Araştırma Makalesi *Research Article*

Pamukkale Tıp Dergisi
Pamukkale Medical Journal

doi:https://dx.doi.org/10.31362/patd.644886

Screening of hepatitis and HIV infections in an alcohol and drug addiction treatment center

Alkol ve uyuşturucu madde bağımlıları tedavi merkezinde hepatit ve HIV enfeksiyonlarının taranması

Özgür Dağlı

Gönderilme tarihi: 10.11.2019 Kabul tarihi: 30.12.2019

Abstract

Purpose: Positivity of HBsAg, anti HCV, and anti HIV can expected to be higher in patients treated in an Alcohol and Drug Addiction Treatment Center (ADATC) as they have many risk factors. In this study, screening of these serologic markers in hospitalised patients was aimed.

Material and methods: A total of 434 patients with a history of alcohol, injecting or noninjecting drug abuse who received treatment in Bursa ADATC unit in 2016 were included in the study. Patient's files were retrospectively screened for HBsAg, anti HCV, anti HIV positivity and demographic features.

Results: Of the 434 patients included in the study with a mean age of 31.95±11.42 years. HbsAg and anti HCV positivity were 2.8%, and 1.4% respectively. None of the patients had HIV positivity. 59.2% of the patients had a family history of drug use.

Conclusion: It was found that the prevalence of hepatitis B or hepatitis C was higher in the patients who had begun drug use in 9-12 age range, or in the patients who were homeless, who had no social support and living alone. Screening of these infections in ADATC is important for public health which will provide prevention and treatment of these diseases.

Key words: Addiction, HBV, HCV, HIV.

Dagli O. Screening of hepatitis and HIV infections in an alcohol and drug addiction treatment center. Pam Med J 2020;13:177-186.

Özet

Amaç: HBsAg, anti HCV ve anti HIV pozitifliğinin, bir Alkol ve Uyuşturucu Madde Bağımlıları Tedavi Merkezi'nde (AMATEM) tedavi edilen hastalarda, birçok risk faktörüne sahip olmaları nedeniyle daha yüksek olması beklenebilir. Bu çalışmada, hastanede yatan hastalarda bu serolojik belirteçlerin taranması amaçlandı.

Gereç ve yöntem: Çalışmaya 2016 yılında Bursa AMATEM ünitesinde yatarak tedavi gören alkol, intravenöz veya intravenöz olmayan madde bağımlılığı öyküsü olan toplam 434 hasta dahil edildi. Hasta dosyaları geriye dönük olarak HBsAg, anti HCV, anti HIV pozitifliği ve demografik özellikler açısından tarandı.

Bulgular: Çalışmaya dahil edilen 434 hastanın ortalama yaşları 31,95±11,42 yıl, HbsAg ve anti HCV pozitifliği ise sırasıyla %2,8 ve %1,4 idi. Hastaların hiçbirinde HIV pozitifliği saptanmadı. Hastaların% 59,2'sinde ailede uyuşturucu kullanımı öyküsü vardı.

Sonuç: Hepatit B veya hepatit C prevalansının, 9-12 yaş aralığında madde kullanmaya başlayanlarda veya evsiz, sosyal destek almayan ve yalnız yaşayan hastalarda yüksek olduğu bulundu. Bu enfeksiyonların AMATEM'de taranması halk sağlığı açısından önemli olup bu hastalıkların önlenmesini ve tedavisini sağlayacaktır.

Anahtar kelimeler: Bağımlılık, HBV, HCV, HIV.

Dağlı Ö. Alkol ve uyuşturucu madde bağımlıları tedavi merkezinde hepatit ve HIV enfeksiyonlarının taranması. Pam Tıp Derg 2020;13:177-186.

