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Research / Araştırma

Relationship Between Suicide Attempts and Synthetic Cannabinoids in Adjustment Disorder

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ABSTRACT

Relationship between suicide attempts and synthetic cannabinoids in adjustment disorder

Objective: Although it has been known that adult patients with an adjustment disorder diagnosis do not have suicidal behavior similar to adolescents, the validity of this assertion in particular groups is unknown. This study was designed to determine the prevalence and risk factors associated with suicide in patients with adjustment disorder that resulted in suicide among young men performing compulsory military service.

Method: Of 202 young men with a diagnosis of adjustment disorder, 125 (61.9%) were admitted with adjustment problems and 77 (38.1%) with suicide attempt. Demographic characteristics, substance abuse, psychiatric disorders, suicide attempts, family history of suicide, self-mutilation, and physical and sexual trauma histories of both groups were compared.

Results: Of the patients who attempted suicide, 83.1% (n=64) selected methods unlikely to fail including firearms, hanging, jumping, cutting tools, and burning. Significant differences were found between the two groups (those who attempted suicide versus those who did not) in terms of SC use and self mutilation history. In addition, the use of synthetic cannabinoids was associated with past suicide attempts. But, it is difficult to generalize the results of the study to all patients with adjustment disorder.

Conclusion: These findings may help to predict suicidal behavior in young men showing symptoms of adjustment disorder.

Keywords: Adjustment disorder, cannabinoids, self-mutilation, suicide

ÖZ

Uyum bozukluğunda intihar girişimi ile sentetik kanabinoid kullanımı arasındaki ilişki

Amaç: Uyum bozukluğu tanısı olan erişkin hastaların, adolesanlara benzer şekilde intihar davranışında bulunmadıkları bilinmesine rağmen, bunun özel gruplardaki geçerliliği bilinmemektedir. Bu çalışma, askerlik hizmetini yapmakta olan ve intihar girişimi ile sonuçlanan uyum bozukluğu tanısı olan genç erkek bireylerdeki intiharla ilişkili prevalansı ve risk faktörlerini saptamak için tasarlanmıştır.

Yöntem: Uyum bozukluğu tanısı alan 202 genç erkeğin 125'i (%61.9) uyum sorunları ile, 77'si (%38.1) intihar girişimi ile başvurdu. Her iki grup demografik özellikler, madde kötüye kullanımı, psikiyatrik hastalıklar, intihar girişimleri, ailede intihar öyküsü, kendine zarar verme girişimleri, fiziksel ve cinsel travma öyküleri açısından karşılaştırıldı.

Bulgular: İntihar girişiminde bulunan hastaların %83.1' i (n=64) ateşli silahlar, asma, atlama, kesici aletler ve yanma dahil olmak üzere başarısız olma ihtimali düşük olan yöntemleri seçmişlerdi. İntihar girişiminde bulunan grup ile intihar girişiminde bulunmayan grup kıyaslandığında, sentetik kanabinoid kullanımı ve kendine zarar verme girişimleri açısından istatistiksel olarak anlamlı farklılıklar bulundu. Ayrıca, sentetik kanabinoidlerin kullanımı geçmişteki intihar girişimleri ile de ilişkilendirildi. Ancak, çalışmanın sonuçlarını uyum bozukluğu olan tüm hastalara genellemek zor görünüyor.

Sonuç: Bu bulgular, uyum bozukluğu belirtileri gösteren genç erkeklerde, intihar davranışını öngörmede yol gösterici olabilir.

Anahtar kelimeler: Uyum bozukluğu, kanabinoidler, kendine zarar verme, intihar

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INTRODUCTION

Suicide is the 10th most common cause of death in the world (1). Many different factors play a role in the emergence of suicidal behavior, which is known to have a close relationship with psychiatric disorders. Ninety percent of suicide victims have a mental disorder (2). The risk of suicide in patients with psychiatric disorders is 5-15 times higher than in the general population (3). Therefore, features associated with suicidal behavior in psychiatric disorders have been investigated in several studies (4,5).

