


## ASSESSMENT OF SUBSTANCE USE AMONG HIGH SCHOOL STUDENTS IN NORTHERN CYPRUS BASED ON THE GATEWAY HYPOTHESIS

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### Abstract

This study is a quantitative survey study based on the data of the research project on the Use of Alcohol, Cigarettes and Other Addictive Substances in Northern Cyprus High Schools students conducted by the Turkish Republic of Northern Cyprus Anti-Drug Commission. In this study, data were collected from 763 high school students in 6 districts in the north of Cyprus through the European School Research Project Alcohol and Other Drugs (ESPAD Survey) Survey, using the stratified sampling method, through the guidance and psychological counselling services of the schools. According to findings of this study, as the smoking age falls, so does the age of switching to e-cigarettes. Similarly, as the age of first cigarette and e-cigarette smoking declines, so does the age of daily use of cigarettes and e-cigarettes. When the regression results of the research are evaluated, it is seen that students' lifetime smoking frequency, age at beginning smoking, e-cigarette smoking frequency, age at first e-cigarette smoking, hookah smoking frequency, and usage of heated non-combustible tobacco products did not predict cannabis use. However, an increase in the frequency of cannabis use among students significantly predicts cannabis consumption.

*Keywords:* Substance use, high school students, Northern Cyprus, Gateway Hypothesis

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doi: 10.15405/ejsbs.341

## 1. Introduction

High school teenagers' usage of cigarettes, e-cigarettes and other tobacco products is a worrisome trend that is continuing to emerge in the present period of technical developments and constantly shifting societal standards. The temptation of these substances continues to be a strong force, seeping into the very fabric of our educational institutions, despite significant attempts to prevent the harmful effects of smoking and the development of novel nicotine delivery methods (Christophi et al., 2008; Singh et al., 2016).

It is a distressing fact to witness the constantly change in high school environment: a rise in teen use of tobacco-related items (Emekdar et al., 2017). These products can now reach new audiences, especially on susceptible young minds, thanks to the ingenious digital adaptation of cigarette marketing tactics that are always evolving (Dunlop, Freeman & Jones, 2016). It is important to understand the underlying reasons of this phenomenon as well as the serious dangers it presents to the health and wellbeing of children.

First of all, the influence of the peer groups has strong impact. Teenagers are frequently influenced by their classmates and strive to fit in and be accepted by society (Noland et al., 2016). Some students might be attracted to begin smoking or vaping if they believe it to be hip or popular in their social groups (Phua, 2011). It is also a way for stress relief and can be used as a coping mechanism to handle academic, social, or personal pressures (Long, 2003). Some can also start smoking or vaping out of natural curiosity or lack of awareness about how it tastes or smells, as well as to defy societal standards (Kaleta et al., 2017; Nodora et al. 2014).

The tobacco and e-cigarette companies have promoted their goods using sophisticated marketing strategies. These products may seem enticing as a result of appealing branding, colourful packaging, flavour options and commercials that appeal to youngsters (Carpenter et al., 2005; Escobedo et al., 2018). Due to disinformation or misleading marketing advertising, teenagers can be tempted to these products as they think they are less dangerous than they are. Plus, easy accessibility and the lack of control on restriction factors have great impact on the increase of the first try or the use (Prokhorov et al., 2006).

Influences of the family and the environment can also play an important role as a role model in youngsters' life; especially with the lack of alternative activities teenagers may be more likely to experience smoking or vaping if there aren't many other options for hobbies or recreational pursuits (McGee et al., 2015).

Recent studies showed that the usage of cigarettes, e-cigarettes (vapes) and tobacco can have significant implications for the use of cannabis and bonzai (a synthetic cannabinoid). Smoking cigarettes or other tobacco products may make it more likely that a person may try other drugs, including marijuana which is known as gateway effect (Nkyi, 2015). Parallel use is also very common, smoking both cigarettes and marijuana at the same time, either by mixing the two or switching between the two (Metz et al., 2020). As well as cigarettes, many people combine tobacco and cannabis to make "spliffs" or "blunts". E-cigarettes, also known as vapes, particularly among young people, could be a gateway to consuming other drugs including cannabis and bonsai (Etter, 2018).