Introduction

Alcohol and drug addiction is an important risk factor worldwide in terms of carrying diseases. The rates of Hepatitis B virus (HBV), Hepatitis C virüs (HCV) and Human immune deficiency virus (HIV) are higher in the dependent population compared to normal population [1-3]. Hepatitis infections are widespread all over the world. 240 million persons are currently HBV carriers. [1]. The prevalence of HBV varies between 2% and 8% in the moderate endemicity countries including Turkey [5]. With a global prevalence estimated as 2.8% HCV, is a chronic cause of infection and lead to chronic liver diseases such as cirrhosis and hepatocellular carcinoma

Özgür Dağlı, MD. University of Health Sciences, Bursa Yüksek Ihtisas Training and Research Hospital, Department of Infectious Diseases and Clinic Microbiology, Bursa, e-mail: drozgurdagli@yahoo.com (orcid.org/0000-0002-6978-8671) (Corresponding Author)

resulting in mortality. HCV infection, which prevalence reaches 80% among intravenous drug users (IDUs) is more prevalent than HIV infection, and protection against HCV infection should be the major priority for health policy makers [6]. According to the recent study, anti HCV positivity has gradually increased among IDUs who received inpatient treatment in Alcohol and Drug Addiction Treatment Centers (ADATC) and has reached 50.1% [7]. Looking to the distribution of all cases according to the possible modes of transmission the most common mode of HIV transmission is through sexual intercourse but IDU is also an important risk factor. Compared with the other European countries, the rate of IDU for the transmission of HIV is lower in Turkey. The reason for this is that injector sharing is less commonly seen in Turkey compared to the other European countries. [7, 8]. The risk of HBV, HCV, and HIV is known to be high also in persons with alcohol use disorder. Majority of HCV and HIV cases seen in alcohol use are caused by a history of IDU [9]. Impaired nutrition and self-care, and immunosuppression in persons with alcohol and drug use enable these infectious agents to settle and spread in the body [10]. Cocaine, morphine and heroin are known to accelerate intracellular HIV growth [9, 11]. Studies investigating coexisting of these infections among the persons with IDU, Hepatitis C virus was also positive in many persons with positive HIV [12]. Risk evaluation is impaired in persons with alcohol and drug use disorder due to the disruption in cognitive functions and tendency to risky behaviours, seeking excitement and impulsive actions are frequently seen [13]. Reaching to these infected persons is crucial for public health, because HCV can be almost completely treated in the light of newly introduced pharmacotherapies and HBV can be suppressed with longterm use of antivirals [14-16]. Also, there are new treatment strategies for HIV as well [17]. In this study the importance of screening and prevalence of hepatitis B, hepatitis C and HIV infection in patients using alcohol and injecting or noninjecting drugs who received inpatient treatment in Bursa ADATC was investigated.

Material and methods

A total of 434 patients with a history of alcohol, injecting or noninjecting drug use who received inpatient treatment in Bursa ADATC were included in the study. The ethical committee approval was taken. Patients' files were retrospectively screened, and their demographics, histories of the use of alcohol, injecting and noninjecting drugs and the outcomes of HBsAg, anti HCV, and anti HIV studied with ELISA were searched. Prescence of HBsAg positivity or anti HCV positivity with positive HCV RNA value or anti HIV positivity were accepted as infected and Statistical analysis was performed using NCSS (Number Cruncher Statistical System) 2007 (Kaysviller, Utah, USA) software. When evaluating the study data, in addition to descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum); Student t- test was used in the comparison of normally distributed quantitative data between the two groups, and Mann Whitney U test in a comparison of non-normally distributed quantitative data between two groups. Where as the qualitative data were compared using Pearson's Chi-Square test, Fisher-Freeman-Halton test, and Fisher's Exact test. The significance level was set at $p<0.05$.

Results

This study was conducted in Bursa ADATC between 1 January 2016 and 1 January 2017 on 434 patients with 94.5% (n=410) being male, and 5.5% (n=24) female. The ages of the patients varied between 18 and 76 years with a mean age of 31.95±11.42 years. (Table 1). Anti HCV with positive HCV RNA was found in 1.4% (n=6), and injection use in 0.7% (n=3) of the patients. Looking at the first used drug by the patients; 58.5% (n=254) had used cannabis, 5.8% (n=25) synthetic cannabinoids / bonzai, 4.8% (n=21) volatile drugs, and 30.9% (n=134) alcohol. The ages of first use were found as 9-12 years in 13.6% (n=59), 13-15 years in 32.3% (n=140), 16-18 years in 32.5% (n=141), 19-25 years in 15.9% (n=69), and over 25 years in 5.8% (n=25). The ages at first admission to ADATC varied between 18 and 71 years with a mean age of 30.08±11.25 years. 95.8% (n=416) of the patients were not infected; Anti HCV was positive in 1.4% (n=6), and HBsAg was positive in 2.8% (n=12) and 4.2% (n=18) of the patients were infected (Table 2). Prescence of infection did not show statistically significant differences according to patients' age, gender, the city of living, and educational durations ($p>0.05$).

