The rate of tattooing was high in patients with substance use disorder, and no relationship between tattoo characteristics and impulsivity level was observed. In patients with tattoos, blood-borne diseases were found to be higher. Thus, we believe that preventive measures might be more important in this patient group.

Keywords: Blood-borne infectious disease, heroin, impulsivity, substance use disorder, tattoo

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ÖZ

Amaç: Madde kullanım bozukluğu (MKB) olan hastalarda dövme oranını, dövme özelliklerini, dövme özellikleri ile dürtüsellik düzeyleri arasındaki ilişkiyi araştırmak amaçlanmıştır.

Yöntemler: DSM-5 tanı kriterlerine göre MKB tanısı alan 400 hasta çalışmaya dahil edildi. Tüm hastalara sosyodemografik veri formu ve Barratt Dürtüsellik Ölçeği-11 verildi. Hastaların dövme çapları en uzun boy ve en uzun en olacak şekilde hassas kumpas ile ölçüldü ve santimetrekare (cm^2) olarak kaydedildi.

Bulgular: 400 hastanın 340'ı (%85) primer olarak opiyat kullanım bozukluğu tedavisi için ve 60 hasta diğer MKB tedavileri için başvurdu. Tüm hastaların yaş ortalaması 29,46 ± 8,80 idi. 379 (%94,8) hasta erkek, 21 (%5,2) hasta kadındı. 181 hastada (%45,4) dövme vardı. En sık dövme yerleşim yeri koldu (%81,77), en sık dövme şekli metin yazısı idi (%62,98) ve dövme yaptırmanın en sık nedeni estetik kaygılardı (%29,83). Dövme sayısı ve çapı ile dürtüsellik düzeyleri arasında anlamlı bir ilişki saptanmadı. Dövmesi olan ve olmayan hastaların dürtüsellik düzeyleri arasında anlamlı fark saptanmadı. Dövmesi olan hastalarda dövmesi olmayan hastalara göre eroin kullanma oranı, intravenöz eroin kullanımı ve damar yolu ile bulaşan hastalık oranı anlamlı düzeyde yüksek idi.

Sonuç: Madde kullanım bozukluğu hastalarında dövme oranlarının yüksek olduğu ve dövme özellikleri ile dürtüsellik düzeyi arasında bir ilişki olmadığı söylenebilir. Dövmeye sahip olan hastalarda kan yoluyla bulaşan hastalık oranları daha fazla olup, bu hasta grubunda koruyucu önlemlere daha fazla önem verilmesi gerektiğini düşünüyoruz.

Anahtar Kelimeler: Dövme, dürtüsellik, eroin, kan yoluyla bulaşan hastalıklar, madde kullanım bozukluğu

INTRODUCTION

Tattooing is the deliberate processing of the skin with special tools that inject color into the skin to draw indelible figures. People have used symbols such as tattoos throughout history as a means of expression and to convey their group membership, beliefs, social status, and mood to others.[1] Tattoos have meanings such as individuality, challenge, love, hate, beauty, fantasies, and freedom.[2] Thus, tattooing is a non-verbal symbol for the person to identify himself in society.

Studies on tattoos have mostly focused on hygiene, infectious diseases, and dermatological problems. Psychiatric studies on tattooing in addicted patients are limited.[3,4] It has been suggested that the rate of tattooing among substance addicts is high, which may indicate the lack of social cohesion and resistance to the rehabilitation process.[5] Today, with the spread and commercialization of tattoos, it is not easy to make inferences regarding its relationship to addiction. Still, one can get some insight into this relationship from the way a tattoo is designed.[6] Indeed, it has been suggested that tattooing can be an indicator of a person's history of drug addiction and that drug use and tattooing are closely related.[4]

Tattooing has also been associated with high-risk behavior.[7] Risk-taking behaviors are likely to be associated with impulsivity, defined as the tendency to act without thinking and considering the results.[8] Impulsivity is suggested to have a strong relationship with tattooing.[9]

In this study, we aimed to investigate the rate of tattooing and its relationship with impulsivity, the motivation for tattooing, and the location and size of tattoos in a large group of patients with substance use disorder (SUD). Therefore, we intended to demonstrate if there was a relationship between tattoos and sociodemographic data and the impulsivity levels of these patients.

METHODS

Study Group

A total of 400 patients with a SUD diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders criteria were enrolled in the study. They were outpatients who were admitted to the Akdeniz University School of Medicine, Alcohol, and Substance Addiction Research and Application Center between the dates of January 15, 2020, and February 15, 2020. The inclusion criteria were being over the age of 18 years, being at least a primary school graduate, and being free of substance effect. Patients who had a history of neurological disease and mental retardation or were under the influence of a substance were not enrolled in the study. The study was approved by the Akdeniz University Faculty of Medicine clinical research ethics committee on January 8, 2020. All the participants gave informed consent before enrollment in the study.

