



# Seroprevalence of HBsAg, Anti-HBs, Anti-HCV, and Anti-HIV in Patients with Alcohol and Substance Abuse in an Amatem Clinic in Eastern Turkiye: a Six-Year Retrospective Evaluation

## Türkiye'nin Doğusunda Bir Amatem Kliniğinde Alkol ve Madde Kullanan Hastalarda, HBsAg, Anti-HBs, Anti-HCV ve Anti-HIV Seroprevalansı: Altı Yıllık Retrospektif Değerlendirme

Pınar Öner<sup>1</sup>, Seda Yılmaz<sup>2</sup>, Nilüfer Kılıç<sup>3</sup>, Filiz Özsoy<sup>4</sup>

<sup>1</sup>Department of Microbiology, Fethi Sekin City Hospital, Elazig, Turkey

<sup>2</sup>Department of Psychiatry, Fethi Sekin City Hospital, Elazig, Turkey

<sup>3</sup>Department of Psychiatry, Elazig Mental Health Hospital, Elazig, Turkey

<sup>4</sup>Department of Psychiatry, Gaziosmanpaşa University School Of Medicine, Tokat, Turkey

### Abstract

**Aim:** Substance abuse and concomitant infections are important causes of morbidity and mortality. Yet, the number of epidemiological studies regarding infectious diseases in people with substance abuse are limited in our country. In this study, the aim was to investigate the frequency of illegal alcohol and substance use in an Alcohol and Drug Research, Treatment and Training Centres (AMATEM) clinic in Turkey as well as the HBsAg, anti-HBs, anti-HCV, and anti-HIV parameters between the years of 2016-2021.

**Material and Method:** HBsAg, anti-HBs, anti-HCV, and anti-HIV tests were conducted using the Enzyme Linked Immunosorbent Assay (ELISA) technique in 6881 alcohol and substance use disorder (ASUD). Urine samples from ASUD's were analyzed for alcohol, cannabis, and cocaine metabolites. The results were evaluated retrospectively.

**Results:** All of the 6881 ASUD's were male with a mean age of 32.18±9.66 years. Of the 6881 ASUD's included in the study, 4107 (59.7%) were opioid addicts; 1479 (21.5%) were mixed drug addicts; 897 (13%) were alcohol addicts; and the rest were addicts with other types of substance use. The mean age of the alcohol users was 45.33±13.03 and the mean age of opioid users was 29.90±7.13. The percentage of opioid addiction in 2016 was 71.2% which dropped to 28.7% in 2021. Meanwhile, the percentage of alcohol addiction was 13.6% in 2016 and increased to 21.4% in 2021; and the percentage of mixed drug use was 8.7% in 2016 and increased to 36.8% in 2021. HBsAg-positivity in opioid users (56.7%) was higher compared to cannabis users (2.6%) and mixed drug users (22.3%). Anti-HCV positivity of opioid users (69.4%) was found to be higher compared to alcohol (9.4%), cannabis (2%), and mixed drug (16.2%) users, and this finding was statistically significant (p=0.0001). Anti-HBs positivity of opioid users (63.1%) was found to be higher compared to alcohol (9.9%), cannabis (3%), and mixed drug (21%) users, and this finding was statistically significant (p=0.0001). Anti-HIV was determined negative in all ASUD's. The highest rates of HBsAg, anti-HCV and anti-HBs positivity were found in the 26-30 years of age.

**Conclusion:** These findings indicate a high prevalence of intravenous substance abuse in the 26-30 years age group in our region as well as the high HBV and HCV rates in this patient group.

**Keywords:** Alcohol, substance abuse, Hepatitis B, Hepatitis C, HIV.

### Öz

**Amaç:** Madde kullanımı ve eşlik eden enfeksiyonlar önemli bir morbidite ve mortalite nedenidir. Ancak, ülkemizde madde kullananlarda bulaçıcı hastalıklar ile ilgili epidemiyolojik çalışmalar kısıtlıdır. Bu çalışmada, Türkiye'de bir AMATEM kliniğinde 2016-2021 yılları arasında yasa dışı madde kullanım sıklığının ve HBsAg, anti-HBs, anti-HCV ve anti-HIV parametrelerinin incelenmesi amaçlanmıştır.

**Gereç ve Yöntem:** 6881 alkol ve madde kullanım bağımlısında (AMKB), HBsAg, anti-HBs, anti-HCV ve anti-HIV testleri ELISA tekniği ile çalışılmıştır. İdrar örnekleri, AMKB'lerden alkol, esrar ve kokain metabolitleri açısından analiz edilmiştir. Sonuçlar retrospektif olarak değerlendirilmiştir.