(Table 3). There was no statistically significant difference between infected and noninfected group according to the first used drug (p>0.05). Accordingly; it was noteworthy that rate of infection was higher in persons who started to use in 9-12 age range compared to the persons who started in 16-18 age range. Prescence of infection presented a statistically significant difference in terms of the used drugs (p=0.022, p<0.05). The rate of the infected patients was significantly higher in the persons who used opiates. Prescence of infection showed statistically significant difference according to the total number of hospitalizations in a year (p=0.016, p<0.05). Prescence of infection showed statistically significant difference according to injection use by the patients (p=0.001, p<0.01); the rate of infected patients was higher in the participants who used injection drugs (Table 4), (Figure 1).

Table 1. Sociodemographic and epidemiologic data.

		Total (n=434)	Anti HCV (n=6)	Intravenous use (n=3)
Age (year)	Min-Max (Median)	18-76 (29)	26-47 (31.5)	26-36 (27)
	Mean±SD	31.95±11.42	33.17±8.18	29.67±5.51
Gender	Male	410 (94.5)	6 (100)	3 (100)
	Female	24 (5.5)	0 (0)	0 (0)
City	Bursa	363 (83.6)	4 (66.7)	1 (33.3)
	Out of Bursa	71 (16.4)	2 (33.3)	2 (66.7)
Education	Illiterate	2 (0.5)	0 (0)	0 (0)
	1-5 years	145 (33.4)	0 (0)	0 (0)
	6-10 years	159 (36.6)	2 (33.3)	2 (66.7)
	≥11 years	128 (29.5)	4 (66.7)	1 (33.3)
Marital status	Single	207 (47.7)	2 (33.3)	1 (33.3)
	Married	163 (37.6)	3 (50.0)	1 (33.3)
	Divorced	31 (7.1)	1 (16.7)	1 (33.3)
	Widowed	33 (7.6)	0 (0)	0 (0)
Living with	Family	378 (87.1)	6 (100)	3 (100)
	Alone	42 (9.7)	0 (0)	0 (0)
	Street	7 (1.6)	0 (0)	0 (0)
	Close relatives	7 (1.6)	0 (0)	0 (0)
Income per capita	0-500 TL	238 (54.8)	4 (66.7)	2 (66.7)
	501-1000 TL	122 (28.1)	1 (16.7)	1 (33.3)
	1001-2000 TL	67 (15.4)	1 (16.7)	0 (0)
	≥2000 TL	7 (1.6)	0 (0)	0 (0)

Table 2. Distribution of used drugs, age of start to use and history of drug use.

		Total (n=434)	Anti HCV (n=6)	Intravenous use (n=3)
Anti HCV	No	428 (98.6)	0 (0)	0 (0)
	Yes	6 (1.4)	6 (100)	3 (100)
Injecting use	No	431 (99.3)	3 (50.0)	0 (0)
	Yes	3 (0.7)	3 (50.0)	3 (100)
First used drug	Cannabis	254 (58.5)	4 (66.7)	2 (66.7)
	Synthetic cannabis	25 (5.8)	0 (0)	0 (0)
	Volatiles	21 (4.8)	0 (0)	0 (0)
	Alcohol	134 (30.9)	2 (33.3)	1 (33.3)
Age of start	9-12 years old	59 (13.6)	1 (16.7)	1 (33.3)
	13-15 years old	140 (32.3)	3 (50.0)	1 (33.3)
	16-18 years old	141 (32.5)	1 (16.7)	1 (33.3)
	19 -25 years old	69 (15.9)	0 (0)	0 (0)
	≥ 25 years old	25 (5.8)	1 (16.7)	0 (0)
Drugs used	Multiple substances (synthetic cannabis and methamphetamine)	321 (74.0)	1 (16.7)	0 (0)
	Benzodiazepine	2 (0.5)	0 (0)	0 (0)
	Synthetic cannabinoid	4 (0.9)	0 (0)	0 (0)
	Alcohol	79 (18.2)	1 (16.7)	0 (0)
	Alcohol + multiple drugs	12 (2.8)	0 (0)	0 (0)
	Opiates	16 (3.7)	4 (66.7)	3 (100)
Family history		257 (59.2)	5 (83.3)	2 (66.7)
Age of first admission to AMATEM	Min-Max (Median)	18-71 (27)	25-34 (25)	25-42 (29.5)
	Mean±SD	30.08±11.25	28.00±5.20	31.00±7.13
Reason for starting treatment	Own request	339 (78.1)	5 (83.3)	3 (100)
	Family request	82 (18.9)	1 (16.7)	0 (0)
	Legal or other reasons	13 (3.0)	0 (0)	0 (0)