Adjustment disorder is characterized by improper responses given to daily life challenges and complex emotional and behavioral pathologies. It is a psychiatric disorder that significantly disrupts functionality (6). The prevalence of adjustment disorder was 1.0% in the general population, 12.0-35.9% among inpatients, and 37.6-40.0% in the military (7). In suicide attempts, 50.0% of patients had adjustment disorder, and adjustment disorder is the most common psychiatric diagnosis in women with recurrent suicide attempts (40.8%) (8). Moreover, the second most common cause of death due to suicide in low- and middle-income communities, after alcohol use, is adjustment disorder (9). In recent years in the UK, adulthood suicide-related deaths due to schizophrenia, personality disorders, and substance abuse diagnosis have decreased. However, deaths due to adjustment disorders and other psychiatric disorders have increased (10).

In adjustment disorder, the time between suicidal ideation and completed suicides was shorter than in other psychiatric disorders (11). Past suicide attempts, a history of psychiatric treatment, poor psychosocial functioning, dysphoria, and psychomotor restlessness have all been identified as risk factors for suicide in adolescents with a diagnosis of adjustment disorder (12). In another study, being young and single and the presence of severe depressive symptoms have also been shown to be risk factors for suicide (13). In addition, substance use was found to be an independent risk factor for suicide attempt in a large-scale follow-up study conducted on adolescents (14). Similarly, it was stated in reviews that chronic use of cannabis can predict suicide and legal sympathomimetic agents create a suicide risk (15,16).

In this study, we determined the risk factors associated with suicide attempts in young men with a diagnosis of adjustment disorder during military service.

METHOD

We enrolled 202 patients admitted to the psychiatric clinic during their military service with a diagnosis of adjustment disorder, made by two psychiatrists according to the DSM-IV-TR criteria. They were followed for three months and were enrolled consecutively. The patients were divided into two groups, one consisting of patients who were admitted with suicide attempts and one without suicide attempts. Sociodemographic data (age, education, marital status), drug use, history of psychiatric diagnoses, suicide attempts and methods, familial suicide attempts and completed suicides history, and self-mutilation as well as physical and sexual trauma history of patients were inquired about on admission. Monthly check-ups were made by different psychiatrists for 3 months. Patients meeting substance dependence criteria on admission and those who did not voluntarily agree to participate in the study were excluded. Patients with psychiatric disorders other than adjustment disorder and substance use disorder were excluded from the study. Patients who were intoxicated due to substance use and who were in the substance withdrawal period were not included in the study.

The trial was performed in accordance with the Declaration of Helsinki and subsequent revisions and approved by an ethics committee (GATA Ethics Committee 09.07.2015/10-343). Written informed consent was obtained from subjects before being admitted to the study.

Statistical Analysis

The data were analyzed with SPSS 15.0. Continuous variables were expressed as mean±standard deviation,

while categorical variables were expressed in numbers and percentages. To compare adjustment disorder patients showing suicidal behavior with those who did not, the Student t test was used for continuous variables and chi-square test for discrete variables. Statistical significance was set at $p<0.05$.

RESULTS

Of the male patients diagnosed with adjustment disorder (n=202), 125 (61.9%) were admitted without suicide attempts and 77 (38.1%) with suicide attempts. Of patients with attempted suicide (n=77), 83.1% (n=64) chose a method that made escape/rescue unlikely (firearms, hanging, jumping, using sharp tools, and burning); 16.9% (n=13) chose a method with a greater chance of escape/rescue (drug overdose). In male patients diagnosed with adjustment disorder, we distinguished two groups – those having attempted suicide and those who did not. There were significant differences in terms of age, years of education, and marital status (Table 1).

While significant differences were found between the two groups (with a previous suicide attempt and without) in terms of self-mutilation and synthetic cannabinoid (SC) use ($p<0.05$), no statistically significant differences were found for history of mental illness, family history of suicide, suicide attempt history, physical/sexual trauma, and substance use (cannabis, ecstasy, heroin, cocaine, volatile solvents, and alcohol) (Table 2).

There was a significant relationship between the use of SC and suicide attempts (Table 3). No statistically significant relationship was found between the suicide attempt and other substances except SC.

