

## Cannabis use in a sample of Aristotle University of Thessaloniki students: a pilot cross-sectional study

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### Abstract

**Background:** Cannabis is the most widespread illicit drug among young adults globally. This study aimed to detect the extent of cannabis use in the study population and its impact on users' lives. We hypothesized that early cannabis use would significantly predict later high-risk use.

**Methods:** An online cross-sectional study using a self-administered questionnaire was conducted in December 2021, aiming to explore the extent of cannabis use among students and detect changes in behavior and impact on their lives. The results were analyzed statistically and correlated.

**Results:** Out of the 297 enrolled participants with a mean age of  $21.0 \pm 2.1$  years, 101 (33.9 %) had used cannabis at least once (50 males). The mean age at first cannabis use was  $18.5 \pm 2.11$  years. Over 90 % reported easy access to it. Behavioral changes following use were reported by 41.6 %, but none except one sought help. Age at first cannabis use was negatively correlated with past-month and past-year use. Cannabis use before midday was positively correlated with age on the first try.

**Discussion:** The prevalence of cannabis use was higher than the European average. Confirming the study's hypothesis, the younger the age at first use, the heavier the past-year and past-month use, which also agrees with previous studies. Cannabis consumption before noon was linked to increased use, and alarmingly, there was reluctance to seek help despite a high proportion of behavioral changes after use.

**Conclusion:** As the legislation on the use of cannabis changes rapidly, and given the increasing popularity of cannabis, there is a need for continued research on how various factors differentially impact its use. HIPPOKRATIA 2021, 25 (4):162-168.

**Keywords:** Cannabis, students, age at first use, frequency of use, cannabis-induced behavioral changes

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### Introduction

Worldwide, cannabis is the most trafficked and cultivated illicit drug of abuse. An individual exhibits impaired physical and intellectual abilities when high on cannabis<sup>1</sup>. Cannabis intensifies sensory awareness in addition to its relaxing effects. Its use may increase pulse rate and appetite in the short term, but with higher doses, slow, confused thinking and altered sensory perception are common<sup>2</sup>. It is a hallucinogen at large doses, causing panic and anxiety, often mounting to psychosis<sup>3</sup>. Regular use of cannabis leads to dependence<sup>4</sup>. In recent years, a growing market for an indoor-produced, high-potency variety has led to stronger varieties, with users experiencing more dangerous psychological effects<sup>5</sup>.

Approximately 162 million people, i.e., 4 % of the world's adult population, use cannabis at least once a year, with over half of all youngsters in some countries having tried cannabis. Interestingly, 9 % of youngsters

trying cannabis cannot stop using it, and the demand for treatment of cannabis-related problems is increasing<sup>6</sup>. Most adolescents having life-long experience with any illicit drug also use cannabis<sup>7</sup>. Widespread use in Europe raises concerns regarding cannabis-related issues in youth, including low educational attainment<sup>8</sup>. In a recent Greek study assessing both lifetime and current cannabis use in medical students, the lifetime prevalence was 19.5 %<sup>9</sup>. It is essential to identify early high-risk users as regular use of cannabis has been established as a significant predictor of later drug use<sup>10</sup>. This study aimed to explore the extent of cannabis use among students, detect changes in their behavior following cannabis use, and its impact on the users' lives and health. We hypothesized that the age when they first tried cannabis would be of importance for the current frequency of use, including the use of cannabis before mid-day.

## Material and Methods

### The Survey Questionnaire

The research was based on the “The detection of cannabis in adolescents and young adults” self-administered questionnaire, compiled by the first author (CAT), and based on The Cannabis Abuse Screening Test<sup>11</sup> and the Epidemiology of Cannabis Use Survey Questionnaire<sup>12</sup>. It consisted of three main categorical questions: “Have you ever used cannabis”; “Was access to cannabis easy”; “Have you experienced any changes in behavior following the use of cannabis”. Frequency of use and qualitative questions about cannabis use and age at first use followed: where, when, with whom, access to it, appreciation of danger to health, type of problems caused, and seeking professional or other help to address them. Demographics included gender, current age, and university school attended.