Table 3. Evaluation of infected and noninfected patients outcomes according to demographic characteristics.

		Infection		*Test value; p*
		Infected (n=18) n (%)	Noninfected(n=416) n (%)	
Age (year)	Min-Max (Median)	19-56 (28,5)	18-76 (29)	*t: 0,736*
Gender	Male	18 (100)	392 (94.2)	χ^2:1.099
	Female	0 (0)	24 (5.8)	[a]*p*:0.613
City	Bursa	16 (88.9)	347 (83.4)	χ^2:0.378
	Out of Bursa	2 (11.1)	69 (16.6)	[a]*p*:0.750
Education	Illiterate	0 (0)	2 (0.5)	χ^2:1.968
	1-5 years	8 (44.4)	137 (32.9)	[b]*p*:0.629
	6-10 years	5 (27.8)	154 (37.0)	
	≥11 years	5 (27.8)	123 (29.6)	
Marital status	Single	8 (44.4)	199 (47.8)	χ^2:0.883
	Married	7 (38.9)	156 (37.5)	[b]*p*:0.889
	Divorced	2 (11.1)	29 (7.0)	
	Widowed	1 (5.6)	32 (7.7)	
Living with	Family	15 (83.3)	363 (87.3)	χ^2:6.544
	Alone	1 (5.6)	41 (9.9)	[b]*p*:0.072
	Street	2 (11.1)	5 (1.2)	
	Close relatives	0 (0)	7 (1.7)	
Income per capita	0-500 TL	12 (66.7)	226 (54.3)	χ^2:0.756
	501-1000 TL	4 (22.2)	118 (28.4)	[b]*p*:0.817
	1001-2000 TL	2 (11.1)	65 (15.6)	
	≥2000 TL	0 (0)	7 (1.7)	

[a]Fisher's Exact Test [b]Fisher-Freeman-Halton Test

[c]Pearson Chi-Square Test [d]Student t Test

Table 4. Evaluation of infected and noninfected patients according to the drug used, age of start to use drugs, and history of using drugs.

		Infection		Test value; *p*
		Infected (n=18)	Noninfected (n=416)	
		n (%)	n (%)	
First used drug	Cannabis	12 (66.7)	242 (58.2)	χ^2:0.925
	Synthetic cannabis	0 (0)	25 (6.0)	[b]*p*:0.797
	Volatiles	1 (5.6)	20 (4.8)	
	Alcohol	5 (27.8)	129 (31.0)	
Age of start	9-12 years old	6 (33.3)	53 (12.7)	χ^2:7.588
	13-15 years old	6 (33.3)	134 (32.2)	[b]*p*:0.076
	16-18 years old	2 (11.1)	139 (33.4)	
	19-25 years old	3 (16.7)	66 (15.9)	
	≥25 years old	1 (5.6)	24 (5.8)	
Drugs used	Multiple drugs	11 (61.1)	310 (74.5)	χ^2:10.365
	Synthetic cannabinoid / Benzodiazepine	0 (0)	6 (1.4)	[b]*p*:0.022*
	Alcohol	3 (16.7)	76 (18.3)	
	Alcohol + multiple drugs	0 (0)	12 (2.9)	
	Opiates	4 (22.2)	12 (2.9)	
Family history	Yes	13 (72.2)	244 (58.7)	χ^2:1.315
	No	5 (27.8)	172 (41.3)	[c]*p*:0.251
Previous hospitalization	Yes	13 (72.2)	175 (42.1)	χ^2:6.390
	No	5 (27.8)	241 (57.9)	[c]*p*:0.011*
Age of first admission to ADATC	Min-Max (Median)	18-56 (27.5)	18-71 (27)	t:0.610
	Mean±SD	31.67±11.24	30.01±11.26	[d]*p*:0.542
Reason for starting treatment	Own request	16 (88.9)	323 (77.6)	χ^2:0.588
	Family request	2 (11.1)	80 (19.2)	[b]*p*:0.739
	Legal or other reasons	0 (0)	13 (3.1)	
History of prison	Yes	4 (22.2)	111 (26.7)	χ^2:0.176
	No	14 (77.8)	305 (73.3)	[a]*p*:0.791
Self-injury behaviour	Yes	8 (44.4)	152 (36.5)	χ^2:0.463
	No	10 (55.6)	264 (63.5)	[c]*p*:0.496
IV use	Yes	3 (16,7)	0 (0)	χ^2: *69,816*
	No	15 (83,3)	416 (100)	