DISCUSSION

In this study, the use of SC and the presence of self-mutilation have been associated with suicide attempts in patients diagnosed with adjustment disorder. A relationship between other psychoactive agents (cannabis, ecstasy, heroin, cocaine, volatile solvent, and alcohol) and suicide attempts could not be found. While 16 of 77 adjustment disorder patients (20.8%) who had made suicide attempts had used SC, this rate was 8.8% in cases without suicide attempts. Sixteen out of 27 people who used SC attempted suicide (59.3%). Also, a significant association was found between the use of SC and a history of suicide attempts; 18 of 96 patients with a history of suicide attempts (18.8%) had used SC. This ratio was 8.5% in patients without a history of suicide attempts; 18 of 27 cases using SC (66.7%) have a history of suicide attempts.

SC is a next-generation drug class produced in the laboratory. SC use is on the rise because it is easily available and cheap. However, it has many negative consequences. SCs are shown to trigger psychotic symptoms including paranoia, hallucinations, disorganized behavior, hypomania, and suicidal thoughts among individuals with or without concomitant

Table 1: Comparison of sociodemographic characteristics of patients with adjustment disorder with and without suicide attempts

	Adjustment disorder					
	No suicide attempt n=125		Suicide attempt n=77			
	Mean	SD	Mean	SD	t	p
Age (year)	23.32	5.43	22.38	3.92	1.318	0.189
Education level (year)	6.91	2.93	6.29	3.40	1.356	0.176
	n	%	n	%	χ^2	p
Marital status						
Single	88	70.4	53	68.8	0.056	0.814
Married	37	29.6	24	31.2		

SD: Standard deviation, t: t test value, χ^2: Chi-square value

Table 2: Comparison of clinical characteristics of patients with adjustment disorder with and without suicide attempts

	Adjustment disorder					
	No suicide attempt n=125		Suicide attempt n=77			
	n	%	n	%	χ^2	p
History of psychiatric disease						
No	77	61.6	48	62.3	0.011	0.917
Yes	48	38.4	29	37.7		
Familial suicide history						
No	96	76.8	55	71.4	0.728	0.393
Yes	29	23.2	22	28.6		
Suicide attempt history						
No	67	53.6	39	50.6	0.166	0.683
Yes	58	46.4	38	49.4		
Physical/ sexual trauma history						
No	123	98.4	74	96.1	1.041	0.371
Yes	2	1.6	3	3.9		
Self mutilation history						
No	66	52.8	28	36.3	5.174	0.023*
Yes	59	47.2	49	63.7		
Synthetic cannabinoid use						
No	114	91.2	61	79.2	5.905	0.015*
Yes	11	8.8	16	20.8		
Ecstasy use						
No	117	93.6	71	92.2	0.143	0.705
Yes	8	6.4	6	7.8		
Heroin use						
No	112	89.6	66	85.7	0.687	0.407
Yes	13	10.4	11	14.3		
Cocaine use						
No	122	97.6	76	98.7	0.298	0.585
Yes	3	2.4	1	1.3		
Volatile solvent use						
No	120	96.0	73	94.8	0.160	0.734
Yes	5	4.0	4	5.2		
Alcohol use						
No	115	92.0	75	97.4	2.489	0.137
Yes	10	8.0	2	2.6		
Cannabinoid use						
No	73	58.4	45	58.4	0.001	0.995
Yes	52	41.6	32	41.6		

χ^2: Chi-square value, *: p<0.05

Table 3: Relationship of suicide attempts with synthetic cannabinoid use in adjustment disorder

	Adjustment disorder					
	No suicide attempt n=106		Suicide attempt n=96			
	n	%	n	%	χ^2	p
Synthetic cannabinoid use						
No	97	91.5	78	81.2	4.579	0.032*
Yes	9	8.5	18	18.8		

χ^2: Chi-square value, *: p<0.05

psychiatric disorders. Many chemical agents react with them, and they interact with the cental nervous system (CNS) via endogenous cannabinoid receptors.