The participants completed a sociodemographic data form and the Barratt Impulsivity Scale-11 (BIS-11). The clinical features of the patients with tattoos were evaluated, and the tattoo size was measured with a Tomax digital caliper (measuring with 0.01 mm precision) in centimeters (cm) at its longest height and widest width. These values were then multiplied to get the square centimeter (cm^2). The sizes of all the tattoos a patient had were measured.

Statistical Analysis

Number and percentage values were used for categorical variables. Mean, standard deviation, minimum, maximum, and median values were used for continuous variables. The Kolmogorov–Smirnov test was used for normality testing. Spearman correlation coefficient was used for the correlation analysis of continuous variables with non-normal distribution. The Mann–Whitney *U* test was used as a non-parametric test for

Table 1. Sociodemographic and Clinical Features of the Patients

	n (400)	%
Sex		
Man	379	94.8
Woman	21	5.2
Marital status		
Single	250	62.5
Married	109	27.3
Divorced	41	10.2
Education		
Primary education	231	57.8
High school	127	31.8
University	42	10.4
Working status (n = 398)		
Working	224	56.3
Unemployed	174	43.7
Smoking		
Yes	388	97.0
No	12	3.0
Alcohol use		
Yes	203	50.7
No	197	49.3
Opiate use disorder		
Yes	340	85.0
No	60	15.0
Opiate use method (n = 339)		
Foil	258	76.1
Intravenous	39	11.5
Two methods together	42	12.4
Other substance use		
Cannabis use	287	71.8
Cocaine use	193	48.3
Stimulating use	208	52.0
Suicide history (n = 399)		
Yes	80	20.1
No	319	79.9
Self-mutilation history (n = 399)		
Yes	128	32.1
No	271	67.9
Forensic case history		
Yes	231	57.8
No	169	42.2
Blood-borne infectious (n = 399) diseases		
Yes	57	14.3
No	342	85.7
	n	**Mean ± SD**
Age (years)	400	29.46 ± 8.80
Body mass index (kg/m^2)	400	22.80 ± 3.83
Monthly earnings ($)	388	330,98 ± 325,18
Monthly substance cost ($)	388	415,13 ± 662,22
Barratt impulsivity scale-11	391	64.32 ± 10.47

comparing numerical data of the two groups. The chi-squared test was used to compare categorical data. Statistical significance was set at $P < .05$. The Statistical Package for the Social Sciences (IBM SPSS Corp., Armonk, NY, USA) version 23.0 statistical software was used for data analyses.

RESULTS

The mean age of the study group was 29.46 ± 8.80, and 379 (94.8%) of the 400 participating patients were male. A total of 440 patients (85%) primarily used opiate, whereas the remaining 60 used some

Table 2. Clinical Features Related to Tattoo

	n (400)	%
Patient with tattoo		
Yes	181	45.25
No	219	54.75
Tattoo location (n = 181)		
Arm	148	81.77
Hand	49	27.07
Shoulder	47	25.97
Back	35	19.34
Chest	31	17.13
Leg	22	12.15
Abdomen	10	5.52
Foot	6	3.31
Face	2	1.10
Other	21	11.60
Tattoo design (n = 181)		
Text	114	62.98
Animal figure	59	32.60
Sun, Moon	35	19.34
Flower	27	14.92
Human picture	20	11.05
Mystical symbol	19	10.50
Skull	13	7.18
Playing cards	13	7.18
Gun	10	5.52
Eye	8	4.42
Religious symbol	5	2.76
Heart	4	2.21
Other	21	11.60
Reason for tattooing (n = 181)		
Because it is aesthetic	54	29.83
Gesture to someone I love	44	24.31
To be accepted socially	41	22.65
No special reason	32	17.68
Expressing my feelings	25	13.81
To rebel against the system	9	4.97
Desire to belong to a group	5	2.76
Other	53	29.28
I got a tattoo when under the influence of drugs (n = 178)		
Yes	60	33.71
No	118	66.29
I regret getting a tattoo (n = 178)		
Yes	83	46.63
No	95	53.37
I will get a new tattoo (n = 178)		
Yes	76	42.70
No	102	57.30
Who made the tattoo? (n = 125)		
Professional tattooist	73	58.40
A non-professional friend	42	33.60
Himself	10	8.00
Was the tattoo made in a sterile environment? (n = 123)		
Yes	67	54.47
No	56	45.53
	cm^2	Mean ± SD
Tattoo diameter	176	330.11 ± 540.20
	year	Mean ± SD
Mean age of first tattooing	177	19.54 ± 4.59
Tattoo number (median)	181	2.00

other substance. None of the patients used any other non-heroin opiates. The average monthly expenditure of the patients for substance ($415.13 ± 662.22) was higher than their average monthly income ($330.98 ± 325.18). Marital status, educational status, employment status, smoking, alcohol and substance use, body mass indices (BMI), impulsivity levels, forensic event, self-mutilation, and history of blood-borne infectious diseases including hepatitis B (HBV), hepatitis C (HCV), and acquired immune deficiency syndrome (HIV) are summarized in Table 1.

