

# The relationship between smoking, alcohol, and substance abuse and psychiatric diseases among adolescents treated in a child and adolescent psychiatry inpatient unit

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## ABSTRACT

**Background.** This study aimed to investigate the prevalence of smoking, alcohol, and substance abuse disorders among adolescents hospitalized in a university hospital child and adolescent psychiatry inpatient unit with different diagnoses, and to determine the rates of these disorders according to the mental illness diagnosis groups.

**Methods.** The study was conducted with 346 adolescents aged 12–18 who had been hospitalized with any psychiatric diagnosis between September 2016 and January 2020 in the child and adolescent psychiatry inpatient unit. The study considered the psychiatric diagnoses, based on the results of the DSM-5-based psychiatric interview; sociodemographic and clinical characteristics; the psychopathology history of first-degree relatives; comorbidities; length of hospital stay; income levels, and smoking, alcohol, and substance abuse.

**Results.** Twenty-four percent (n=83) of the participants had been smoking for 18 months or longer, 6.9% (n=24) were using alcohol, and 1% (n=28) were substance abusers. When the diagnosis distributions were examined, smoking was found to be higher in those with depressive disorders and trauma and related disorders, while smoking, alcohol, and substance use were found to be higher in the disruptive behavior disorder group. Smoking was found to be significantly lower in the obsessive-compulsive disorder group.

**Conclusions.** Smoking, alcohol, and substance use among inpatient children and adolescents may worsen their existing psychopathology, so health professionals working in this field should consider this situation.

**Key words:** smoking, alcohol, substance, adolescent, psychiatry clinic.

Smoking, alcohol, and substance abuse disorders are recognized as important public health problems, and this situation has increased over the years both in our country and globally.<sup>1</sup> One of the most critical periods in the development of a substance use disorder is adolescence,<sup>2</sup> when first contact with addictive substances and harmful usage occur most frequently.<sup>3</sup> In a study investigating the prevalence of smoking and substance abuse among 1235 adolescents in our country, the frequencies for smoking

and use of other addictive substances were found to be 15.8% and 5%, respectively. The rate of smoking was 24.1% in male students and 7.7% in female students, while the rate of use of other addictive substances was 8.2% in male students and 9% in female students. It has been emphasized that harmful behaviors such as smoking and substance abuse were high in adolescents in that study.<sup>4</sup> The high prevalence of those behaviors is worrying because of the potential adverse effects on social, emotional, cognitive, physical, and academic outcomes.<sup>5</sup>

Among the risk factors for smoking, alcohol, and substance abuse in adolescents, individual factors, family and peer influence, and genetic

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and environmental factors are often cited.<sup>3</sup> Many previous studies have shown that alcohol, substance, and cigarette use are higher among psychiatric patients.<sup>6</sup> Adolescents may be more prone to substance abuse if they suffer from disruptive disorders, such as oppositional defiant disorder (ODD), conduct disorder (CD), and attention deficit hyperactivity disorder (ADHD), depression, or another psychiatric disorder.<sup>1</sup> Over half of the young people diagnosed with ADHD also have a substance abuse disorder.<sup>7</sup> In ODD and CD, the child or adolescent may be angry, may be in conflict with authority, may experience exclusion, and may be inclined to make friends with adolescents who exhibit similar behaviors. This situation poses a serious risk for criminal and substance abuse behaviors. In addition, substance abuse has been found to be more frequent in those exposed to trauma and neglect in childhood.<sup>8</sup> According to Karakuş et al.<sup>9</sup> in a study conducted with adult patients hospitalized in a psychiatric clinic, alcohol and substance use ranged between 25% and 75%. In that study, alcohol and substance use disorders were found to occur in 55% of those with psychotic disorders, 61% with mood disorders, and 81% with anxiety disorders.

Smoking, alcohol, and substance abuse disorders in children and adolescents under psychiatric treatment in an inpatient service may adversely affect the disease and treatment process by worsening the existing psychopathology. The failure to treat smoking, alcohol, and substance abuse disorders during or after treatment of the primary disorder may aggravate the disease process, create resistance to treatment, and make the treatment more difficult. For this reason, it is important for physicians to know the relationship between cigarette, alcohol, and substance abuse and psychiatric disorders, especially in adolescents receiving inpatient psychiatric treatment.