There are very few studies in the literature suggesting that there is a relationship between suicidal attempts and the use of SC in adjustment disorder. In addition to a case presentation that discussed suicidal thoughts caused by the use of SC and self-mutilation behavior (17), it was found that 10.8% of patients showed self-mutilative behaviors. In a retrospective study that investigated the acute effects of SC intoxication, 0.8% had attempted suicide or self-mutilation (18). It is not known what type of effect SC use has on long-term suicidal thoughts. Postmortem studies indicate that endocannabinoid levels in the dorsal prefrontal cortex are increased in completed suicides linked to depression and alcoholism. It is not known whether this situation is a result of a compensatory mechanism or a cause of suicide. It is also thought that CB1 receptor sensitivity in the prefrontal cortex can play a role in the pathophysiology of suicide (19). Cannabis use can lead to suicidal behavior associated with disinhibition, and SCs are 4-100 times more potent and long-lasting than cannabis (20). A disinhibition-mediated relationship between SC use and suicide attempts may be present. In a recent study conducted in a large sample in soldiers, disinhibition was found to be a predictor of suicide. Biological research in this area is critical (21).

In this study, the suicide attempt rate in young male patients with a diagnosis of adjustment disorder was 38.1%. In similar studies, suicide rates were 19.7% and 26.8%, respectively, in adjustment disorder (13,22). The rate we found is higher when compared to other studies investigating the suicide rate in adjustment disorder. This may be due to the rapid discharge of patients who have attempted suicide because of the hospital's low capacity for treatment and follow-up. Adjustment disorder patients who did not attempt suicide are mostly treated and followed at local hospitals.

Of the patients who attempted suicide, 83.1% selected methods with a low chance of escape/rescue. This finding suggests that young men with a diagnosis of adjustment disorder largely choose irreversible suicide methods, and they carry strong suicidal intent. Male sex and being adult is known to be decisive in the choice of a more lethal method of suicide (23). When the intensity of suicide intention and the lethality of the method chosen are additive, adjustment disorder in young men can lead to very serious consequences.

In the study, suicide attempts were associated with self-mutilation. In other words, self-mutilation history is an indicator for future suicide attempts. In another study conducted on an adult military population, self-mutilation was a prospective predictor for suicide attempts. Researchers indicated that self-mutilation is an avoidance behavior associated with failure to regulate negative emotions caused by stressful life events. It is a sign of the tendency to develop suicidal behavior (24). Similarly, a strong association between suicide attempts and self-mutilation in a civilian adult population has been found (25).

In this study, a significant relationship between suicide attempt history and current suicide attempt has not been determined. Similarly, Bryan et al. (24) reported that the suicide attempt history in a military sample is not an indicator of subsequent suicide. But if self-mutilation history accompanies previous suicide attempts, it may predict further suicide attempts. On the other hand, a publication studying the risk factors associated with suicide showed that suicide attempt history is a strong predictor for repeated and completed suicides (26). The main reason for this difference might be that the research was done in different communities (military vs. civilian).

The literature states that stressful life events can double alcohol use disorders (27). There is a high substance abuse comorbidity in adjustment disorder (28). On the other hand, it was reported that substance-dependent individuals had a suicide attempt history of 40.0% (29). There was a relationship between suicide attempts and the use of certain substances including alcohol and cannabis (30). In this light, our study examined the relationship between suicide attempts and abuse of different substances. The use of SC has been associated with self-mutilation and suicide attempts.

There are some limitations of our study. First, the study was performed in young men during the period of military service. This makes it difficult to generalize the results of the study to all patients with adjustment disorder. Second, the level of disinhibition was not measured – although this was thought to play a role in suicide. Finally, we did not carry out toxicology assessments for SC and other drugs. This is another limitation of the study.

In summary, this study has shown that self-mutilation history and SC use predict suicide attempts in patients with an adjustment disorder diagnosis during military service, and these patients choose suicide methods that have a small chance of escape/rescue. Although adjustment disorder occurring due to stressful life events generally has a positive prognosis, clinical presentation and outcome in high-risk groups is negative. Therefore, there is a need for new studies that reveal high-risk groups and risk factors for adjustment disorders. Also, the use of SC is gradually increasing, and biological research is needed to illuminate the relationship between these drugs and suicide attempts. The results of such studies may identify biological responses that play a role in the emergence of suicide.

