



## Short report

## Are the last grade medical students aware of the danger of synthetic cannabinoids?



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## ABSTRACT

Synthetic cannabinoids are drugs which are increasingly used by especially adolescents and young people. In recent years hospital admissions even concluding with deaths have been observed. Therefore, the awareness of medical students, who will be in challenge with this new drug abuse, is an important issue. The aim of this study is to figure out the awareness of the last grade medical students and its correlates. This is a questionnaire based descriptive study with the participation of 148 students at Karadeniz Technical University Medical Faculty, Turkey. An awareness score was produced to measure awareness (cronbach alpha = 0.67). The 17.6% (26/148) of students who reported not knowing what synthetic cannabinoids were and hearing the name for the first time in this study. The 16.4% of students assumed that synthetic cannabinoid use was legal, and 16.2% assumed that synthetic cannabinoids are not drugs. The internet (including social media) (48.6%) and pharmacology lectures (40.5%) were identified as the most stated sources of information. The students who have synthetic cannabinoid user friends and social media account have significantly higher awareness scores ( $p < 0.05$  for both). Last grade medical students have a lack of awareness towards synthetic cannabinoids which is an increasing threat that they have to challenge.

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## 1. Introduction

Synthetic cannabinoids (SCs) are compounds which have been increasingly used by young people and young adults in particular in recent years.<sup>1,2</sup> The SCs are compounds that mimic the effects of cannabis which have various types of chemical structures. There are many synthetic cannabinoid compounds like HU, AM, JWH, XLR, CP, UR, AKB, APICA, APINACA.<sup>1,3,4</sup> Clinical effects observed to date include hallucinations, anxiety, paranoia, psychosis, agitation, confusion, seizures, nausea, vomiting, tachycardia, dyspnea, acute kidney failure, ST elevation at ECG, myocardial infarction, self-harming behaviors, suicide and death.<sup>1,5–9</sup>

SCs, originally produced for medical purposes, are now also manufactured in clandestine laboratories, mixed with herbal

products and sold under various names in attractive, bright packaging likely to be attractive to young people. They are frequently rolled up like cigarettes and inhaled. They are easily available in gas stations, places known as head shops and on the internet. The packaging may give the impression that they are harmless, natural products. They may even be sold as nail polish remover, incense or deodorants.<sup>1,5,6</sup>

SCs which entered the European market under the name of 'Spice' and 'K2' in America have been sold under the names of 'Bonzai' in Turkey since 2009.<sup>10–13</sup> SCs, which are already on the lists of prohibited substances in the U.S. and Europe, are also banned in Turkey.<sup>10,13</sup> Although they are banned, producers employ an interesting technique and are able to alter the chemical structures of SCs to enable users to avoid detection at toxicology scans. Forensic laboratories are constantly striving to keep up with new substances. The possibility of detection at toxicology tests used in hospitals is even lower. This fact enables users to perceive SCs as easily used drugs without being detected, thus it causes the common use.<sup>1,5,8</sup>

Lifetime use among university students in the U.S. ranges between 1.1% and 9.0% while the level of use among high school

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students in the previous year was 6.4%.<sup>8,14</sup> There are no prevalence studies for Turkey, but according to Turkish Drug Report, 780 kg of SCs were seized in 2013, much more than the levels for 2011 and 2012.<sup>12</sup> They may be popular among young people for reasons such as curiosity, relaxation and feeling better, perceptions of avoiding legal sanctions and easy accessibility.<sup>2,8,15</sup> They are particularly used together with cannabis and alcohol.<sup>2,8,14,16</sup>

Presentations to hospital due to SC use have increased in recent years. According to the U.S. Drug Abuse Warning Network, there were 11,406 SC-related presentations in 2010, 3/4 of which involves the 12–29 age group.<sup>1</sup> As the usage of SCs increases, the diverse health effect reports also increase. Law et al. noted that diverse health effect reports due to SCs increased by 330% between January–April 2015 in United States.<sup>17</sup>

Recent publications in Turkey particularly report hospital presentations in the adolescent age group.<sup>18</sup> The question therefore naturally arises of how aware physicians are on this subject. The only study of physician awareness was performed in Chicago and reported low awareness and a need for education.<sup>19</sup> Education in medical faculties in Turkey lasts 6 years. At the Karadeniz Technical University Medical Faculty, where this study was performed, the final year consists of internships and students attend all the theoretical classes as well as practical medicine. The increasing use of SCs and associated hospital presentations mean that medical students therefore need to have greater experience and preparation. No studies have to date investigated medical students' awareness of this subject.

The purpose of this first study in the literature on the subject involving medical students was therefore to determine the levels of awareness of SCs among the last grade medical students and the factors affecting that awareness.