Although there are various studies with different methodologies on smoking, alcohol, and substance use disorders among adolescents, the number of these studies is small compared to studies conducted in adults. In addition,

no study has been found in the literature on smoking, alcohol, and substance use disorders among adolescent psychiatric patients treated in the inpatient service. Considering the limitations in the literature on smoking, alcohol, and substance abuse data among child and adolescent psychiatric patients, this study aimed to determine the prevalence of smoking, alcohol, and substance abuse disorders among adolescents hospitalized with different diagnoses in a university hospital child and adolescent psychiatry inpatient unit; it also aimed to determine the rates of these disorders according to the diagnostic group.

### Material and Methods

The study was conducted with adolescents who had been hospitalized with any psychiatric diagnosis between September 2016 and January 2020 in our child and adolescent psychiatry inpatient unit. Patients younger than 12 years of age were excluded from the study. A total of 384 inpatients were reached, and 38 patients with missing data were excluded; thus, files of 346 adolescents aged 12–18 were analyzed retrospectively. The study considered the psychiatric diagnoses, based on the results of the DSM-5-based psychiatric interview; sociodemographic and clinical characteristics; the psychopathology history of first-degree relatives; comorbidities; length of hospital stay; income levels, and smoking, alcohol, and substance abuse. Adolescents who had smoked cigarettes daily for more than 1 year and used alcohol or another substance for at least 2 days a week were defined as the “user group.” Ethical approval was obtained for this study from the Malatya İnönü University Health Sciences Non-Interventional Clinical Research Ethics Committee (Protocol no: 2021/2327, Date: 27.07.2021).

### Statistical Analysis

The SPSS 17.0 (Statistical Program in Social Sciences) package program was used for the statistical analysis. Data on quantitative variables were expressed as mean ( $\bar{x}$ )  $\pm$  standard

deviation (ss), while data on qualitative variables were expressed as numbers and percentages. Pearson and Fisher’s chi-square test was used to evaluate qualitative variables, with  $p < 0.05$  considered statistically significant.

### Results

Two hundred and thirty-two female (67.1%) and 114 male (32.9%) hospitalized adolescent patients were included in this study. The mean age of the participants was  $15.42 \pm 1.38$  years (min-max=12-18). Of the patients, 77.7% (269) lived with nuclear families, 5.2% (18) with extended families, and 17.1% (29) with divided families. The sociodemographic variables are shown in Table I.

Of the participants, 24% (83) used cigarettes, 6.9% (24) used alcohol, and 8.1% (28) had been using substances for more than 1 year.

**Table I.** Sociodemographic characteristics of the participants.

Characteristics	n	%	
Gender	Female	232	67.1
	Male	114	32.9
Family type	Nuclear	269	77.7
	Extended	18	5.2
	Divided	59	17.1
Living with	Family	325	93.9
	Social service	13	3.8
	Relative	8	2.3
Income level	Low	169	48.8
	Middle	124	35.8
	High	10	2.9
Psychopathology in first-degree relatives	Yes	152	43.9
	No	194	56.1
Smoking	Yes	83	24.0
	No	263	76.0
Alcohol use	Yes	24	6.9
	No	322	93.1
Substance abuse	Yes	28	8.1
	No	318	91.9
Age	Mean±SS	Min-Max	
Length of stay (days)	15.42±1.38	12-18	
	25.30±24.32	1-175	

On the basis of the DSM-5-based psychiatric interview, the diagnoses of the participants were as follows: 22.8% (79) schizophrenia and other disorders with psychosis, 34.7% (120) depressive disorder, 21.4% (74) disruptive behavior disorder, 7.5% (26) trauma and related disorder, 7.8% (27) bipolar disorder, 6.1% (21) anxiety disorder, 7.2% (25) eating disorder, 6.1% (21) somatic disorder, 13.0% (45) neurodevelopmental disorder, and 5.5% (20) obsessive-compulsive disorder (OCD) (Table II).