Overall, smoking, using e-cigarettes, and using tobacco can have an impact on the use of cannabis and bonzai through a variety of avenues, such as raising the likelihood of co-use, serving as a gateway drug or changing how risky drug usage is seen.

## 2. Literature Review

In this section, the gateway hypothesis is explained and a description of substance use in Northern Cyprus is provided.

### 2.1. Gateway Hypothesis

The Gateway Hypothesis advocates a sequential progression of substance use, implying that the use of a less hazardous or socially acceptable substance serves as a stepping stone to the use of more potent or unlawful substances. This idea has sparked a lot of interest in the field of substance misuse and addiction, with academics and clinicians delving into its validity, mechanisms, and ramifications (Kandel, 2002; Kandel and Kandel, 2015). The Gateway Hypothesis was developed in the 1970s as a conceptual framework to explain the transition from legal substances such as tobacco and alcohol to illicit substances such as marijuana and heavier narcotics. Early research on adolescent drug use, such as Kandel and Yamaguchi's (1993) study, supported the idea of a sequential pattern. However, additional research has produced inconsistent results, sparking discussion regarding the hypothesis's validity.

Numerous longitudinal studies have found links between early use of legal substances and later usage of illicit drugs. As Nkansah-Amankra and Minelli (2016) and Barry et al. (2016) emphasize in their research, the widespread use of legal substances by young people in any country increases the risk of future illicit drug use. The research findings (Nestler & Malenka, 2004; Volkow, 2010) imply that exposure to one substance may modify brain chemistry or lead to the formation of social networks that ease access to other substances. The Gateway Hypothesis posits a number of factors to explain the transition from legal to illegal substances. Early substance use may sensitize the brain's reward pathways, making individuals more prone to seeking stronger forms of reinforcement, according to one process. Social and environmental factors, including as peer influence and substance availability, have also been posited as transitional paths (Mayet et al., 2016; Millar et al., 2021; Nkansah-Amankra, 2020).

The Gateway Hypothesis's detractors claim that the observed connections could be driven by shared risk factors such as genetic predisposition, underlying mental health disorders, or a shared vulnerability to risk-taking behavior. Furthermore, other studies have found no consistent indication of a linear shift from legal to illegal substances (Golub & Johnson, 1998). For example, Merrill and others (1999) argue that the 'gateway' notion is not universally accepted by all researchers. While others accept the findings of 'gateway' studies, they correctly contend that causality is difficult to establish in the absence of clinical proof. Similarly, Golub and Johnson's study (2002) found that the use of gateway substances such as alcohol and tobacco by young people is not the main cause of hard drug use and related problems. Therefore, youth struggling with the use of gateway drugs may not be an appropriate approach to drug abuse prevention.

Despite ongoing debate, the Gateway Hypothesis has influenced preventative and treatment methods, as Bretteville-Jensen, Melberg, and Jones (2008) underline in their study titled as "can we believe in gateway theory". Early interventions aimed at reducing teenage use of legal substances have been designed to reduce the risk of transition to illegal drugs. Understanding the potential routes of drug use development can also help to inform personalized treatment approaches that address both the substance of abuse and underlying vulnerabilities (DiClemente, 2018).

The Gateway Hypothesis is still a point of contention in the world of substance misuse research. While early evidence suggested a straight path from legal to illegal substances, further research has revealed

the complexities of substance use trajectories. Researchers continue to investigate the interplay between genetic, environmental, and individual factors that contribute to substance use beginning and progression as our understanding of addiction processes and risk factors evolves. Although influential, the Gateway Hypothesis should be studied alongside competing hypotheses in order to gain a thorough knowledge of substance use patterns and inform successful prevention and intervention measures (Golub & Johnson, 2002; Mayet et al., 2016; Merrill et al., 1999).

