

ORIGINAL ARTICLE

Differences in clinical signs and severity of intoxication due to street drugs in adolescents and young adults treated in emergency departments

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Objective. To determine whether symptoms and levels of severity of intoxication from street drugs differ between adolescents and young adults who come to hospital emergency departments for treatment.

Methods. We studied a consecutive cohort of adolescents (aged 12-17 years) and young adults (aged 18-30 years) who were treated in 11 hospital emergency departments belonging to the Drug Abuse Network of Spanish Hospital Emergency Departments (REDURHE). Sociodemographic and clinical characteristics and level of severity were recorded for comparison between adolescents and young adults, adjusted for sex, alcohol co-ingestion, and type of drug used. An intoxication was recorded as severe if at least 1 of the following indicators was present: cardiac arrest, tracheal intubation, intensive care unit admission, and in-hospital death.

Results. We included a total of 2181 patients: 249 adolescents (11.4%) and 1932 young adults (88.6%). Alcohol co-ingestion and use of multiple drugs were less common in adolescents, who had significantly more events related to cannabis (in 81.1% vs 49.0% of young adults) and benzodiazepines (13.3% vs 5.5%). The adolescents had significantly fewer intoxications from the use of cocaine (10.8% vs 45.1%), amphetamines (17.3% vs 32.3%), ketamine (0.4% vs 6.0%) and gamma-hydroxybutyrate (0.4% vs 4.0%). A higher proportion of adolescents than young adults presented with diminished consciousness (23.0% vs 16.9%), but fewer manifested anxiety (15.9% vs 26.3%), palpitations (11.0% vs 19.5%), or chest pain (2.8% vs 9.2%). The pattern of associations was similar in the subgroup of intoxications due to cannabis. The adjusted model confirmed that the adolescents were more likely to have diminished consciousness, with an odds ratio (OR) of 1.851 (95% CI, 1.204-2.844) and less likely to have anxiety (OR, 0.529 (95% CI, 0.347-0.807)). Intoxication was severe in 46 patients overall (2.1%); in adolescents and young adults the proportions were 0.8% and 2.3%, respectively ($P = 0.129$). In adolescents, the OR was 0.568 (95% CI, 0.131-2.468) for severity; for component indicators, the ORs were 0.494 (95% CI, 0.063-3.892) for intubation and 0.780 (95% CI, 0.175-3.475) for intensive care unit admission. No deaths occurred.

Conclusion. Adolescents requiring emergency care for street drug intoxication had co-ingested alcohol or taken multiple drugs less often than young adults. Cannabis was the drug most often used by adolescents, who presented more often with diminished consciousness but less often with anxiety. We detected no differences related to event severity.

Keywords: Poisoning. Street drugs. Severity. Adolescents. Young adults. Emergency department.

Características diferenciales en las manifestaciones clínicas y la gravedad de las intoxicaciones por drogas de abuso en adolescentes atendidos en servicios de urgencias en comparación con adultos jóvenes

Objetivo. Investigar si existen diferencias en las drogas, sintomatología y gravedad entre adolescentes y jóvenes atendidos por intoxicación por drogas en servicios de urgencias hospitalarios (SUH).

Método. Entre los pacientes consecutivos atendidos por consumo de drogas en los 11 SUH de la REDURHE (Red de estudio de Drogas en Urgencias Hospitalarios en España), se seleccionaron los adolescentes (edad = 12-17 años) y los jóvenes (edad = 18-30 años). Se compararon las características sociodemográficas, clínicas y la gravedad (evento adverso combinado –EAC–: parada cardiorrespiratoria, intubación endotraqueal, ingreso en cuidados intensivos o muerte intrahospitalaria) en adolescentes y jóvenes, ajustadas por sexo, coingesta de etanol y drogas involucradas.

Resultados. Se incluyeron 2.181 pacientes (adolescentes = 249, 11,4%; jóvenes = 1.932, 88,6%). En adolescentes, la coingesta de etanol y múltiples drogas fue menos frecuente. Hubo significativamente más asistencias por cannabis (81,1% vs 49,0%) y benzodiazepinas (13,3% vs 5,5%) y menos por cocaína (10,8% vs 45,1%), anfetaminicos (17,3%

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vs 32,3%), ketamina (0,4% vs 6,0%) y gamma-hidroxibutirato (0,4% vs 4,0%). Los adolescentes presentaron más disminución de consciencia (23,0% vs 16,9%) y menos ansiedad (15,9% vs 26,3%), palpitaciones (11,0% vs 19,5%) y dolor torácico (2,8% vs 9,2%). Estas asociaciones se mantuvieron al analizar el subgrupo de intoxicados por cannabis. En el modelo ajustado, los adolescentes presentan más disminución de consciencia con (OR = 1,851, IC 95%: 1,204-2,844) y menos ansiedad (OR = 0,529, IC 95%: 0,347-0,807). Se observó EAC en 46 pacientes (2,0%; 0,8% vs 2,3%, $p = 0,129$). La OR ajustada en adolescentes para EAC fue 0,568 (IC 95%: 0,131-2,468), y para intubación 0,494 (IC 95%: 0,063-3,892) y para ingreso en intensivos 0,780 (IC 95%: 0,175-3,475). No hubo fallecimientos.