Of the 400 patients, 181 (45.4%) had tattoos. The most common tattoo location was the arm (81.77%), and the most common type was text design (62.98%). The most common reason for tattooing was aesthetic concerns (29.83%). Sixty (33.71%) patients reported that they had a tattoo under the influence of the substance; 83 (46.63%) regretted getting a tattoo, and 76 (42.70%) wanted to have a tattoo again. Only 73 (58.40%) patients reported that they had their tattoos drawn by a professional tattooist, and only 67 (54.47%) reported that they had the tattooing process in sterile conditions. The median tattoo number of the patients was 2.00 (min = 1, max = 100), the mean tattoo size was 330.11 ± 540.20 cm^2, and the mean age of first tattooing was 19.54 ± 4.59 years (Table 2).

There was no significant correlation between the impulsivity levels of the patients and number of tattoos (r = 0.019, *P* = .805) or tattoo diameter (r = –0.960, *P* = .210). No relation was found between BMI and tattoo diameter (r = 0.096, *P* = .204) (Table 3).

When the patients with and without tattoos were compared, the ratio of heroin use in patients with tattoos (92.81%) was significantly higher than that in patients without tattoos (78.53%) (*P* < .001). Intravenous (IV) use of heroin was significantly more prevalent in patients with tattoos (14.37%) than in those without tattoos (8.77%) (*P* = .001). There was no difference in the patients with and without tattoos on the basis of their sex (*P* > .05). In patients with tattoos, the rate of infectious diseases (21%) was significantly higher than those without tattoos (8.8%) (*P* = .001). There was no significant difference between the impulsivity levels of patients with (64.69 ± 10.84) and without tattoos (64.00 ± 10.20) (*P* = .521) (Table 4).

The rate of blood-borne infectious diseases in patients with IV heroin use (55.6%, n = 45) was significantly higher than in those without IV heroin use (4.3%, n = 11) (*P* < .05).

DISCUSSION

In this study, a high rate of tattooing was found in patients with SUD. The most common location of the tattoos was the arm, and the most common tattoo type was text design. In addition, the most common tattoo motivation was aesthetic concerns. There was no difference between impulsivity levels in patients with and without tattoos. Both tattoo size and number had no relation to the impulsivity level. Rates of heroin use, IV heroin use, and blood-borne infectious diseases were all higher in patients with tattoos than those without tattoos.

Although there are studies reporting that individuals with tattoos are more likely to have motor impulsivity and risky behaviors, some recent studies suggest that patients with and without tattoos are more similar.[10-12] In their research, Swami et al[13] found that tattooed adults had higher motor impulsivity and were more willing to take risks in entertainment, health, and safety. However, they reported that the effect sizes of these differences were negligible; there was no relationship between tattoos and any variables and that tattooed and non-tattooed adults were quite similar. In our study, the total scores of BIS-11 were similar between patients with and without tattoos, and there was no relationship between impulsivity level

Table 3. Spearman Correlation Coefficients Between Impulsivity, Body Mass Index, Tattoo Diameter, and Tattoo Number

	Tattoo Diameter	Barratt Impulsivity scale-11	Body Mass Index	Tattoo Number	*P*
Tattoo diameter	1.000	–0.134	0.096	**0.559***	**.000***
Barratt impulsivity scale-11		1.000	0.040	0.019	> .05
Body mass index			1.000	0.055	> .05
Tattoo number				1.000	> .05

Bold values are statistically significant.

Table 4. Comparison of Patients With and Without Tattoos

	Patient With Tattoo		Patient Without Tattoo		
	n (181)	%	n (219)	%	*P*
Sex (n = 399)					
Man	172	95.0	206	94.5	> .05*
Woman	9	5.0	12	5.5	
Opiate use disorder (n = 339)					
Yes	168	92.80	171	78.40	**< .001***
No	13	7.20	47	21.60	
Opiate use method (n = 338)					
Foil	113	67.70	144	84.20	**.001***
Intravenous	24	14.40	15	8.80	
Two methods together	30	18.0	12	7.0	
Blood-borne infectious disease (n = 398)					
Yes	38	21.0	19	8.80	**.001***
No	143	79.0	198	91.20	
Barratt impulsivity scale-11 (n = 390) (Mean ± SD)	64.69 ± 10.84		64.00 ± 10.20		> .05**

*Chi-square; **Mann–Whitney *U* test. Bold values are statistically significant.

and the size and number of tattoos. Therefore, we believe that, contrary to what was suggested earlier, tattooing may not be related to impulsivity, but to some other motivating factors which may also lead to higher rates of tattooing in the general population.