## 2.2. Substance Use in Northern Cyprus

Substance abuse is a worldwide issue, and the region of Northern Cyprus is not an exception. Northern Cyprus, like many other locations, has a high use of alcohol and tobacco. Illegal drug use has also been documented, including cannabis, MDMA (Ecstasy), cocaine, and synthetic substances. Substances' legal status varies. While both tobacco and alcohols are legal and regulated, the ownership, sale or use of illicit substances, including cannabis, is illegal. Drug-related criminal actions can result in harsh penalties, such as imprisonment (North Cyprus Anti Drug Commission, 2021).

Many factors, including social, economic, and cultural considerations, can lead to substance use in Northern Cyprus. Pressure from peers, substance accessibility, anxiety, and a lack of understanding about the risks connected with substance use can all play a role. Substance abuse can have a variety of detrimental health and societal outcomes. Physical health issues, addiction, mental health illnesses, strained relationships, financial difficulties, and legal issues are examples of these. Substance misuse can also have an influence on productivity and overall well-being (Çakıcı et al., 2019; Çakıcı Eş et al., 2020)

Efforts to fight substance abuse in Northern Cyprus are expected to include a mix of prevention, education, and treatment programs. Public awareness campaigns, school-based instruction, counselling services, support groups, and medical care for persons struggling with addiction may be included. Individuals in Northern Cyprus seeking help for drug abuse concerns may have access to a variety of support services, including mental health specialists, addiction treatment centres, and support groups (Tecel Hatipoglu & Ögel, 2022).

Tremeşeli (2022), in her study titled "An assessment of addiction research on students in Northern Cyprus", compiled the research on substance abuse in Northern Cyprus. According to the findings of this study, by defining the preferred substances, the recurrence of prevalence studies on substance misuse among young people in Northern Cyprus at regular intervals exposes changes in patterns of substance use rates and which issues should be focused in preventative programs. The majority of research is described as assembling, collecting, summarizing, and analyzing numerical data using descriptive statistics to determine the prevalence of substance use and dangerous behaviors. One limitation of these researches is that they do not sufficiently address preventive and therapeutic factors (Tremeşeli, 2022).

## 3. Method

### 3.1. Research Aim and Questions

This article seeks to answer the following questions based on the gateway effect in Northern Cyprus:

- i. What is the correlation between cigarette, e-cigarette, hookah, cannabis and bonsai use among high school students in Northern Cyprus?
- ii. What is the correlation between the age of initiation of smoking, e-cigarettes and cannabis?

- iii. Do the usage frequency of cigarette, e-cigarette, hookah, tobacco products and cannabis predicts the use of bonsai?

### 3.2. Research Design

This study is a quantitative survey study based on the data of the research project on the Use of Alcohol, Cigarettes and Other Addictive Substances in Northern Cyprus High Schools students conducted by the Turkish Republic of Northern Cyprus Anti-Drug Commission.

### 3.3. Data Collection Tool

The European school survey project on Alcohol and other drugs (ESPAD) was used in this study. ESPAD research: on alcohol, cigarettes, e-cigarettes, use of marijuana and other illegal drugs, abuse of health drugs (anabolic steroids, antidepressants, etc.), gambling and online gambling, social media and gaming addiction, it collects data on students aged 15-16 years old (<http://espad.org/purpose-methodology>).

The survey was applied in more than 40 countries in 7 waves between 1995 and 2019, and the participation in the survey by years is as follows. 59406 students participated in the survey, which was applied in 16 countries for the first time in 1995. 59406 students participated in the survey conducted in 1999 with the participation of 64843 students from 23 countries, 97759 students from 36 countries in 2003, 128021 students from 43 countries and 111973 students from 40 countries in 2007. 96905 students from 36 countries in 2011, 102484 students from 35 countries in 2015 (<https://data.espad.org/>). In addition, the data obtained by years and countries can be compared in the ESPAD data portal.

### 3.4. Research Sample and Data Collection Procedure

In this study, data were collected from 763 high school students in 6 districts in the north of Cyprus through the European School Research Project Alcohol and Other Drugs (ESPAD Survey) Survey, using the stratified sampling method, through the guidance and psychological counselling services of the schools.