In the analysis made in terms of demographic variables (gender, family type, living with, psychopathology in the family, income levels), no statistically significant difference was found between those who use cigarettes, alcohol, and drugs and those who do not (Table III).

**Table II.** Psychiatric diagnoses received by the participants.

Primary Psychiatric Diagnosis	n	%	
Schizophrenia and related disorders	Yes	79	22.8
	No	267	77.2
Depressive disorder	Yes	120	34.7
	No	226	65.3
Disruptive behavior disorders	Yes	74	21.4
	No	272	78.6
Trauma and related disorders	Yes	26	7.5
	No	320	92.5
Bipolar disorder	Yes	27	7.8
	No	319	92.2
Anxiety disorders	Yes	21	6.1
	No	325	93.9
Eating disorder	Yes	25	7.2
	No	321	92.8
Somatic disorder	Yes	21	6.1
	No	325	93.9
Neurodevelopmental disorders	Yes	45	13.0
	No	301	87.0
Obsessive-compulsive disorder	Yes	20	5.8
	No	326	94.2
Secondary psychiatric diagnosis	Yes	199	57.5
	No	147	42.5

**Table III.** Smoking, alcohol and substance abuse rates regarding demographic values.

Features	Smoking			Alcohol			Substance		
	Yes n (%)	No n (%)	X <sup>2</sup> p	Yes n (%)	No n (%)	X <sup>2</sup> p	Yes n (%)	No n (%)	X <sup>2</sup> p
Gender									
Female	51 (22.0)	181 (78.0)	1.553	14 (6.0)	218 (94.0)	0.887	18 (7.8)	214 (92.2)	0.106
Male	32 (28.1)	82 (71.9)	0.229	10 (8.8)	104 (91.2)	0.372	10 (8.8)	104 (91.2)	0.834
Family type									
Nuclear	66 (24.5)	203 (75.5)	0.199	19 (7.1)	250 (92.9)	0.806	21 (7.8)	248 (92.2)	0.262
Extended	4 (22.2)	14 (77.8)	0.906	2 (11.1)	16 (88.9)	0.668	2 (11.1)	16 (88.9)	0.877
Divided	13 (22.0)	46 (78.0)		3 (5.1)	56 (94.9)		5 (8.5)	54 (91.5)	
Family	80 (24.6)	245 (75.4)		20 (6.2)	305 (93.8)		26 (8)	299 (92)	
Who lives with?									
Relative	2 (25.0)	6 (75.0)	1.968	2 (25.0)	6 (75.0)	5.789	0 (0)	8 (100.0)	1.638
Social service	1 (7.7)	12 (92.3)	0.374	2 (15.4)	11 (84.6)	0.055	2 (15.4)	11 (84.6)	0.441
Psychopathology									
Yes	38 (25.0)	114 (75.0)	0.152	11 (7.2)	141 (92.8)	0.038	10 (6.6)	142 (93.4)	0.835
No	45 (23.2)	149 (76.8)	0.395	13 (6.7)	181 (93.3)	0.504	18 (9.3)	176 (90.7)	0.239
Income level									
Low	36 (21.3)	133 (78.7)	2.425	8 (4.7)	161 (95.3)	1.595	16 (9.5)	153 (90.5)	1.997
Middle	36 (29)	88 (71.0)	0.297	10 (8.1)	114 (91.9)	0.451	9 (7.3)	115 (92.7)	0.368
High	2 (20.0)	8 (80.0)		1 (10.0)	9 (90.0)		2 (20.0)	8 (80.0)	

In terms of psychiatric disorders, smoking, alcohol, and substance abuse were statistically similar for those experiencing schizophrenia, bipolar disorder, anxiety, eating disorders, somatic disorders, and neurodevelopmental disorders. Smoking was found to be significantly higher in those with depressive disorder and with trauma and related disorders (p=0.001, p=0.023). Smoking, alcohol, and substance abuse were found to be significantly higher in those with disruptive, impulse-control, and CDs (p=0.002, p=0.005, p=0.007). In the OCD group, smoking was found to be significantly lower (p=0.040) (Table IV).