**Bulgular:** 6881 AMKB'nin tümü erkektir ve ortalama yaşları 32.18±9.66 yıldır. Çalışmaya dahil edilen 6881 AMKB'nin 4107'si (%59.7) opioid, 1479'u (%21.5) mix ilaç, 897'si (%13) alkol, diğerleri ise farklı yollarla madde kullanan bağımlılardan oluşmaktadır. Alkol kullananların yaş ortalamaları 45.33±13.03 ve opioid kullanicılarının ise 29.90±7.13 idi. 2016 yılında opioid bağımlılığı %71,2 iken, 2021 yılında %28,7'ye düşmüştür. Bununla birlikte alkol bağımlılığı 2016 yılında %13,6 iken, 2021 yılında %21,4'e ve mix ilaç kullanımı ise 2016 yılında %8,7 iken 2021 yılında %36,8'e yükselmiştir. Opioid kullanicıları arasında HBsAg pozitifliği (%56,7), esrar (%2,6) ve mix ilaç kullanicılarından (%22,3) yüksek olarak tespit edilmiştir. Opioid kullanicılarının anti-HCV pozitifliği (%69,4), alkol (%9,4), esrar (%2) ve mix ilaç kullanicılarından (%16,2) yüksek ve istatistiksel olarak anlamlı bulunmuştur (p=0.0001). Opioid kullanicılarının anti-HBs pozitifliği (%63,1), alkol (%9,9), esrar (%3) ve mix ilaç kullanicılarından (%21) yüksek ve istatistiksel olarak anlamlı bulunmuştur (p=0.0001). Anti-HIV tüm AMKB hastalarda negatif olarak tespit edilmiştir. HBsAg, anti-HCV, anti-HBs pozitifliği en yüksek oranlarda 26-30 yaş aralığında belirlenmiştir.

**Sonuç:** Bu veriler, bölgemizde özellikle 26-30 yaş grubunda yüksek damar içi madde kullanım yaygınlığını ve bu hasta grubunda, yüksek HBV, HCV oranlarını işaret etmektedir.

**Anahtar Kelimeler:** Alkol, madde kullanımı, Hepatit B, Hepatit C, HIV.

**Corresponding (İletişim):** Pınar Öner, Department Of Microbiology, Fethi Sekin City Hospital, Elazig, Turkey

**E-mail (E-posta):** drpınaroner@hotmail.com

**Received (Geliş Tarihi):** 14.10.2022 **Accepted (Kabul Tarihi):** 16.11.2022



## INTRODUCTION

Although many infectious diseases affect developing countries, Hepatitis B (HBV), Hepatitis C (HCV), and HIV remain at threatening levels for the public health in developed countries to this day (1). Globally, the annual rate of mortality due to viral hepatitis is approximately 1.34 million, and due to HIV/AIDS is 1.3 million (2). Hepatitis B, Hepatitis C, and HIV infections are transmitted via exposure to bodily fluids such as blood. Drug users including intravenous substance users, males who have sex with other males, and sex workers comprise the population considered to be at high risk for HIV and viral hepatitis (3). It is estimated that 1 in 8 substance users lives with HIV, and that this number is 1.4 million people worldwide. HIV infection is 22 times more common in those with intravenous substance use compared to the general population (4). National Institute on Drug Abuse (NIDA) considers drug addiction and HIV to be intertwined epidemics, and emphasizes the close connection between substance addiction and hepatitis (NIDA, 2013) (1).

In the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), addictive substances are classified into 10 groups: alcohol, nicotine, caffeine, sedative-hypnotics and anti-anxiolytics, opioids, stimulants, inhalants, cannabis, hallucinogens, and other (or unknown substances). Substance use disorders have social, legal, and vocational consequences (5). According to Alcohol and Drug Research, Treatment and Training Centres (AMATEM) 2015 data, the prevalence of alcohol, cannabis, and opioid use disorders are quite high in the United States of America (6). Studies on substance abuse disorders report high rates of mixed substance abuse disorders (7). Individuals with mixed substance abuse disorders are at a high risk of adverse health consequences including contagious infectious diseases, high morbidity, and early mortality (8).

In this study, the main purpose was to investigate the positivity and evaluate the results of Hepatitis B surface antigen (HBsAg), Hepatitis B surface antibody (anti-HBs), Hepatitis C antibody (anti-HCV), and human immunodeficiency virus antibody (anti-HIV) tests in people who were referred to the AMATEM clinic in XXX Mental Health Hospital with alcohol use disorder (AUD) and substance use disorder (SUD) according to DSM-5 criteria. Moreover, it was aimed to compare the HBsAg, anti-HBs, anti-HCV, and anti-HIV parameters of patients with intravenous and other substance use methods.