While 47.18% (n=360) of the students included in the study were male and 49.02% (n=374) were female, 3.8% (n=29) of the students avoided specifying their gender. 25.95% (n=198) of the students participating in the research were in Kyrenia, 24.12% in Nicosia, 19.79% in Famagusta (n=151), 14.68% in İskele, 9.57% in Güzelyurt (n=73), and 5.9% in u (n=45) are educated in high schools in Lefke districts. 26.4% of the students participating in the research were born in 2007 (16 years old), 25.3% were born in 2006 (17 years old), 22.8% were born in 2005 (18 years old), 21.9% were born in 2008 (born 15 years, 2.6%) Born in 2004 (age 19), 1% of them are students between the ages of 20 and 22.

### 3.5. Analysis of Data

The data obtained within the scope of the research were analyzed via SPSS 24 software. Pearson correlation analysis was used to determine the relationships between factors related to smoking, e-cigarette, hookah, cannabis use and bonsai use. Pearson correlation analysis was also used to examine the relationships between smoking, e-cigarettes, and the age of starting cannabis. Linear regression analysis was used to determine to what extent the frequency of use of cigarettes, e-cigarettes and other tobacco products and cannabis predicted bonsai use.

#### 4. Findings

**Table 1.** Relationships between Cigarette, E-Cigarette, Hookah, Cannabis and Bonsai Use among High School Students in Northern Cyprus

Observed	Variables	N	r	P
<b>Hookah Use</b>	Lifetime smoking use- Hookah usege	763	.457	.000
	Last a month smoking use- Hookah use	763	.383	.000
	Lifetime E-Smoking use- Hookah usege	763	.466	.000
	Last a mounth E-Smoking use- Hookah use	763	.389	.000
	Use of heated (non-burn) tobacco-use of hookah	763	.394	.000
	Moistsnuff use - Hookah use	763	.152	.000
<b>E-Cigarette Usage</b>	Lifetime Cigarette Use - Lifetime E-Cigarette Use	729	.540	.000
	Cigarette Use in the Last 1 Month - E-Cigarette Use in the Last 1 Month	763	.619	.000
	Lifetime E-Cigarette Use - Use of heated (non-burn) tobacco	729	.567	.000
	Last a mounth E-Cigarette Use - Use of heated (non-burn tobacco)	763	.433	.000
<b>Cannabis Usage</b>	Lifetime smoke usage - lifetime cannabis use	763	.224	.000
	Smoking in the last 1 month - cannabis use in the last 1 month	763	.234	.000
	Lifetime use of E-Cigarettes - Lifetime Cannabis use	729	.107	.004
	E-cigarette use in the last 1 month - Cannabis use in the last 1 month	763	.235	.000
	Cannabis use in the last 1 year - Using cannabis with tobacco	763	.819	.000
	Cannabis - hookah use	763	.129	.000
	Heating (non-burn) tobacco - Cannabis use	763	.251	.000
	Moistsnuff usage - cannabis usage	763	.201	.000
<b>Bonzai Usage</b>	Cigarette usage throughout life - Bonzai Use	763	.115	.001
	Smoking in the last 1 month - Bonzai use	763	.149	.000
	E-Cigarette use during lifetime - Bonzai Use	729	.055	.139
	E-Cigarette use in the last 1 month - Bonzai Use	763	.162	.000
	Hookah use -Bonzai use	763	.101	.005
	Use of heated (non-burn) tobacco - use of Bonzai	763	.130	.000
	Moistsnuff use - Bonzai use	763	.274	.000
	Lifetime cannabis use - Bonzai use	763	.607	.000
	Cannabis use in the last 1 year - Bonsai use	763	.566	.000
Cannabis use in the last 1 month - Bonsai use	763	.533	.000	