### Discussion

In the current study, the prevalence of smoking, alcohol, and substance abuse disorders was investigated by including 346 adolescents between the ages of 12 and 18 who had been hospitalized in a child and adolescent psychiatry inpatient unit, and their smoking, alcohol, and substance abuse was compared according to the diagnosed psychiatric disorder. When the data were analyzed, it was determined that 24% of the participants had used cigarettes, 6.9% had used alcohol, and 8.1% had used other substances for more than 1 year. It was found that smoking was higher in the depressive disorder and the trauma and related disorders group, and that cigarette, alcohol, and substance abuse were higher for disruptive, impulse-control, and conduct disorders. In the OCD group, smoking was found to be significantly lower.

According to the World Health Organization, 24 million adolescents aged 13–15 (17 million boys and 7 million girls) globally were reported to be current cigarette smokers. This averages out at 6.5–9% of boys and 4% of girls in this age group.<sup>10</sup> In a study investigating smoking and substance use among 1235 young people between the ages of 14 and 18 in 2020, the prevalence of smoking was found to be 15.8%, and the frequency of other addictive substances was 5%.<sup>4</sup> Dikeç et al.<sup>11</sup> found that the rate for smoking was 16.2%, alcohol use was 2.8%, and

**Table IV.** Relationship between psychiatric diagnoses and smoking, alcohol and substance abuse of the participants.

Diagnosis	Smoking			Alcohol			Substance			p			
	Yes n (%)	No n (%)	X <sup>2</sup>	p	Yes n (%)	No n (%)	X <sup>2</sup>	p	Yes n (%)		No n (%)	X <sup>2</sup>	p
Schizophrenia and related disorders	Yes	14 (17.7)	65 (82.3)	2.205	0.177	5 (6.3)	74 (93.7)	0.058	0.809	7 (8.9)	72 (91.1)	0.081	0.776
	No	69 (25.8)	198 (74.2)			19 (7.1)	248 (92.9)			21 (7.9)	246 (92.1)		
Depressive disorder	Yes	41 (34.2)	79 (65.8)	10.438	<b>0.001</b>	12 (10.0)	108 (90.0)	2.671	0.102	14 (11.7)	106 (88.3)	3.156	0.076
	No	42 (18.6)	184 (81.4)			12 (5.3)	214 (94.7)			14 (6.2)	212 (93.8)		
Disruptive behavior disorders	Yes	29 (37.2)	49 (62.8)	9.610	<b>0.002</b>	11 (14.1)	67 (85.9)	8.011	<b>0.005</b>	12 (15.4)	66 (84.6)	7.200	<b>0.007</b>
	No	54 (20.1)	214 (79.9)			13 (4.9)	255 (95.1)			16 (6.0)	252 (94.0)		
Trauma and related disorders	Yes	11 (42.3)	15 (57.7)	5.174	<b>0.023</b>	2 (7.7)	24 (92.3)	0.025	0.875	3 (11.5)	23 (88.5)	0.449	0.503
	No	72 (22.5)	248 (77.5)			22 (6.9)	298 (93.1)			25 (7.8)	295 (92.2)		
Bipolar disorder	Yes	4 (14.8)	23 (85.2)	1.352	0.245	1 (3.7)	26 (96.3)	0.474	0.491	2 (7.4)	25 (92.6)	0.018	0.892
	No	79 (24.8)	240 (75.2)			23 (7.2)	296 (92.8)			26 (8.2)	293 (91.8)		
Anxiety disorders	Yes	4 (19.0)	17 (81.0)	0.299	0.584	2 (9.5)	19 (90.5)	0.232	0.630	1 (4.8)	20 (95.2)	0.333	0.564
	No	79 (24.3)	246 (75.7)			22 (6.8)	303 (93.2)			27 (8.3)	298 (91.7)		
Eating disorder	Yes	4 (16.0)	21 (84.0)	0.943	0.331	1 (4.0)	24 (96.0)	0.360	0.549	1 (4.0)	24 (96.0)	0.607	0.436
	No	79 (24.6)	242 (75.4)			23 (7.2)	298 (92.8)			27 (8.4)	294 (91.6)		
Somatic disorder	Yes	3 (14.3)	18 (85.7)	1.154	0.283	0 (0.0)	21 (100.0)	1.666	0.197	1 (4.8)	20 (95.2)	0.333	0.564
	No	80 (24.6)	245 (75.4)			24 (7.4)	301 (92.6)			27 (8.3)	298 (91.7)		
Neurodevelopmental disorders	Yes	8 (17.8)	37 (82.2)	1.094	0.296	2 (4.4)	43 (95.6)	0.498	0.481	1 (2.2)	44 (97.8)	2.397	0.122
	No	75 (24.9)	226 (75.1)			22 (7.3)	279 (92.7)			27 (9.0)	274 (91.0)		
Obsessive-compulsive disorder	Yes	1 (5.0)	19 (95.0)	4.197	<b>0.040</b>	0 (0.0)	20 (100.0)	1.582	0.208	0 (0.0)	20 (100.0)	1.896	0.172
	No	82 (25.2)	244 (74.8)			24 (7.4)	302 (92.6)			28 (8.6)	298 (91.4)		