### Study design

This cross-sectional study received approval from the Aristotle University of Thessaloniki (AUTH) Research and Ethics Committee (decision No: 2.456, date: 07/12/21) and was conducted online only for three days, from December 14 until December 16, 2021. The survey was created using Google Forms and distributed on social media and the AUTH medical students’ platform. The time required for the completion of the survey was ten minutes. All potential participants who accessed the survey platform were initially informed about the research and kindly requested to tick the consent checkbox before proceeding. Participation was anonymous and voluntary. Inclusion criteria were: i) acceptance to participate and ii) being a student at AUTH.

### Statistical analysis

All analyses were performed by IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA) software. The normality of distribution for all variables was checked by the Kolmogorov-Smirnov test. Non-parametric tests were applied to scales presenting a non-normal distribution (p value <0.001). Continuous variables were expressed as mean  $\pm$  standard deviation, and cat-

egorical variables as frequencies and percentages (%). Demographic, social, and cannabis use data were compared for continuous variables using independent t-tests and for categorical variables using the  $\chi^2$  test. The Spearman’s  $\rho$  (rho) coefficient was used to measure the strength and the direction of association between two ranked variables. A sensitivity power analysis (G\*Power)<sup>13</sup> was conducted for all comparisons after the participants were recruited and Cohen’s D (d) is reported for each comparison. The level of statistical significance was set to  $p=0.05$ .

## Results

We excluded 30 out of the 327 respondents, as they presented many missing answers (>20 %). Two-hundred and ninety-seven participants entered the study (Table 1). One hundred and ninety-seven of those were female (66.4 %), 100 male (33.6 %), 72 philology (PhilS), and 225 medical students (MedS). The mean age was  $21.9 \pm 2.1$  years, with the female’s age ( $20.6 \pm 1.9$  years) being significantly lower than the male’s age ( $22 \pm 2$  years) (t-test =5.7,  $p < 0.001$ ;  $d = 0.35$ ). Moreover, the MedS age ( $21.8 \pm 1.7$  years) was significantly higher than the age of PhilS ( $18.7 \pm 1.3$  years) (t-test =-14.1,  $p < 0.001$ ;  $d = 0.35$ ).

One hundred and one (33.9 %) of the participants had used cannabis at least once in their lifetime (Table 2). Irrespective of the school attended, there was an equal representation of the two genders within the entire users’ group, with 50 males (49.5 %) and 51 females (50.5 %) ( $\chi^2 = 1.257$ ,  $p = 0.262$ ;  $d = 0.30$ ). The mean age of users was  $21.8 \pm 2.10$  (range 18-26) years, significantly higher than the mean age of non-users [ $20.6 \pm 1.94$  (range 18-25) years] (t-test =4.947,  $p < 0.001$ ;  $d = 0.30$ ). The mean age at first cannabis use was  $18.5 \pm 2.11$  (range 13-23) years. The circumstances under which individuals tried cannabis for the first time included mainly curiosity (54.5 %), followed by peer pressure (35.6 %), and stress or mood swings (5 %). The social setting at first contact with cannabis did not differ significantly between the two student groups ( $\chi^2 = 1.803$ ,  $p = 0.614$ ;  $d = 0.30$ ) nor between the two genders ( $\chi^2 = 3.326$ ,  $p = 0.344$ ;  $d = 0.30$ ). The vast majority of cannabis users (90.2 %) reported easy access to it, irrespective of gender ( $\chi^2 = 0.001$ ,  $p = 0.974$ ;  $d = 0.30$ ) or school attended ( $\chi^2 = 0.836$ ,  $p = 0.360$ ;  $d = 0.30$ ). Over three-quarters (77.5 %) had initially found it from friends, 8.5 % in Thessaloniki’s city center, 8.5 % in Amsterdam caf  es, and a smaller 5.6 % either at school or university. Regarding the answers to this question, there appears to be a statistically significant difference between males and females regarding the place they were first exposed to cannabis ( $\chi^2 = 9.011$ ,  $p = 0.029$ ).