[a]Fisher's Exact Test [b]Fisher-Freeman-Halton Test [c]Pearson Chi-square Test
*[d]Student t Test [e]Mann Whitney U Test **p<0.01 *p<0.05*

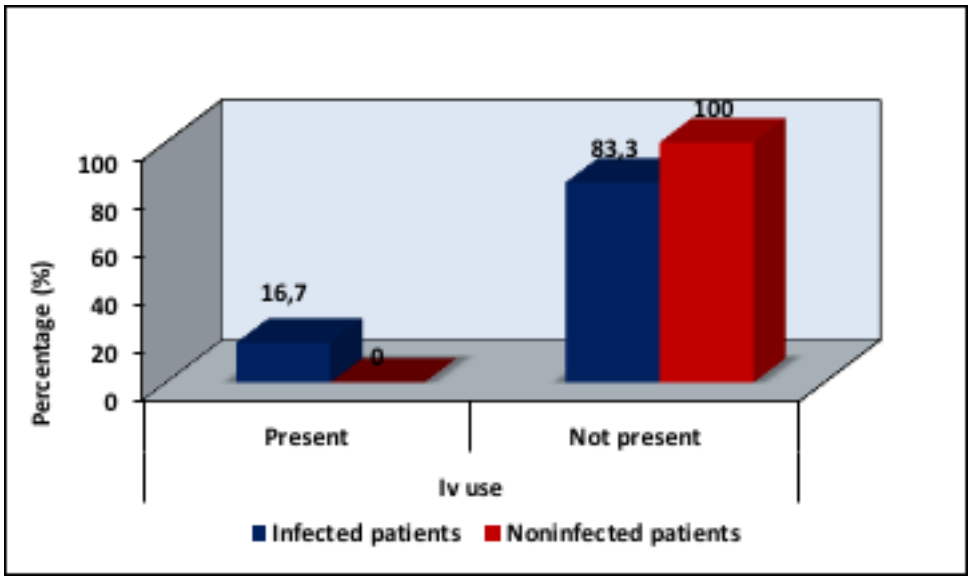

Figure 1. Distribution of infected and noninfected patients according to injecting use.