## MATERIAL AND METHOD

### Participants

People with alcohol use disorder (AUD) and substance use disorder (SUD) according to DSM-5 criteria who were treated in the AMATEM clinic in Elazığ Mental Health Hospital between the years 2016-2021 were included in this study. Etiological distribution was evaluated retrospectively based on the rates of illegal substance use, alcohol use, and hepatitis

serology profiles. Only the first test result was included in patients with multiple test results. The study was carried out with the permission of Firat University Ethics Committee (Date: 06.07.2022, Decision No: 09-18).

### Serological Analysis

The serums obtained from peripheral blood of patients with substance and alcohol addiction were studied using Architect i2000SR (Abbott, USA) system enzyme immunoassay test kits HBsAg (Architect HBsAg Qualitative II Reactive Kit, Abbott, USA), anti-HIV (Architect Ag/Ab Combo Reactive Kit, Abbott, USA), anti-HCV (Architect Anti HCV Reactive Kit, Abbott, USA), and anti-HBs. Samples with a cut-off index  $<1$  were considered negative whereas samples with a cut-off index  $\geq 1$  were considered positive for HBsAg, anti-HCV, and anti-HIV. For anti-HBs, samples with  $<10$  mIU/ml were considered negative whereas those with  $>10$  mIU/ml were considered positive. Serums of patients who were tested positive for anti-HIV were confirmed using Western Blot analysis.

### Drug Analysis

Urine samples obtained from patients were analyzed in the hospital's clinical laboratory for the metabolites of all substances and drugs including alcohol, cocaine, cannabinoid, and opioid using EIA (enzyme immunoassay) method (Beckman AU480 Automated Biochemistry Analyzer).

### Statistical Analysis

The data collected in this study were analyzed using the Statistical Package for Social Science for Windows (SPSS) 24.0 package program. The distributions of diagnosis, applied serological tests, test results, etc. for patients included in the evaluation were determined using frequency and percentage distribution analyses. Patients' age was investigated based on mean and standard deviation values. A chi-squared test was applied to determine whether the test results of patients differed significantly according to diagnosis, age groups, and years. In addition, a one-way analysis of variance (ANOVA) test was used to determine any statistically significant difference in patients' age groups based on tests applied to patients, test results, and diagnoses. The results were meaningful with confidence levels of 99% ( $p < 0.01$ ) and 95% ( $p < 0.05$ ).

## RESULTS

6881 patients with alcohol and substance abuse were included in this study. The distribution of patients with substance abuse according to years is shown in **Table 1**. Of the patients with substance abuse, 59.7% were taken in for treatment for opioid addiction; 21.5% were taken in for treatment for mixed drug use; and 13% were taken in for treatment for alcohol addiction (**Table 2**). 73.2% of patients receiving treatment were only diagnosed with substance addiction whereas 15% were diagnosed both with substance addiction and comorbid psychiatric diseases. There was a statistically significant change in the

substance abuse distribution according to years ( $p=0.0001$ ). Opioid addiction rate was 71.2% in 2016 whereas it dropped to 28.7% in 2021. However, alcohol addiction rate of 13.6% in 2016 increased to 21.4% in 2021. Similarly, mixed drug use rate of 8.7% in 2016 increased to 36.8% in 2021. There was no significant change in other substance abuse (**Table 3**). All substance and alcohol addicts in this study consisted of males. Significant differences in the mean age of participants were detected according to years ( $p=0.0001$ ). The mean age of patients decreased moving from 2016 to 2021 (**Table 1**). There were also significant differences in the mean age of patients with alcohol and opioid use and other substance abuse ( $p=0.0001$ ). The mean age was highest in alcohol addicts ( $45.33\pm 13.03$ ), and lowest in opioid addicts ( $29.9\pm 7.13$ ) (**Table 4**). Despite a decrease in the number of patients in 2019, 2020, and 2021 compared to previous years, there were no significant differences in the distribution of number of tests applied according to years ( $p=0.076$ ). There was a significant change in the anti-HBs ( $p=0.0001$ ) and anti-HCV ( $p=0.0001$ ) positivity based on alcohol and substance abuse. However, there was no significant change in HBsAg

test results ( $p=0.097$ ). Furthermore, anti-HIV tested negative in all patients with substance and alcohol abuse (**Table 5**). The patients were divided into 6 groups according to age ( $\leq 25$ , 26-30, 31-35, 36-40, 41-45,  $45\geq$ ). The distribution of seropositivity according to age is shown in **Table 6**. HBsAg and anti-HCV positivity rates increased significantly as patient age increased ( $p=0.0001$ ;  $p=0.0001$ , respectively). Anti-HBs positivity decreased as patient age increased ( $p=0.0001$ ). The highest rates of HBsAg, anti-HCV and anti-HBs positivity were found in the 26-30 years age range.