Forty-two (41.6 %) of the participants reported changes in behavior following cannabis use, independent of gender ( $\chi^2 = 0.102$ ,  $p = 0.749$ ;  $d = 0.30$ ) and student group ( $\chi^2 = 0.557$ ,  $p = 0.455$ ;  $d = 0.30$ ). Of the 42, 36 reported on specific changes in behavior induced by cannabis after use. One-half had experienced increased pleasure, 27.8 % reported feelings of increased anxiety, 8.3 % reported distorted perception, and 13.9 % had mixed symptoms (Table 2).

**Table 1:** Sociodemographic characteristics of the sample of this cross-sectional study, which explores the extent of cannabis use, changes in behavior, and its impact on users’ lives and health.

	Gender	
	Female	Male
	197 (66.4)	100 (33.6)
<b>Age (years)</b>		
18-21	143	37
$\geq 22$	54	62
<b>School</b>		
Philology (72)	65	7
Medical (225)	133	92

Values are presented as numbers and percentages (in brackets).

**Table 2:** The characteristics and extent of cannabis use among the 297 participants of this cross-sectional study were collected utilizing an online self-administered questionnaire.

Questions	Answers	Gender		Total (%)
		Male (%)	Female (%)	
Have you ever used cannabis?	Yes	50 (50.5)	51 (25.8)	101 (33.9)
	No	49 (49.5)	147 (74.2)	196 (65.8)
$\chi^2 = 18.011, p < 0.001$				
Under what circumstances did you try cannabis for the first time?	Peer Pressure	16 (32.0)	20 (39.2)	36 (35.6)
	Curiosity	31 (62.0)	24 (47.1)	55 (54.5)
	Stress/Mood Swings	1 (2.0)	4 (7.8)	5 (5.0)
	Other Reason	2 (4.0)	3 (5.9)	5 (5.0)
$\chi^2 = 3.326, p = 0.344$				
Was access to cannabis easy?	Yes	45 (90.0)	46 (90.2)	91 (90.1)
	No	5 (10.0)	5 (9.8)	10 (9.9)
$\chi^2 = 0.001, p = 0.974$				
Where did you find cannabis for the first time?	School/University	2 (5.9)	2 (5.4)	4 (5.6)
	Amsterdam	1 (2.9)	5 (13.5)	6 (8.5)
	Thessaloniki City Center	6 (17.6)	0 (0.0)	6 (8.5)
	Friends/Brother/Party	25 (73.5)	30 (81.1)	55 (77.5)
$\chi^2 = 9.011, p = 0.029$				
Have you observed changes in your behaviour following the use of cannabis?	Yes	20 (40.0)	22 (43.1)	42 (41.6)
	No	30 (60.0)	29 (56.9)	59 (58.4)
$\chi^2 = 0.102, p = 0.749$				
What changes in behavior have you observed following cannabis use?	Increased Pleasure, Euphoria, Feeling Relaxed	9 (50.0)	9 (50.0)	18 (50.0)
	Anxiety, Fear, Panic, Paranoia	7 (38.9)	3 (16.7)	10 (27.8)
	Perceptual Distortion, Altered Sense of Time, Disinhibition, Poor Motor Coordination	1 (5.6)	2 (11.1)	3 (8.3)
	Mixed	1 (5.6)	4 (22.2)	5 (13.0)
$\chi^2 = 3.733, p = 0.292$				
At which stage would you consider cannabis use harmful to your health?	once or twice	5 (10.2)	5 (10.2)	10 (10.2)
	3-4 times	1 (2.0)	3 (6.1)	4 (4.1)
	>4 times	43 (87.8)	41 (83.7)	84 (85.7)
$\chi^2 = 1.048, p = 0.592$				
Have you used cannabis over the last year (12 months)?	Yes	34 (69.4)	28 (56.0)	64 (63.4)
	No	15 (30.6)	22 (44.0)	37 (36.6)
$\chi^2 = 2.518, p = 0.284$				
How many times did you use cannabis over the last year?	Once	4 (11.8)	11 (36.7)	15 (23.4)
	Twice	5 (14.7)	2 (6.7)	7 (10.9)
	$\geq 3$ times	25 (73.5)	17 (56.7)	42 (65.6)
$\chi^2 = 5.849, p = 0.054$				