The prevalence of tattooing among the citizens of Europe and the United States is about 12% and 24%, respectively.[14] This rate is higher in those with SUDs. In a study with 334 heroin users, 126 (37.7%) of them had tattoos.[15] In another study with 860 adolescents who participated in a substance use reduction program, 245 of the participants had at least 1 tattoo. Cannabis (62%) and alcohol (54%) were the most frequently used substances in this sample.[4] It has been reported that adolescents with at least 1 tattoo or piercing have a significantly higher risk of drug addiction and suicide than their peers.[16] In a study conducted in our country, the most common and striking findings in SUD cases were tattoos. Tattooing rates were 32.7% for bonsai users and 51% for heroin users. The age of first starting substance use was lower in tattooed patients than in those without tattoos. Evaluation of dermatological findings including tattooing is important in detecting SUD and obtaining information about the mental state of the patients.[17] Thus, the high rate (45.4%) of tattooing in our study group seems to be in accordance with the literature.

The upper extremities (fingers, hands, wrist, forearm, and upper arm) are reported as the most common location used for tattooing.[18] Borokhov et al[19] found that 21 (44.7%) of the 41 patients who used substance also had tattoos on their upper extremities, 13 (27.7%) on their lower extremities, 10 (21.3%) on the chest and abdomen, and 3 (6.3%) of the upper part of the back. In our study, in accordance with the literature, the most common tattoo location was the arm region (81.77%).

The most common reason for tattooing reported by the patients in our study was that they had aesthetic concerns (29.83%). In their study in Italy, Quaranta et al[20] found that the main reason for getting a tattoo was aesthetic appearance. Bhargava and Singh[18] reported in a study that a tattoo design could represent the category of substance and could be a symbolic interpretation of the effects of the substance. In a study conducted with postmortem examination, tattoos such as an archangel attacking the devil, Jesus Christ, and a spider web were reported to be tattoo designs related to psychoactive substance abuse.[6] In our study, the most common tattoo design was in the form of text, and a tattoo design associated with a particular substance could not be established. We believe the most frequent aesthetic concern for tattooing the arm could be to cover up some scar or cosmetic problems in that area.

Tattooing has been identified as an independent risk factor for HCV transmission among the prisoners in Australian prisons and as a risk behavior for HIV transmission in prisons in Georgia.[21,22] In our study, 33.71% of the patients reported that they had tattoos in non-sterile conditions, whereas 45.53% were under the influence of the substance. The rate of blood-borne infectious diseases was significantly higher in patients with tattoos than in patients without tattoos. Literature findings show that preventive interventions are required to reduce the risk of HCV transmission through non-sterile tattoo and injection applications.[23] The higher rate of infectious diseases in patients with tattoos underlines the importance of educating substance users who want to get tattooed regarding sterile equipment and preventive training. In our study, the use of IV heroin was found to be significantly higher in patients with tattoos. In a survey conducted in France, tattoo use was more common in those who used the substance by injection.[24] Intravenous substance use is a known risk factor for blood-borne diseases.[25] One study reported that 11.2% of participants had 3 or more tattoos as a potential risk factor for HBV infection. However, HBV exposure has not been associated with multiple tattoos.[26] We think that tattooing, as well as IV substance use, may be a risk factor for infectious diseases, and clinicians need to consider this problem in the management of substance users.

In one study, the majority of substance users had a low-income history,[15] and in our study, the patients' monthly income was well below monthly substance costs. We think that this situation could be correlated to the high crime rate in substance users, and this issue is a significant problem that should be emphasized in terms of public health. Given the limited number of studies in the literature investigating the relevant factors with tattooing in SUDs, our study with a large sample may provide considerable insight into these issues. However, this study also had a few limitations, including being cross-sectional, not being able to explain the relationship between substance types and tattoo styles, excluding psychopathologies that may cause impulsivity, and the majority of the sample being men.

In conclusion, although we found a high rate of tattooing in patients with SUD in our study, there was no relationship between tattoo size and number and impulsivity level. We also found out that patients with SUD got tattooed under non-sterile conditions, and patients with tattoos had higher rates of blood-borne diseases and IV heroin use. We believe that comprehensive and multicenter studies are needed to explain the etiological factors of tattooing and the relationship between infectious diseases and tattooing in patients with SUD.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Akdeniz University (Date: January 8, 2020).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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