When the results of the research conducted in high schools in Northern Cyprus were analysed (see table 1), it was found that there was a positive and moderately significant relationship between the frequency of smoking cigarettes and the frequency of hookah use ( $r=.457$ ,  $p<0.05$ ). There was a weak positive significant relationship between the students' cigarette use in the last month and their hookah use ( $r=.383$ ,  $p<0.05$ ). There was a moderately significant positive relationship between students' lifetime use

of e-cigarettes and hookah use ( $r=.466$ ,  $p<0.05$ ). There was a weakly significant positive correlation between students' use of e-cigarettes and hookah use in the last month ( $r=.389$ ,  $p<0.05$ ). There was a weakly significant positive correlation between students' use of heated tobacco (non-burn) and hookah use ( $r=.394$ ,  $p<0.05$ ). There was a very weak positive and weakly significant relationship between Moist snuff and hookah use ( $r=.152$ ,  $p<0.05$ ).

A moderately significant positive correlation was found between the lifetime smoking frequency of the students and the frequency of e-cigarette use ( $r=.540$ ,  $p<0.05$ ). However, a highly significant positive correlation was found between the increase in the frequency of cigarette use in the last month and the increase in the frequency of e-cigarette use in the last month ( $r=.619$ ,  $p<0.05$ ). A moderate positive correlation was found between lifetime e-cigarette use and heated (non-combustible) tobacco use ( $r=.567$ ,  $p<0.05$ ). Similarly, a moderate positive correlation was found between the increase in e-cigarette use in the last 1 month and the use of heated (non-combustible) tobacco ( $r=.433$ ,  $p<0.05$ ). In this context, it is seen that the increase in the frequency of cigarette use of the learners increases the level of e-cigarette and heated tobacco use.

There was a weak positive correlation between the frequency of cigarette use and cannabis use ( $r=.224$ ,  $p<0.05$ ). A weak positive significant relationship was found between the frequency of cigarette use in the last 1 month and cannabis use ( $r=.234$ ,  $p<0.05$ ). The weakest positive relationship was observed between the frequency of e-cigarette use and the frequency of cannabis use ( $r=.107$ ,  $p<0.05$ ). However, although it was weak in the frequency of e-cigarette use in the last month and the frequency of cannabis use in the last month, a stronger relationship was observed for these parameters than for lifetime ( $r=.235$ ,  $p<0.05$ ). However, a strong positive correlation was found between cannabis use in the last year and cannabis use with tobacco ( $r=.819$ ,  $p<0.05$ ). In this context, it can be said that cannabis and tobacco are used together intensively. A very weak positive significant relationship was observed between hookah use and cannabis use ( $r=.129$ ,  $p<0.05$ ). A weak significant correlation was observed between the frequency of cannabis use and heating tobacco ( $r=.251$ ,  $p<0.05$ ). Moistsnuff usage was also weakly correlated with cannabis use ( $r=.201$ ,  $p<0.05$ ). When all these relationships are considered, it is seen that although there is a relationship below the medium level between smoking and cannabis use, the relationship between tobacco use and cannabis use is high.

There was a very weak positive correlation between the frequency of cigarette use and bonsai use ( $r=.149$ ,  $p<0.05$ ). At the same level, a very weak positive significant relationship was observed between the frequency of cigarette use in the last month and bonsai use ( $r=.149$ ,  $p<0.05$ ). There was no significant relationship between the frequency of e-cigarette use and the frequency of bonsai use ( $p>0.05$ ), but a very weak positive significant relationship was found between the increase in the frequency of e-cigarette use in the last 1 month and bonsai use ( $r=.162$ ,  $p<0.05$ ). Similar to the frequency of cigarette use, a very weak positive significant correlation was found between hookah and bonsai use, and between heated (non-combustible) tobacco and bonsai use ( $p<0.05$ ). A slightly stronger positive significant relationship was found between moist snuff use and bonsai use than cigarette use ( $p<0.05$ ). Although the relationship between cigarette and its derivatives and bonsai use is weak or very weak, stronger relationships are seen in cannabis and bonsai use. There was a high positive significant relationship between the frequency of cannabis use and the frequency of bonsai use ( $r=.607$ ,  $p<0.05$ ). Significant relationships above the medium

level were observed between the frequency of cannabis use in the last 1 year and similarly in the last 1 month and Bonsai use ( $p < 0.05$ ).