Have you used cannabis over the last month (30 days)?	Yes	18 (35.3)	16 (33.3)	34 (34.3)
	No	33 (64.7)	32 (66.7)	65 (65.7)
$\chi^2 = 0.005, p = 0.944$				
How many times did you use cannabis over the last month?	Once	2 (11.1)	7 (43.8)	9 (26.5)
	Twice	6 (33.3)	2 (12.5)	8 (23.5)
	$\geq 3$ times	10 (55.6)	7 (43.8)	17 (50.0)
$\chi^2 = 5.208, p = 0.074$				
Have you ever used cannabis before midday?	yes	16 (47.1)	6 (23.1)	22 (36.7)
	no	18 (52.9)	20 (76.9)	38 (63.3)
$\chi^2 = 3.649, p = 0.056$				
Who are you with when using cannabis?	alone	2 (5.9)	2 (7.7)	4 (6.7)
	with certain people	32 (94.1)	24 (92.3)	56 (93.3)
$\chi^2 = 0.078, p = 0.781$				
Are your friends and family aware of your frequent use of cannabis?	yes	17 (50.0)	12 (46.2)	29 (48.3)
	no	17 (50.0)	14 (53.8)	31 (51.7)
$\chi^2 = 0.946, p = 0.623$				
If they are aware, have they tried to help you in any way?	yes	2 (7.4)	3 (15.0)	5 (10.6)
	no	25 (92.6)	17 (85.0)	42 (89.4)
$\chi^2 = 0.697, p = 0.404$				

Values are presented as numbers and percentages (in brackets).

Interestingly, 85.7 % of users considered cannabis harmful only if used more than four times in a lifetime. This result was independent of gender ( $\chi^2 = 1.371, p = 0.712; d = 0.30$ ) or school attended ( $\chi^2 = 3.756, p = 0.289; d = 0.30$ ). One-half stated that their family was aware of their cannabis use, but only five (10.6 %) of them reported that their family had cautioned them on the effects of cannabis. Only one participant had ever self-referred for help. This striking result was explained by the answers of those who had not sought help, stating they: i) considered their use occasional (33.3 %), ii) felt they were in control of their use (33.3 %), iii) did not consider their use harmful (29.2 %), or iv) explicitly stated that they were not addicted (4.2 %).

Sixty-four of the 101 participants who used cannabis at least once (63.4 %) had used cannabis over the preceding 12 months, and 42 of those (41.6 %) had used cannabis more than three times during this period. Thirty-four (34.3 %) of those participants had used cannabis over the last month, of whom 50 % used cannabis over three times during the past month, 23.5 % twice, and another 26.5 % once. Past-year prevalence of cannabis use was not significantly different between males and females ( $\chi^2 = 2.518, p = 0.284; d = 0.38$ ), and past-month prevalence of cannabis use was also not significantly different between the two genders ( $\chi^2 = 0.005, p = 0.944; d = 0.38$ ). However, the past-year frequency in males using cannabis was higher than in females ( $\chi^2 = 5.849, p = 0.054; d = 0.38$ ).

Regarding the timing of use, 36.7 % answered that

they had ever used cannabis before midday. Males appeared to have used cannabis before midday more than females ( $\chi^2 = 3.649, p = 0.056; d = 0.36$ ), but there was no difference between the student groups regarding the use of cannabis before midday ever ( $\chi^2 = 0.007, p = 0.933; d = 0.38$ ). MedS had used cannabis more than PhilS over the previous year ( $\chi^2 = 14.534, p = 0.001; d = 0.38$ ) but not over the previous month ( $\chi^2 = 0.332, p = 0.564; d = 0.37$ ).

Data regarding changes in behavior induced by cannabis in 51 of the study's participants are shown in Table 3. There was no significant difference between males and females ( $\chi^2 = 7.226, p = 0.204; d = 0.35$ ) or student groups ( $\chi^2 = 7.639, p = 0.177; d = 0.36$ ) with regards to these self-reported behavioral changes.