Contribution Categories		Author Initials
Category 1	Concept/Design	T.O., H.O., A.B., S.A., A.A.
	Data acquisition	T.O., S.K., C.C., K.N.O.
	Data analysis/Interpretation	A.B., H.O., T.O., O.U.
Category 2	Drafting manuscript	T.O., H.O., A.B., C.C., O.U.
	Critical revision of manuscript	S.A., A.A., S.K., K.N.O., O.U.
Category 3	Final approval and accountability	T.O., H.O., A.B., S.A., A.A., S.K., C.C., K.N.O., O.U.
Other	Technical or material support	N/A
	Supervision	N/A
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REFERENCES

1. Hawton K, van Heeringen K. Suicide. Lancet 2009; 373:1372-1381. **[CrossRef]**

2. Phillips MR. Rethinking the role of mental illness in suicide. Am J Psychiatry 2010; 167:731-733. **[CrossRef]**

3. Harris EC, Barraclough B. Suicide as an outcome for mental disorders. A meta-analysis. Br J Psychiatry 1997; 170:205-228. **[CrossRef]**

4. Hoertel N, Franco S, Wall MM, Oquendo MA, Kerridge BT, Limosin F, Blanco C. Mental disorders and risk of suicide attempt: a national prospective study. Mol Psychiatry 2015; 20:718-726. **[CrossRef]**

5. Randall JR, Walld R, Finlayson G, Sareen J, Martens PJ, Bolton JM. Acute risk of suicide and suicide attempts associated with recent diagnosis of mental disorders: a population-based, propensity score–matched analysis. Can J Psychiatry 2014; 59:531-538. **[CrossRef]**

6. Sadock BJ, Sadock VA, Ruiz P. Kaplan and Sadock's Synopsis of Psychiatry: Behavioral Sciences/Clinical Psychiatry. Eleventh ed., Philadelphia: Wolters Kluwer, 2014.

7. Oznur T. Clinical and differential diagnosis of adjustment disorder. Turkiye Klinikleri Journal of Psychiatry Special Topics 2015; 8:53-60. (Turkish)

8. Shakeri J, Farnia V, Abdoli N, Akrami MR, Arman F, Shakeri H. The risk of repetition of attempted suicide among Iranian women with psychiatric disorders as quantified by the suicide behaviors questionnaire. Oman Med J 2015; 30:173-180. **[CrossRef]**

9. Manoranjitham SD, Rajkumar AP, Thangadurai P, Prasad J, Jayakaran R, Jacob KS. Risk factors for suicide in rural south India. Br J Psychiatry 2010; 196:26-30. **[CrossRef]**

10. Windfuhr K, Kapur N. Suicide and mental illness: a clinical review of 15 years findings from the UK National Confidential Inquiry into Suicide. Br Med Bull 2011; 100:101-121. **[CrossRef]**

11. Pelkonen M, Marttunen M, Henriksson M, Lonnqvist J. Suicidality in adjustment disorder – clinical characteristics of adolescent outpatients. Eur Child Adolesc Psychiatry 2005; 14:174-180. **[CrossRef]**

12. Pelkonen M, Marttunen M, Henriksson M, Lonnqvist J. Adolescent adjustment disorder: precipitant stressors and distress symptoms of 89 outpatients. Eur Psychiatry 2007; 22:288-295. **[CrossRef]**

13. Casey P, Jabbar F, O'Leary E, Doherty AM. Suicidal behaviours in adjustment disorder and depressive episode. J Affect Disord 2015; 174:441-446. **[CrossRef]**

14. Pumariega AJ, Burakgazi H, Unlu A, Prajapati P, Dalkilic A. Substance abuse: risk factors for Turkish youth. Bulletin of Clinical Psychopharmacology 2014; 24:5-14. **[CrossRef]**

15. Borges G, Bagge CL, Orozco R. A literature review and meta-analyses of cannabis use and suicidality. J Affect Disord 2016; 195:63-74. **[CrossRef]**

16. Gorun G, Dermengiu D, Curca GC, Hostiuc S, Ioan B, Luta V. Toxicological drivers issues in "legal highs" use. Romanian Journal of Legal Medicine 2010; 18:271-278. **[CrossRef]**

17. Thomas S, Bliss S, Malik M. Suicidal ideation and self-harm following K2 use. J Okla State Med Assoc 2012; 105:430-433.