**Table 1.** Distribution of substance abuse patients according to years and mean age

Years	The number of substance abuse patients n	Age Mean $\pm$ SD
2016	1452	33.24 $\pm$ 9.71
2017	1753	32.82 $\pm$ 10.46
2018	1766	31.23 $\pm$ 8.7
2019	586	31.64 $\pm$ 9.43
2020	511	31.48 $\pm$ 10.09
2021	813	31.07 $\pm$ 9.69
Total	6881	32.18 $\pm$ 9.66

**Table 2.** Substance abuse distribution

Substance abuse	n (%)	Substance abuse and additional illness	n(%)
Alcohol	897 (13)	Substance abuse only	5040 (73.2)
Cannabinoids	234 (3.4)	Substance abuse-related psychotic disorder (psychosis)	26 (0.4)
Sedatives and hypnotics	32 (0.5)	Substance abuse and mood disorder (mania, bipolar disorder)	76 (1.1)
Cocaine	15(0.2)	Substance abuse and additional psychiatric diagnosis (Depression, Anxiety, Panic Disorder, Social Phobia, Personality Disorder, Adjustment Disorder)	1030 (15)
Opioids	4107 (59.7)	Substance abuse and non-psychiatric diseases (epilepsy, polyneuropathy, diabetes, headache vs.)	709 (10.3)
Caffeine and other stimulants	85 (1.2)		
Volatile and Solvent	32 (0.5)		
Mixed drugs	1479 (21.5)		
Total	6881 (100)	Total	6881 (100)

Mixed drugs: both cannabis and opioid users

**Table 3.** Substance abuse rates according to years

	Alcohol n (%)	Cannabinoid n (%)	Sedatives and hypnotics n (%)	Cocaine n (%)	Opioid n (%)	Caffeine and other stimulants n (%)	Volatile and solvent n (%)	Mixed drugs n (%)
2016	198 (13.6)	58 (4)	6 (0.4)	3 (0.2)	1034 (71.2)	3 (0.2)	24 (1.7)	126 (8.7)
2017	242 (13.8)	78 (4.4)	3 (0.2)	5 (0.3)	1025 (58.5)	15 (0.9)	1 (0.1)	384 (21.9)
2018	148 (8.4)	41 (2.3)	3 (0.2)	5 (0.3)	1162 (65.8)	0 (0)	0 (0)	407 (23)
2019	56 (9.6)	13 (2.2)	1 (0.2)	0 (0)	400 (68.3)	0 (0)	0 (0)	116 (19.8)
2020	79 (15.5)	20 (3.9)	10 (2)	2 (0.4)	253 (49.5)	0 (0)	0 (0)	147 (28.8)
2021	174 (21.4)	24 (3)	9 (1.1)	0 (0)	233 (28.7)	67 (8.2)	7 (0.9)	299 (36.8)

$p=0.0001$

**Table 4.** Distribution of substance abuse patients according to mean age

	n	Mean±SD		n	Mean±SD
Alcohol	897	45.33±13.03	Substance abuse only	5040	32.20±9.67
Cannabinoids	234	33.56±7.82	Substance abuse related psychotic disorder	26	32.36±9.24
Sedatives and hypnotics	32	33.82±8.89	Substance abuse and mood disorder	76	33.10±10.42
Cocaine	15	39.33±1.63	Substance abuse and additional psychiatric diagnosis	1030	32,22±9.76
Opioids	4107	29.90±7.13	Substance abuse and non-psychiatric diseases	709	31,88±9.44
Caffeine and other stimulants...	85	27.93±4.96			
Volatile and solvent	32	35.91±6.68			
Mixed drugs	1479	30.36±7.2			
Total	6881		Total	6881	

P=0,0001

## DISCUSSION

It is estimated that over 93 million adults and more than one fourth of people in the 15-64 age range try illegal substances at one point in their lives in the European Union. The number of males with substance abuse experience (56.8 million) is reported to be higher than the number of females with substance abuse experience (36.8 million) (9). In our study, all addicts consisted of males. The reason for this was the physical conditions of the AMATEM clinic as well as the sociocultural structure of the region where the city is located.