The Spearman's (rho) coefficient was used to test for correlations between the variables (Table 4). The younger the current age, the younger the age at the first cannabis try (rho = 0.291,  $p < 0.01$ ). Furthermore, the older the age at first cannabis use: i) the easier the access to cannabis (rho = 0.230,  $p < 0.05$ ); ii) the higher the likelihood of use in the previous month (rho = 0.273,  $p < 0.01$ ); iii) the less frequent the monthly cannabis use (rho = -0.475,  $p < 0.01$ ); iv) the higher the likelihood to have ever used cannabis before midday (rho = 0.383,  $p < 0.01$ ); and the less frequent the use over the previous year (rho = -0.375,  $p < 0.01$ ) and over the previous month (rho = -0.364,  $p < 0.05$ ). Interestingly, the frequency of monthly use was inversely related to the easiness of access to cannabis (rho = -0.330,  $p < 0.05$ ). Moreover, participants who had used cannabis over the previous year: i) were more likely

**Table 3:** Self-reported data on long-term changes in behavior induced by cannabis in 51 participants.

Self-reported long-term changes in behavior in cannabis users	Gender		Total (%)
	Male (%)	Female (%)	
	29 (56.9)	22 (43.1)	
	$\chi^2 = 7.226, p = 0.204$		
Frequent disagreements and fights	2 (6.9)	1 (4.5)	3 (5.9)
Constant irritation and attitude problems	7 (24.1)	2 (9.1)	9 (17.6)
Panic attacks	3 (10.3)	0 (0.0)	3 (5.9)
Poor academic performance	2 (6.9)	1 (4.5)	3 (5.9)
Other, incl. overeating, somnolence, xerostomia, occasional tachycardia and shortness of breath, lack of perception	4 (13.8)	8 (36.4)	12 (23.5)
Beneficial changes, e.g., relaxation, improvement in exam performance	2 (6.9)	3 (13.6)	5 (9.8)
No changes in behavior	8 (27.7)	7 (31.9)	15 (29.4)
Mixed problems (eg, elevated mood followed by headache and dysphoria, either sleepiness or increased energy)	1 (3.4)	0 (0.0)	1 (2.0)

Values are presented as numbers and percentages (in brackets).

**Table 4:** Correlation coefficients (rho) for study variables.

Variables	1	2	3	4	5	6	7	8	9
1. Current Age (n =296)									
2. Age when first tried cannabis (n =100)	0.291**								
3. Was access to cannabis easy (n =100)	0.004	0.230*							
4. Past year cannabis use (n =100)	0.142	0.160	-0.128						
5. Past month cannabis use (n =97)	0.110	0.273**	-0.045	0.453**					
6. Past month frequency of cannabis use (n =33)	-0.008	-0.475**	-0.330*	-0.047	-0.592**				
7. Use of cannabis ever before midday (n =59)	-0.214	0.383**	0.197	-0.051	0.434**	-0.664**			
8. Who are you with when using cannabis? (n =59)	-0.163	-0.045	0.105	-0.323*	0.116	-0.083	0.074		
9. Are your friends and family aware of your frequent use of cannabis (n =59)	-0.250	0.050	-0.019	0.267*	0.249	-0.142	0.038	0.075	

\*\*p <0.01 (2-tailed); \* p <0.05 level (2-tailed)

to have used it over the previous month ( $\rho = 0.453, p < 0.01$ ); ii) were more likely to be alone when using the substance ( $\rho = -0.323, p < 0.05$ ); and iii) their friends and family were more likely to be aware of their cannabis use ( $\rho = 0.267, p < 0.05$ ). Participants who had used cannabis over the past year: i) were likely to have used it less frequently over the past month ( $\rho = -0.592, p < 0.01$ ); and ii) were more likely to have ever used it before midday ( $\rho = 0.434, p < 0.01$ ). Lastly, the higher the monthly frequency of cannabis use, the less likely the ever cannabis use to be before midday ( $\rho = -0.664, p < 0.01$ ).