**Table 2.** Relationships between the age of initiation of smoking, the age of initiation of e-cigarettes and the age of initiation of cannabis

Variables	N	r	P
Age at first cigarette - Age at smoking every day	763	.526	.000
Age at first cigarette - Age at first e-cigarette	763	.492	.000
Age at smoking cigarettes every day - Age at smoking e-cigarettes every day	763	.333	.000
First cigarette age - First cannabis age	757	.120	.001
Everyday smoking age - first cannabis age	757	.143	.000
First E-cigarette age - first cannabis age	757	.114	.002
Everyday E-cigarette age - First cannabis age	757	.079	.029

There was a moderately significant positive correlation between the age of first smoking and the age of daily smoking ( $r = .526$ ,  $p < 0.05$ ). In this context, as the age of first smoking increases, the age of every day smoking also increases. However, the decrease in the age of starting to smoke first cigarette causes the age of starting to smoke every day to decrease. Similarly, a positive significant relationship slightly below the medium level was observed between the age at first smoking and the age at first e-cigarette ( $r = .492$ ,  $p < 0.05$ ). A weak positive significant correlation below the moderate level was observed between the age at first cigarette smoking and the age at first e-cigarette smoking ( $r = .333$ ,  $p < 0.05$ ). weak positive significant correlations were observed between the age at first cigarette smoking, the age at first cigarette smoking, the age at first e-cigarette smoking and the age at first e-cigarette smoking and the age at first cannabis use ( $p < 0.05$ ). Considering these findings, as the smoking age decreases, the age of switching to e-cigarettes also decreases. Similarly, as the age of first cigarette and e-cigarette smoking decreases, the age of using cigarettes and e-cigarettes every day also decreases. Early introduction of students to cigarettes increases the likelihood that they will be introduced to other cigarettes and tobacco products at a younger age. Again, early introduction to cigarettes and e-cigarettes and making this behaviour a daily routine at an early age decreases the age of cannabis use, albeit at a weak level.

**Table 3.** The extent to which the frequency of cigarette, e-cigarette, hookah, tobacco products and cannabis use predicts the use of bonsai

	B	Sh <sub><math>\bar{x}</math></sub>	$\beta$	t	p
(Constant)	-.001	.004		-.314	.753
Frequency of smoking (lifetime)	-.001	.002	-.013	-.245	.806
Age at first smoking	.000	.001	-.017	-.339	.735
Frequency of e-cigarette use (lifetime)	.000	.002	-.008	-.135	.893
Age at first use of e-cigarettes	.002	.005	.020	.328	.743
Hookah Use	.004	.003	.053	1.325	.186
Use of heated (non-combustible) tobacco	-.002	.004	-.022	-.502	.616
Frequency of cannabis use (lifetime)	.075	.012	.298	6.040	<b>.000</b>
Age of first cannabis use	.018	.006	.142	2.881	<b>.004</b>
<b>R=</b> .413	<b>R<sup>2</sup>=</b> .170				
<b>F=</b> 18.316	<b>p=</b> .000				



According to the results of multiple linear regression analysis, students' lifetime smoking frequency, age at first smoking, frequency of e-cigarette smoking, age at first e-cigarette smoking, frequency of hookah smoking and frequency of using heated non-combustible tobacco products did not directly predict bonzia use ( $p > 0.05$ ). However, the increase in the frequency of cannabis use of the students significantly predicts the use of bonzai ( $p < 0.05$ ). In addition, the age of first cannabis use also predicts bonzai use ( $p < 0.05$ ). As a result of these findings, it can be said that students who use cannabis and meet cannabis at a young age are in a higher risk group in terms of bonzai use than those who use cigarettes and tobacco products.