Discussion

When demographic characteristics of the 434 patients were examined; it can be said that the vast majority were male, young, Bursa residents, and single with middle educational level, middle-low income level persons using cannabis, methamphetamine and alcohol, having a family history of drugs, with a start age drug use between 13 and 18 years. These data seem to be consistent with the results of the other studies performed in our country [18-21]. The use of synthetic cannabis and methamphetamine together can be explained by the increasing use of methamphetamine in recent years [22]. Synthetic cannabis has been on record for many years as an illicit drug commonly seen in our country [23, 24]. In our study anti HCV was positive in 1.4% of the patients and HbsAg positivity was found in 2.8%. These rates are consistent with the other studies from our country [25]. In HCV positive patients the incidence of hepatocellular carcinoma increases with age and especially over 40 age group the rate is 21.6% among males. High levels of HBV viremia at a young age, which mostly affects males, are associated with an increased risk of hepatocellular carcinoma. Therefore early diagnosis and treatment of HCV and HBV infection will be beneficial in drug users [26]. HCV clearance offers a direct strategy to reduce the force of infection and represents an important public health measure to control HCV at a global level. Therefore searching the high risk population in ADACT is important for public health [27]. HIV positivity was not observed in any of our participants. While it is pleasing, HIV positivity is reported as 1.2% in the literature. The incidence of HIV is between 1% and 3.5%, although lower compared to the other countries, the increasing number of cases poses danger [28]. In this study it was found in the analysis that the prevalence of hepatitis B or hepatitis C was higher and close to statistical significance in the patients who had begun substance use in the 9-12 age range, or in the patients who were homeless, had no social support or living alone. Higher rates of Anti HCV and HbsAg positivity in persons who had begun to use drugs in relatively young ages may be explained by the fact that adolescents are uneducated about communicable diseases, and their willingness to take risk is higher than adults [20]. In addition, higher rates of Anti HCV and HbsAg positivity in patients with high number of hospitalization may be attributed to undertreated dependency, incomplete hospitalization, low motivation of treatment, and low capacity to undertake personal responsibilities. Insufficient self-care and personal hygiene in these persons may be associated with their high risk-taking behaviours. Patients with a high number of hospitalization are those who often experience relapses. These patients may be involved in the group with possibilities of occasionally living out of the home, trying different drugs due to close contact with other abusers, self-harming, and trying to use drugs through different ways; resulting in increased risk for carrying infectious diseases. Injecting drug use is known to be

one of the most important factors for the risk of communicable diseases worldwide. In fact, there was anti HCV positivity in all three patients in our clinic who used injecting drugs, or in other words half of the patients with positive anti HCV were those using injecting drugs/opioids. This result is consistent with the literatüre [6]. Opioids are a kind of drugs that need to be emphasized in terms of both posing a risk with injecting use and triggering risky behaviours secondary to dependency potential. In this study, the high rate of infection in opioid users was compatible with the literature [29]. The World Health Organisation have a hepatitis strategy 2016-2021 would be expected to deliver a 70% reduction in HCV incidence by 2030 (50% reduction by 2020) compared with 2010, and 60% reduction in HCV-related deaths by 2030 compared with 2010 [27, 30]. AIDS related deaths is forecasted to come under 200.000 in 2020 by diagnosing 90% of the patients infected by HIV, initiation of the treatment in 90% of the diagnosed patients, and complete suppression of the virus in 90% of the persons whose treatment is initiated, is known as “90-90-90” ratio. The risk of infections can be reduced by awareness-raising activities [30, 31]. In a study from a mental care hospital from our country of the patients 2.7% were HBsAg positive and 1.8% were anti HCV positive which supports our findings [32]. A limitation of the study includes lack of a risky sexual intercourse history in our patients, but the author concluded that lack of the investigating this risk did not affect the results, based on the current prevalence consistent with the literature.

In conclusion, the present study is the largest patient group conducted on this issue in Turkey. In our study anti HCV and HbsAg positivity was found as 1.4% and 2.8% respectively. The prevalence of hepatitis B or hepatitis C was higher and close to statistical significance in the patients who had begun substance use in the 9-12 age range, or in the patients who were homeless, had no social support or living alone. HIV positivity was not observed in any of our participants. Risk evaluation is impaired in persons with alcohol and drug use disorder due to the disruption in cognitive functions and tendency to risky behaviours resulting in high risk of infections. Given that the health recording system is not sufficient in our country, our study is an important source both for the public health, infectious diseases, and psychiatry. Since developments in the treatment of HBV, HCV and HIV are promising, the responsibility of ADATC’s and psychiatrists have increased by screening of these infections towards the target of decreasing deaths and prevent the spread of these diseases which is also important for public health. This study contributes to the literature from this aspect as a guiding study within the context of this information.

Conflict of interest: No conflict of interest was declared by the authors.