## Discussion

One-third of participants had used cannabis at least once-in-lifetime, and almost two-thirds of them had used it during the preceding year. Considering that the 2019 European percentage of at least once-in-lifetime users was 27.2 %, and the percentage for past-year use among young adults aged 15 to 34 years was 15 %<sup>14</sup>, the prevalence of cannabis use found in the population of the current study was much higher. Males and females were equally represented in the users' group, and past-month prevalence of cannabis use was not significantly different between genders, confirming that the use of cannabis has

grown among both women and men<sup>15</sup>.

Substance abuse emerges early in adolescence<sup>16</sup>. In the current study, cannabis users were older than non-users. Most subjects first tried cannabis immediately prior to or soon after entering university. Peer pressure and curiosity were the main reasons for initially trying cannabis, supporting the argument that eagerness for experimentation and unawareness of potential harms may explain the phenomenon, notwithstanding pre-existing mental health problems, social background, accessibility, and moral issues<sup>17</sup>.

In the present sample, the younger the age at first use, the higher the past-year and the past-month use, confirming the results from a large Canadian survey of high school students<sup>18</sup>. Early cannabis use increases the intensity and probability of subsequent drug use<sup>19</sup> while using cannabis early in life predisposes to more intense difficulty quitting later<sup>20</sup>, often leading to mental health problems<sup>21</sup>.

Like morning alcohol consumption among alcohol-dependent individuals, morning use of cannabis may indicate dependence and increased cannabis-related impairment. Use before midday was surprisingly reported by 42% of males and 28% of females, indicating that many were long-term users or prone to long-term abuse<sup>11</sup>. Furthermore, older participants were more likely to use cannabis before noon, and students consuming cannabis before noon reported higher past-month use. Therefore, the timing of cannabis use during the day appears to be a crucial factor in examining cannabis-associated problems<sup>22</sup>.

Access to cannabis was reported to be generally easy. At first use, most participants were supplied by friends or at caff es. The older a subject was at first cannabis use, the easier it was to be supplied and vice versa. Following cannabis consumption, behavioral changes, including drowsiness, overeating, feelings of palpitations and anxiety, dry mouth, and confusion, were reported by four out of ten users independently of gender or school attended. The older the participant, the less likely his/her family and friends would know about his/her use. The striking majority never had self-referred for help to control cannabis use, ignoring its life-long health effects. Cannabis-related risk perceptions are becoming more permissive with time across ages, in contrast to alcohol-related risk perceptions, which have stayed stable over time<sup>23</sup>.

The present study's findings should be considered along with some of its limitations. First, given the exploratory nature of this study, we did not conduct an *a priori* power analysis. We recruited our sample for three days only, shortly after approval from the Ethics Committee; thus, the sample size was small. This is reflected in the power analyses calculating the effect sizes detected. Test statistics were sensitive to effects of Cohen's *d* ranging from 0.28 to 0.46 with 80 % power ( $\alpha = 0.05$ ), *d* values representing small to medium effect sizes. Given that the student population of AUTh reaches over 85,000 in total<sup>24</sup>, we consider this a pilot study mainly generating

hypotheses to be tested later with an independent study. Second, the female gender was over-represented in the total sample, reflecting the nature of this pragmatic real-time study. Most Philology students participating in the study were female, and female students were either more eager to volunteer to answer the questionnaire or had more time to do so. However, in the cannabis users' subsample, there was an equal gender representation, with 50 males and 51 females answering the questionnaire. Third, the nature of self-reporting data is subject to recall and reporting bias. Finally, we have not accounted for other important factors, such as sensation seeking, mental health and psychopathology, other drug use, parents' education, household socioeconomic status, and place of residence.

As the medical use of cannabis has lowered the threshold of accessibility, cannabis abuse is proliferating with unknown implications<sup>25</sup>. Legalizing laws impact risk perception, intention to use, and use of cannabis<sup>26</sup>. Since legislation regarding medical and non-medical use of cannabis changes rapidly, further research is needed on cannabis use motives, age at first use, gender, the timing of use, social setting, frequency of use, psychopathology, and socioeconomic status differentially impacting patterns and effects of use, especially in the young.

#### Conflict of interest

The authors declare that they have no conflicts of interest.

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