## 2. Methods

This descriptive, questionnaire-based research was performed with the participation of last grade medical students of Karadeniz Technical University Medical Faculty (N = 164). It was completed with 148 interns (coverage = 90.2%).

Participation in the study was voluntary, and questionnaires were completed anonymously. At the beginning of the questionnaire, students were informed of the purpose of the study, and completion of the form was interpreted as consent. Approval for the study was granted by the Karadeniz Technical University Medical Faculty Management Board (Approval No. 2015-5/3).

The research data were collected by using a questionnaire in April–May 2015. The questionnaire consisted of four parts. The first part contained questions inquiring into sociodemographic characteristics (age, sex) and habits (smoking, alcohol use). The second part inquired into drug use, what the substance was if the subject used or experienced any, whether the subject had any friends who used drugs, if so what substances they used, whether any family members used drugs, and if so what they used. Students were next asked two multiple select questions. The first question asked which of a list of substances (amphetamine, marijuana, cocaine, heroin, morphine, ecstasy and the SCs Bonzai, K2, Spice, Jamaica and JWH) were drugs, and the second one was which of these were SCs. Blank spaces were also provided for participants to write down the names of the substances they knew other than in the list. In order to determine students' clinical knowledge of SCs, that same section also inquired into whether students had ever seen patients with drug intoxication, if so what substance was involved, and how SCs can be used (orally, inhalation, intramuscularly, intravenously or by the rectal route). Students were next asked whether they knew about the effects of SCs, and were asked to select one of three options; 1) I do not know, this research is the first time I have heard of

them, 2) I have heard of them, but I do not know their effects or 3) I know them. If the students reported that they knew, they were asked to list the effects they were familiar with. This was followed by a multiple select question intended to elicit the sources of that information (medical faculty pharmacology classes, the internet, TV or medical textbooks). The first of the last two questions in this section asked whether students had encountered reports of SC use on the social media (facebook, twitter, youtube, tumblr, instagram etc.), and the second one inquired into whether they asked patients about SCs when taking anamnesis. The final part of the questionnaire contained 15 propositions and students were asked to respond to these propositions on a 5-point Likert-type scale (completely agree, partly agree, do not know, disagree and completely disagree). Subjects responding completely agree or agree, and those responding disagree or completely disagree were combined, while the do not know option was preserved. The propositions are shown in Table 1.

An awareness score was calculated on the basis of answers to 9 questions. Eight of these were scored according to responses to the first 8 propositions shown in Table 1 (with the exception of the 2nd question, 1 point was given for expression of agreement, while in the 2nd question 1 point was given for expression of disagreement. No points were given for saying 'do not know' or for leaving a question blank). These items had a Cronbach Alpha score of 0.67. Finally, 1 point was given to the students who marked the correct options for the question in the second part of the questionnaire asking about the SCs that subjects were familiar with, and who did not incorrectly mark other substances. An awareness score out of 9 was thus calculated for each subject.

Statistical analysis was performed on SPSS 13.0 (Chicago, USA) software. Descriptive statistics were expressed as number, percentage, mean, median, standard deviation, minimum and maximum. Normal distribution of awareness scores was assessed using the Kolmogorov–Smirnov test. The Mann–Whitney U test was used to determine factors affecting awareness scores. Bonferroni adjustment was used where required. The reliability of the awareness score was calculated with Cronbach-alpha.

## 3. Results

Sociodemographic characteristics and habits of the participants are shown in Table 2. Awareness of known synthetic cannabinoid brands and JWH on the market was presented at Fig. 1.

The 17.6% (26/148) of students reported not knowing what SCs were and hearing the name for the first time in this study, while 49.3% (73/148) stated that they heard the name but were unfamiliar with the effects. Additionally, 34.5% (51/148) of students said they had seen patients with drug intoxication and 19.6% (29/148) reported having seen bonzai intoxication. Asked whether they inquired into SC use when taking anamnesis, 43.2% (64/148) of students said they had never asked, 40.5% (60/148) reported that they only asked when they knew or suspected that the patient has psychiatric disease and/or substance dependence, while 16.2% (24/148) stated that they asked all patients.

Asked about modes of SC use, 41.9% (62/148) of students cited the oral route, 40.5% (60/148) inhalation, 33.1 (49/148) the intravenous route, 12.2% (18/148) the intramuscular route and 4.1% (6/148) the rectal route. A total of 30.4% (n = 45) stated the effects of SCs. When asked to write the effects down, the five most common were hallucination (10.1%, 15/148), coma (6.8%, 10/148), impaired consciousness (6.8%, 10/148), tachycardia (6.8%, 10/148) and nausea (6.1%, 9/148).

When students were asked the source of their information about SCs, 48.6% (72/148) cited the internet including social media,

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