The most commonly used illegal substance worldwide is reported to be cannabis. Research indicates that the numbers of cannabis and opioid users worldwide are 161 million and 16 million respectively (5). Among the 6881 patients included in our study, the most used substance was opioid (59.7%), the second most used substance was alcohol (13%), and the last most used substance cannabis (3.4%). This finding could indicate that intravenous substance abuse is more common compared to non-intravenous substance abuse and that our region differs from worldwide use in this aspect.

**Table 5.** Distribution of seropositivity rates according to substance abuse

	HbsAg		Anti-Hbs		Anti-HCV		Anti-HIV	
	N	P	N	P	N	P	N	P
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Alcohol	854 (12.8)	43 (18.5)	473 (18.6)	430 (9.9)	801 (13.3)	53 (9.4)	859 (13.1)	0
Cannabinoids	228 (3.4)	6 (2.6)	112 (4.4)	131 (3)	223 (3.7)	11 (2)	226 (3.4)	0
Sedatives and hypnotics	32 (0.5)	0 (0)	14 (0.6)	18 (0.4)	32 (0.5)	0 (0)	29 (0.4)	0
Cocaine	15 (0.2)	0 (0)	1 (0)	14 (0.3)	15 (0.2)	0 (0)	15 (0.2)	0
Opioids	3975 (59.8)	132 (56.7)	1345 (53)	2736 (63.1)	3495 (58)	391 (69.4)	3922 (59.6)	0
Caffeine and other stimulants	85 (1.3)	0 (0)	15 (0.6)	70 (1.6)	82 (1.4)	3 (0.5)	83 (1.3)	0
Volatile and solvent	32 (0.5)	0 (0)	5 (0.2)	27 (0.6)	18 (0.3)	14 (2.5)	32 (0.5)	0
Mixed drugs	1427 (21.5)	52 (22.3)	572 (22.5)	912 (21)	1359 (93.7)	91 (16.2)	1415 (21.5)	0
Overall	6648 (96.6)	233 (3.4)	2537 (36.9)	4338 (63.1)	6025 (91.5)	563 (8.5)	6581 (100)	0
p value	0.097		0.0001		0.0001		-	

Mixed drugs: both cannabis and opioid users, HbsAg: Hepatitis B surface antigen, anti-Hbs:Hepatitis B surface antibody, anti-HCV :Hepatitis C antibody, anti-HIV :human immunodeficiency virus antibody. N=Negative, P=Positive

**Table 6:** Distribution of seropositivity rates according to age

	HbsAg		Anti-Hbs		Anti-HCV		Anti-HIV	
	N	P	N	P	N	P	N	P
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Age groups								
≤25	1573 (23.7)	35 (15)	346 (13.6)	1257 (29)	1432 (23.8)	104 (18.5)	1530 (23.2)	
26-30	2348 (35.3)	68 (29.2)	635 (25)	1789 (41.2)	2188 (36.3)	161 (28.6)	2327 (35.4)	
31-35	1127 (17)	31 (13.3)	684 (27)	469 (10.8)	991 (16.4)	86 (15.3)	1113 (16.9)	
36-40	643 (9.7)	34 (14.6)	378 (14.9)	299.9	603 (10)	52 (9.2)	648 (9.8)	
41-45	315 (4.7)	0 (0)	130 (5.1)	181 (4.2)	259 (4.3)	51 (9.1)	299 (4.5)	
45≤	642 (9.7)	65 (27.9)	364 (14.3)	343 (7.9)	552 (9.2)	109 (19.3)	664 (10.1)	
Overall	6648 (96.6)	233 (3.4)	2537 (36.9)	4338 (63.1)	6025 (91.5)	563 (8.5)	6581 (100)	
p value	0.0001		0.0001		0.0001			

HbsAg: Hepatitis B surface antigen, anti-Hbs:Hepatitis B surface antibody, anti-HCV :Hepatitis C antibody, anti-HIV :human immunodeficiency virus antibody. N=Negative, P=Positive

The majority of the new HCV infection cases worldwide are a result of different types of substance use, and primarily intravenous substance abuse (10). Furthermore, studies have shown increased rates of HBV and HIV infections in people with a substance abuse history compared to the general population (11). Grebely and colleagues reported that 8.5% of all HCV infections globally consist of intravenous substance users (12). Other analyses have shown a global HCV rate of 8% among intravenous substance users, and a morbidity rate of drug use-related global HCV of 39% (13). The data from the present study suggests higher rates of anti-HCV positivity (69.4%) in intravenous substance users compared to global HCV rates. A study conducted with 943 intravenous drug users from 3 different cities reported an anti-HIV prevalence of 21%, HBsAg of 5%, and anti-HCV of 55% (14). Another study that evaluated the anti-HCV prevalence found an HCV positivity rate of 81.3% in intravenous substance users while this rate was 19.1% in substance users through other ways of administration (15). Our findings revealed higher positivity rates for anti-HCV (69.4%) and HBsAg (56.7%) compared to Scheibe and colleagues' study. This difference could be due to the higher number of patients (6881) included in our study compared to Scheibe and colleagues' study. However, our results showed lower positivity rates for anti-HCV (69.4%) compared to Removille and colleagues' study.