## 5. Discussion and Conclusion

The results of the study indicate that there is a moderate relationship between hookah use and cigarette and e-cigarette use. Hookah smoking entails inhaling tobacco smoke that has passed through water before being breathed. The relationship between hookah usage and other substance use, such as cigarettes, e-cigarettes, bonzai (synthetic cannabinoids), and cannabis, varies and is influenced by a number of factors. Hookah and cigarette use are highly correlated, particularly among young adults. Many people who smoke hookah also smoke cigarettes. Some people use both types of smoking interchangeably, while others combine the two. Hookah and cigarette use together can increase overall exposure to hazardous chemicals contained in tobacco smoke (Doran et al., 2015). Some hookah smokers may also use e-cigarettes (Barnett et al., 2015). The popularity of flavored e-liquids, as well as the idea that vaping is less dangerous than smoking, may contribute to this overlap.

According to findings of this study, as the smoking age falls, so does the age of switching to e-cigarettes. Similarly, as the age of first cigarette and e-cigarette smoking declines, so does the age of daily use of cigarettes and e-cigarettes. Students who are exposed to cigarettes at a young age are more likely to be exposed to other smokes and tobacco products at a later age. Early smoking is associated with a higher susceptibility to nicotine addiction, higher levels of dependency, and a higher risk of continuing tobacco use throughout life (Kandel et al., 2007). The age at which e-cigarette use begins is also a major determinant. Early e-cigarette use can expose individuals to the risks of breathing toxic chemicals and nicotine, which can lead to nicotine addiction. Furthermore, early vaping may serve as a doorway to later tobacco cigarette smoking (Chapman et al., 2019).

In this study it is found that early exposure to cigarettes and e-cigarettes, as well as making this behavior a daily practice at a young age, reduces the age of cannabis usage, albeit at a low level. The literature (Agrawal et al., 2004; Kokkevi et al., 2006) emphasizes that early cannabis consumption is associated with a number of negative effects. The adolescent brain is especially vulnerable to cannabis's effects, which can disrupt normal brain development and result in cognitive deficiencies, decreased memory, and an increased risk of mental health disorders. Early cannabis use is also associated with an increased risk of developing cannabis use disorder and dependency. However, it is important to note that cannabis usage carries various degrees of danger based on factors such as frequency of use, product strength, and individual sensitivity.

The results of this study are in line with the literature and show that the relationship between the age of initiation of smoking, e-cigarettes and cannabis is complex and interconnected (Butler et al., 2022; Weinberger et al., 2021). Starting with one substance at a young age may raise the risk of attempting other substances, a phenomenon known as the gateway hypothesis (Kandel & Kandel, 2015). Individuals who

begin using e-cigarettes or nicotine at an early age, may be more prone to experiment with cannabis as well (Ren & Lotfipour, 2019). Furthermore, there are legal and social considerations that determine the age at which these substances are first used. The legal age for purchasing and using tobacco, e-cigarettes, and cannabis varies by jurisdiction and can influence the age at which people are exposed to these substances (Dave et al., 2019; Pesko et al., 2016). To summarize, the relation between the age of initiation of smoking, e-cigarettes, and cannabis is complex, with possible health, addiction, and overall well-being implications. Delaying the onset of substance use, particularly during adolescence, is connected with better results and lower dangers.

When the regression results of the research are evaluated, it is seen that students' lifetime smoking frequency, age at beginning smoking, e-cigarette smoking frequency, age at first e-cigarette smoking, hookah smoking frequency, and usage of heated non-combustible tobacco products did not predict bonsai use. However, an increase in the frequency of cannabis use among students significantly predicts bonsai consumption. As Çoban (2014) revealed in his study, the frequent occurrence of deaths due to bonsai use indicates that research on the use of this substance should be conducted and that it should be on the public agenda as the most important cause for concern. Karaaziz and Keskindağ (2016) also emphasize that bonsai, which is abused especially by young people and can quickly develop addiction, is very dangerous due to the chemicals in it. The belief that bonsai has similar effects to cannabis is very common among people. The regression findings revealed important information about the predictors of bonsai intake among students. The strong prediction of bonsai intake by increased cannabis usage emphasizes the importance of a comprehensive strategy to drug use prevention and intervention. Future research could look deeper into the particular mechanisms and underlying factors that underlie the association between cannabis and bonsai intake, potentially leading to more effective techniques for managing substance use in kids.

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