substance use was 2.8% in adolescents who applied to a child psychiatry outpatient clinic. In the present study, the overall rate for smoking was found to be 24.0%, alcohol was 6.9%, and substance abuse was 8.1%, results higher than in the literature. These results are important in terms of showing that adolescents treated in an inpatient psychiatry clinic have a higher rate of smoking, alcohol, and substance use disorders. These high rates emphasize that it is necessary for clinicians to intervene in smoking, alcohol, and substance use disorders as well as treating the existing psychiatric disease. Our results concern adolescents receiving inpatient treatment, and there is no study in the literature with a similar methodology for comparison of the results. We think that it would be inappropriate to compare the data from this study on the frequency of smoking, alcohol, and substance use with the general population or outpatients in similar age groups. It is known that the frequency of cigarette, alcohol, and substance use is higher in individuals with existing psychiatric disorders than in the general population. In addition, considering that adolescents receiving tertiary health care and inpatient treatment are resistant to treatment, it is to be expected that the frequency of smoking, alcohol, and substance use is higher than in the general population and in patients followed in an outpatient clinic.

Previously, the rates of using addictive substances, both cigarettes and those other than cigarettes, were found to be significantly higher in male students than female students.<sup>4</sup> On the other hand, there are also studies showing that there is no gender difference regarding smoking among adolescents.<sup>12</sup> Smoking, alcohol, and substance abuse were found to be similar in all demographic variables, including gender, which may be related to the study group with existing psychiatric disorders.

The association of psychiatric disorders with smoking, alcohol, and substance use disorders has been increasing in recent years.<sup>6</sup> Although the etiology of this association is not clearly known, it is thought that either a causal relationship or a common etiological factor

underlying both disorders may be responsible. Although information on smoking, alcohol, and substance abuse in psychiatric patients is included in the literature, studies investigating inpatients are limited. In a study investigating alcohol and substance abuse disorders in adult patients hospitalized in a psychiatric clinic in 2012, addiction or abuse problems were found at rates of 57.4% for nicotine, 21.9% for alcohol, and 18% for other substances.<sup>9</sup> In this study, smoking was found to be higher than alcohol and substance abuse, and the data support the literature.

Smoking was found to be higher in patients with a depressive disorder and with trauma and related disorders. In many studies, smoking is high in adolescents with previous depressive symptoms.<sup>13,14</sup> The results of a longitudinal epidemiological study of a population of 10,800 (adolescence to early adulthood) in the USA showed that the link between depressive symptoms and substance abuse was bidirectional. Another study found that higher levels of depression in adolescence were associated with more frequent abuse of psychoactive substances in early adulthood; it emphasized that more frequent substance abuse was also associated with an increase in the intensity of depressive symptoms after a few years.<sup>15,16</sup> In addition, nicotine dependence may be associated with anhedonia in patients with depression, and nicotine may have an effect on the hedonic system.<sup>16</sup>

Previous studies have shown a positive relationship between trauma and related disorders and smoking.<sup>17,18</sup> For example, daily cigarette use and nicotine addiction among people with post-traumatic stress disorder (PTSD) were found to be higher than among those without PTSD.<sup>19</sup> Breslau et al.<sup>20</sup> showed that individuals who had a traumatic event also increased their smoking after the trauma and PTSD symptoms. Yaşan et al.<sup>18</sup> found that the experience of trauma before the age of 16 in a smoker group was twice as high as in a non-smoker group, and this situation was associated with individuals being more

open to experiencing traumatic experiences in developing countries due to family relationships and social gender roles. The higher rate of smoking in trauma-related disorders in our study is also consistent with this literature.