Unfortunately, there is limited data on the prevalence of HBV, HCV, and HIV in drug addicts in our country. In seroprevalence studies conducted in Türkiye, it has been determined that the HBsAg positivity rate in the whole population is approximately 4-5%, but has decreased to around 2% in recent years (16). A study conducted in Türkiye reported that out of 2007 patients with intravenous substance use, 912 (50.1%) were anti-HCV positive and 156 (8.57%) were HBsAg positive (17). In a study conducted in Elazığ in 2011-2012, the frequency of HBsAg, anti-HBs, anti-HCV, and anti-HIV in substance addicts was reported as 2.6%, 38.3%, 9.4%, and 0%, respectively (18). Another study conducted in Elazığ reported the frequency of HBsAg, anti-HBs, and anti-HCV in substance addicts as 4%, 52.3%, and 7.9%, respectively (19). Similar to other studies conducted in our city, our study detected HBsAg and anti-HCV frequencies of 3.4% and 8.5%, respectively. However, anti-HBs positivity rate (63.1%) was higher in our study compared to others. No anti-HIV positivity was detected in the patients included in our study. HBV and HCV viruses are transmitted more easily than HIV, and they are more stable in different environmental conditions. Thus, the frequency of HBV and HCV infections are typically much higher than HIV infection (20).

There are studies showing that the anti-HCV levels in non-intravenous substance users are higher compared to the normal population (21). Furthermore, it is reported that HCV infections can develop through transmission via nasal secretion and equipment used during substance preparation as well (22). In a study conducted in Van in 2010-2011 with 55 patients with non-intravenous substance use, 1 patient (1.8%)

with HBsAg positivity and 1 patient (1.9%) with anti-HCV positivity were detected whereas no patients with anti-HIV positivity were detected (23). Another study has reported that out of 4357 patients that consists mostly of non-intravenous substance users 94 (2.2%) were HBsAg positive; out of 4451 patients 27 (0.6%) were anti-HCV positive; and out of 4464 patients 10 (0.2%) were anti-HIV positive (24). Different studies have given anti-HCV positivity rates in cannabis users as 0% (19), 1.8% (18), 1.8% (25), and 0.6% (24). In the present study, the rate of anti-HCV positivity in cannabis users was similar to Karabulut et al. (18) and Mistik et al.'s (25) findings (2%). The prevalence of HBV, HCV, and HIV infections in substance users is influenced by a number of factors including needle sharing frequency, the number of people sharing a needle, social structuring among addicts, drug types, risky sexual behavior, and addicts' awareness of possible risks and their ability to take preventive measures. Moreover, it has been shown that the type of the injected drug is related to the prevalence and incidence of the HIV infection (26). The present study found anti-HCV positivity in 2% of cannabis users, 69.4% of opioid users, and 16.2% of mixed drug users. This data may indicate that the drug type affects the anti-HCV rates.

In a study by Çatak et al. about alcohol/drug and substance addiction, it was found that substance use is especially high in younger age groups. The same study also found that alcohol use increases in older age groups over time (27). Our study also demonstrated that the age of alcohol users was the highest and opioid users was the lowest. There was an increase in alcohol and mixed drug use over the years. In one study, it was shown that the incidence of mood, anxiety, substance misuse, and personality disorders decreased with age (28). Another study showed that although the rates of schizophrenia, bipolar disorder, and alcohol/substance use decreases with age; depression, anxiety, non-organic psychosis, and mood disorders increase (27). The present study did not find any differences with age in people with comorbid psychiatric (bipolar disorder, psychosis etc.) and non-psychiatric (diabetes, epilepsy etc.) diseases alongside substance abuse.