References

1. Basu D, Sharma AK, Gupta S, Nebhinani N, Kumar V. Hepatitis C virus (HCV) infection & risk factors for HCV positivity in injecting & non-injecting drug users attending a de-addiction centre in northern India. Indian J Med Res 2015;142:311-316. https://doi.org/10.4103/0971-5916.166596
2. Mutlu EA, Altıntoprak AE, Tokuçoğlu L. Seroprevalence of hepatitits B, hepatitits C, HIV and syphilis infections among non-injecting drug users. Anadolu Psikiyatri Derg 2015;16:65-68. https://doi.org/10.5455/apd.152522
3. Ruiseñor-Escudero H, Wirtz AL, Berry M, et al. Risky behavior and correlates of HIV and Hepatitis C Virus infection among people who inject drugs in three cities in Afghanistan. Drug&Alcohol Dependence 2014;143:127-133. https://doi.org/10.1016/j.drugalcdep.2014.07.022
4. Ott J, Stevens G, Groeger J, Wiersma S. Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. Vaccine 2012;30:2212-2219. https://doi.org/10.1016/j.vaccine.2011.12.116
5. Gurol E, Saban C, Oral O, Cigdem A, Armagan A. Trends in hepatitis B and hepatitis C virus among blood donors over 16 years in Turkey. Eur J Epidemiol 2006;21:299-305. https://doi.org/10.1007/s10654-006-0001-2
6. Evren C, Bilici R, Üçbilek E, İnan D. Türkiye'de damar içi madde kullanan kişilerde hepatit C enfeksiyonunu önlemeye yönelik eylem çağrısı. Dusunen Adam 2017;30:271-277. https://doi.org/10.5350/dajpn20173004001
7. Alaei A, Alaei K, Waye K, et al. Hepatitis C infection and other drug-related harms among inpatients who injected drugs in Turkey. J Viral Hepat 2017;24:496-505. https://doi.org/10.1111/jvh.12662
8. Mutlu E, Alaei A, Tracy M, Waye K, Cetin MK, Alaei K. Correlates of injection drug use among individuals admitted to public and private drug treatment facilities in Turkey. Drug&Alcohol Dependence 2016;164:71-81. https://doi.org/10.1016/j.drugalcdep.2016.04.032