In disruptive, impulse-control, and conduct disorders such as ODD and CD, the child or adolescent may be angry and in conflict with authority, may experience exclusion, and may be inclined to make friends with adolescents displaying similar behaviors. This situation poses a serious risk for delinquency and substance use behavior.<sup>21</sup> Longitudinal studies have found a strong positive relationship between the presence of externalizing behaviors in childhood and subsequent substance use in adolescence.<sup>22</sup> In a study that investigated the clinical characteristics of adolescents who were hospitalized in a child and adolescent substance treatment center, it was found that 80% of the cases had at least one comorbid psychiatric disorder, and of these, 46.3% were diagnosed with a conduct disorder.<sup>23</sup> A meta-analysis showed that individuals with ODD and CD were at high risk for substance-related disorders (the odds ratios were for alcohol: 1.73; for nicotine: 4.22; and for other substances: 4.86). In this study, as in the literature, cigarette, alcohol, and substance use were found to be significantly higher in the disruptive behavior disorder group.<sup>24</sup>

In the present study, smoking was found to be lower in the OCD group than in those without OCD. Although smoking is more common in psychiatric disorders than in the general population, may not apply to OCD. Some studies have shown that individuals with OCD have a significantly lower rate of smoking than the general population.<sup>25,26</sup> There are different opinions regarding the low smoking rate in these patients. Bejerot et al.<sup>27</sup> reported that non-smoking was mostly associated with an obsessive-compulsive personality disorder among individuals with OCD. In addition, these people do not like to take risks and do not exhibit impulsive behaviors related to smoking; it is also suggested that OCD-

specific symptoms, such as fear of starting a fire, harm to the body, and fear of getting sick, can discourage smoking behavior.<sup>28</sup> Otherwise, one of the studies examining the relationship between OCD and smoking in adolescents did not find a significant difference in smoking status among adolescents with OCD, but it was suggested that this may have been due to the small sample size.<sup>29</sup>

In the adult population, smoking, alcohol, and substance use increase in disorders such as psychotic disorders, bipolar disorder, and anxiety disorders.<sup>30-32</sup> However, no difference was found among the groups in this study: the relatively small number of participants and the fact that the study was not a follow-up study may be the reasons for this result.

To the best of our knowledge, this is the first study to investigate the relationship between smoking, alcohol, and substance use and psychiatric disorders in adolescents receiving inpatient treatment in a psychiatry inpatient unit. The relatively large sample size and the inclusion of comorbid psychiatric diagnoses are strengths of our study. However, the fact that it is a retrospective study and that a structured scale was not used when evaluating smoking, alcohol, and substance use can be limitations.

In the current study, smoking was higher in the depressive disorder and the trauma and related disorders groups, and smoking, alcohol, and substance abuse were higher for disruptive, impulse-control, and conduct disorders. It should be kept in mind by health professionals working in this field that smoking, alcohol, and substance use in children and adolescents under psychiatric treatment in an inpatient service may increase their existing psychopathology. For this reason, awareness of the accompanying psychopathologies will contribute to the treatment of primary psychopathologies as well as smoking, alcohol, and substance use. To define the factors related to substance use in adolescents with a psychiatric diagnosis more clearly, studies beyond cross-sectional studies and with larger samples are needed.

## Ethical approval

Ethical approval was obtained for this study from the Malatya Inonu University Health Sciences Non-Interventional Clinical Research Ethics Committee (2021/2327).

## Author contribution

The authors confirm contribution to the paper as follows: study conception and design: AÇD, YED; data collection: AÇD, YED, GK analysis and interpretation of results: AÇD, GK, MEB, GT; draft manuscript preparation: AÇD, YED, ÖÖ. All authors reviewed the results and approved the final version of the manuscript.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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