Studies show that the age group with the highest prevalence for HCV infection in the general population is 25 and above, but there is also an increase in prevalence in 50 years and above as well (29). In a study conducted with data from 22 AMATEM and several private clinics in Türkiye, HCV infection was detected in 47% of patients with intravenous substance use; and the majority of these patients consisted of teenagers and young adults (30). Another study conducted with substance addicts in the Eastern Anatolian region of Turkey showed that there were no patients with HCV infection below the age of 20, but 22% of those with an HCV infection were in the 20-29 years age range (22). One study found a mean age of  $29.84 \pm 5.7$  for people with intravenous substance use. It was reported that 3 (17.6%) of these patients were anti-HCV positive and 1 (5.8%) was anti-HIV positive. No HBsAg positivity was detected in the same patient group

(24). Similarly, our study found a mean age of intravenous substance use of  $29.90 \pm 7.13$ . However, unlike Altuğlu et al.'s (24) study, 56.7% HBsAg positivity was detected in intravenous substance users. In our study, HCV positivity was highest in the 26-30 years age group (28.6%) and second highest in the 45 years and above age group (19.3%). 26-30 years age group comprises patients with high opioid use and thus a high risk of transmission. However, it is interesting that the 45 years and above age group with high alcohol use showed HBsAg and anti-HCV positivity of 18.5% and 9.4%, respectively. On the other hand, anti-HBs positivity was 9.9% in these patients. When compared to younger age groups with opioid use (anti-HBs positivity of 63.1%), this finding indicates that the older population that is not vaccinated is at risk.

## CONCLUSION

More studies are needed to determine the true prevalence of hepatitis and HIV among people with alcohol and substance use disorder in our country. It is important to understand the regional situation of HBV, HCV, and HIV infections in order to prevent them and develop strategies geographically. This study showed that opioid use is quite high in the 26-30 years age group. Moreover, the findings of our study indicated that HBV and HCV infections are an increasing problem among opioid users in Eastern Turkey. Therefore, prevention programs for hepatitis and HIV among ASAs should especially target the younger population.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was carried out with the permission of Firat University Ethics Committee (Date: 06.07.2022, Decision No: 09-18).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

## REFERENCES

- Herrmann ES, Matusiewicz AK, Stitzer ML, Higgins ST, Sigmon SC, Heil SH. Contingency Management Interventions for HIV, Tuberculosis, and Hepatitis Control Among Individuals With Substance Use Disorders: A Systematized Review. *J Subst Abuse Treat* 2017;72:117-25.
- Scheibe A, Young K, Versfeld A, et al. Hepatitis B, hepatitis C and HIV prevalence and related sexual and substance use risk practices among key populations who access HIV prevention, treatment and related services in South Africa: findings from a seven-city cross-sectional survey (2017). *BMC Infect Dis* 2020;20(1):655.
- World Health Organization. Consolidated guidelines on HIV prevention, diagnosis, treatment and Care for key Populations. Geneva: WHO; 2016. <https://www.who.int/publications/i/item/9789241511124>
- Huff HV, Carcamo PM, Diaz MM, et al. HIV and Substance Use in Latin America: A Scoping Review. *Int J Environ Res Public Health* 2022;19(12):7198.
- Kulu M, Özsoy F, Demir B. Inflammation levels in patients with alcohol and substance use disorders. *Cukurova Med J* 2021;46(4):1558-65.
- Bahoric AL, Satre DD, Kline-Simon AH, Weisner CM, Campbell CC. Alcohol, Cannabis, and Opioid Use Disorders, and Disease Burden in an Integrated Healthcare System. *J Addict Med* 2017;11(1):3-9.
- Whiteford H, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet* 2013;382:1575-86.
- Volkow N, Frieden T, Hyde P, Stephen S. Medication-assisted therapies-tackling the opioid-overdose epidemic. *N Engl J Med* 2014;370:2063-6.
- D'Arrigo L, Goosdeel A. Avrupa Uyuşturucu ve Uyuşturucu Bağımlılığını İzleme Merkezi, Avrupa Uyuşturucu Raporu: trendler ve gelişmeler, Avrupa Toplulukları Resmi Yayınlar Bürosu, Lüksemburg: 2017. <https://www.emcdda.europa.eu/system/files/publications/4541/TDAT17001TRN.pdf>. Erişim tarihi: 04.09.2022.
- Amon JJ, Garfein RS, Ahdieh-Grant L, et al. Prevalence of hepatitis C virus infection among injection drug users in the United States, 1994–2004. *Clin Infect Dis* 2008;46:1852–8.
- Ferreira RC, Rodrigues FP, Teles SA, et al. Prevalence of hepatitis B virus and risk factors in Brazilian non-injecting drug users. *J Med Virol* 2009;81:602–9.
- Grebely J, Larney S, Peacock A, et al. Global, regional, and country-level estimates of hepatitis C infection among people who have recently injected drugs. *Addiction* 2019;114:150-66.
- Trickey A, Fraser H, Lim AG, et al. The contribution of injection drug use to hepatitis C virus transmission globally, regionally, and at country level: a modelling study. *Lancet Gastroenterol Hepatol* 2019;4(6):435-44.
- Scheibe A, Young K, Moses L, et al. Understanding hepatitis B, hepatitis C and HIV among people who inject drugs in South Africa : findings from a three-city cross-sectional survey. *Harm Reduct J* 2019;16:1-11.
- Removille N, Origer A, Couffignal S, Vaillant M, Schmit JC, Lair ML. A hepatitis A, B, C and HIV prevalence and risk factor study in ever injecting and non-injecting drug users in Luxembourg associated with HAV and HBV immunisations. *BMC Public Health*. 2011;11:351.
- Ozkan H. Epidemiology of chronic hepatitis B in Turkey. *Euroasian J Hepato Gastroenterology* 2018;8:73–4.
- Ay B, Toklu MK, Sarıkamışlı M, Deniz F. Türkiye Uyuşturucu ve Uyuşturucu Bağımlılığı İzleme Merkezi, Türkiye Uyuşturucu Raporu: 2013. <http://www.sck.gov.tr/wp-content/uploads/2020/02/2013-T%C3%BCrkiye-Uyu%C5%9Fturucu-Raporu.pdf>. Erişim tarihi:01.09.2022.
- Karabulut N, Bulut Y, Telo S. Frequency of Hepatitis B and C Viruses, and HIV Among Drug Addicts in the Eastern Anatolia, Turkey. *Jundishapur J Microbiol*. 2015;8:e19698.
- Karabulut N, Catak Z. Frequency of Hepatitis B Virus, Hepatitis C Virus and Human Immunodeficiency Virus Infections in Cannabis and Opioid Addicts. *Viral Hepat J*. 2017;23:26-9.
- Des Jarlais DC, Diaz T, Perlis T, et al. Variability in the Incidence of Human Immunodeficiency Virus, Hepatitis B Virus, and Hepatitis C Virus Infection among Young Injecting Drug Users in New York City. *Am J Epidemiol*. 2003;157:467-71.
- Allison RD, Conry-Cantilena C, Koziol D, et al. A 25-year study of the clinical and histologic outcomes of hepatitis C virus infection and its modes of transmission in a cohort of initially asymptomatic blood donors. *J Infect Dis* 2012;206:654-61.
- Yetim A, Şahin M. Hepatitis C virus (HCV) infection in youth with illicit drug use: sociodemographic evaluation and HCV genotype analysis. *Klinik Derg* 2018;31(3):190-4.
- Mutlu EA, Altıntoprak AE, Tokucoglu L. Seroprevalence of hepatitis B, hepatitis C, HIV and syphilis infections among non-injecting drug users. *Anadolu Psikiyatri Derg* 2015;16:65-8.