18. Kamijo Y, Takai M, Fujita Y, Hirose Y, Iwasaki Y, Ishihara S, Yokoyama T, Yagi K, Sakamoto T. A multicenter retrospective survey of poisoning after consumption of products containing synthetic chemicals in Japan. Intern Med 2014; 53:2439-2445. **[CrossRef]**

19. Ashton CH, Moore PB. Endocannabinoid system dysfunction in mood and related disorders. Acta Psychiatr Scand 2011; 124:250-261. **[CrossRef]**

20. Rech MA, Donahey E, Cappiello Dziedzic JM, Oh L, Greenhalgh E. New drugs of abuse. Pharmacotherapy 2015; 35:189-197. **[CrossRef]**

21. Venables NC, Sellbom M, Sourander A, Kendlere KS, Joiner TE, Drislanea LE, Sillanmäki L, Elonheimo H, Parkkola K, Multimaki P, Patrick CJ. Separate and interactive contributions of weak inhibitory control and threat sensitivity to prediction of suicide risk. Psychiatry Res 2015; 226:461-466. **[CrossRef]**

22. Bolu A, Doruk A, Ak M, Ozdemir B, Ozgen F. Suicidal behavior in adjustment disorder patients. Dusunen Adam The Journal of Psychiatry and Neurological Sciences 2012; 25:58-62. **[CrossRef]**

23. Mergl R, Koburger N, Heinrichs K, Szekely A, Toth MD, Coyne J, Quintao S, Arensman E, Coffey C, Maxwell M, Varnik A, van Audenhove C, McDaid D, Sarchiapone M, Schmidtke A, Genz A, Gusmao R, Hegerl U. What are reasons for the large gender differences in the lethality of suicidal acts? An Epidemiological analysis in four European countries. PloS one 2015; 10:e0129062. **[CrossRef]**

24. Bryana CJ, Rudda MD, Wertenbergerd E, Young-McCaughone S, Peterson A. Nonsuicidal self-injury as a prospective predictor of suicide attempts in a clinical sample of military personnel. Compr Psychiatry 2015; 59:1-7. **[CrossRef]**

25. Dickstein DP, Puzia ME, Cushman GK, Weissman AB, Wegbreit E, Kim KL, Nock MK, Spirito A. Self-injurious implicit attitudes among adolescent suicide attempters versus those engaged in nonsuicidal self-injury. J Child Psychol Psychiatry 2015; 56:1127-1136. **[CrossRef]**

26. Beghi M, Rosenbaum JF, Cerri C, Cornaggia CM. Risk factors for fatal and nonfatal repetition of suicide attempts: a literature review. Neuropsychiatr Dis Treat 2013; 9:1725-1736.

27. Boden JM, Fergusson DM, Horwood LJ. Associations between exposure to stressful life events and alcohol use disorder in a longitudinal birth cohort studied to age 30. Drug Alcohol Depend 2014; 142:154-160. **[CrossRef]**

28. Carta MG, Balestrieri M, Murru A, Hardoy MC. Adjustment Disorder: epidemiology, diagnosis and treatment. Clin Pract Epidemiol Ment Health 2009; 5:15. **[CrossRef]**

29. Yuodelis-Flores C, Ries RK. Addiction and suicide: a review. Am J Addict 2015; 24:98-104. **[CrossRef]**

30. Artenie AA, Bruneau J, Roy E, Zang G, Lesperance F, Renaud J, Tremblay J, Jutras-Aswad D. Licit and illicit substance use among people who inject drugs and the association with subsequent suicidal attempt. Addiction 2015; 110:1636-1643. **[CrossRef]**