9. Fuster D, Sanvisens A, Bolao F, Rivas I, Tor J, Muga R. Alcohol use disorder and its impact on chronic hepatitis C virus and human immunodeficiency virus infections. World J Hepatol 2016;8:1295. https://doi.org/10.4254/wjh.v8.i31.1295
10. Singal AK, Anand BS. Mechanisms of synergy between alcohol and hepatitis C virus. J Clin Gastroenterol 2007;41:761-772. https://doi.org/10.1097/mcg.0b013e3180381584
11. Nolan S, Walley AY, Heeren TC, et al. HIV-infected individuals who use alcohol and other drugs and virologic suppression. AIDS care 2017;29:1129-1136. https://doi.org/10.1080/09540121.2017.1327646
12. Mirsal H, Kalyoncu A, Pektas O, Tan D, Beyazyurek M. The prevalance of hepatitis B, C and HIV seropositivity among iv heroin users. J Depend 2003;4:10-14.
13. Cicek IE, Cicek E, Kayhan F, et al. The roles of BDNF, S100B, and oxidative stress in interferon-induced depression and the effect of antidepressant treatment in patients with chronic viral hepatitis: a prospective study. J Psychosom Res 2014;76:227-232. https://doi.org/10.1016/j.jpsychores.2014.01.003
14. Tang LS, Covert E, Wilson E, Kottilil S. Chronic hepatitis B infection: a review. Jama 2018;319:1802-1813. https://doi.org/10.1001/jama.2018.3795
15. Sterling RK, Dharel N. Treatment of hepatitis C, then, now and tomorrow. BMJ Evidence-Based Medicine 2015;20:23-23. https://doi.org/10.1136/ebmed-2014-110103
16. Kohli A, Shaffer A, Sherman A, Kottilil S. Treatment of hepatitis C: a systematic review. Jama 2014;312:631-640. https://doi.org/10.1001/jama.2014.7085
17. Gu W-G. Newly approved integrase inhibitors for clinical treatment of AIDS. Biomedicine&Pharmacotherapy 2014;68:917-921. https://doi.org/10.1016/j.biopha.2014.09.013
18. Aktaş EÖ, Koçak A, Şenol E, ve ark. Ege Bölgesinde ele geçirilen narkotik maddeler ve madde bağımlılarının incelenmesi. Turkiye Klinikleri Journal of Forensic Medicine and Forensic Sciences 2006;3:13-24.
19. Avşar G, Koç F, Aslan G. Madde bağımlısı hastalarda sosyal destek ve benlik saygısı ACU Sağlık Bil Derg 2016:44-49.
20. Yüncü Z, Basay BK, Özbaran B, Aydin C, Tamar M. Madde kullanım bozukluğu olan ergenlerde HBV: yaygınlık, riskler, asilama/Hepatitis B virus among adolescents with substance use disorder: prevalence, risks, vaccinization. Anadolu Psikiyatri Dergisi 2008;9:208.
21. Yüncü Z, Saatçioğlu H, Aydın C, Özbaran B, Altıntoprak E, Köse S. Bir şehir efsanesi: madde kullanmaya başlama yaşı düşüyor mu?. Literatür Sempozyum 2014;1:43-50.
22. Karakukcu C, Ciraci MZ, Kocer D, Erturk Zararsiz G, Reyhancan M, Altintop I. Regional drug abuse prevalence depending on laboratory based urine illicit drug screening results. Anadolu Psikiyatri Derg 2018;19:169-176. https://doi.org/10.5455/apd.264474
23. Tekin K. Gençlere yönelik güncel tehdit: bonzai bağımlılığı. Turkiye Klinikleri Journal of Psychiatric Nursing-Special Topics 2015;1:1-5.
24. Karaaziz M, Keskindağ B. Gençler arasındaki popüler psikoaktif madde; sentetik kannabinoid (bonzai): bir gözden geçirme. Klinik Psikiyatri Dergisi 2016;19:137-144. https://doi.org/10.5505/kpd.2016.03522
25. Tozun N, Ozdogan O, Cakaloglu Y, et al. Seroprevalence of hepatitis B and C virus infections and risk factors in Turkey: a fieldwork TURHEP study. Clin Microbiol Infect 2015;21:1020-1026. https://doi.org/10.1016/j.cmi.2015.06.028
26. Stasi C, Silvestri C, Voller F, Cipriani F. The epidemiological changes of HCV and HBV infections in the era of new antiviral therapies and the anti-HBV vaccine. J Infect Public Health 2016;9:389-395. https://doi.org/10.1016/j.jiph.2015.05.004
27. Lanini S, Easterbrook PJ, Zumla A, Ippolito G. Hepatitis C: global epidemiology and strategies for control. Clin Microbiol Infect 2016;22:833-838. https://doi.org/10.1016/j.cmi.2016.07.035
28. Gökengin D. Türkiye'de HIV infeksiyonu: hedefe ne kadar yakınız? Klimik Dergisi 2018;31:4-10. https://doi.org/10.5152/kd.2018.04
29. Kandemir Ö, Gültekin O. Kronik hepatit C enfeksiyonlu damar içi uyusturucu madde kullanıcılarında hepatit C virüs genotiplerinin dağılımı/distribution of hepatitis C virus genotypes in injection drug users with chronic hepatitis C. Türkiye Klinikleri Tıp Bilimleri Dergisi 2017;37:21. https://doi.org/10.5336/medsci.2016-54118
30. Duffell EF, Hedrich D, Mardh O, Mozalevskis A. Towards elimination of hepatitis B and C in european union and european economic area countries: monitoring the World Health Organization's global health sector strategy core indicators and scaling up key interventions. Euro Surveill 2017;22:30476. https://doi.org/10.2807/1560-7917.es.2017.22.9.30476
31. Dayan S, Tekin A, Tekin R, et al. HBsAg, anti-HCV, anti-HIV 1/2 and syphilis seroprevalence in healthy volunteer blood donors in the southeastern anatolia: evaluation of eleven years. J Infect Dev Ctries 2013;7:665-669. https://doi.org/10.3855/jidc.2835
32. Sezak N, Tosun S, Eriş N, Ayer A. Ruh Sağlığı Hastanesinde yatarak tedavi gören hastalarda hepatit B ve hepatit C infeksiyonlarinin sıklığı ve buna etkili faktörlerin değerlendirilmesi. Klimik Dergisi 2011;24:154. https://doi.org/10.5152/kd.2011.38

Acknowledgments: M.D Elif Aktan MUTLU edited the article for psychiatry literatüre in terms of English.

Ethics committee approval: The ethical committee approval was taken from Bursa Research and Training Hospital with the number 2011- KAEK-25 2018/01-20.