24. Altuđlu İ, Tanyeri S, Zeytinođlu A, Altıntoprak AE. HBsAg, Anti-HCV and Anti-HIV Seroprevalance Among Drug Users: a Retrospective Assessment. *Arch Neuropsychiatry* 2019;56:186-90.
25. Mıstık R. Epidemiology of hepatitis C in Turkey. Tabak F, Tosun S, editors. *Viral Hepatitis*. Istanbul: Istanbul Tıp; 2013. p.83–112.
26. Kruse GR, Barbour R, Heimer R, et al. Drug choice, spatial distribution, HIV risk, and HIV prevalence among injection drug users in St. Petersburg, Russia. *Harm Reduct J* 2009;6:22.
27. Çatak Z, Üzmez E, Öztürk N, Uđur K, Aydın S. Rates of distribution of psychiatric disorders, hepatitis seroprevalence and illicit substance usage among adults aged 50 years and over in Turkey: a regional representative study. *Anatolian Journal of Psychiatry* 2019;20(6):635-41.
28. Reynolds K, Pietrzak RH, El-Gabalawy R, Mackenzie CS, Sareen J. Prevalence of psychiatric disorders in US older adults: findings from a nationally representative survey. *World Psychiatry* 2015;14:74-81
29. Demirci M, Çınar C, Eslek A, Orhan M, Akar ŞŞ. Evaluation of Anti-HCV Positivity in Patients Receiving Inpatient Treatment in a Mental Health Hospital in Turkey. *J Tepecik Educ Res Hosp* 2022;32(2):279-82.
30. Alaei A, Alaei K, Wayne K, Tracy M, Nalbandyan M, Mutlu E, Cetin MK. Hepatitis C infection and other drug-related harms among inpatients who injected drugs in Turkey. *J Viral Hepat* 2016; 24(6): 496-505.