Conclusión. Los adolescentes intoxicados por drogas atendidos en SUH presentan con menor frecuencia coingesta de etanol o múltiples drogas. La droga más frecuentemente implicada es el cannabis, y presentan más disminución de consciencia y menos ansiedad. No detectamos diferencias en la gravedad entre adolescentes y jóvenes.

Palabras clave: Intoxicación. Drogas. Gravedad. Adolescentes. Jóvenes. Urgencias.

Introduction

The onset of illegal drug use in Spain is around 14 years of age.¹ Its long-term consequences at the level of intellectual development² are well established, as a subsequent trigger of mental illness,³ as well as facilitating the transition to permanent drug use.⁴ Its acute consequences derived from its use in relation to aggressions, traffic or work accidents, risky sexual behaviors, etc.⁵ are also known. However, few studies have analyzed its impact in terms of the severity of cases seen in hospital emergency services in Spain, both in adolescents and young people.^{6,7} In 2016, the Network for the Study of Drugs in Hospital Emergencies in Spain (REDURHE) was created, with the purpose of creating a group of emergency departments (EDs) and sentinel emergency professionals, for the permanent registration of cases of this type of intoxication that would allow updated and realistic epidemiological information on the incidence and trends of drug users who are treated at EDs for acute problems arising from their use. This network has characteristics similar to the Toxicological Observatory of the Spanish Society of Pediatric Emergencies,⁸ although it is made up of both general EDs (with care for adults and children) and pediatric emergency services.^{9,10} To our knowledge, there are no similar previous studies of this type. The aim of this paper is to analyze whether there are differences between adolescents and young people in attendance at Spanish EDs due to acute drug intoxication (toxic substances involved, symptomatology and severity).

Methods

Descriptive and prospective observational study of patients treated for symptoms derived from the use of drugs of abuse in 11 EDs that are members of the REDURHE Registry. This registry is carried out through non-probabilistic, consecutive sampling of patients treated for symptoms derived from the use of drugs of abuse, during an initial period of 24 months (from August 2017 to July 2019). The characteristics of the registry have been previously described. For the present study, all those aged between 12-17 years (adolescents) and 18-30 years (young people) were selected (Figure 1). The drugs involved were determined by clinical his-

tory or toxicological analysis, according to standard clinical practice in the ED, grouped according to a previous classification made by our group¹⁰ and others at European level.¹¹ Sociodemographic and clinical characteristics were collected, based on the REDURHE method previously published.¹⁰ Patients with pure ethyl alcohol intoxication are not included in the REDURHE registry, although ethyl alcohol consumption by the patient is included as an accompanying toxicant to the use of illegal drugs. The EDs were classified according to their location: areas with a high incidence of leisure tourism (Palma de Mallorca, Tenerife and Ibiza), large metropolises (Barcelona and Móstoles), or cities that are not primarily tourist areas (Zaragoza, Valladolid, Burgos and Salamanca). The shift of attendance was divided into: morning (8-16 hours), afternoon (16-24 hours) and evening hours (0-8 hours). The symptomatology recorded consisted of 21 symptoms and signs collected on arrival of the patient at the ED.⁹ The primary indicator of severity was the combined adverse event (CAEs) consisting of cardiorespiratory arrest, need for intubation, admission to intensive care or in-hospital death during the episode. These adverse events (AE), considered individually, formed the secondary indicators of severity.

Sociodemographic data, drug type, symptomatology, emergency department management and severity were compared according to age group (adolescents vs. young adults). For this purpose, quantitative variables were expressed as mean (standard deviation -SD-) and groups were compared using Student's T test or Mann-Whitney U test. Qualitative variables were expressed as absolute numbers and percentages and the comparison between groups was carried out using the chi-squared test or Fisher's exact test if necessary. The magnitude of associations between being an adolescent and symptomatology and severity was calculated by logistic regression and expressed as crude odds ratio (OR) with its 95% confidence interval (95% CI). For those symptoms and signs present in more than 5% of patients, ORs were adjusted for age, ethanol intake and drugs consumed, and further analyzed for the subgroups of cannabis- and amphetamine-intoxicated patients individually (the most numerous). All primary and secondary indicators of severity were also calculated on an adjusted basis. A value of $P < .05$ was considered statistically significant or if the 95% CI of the OR excluded

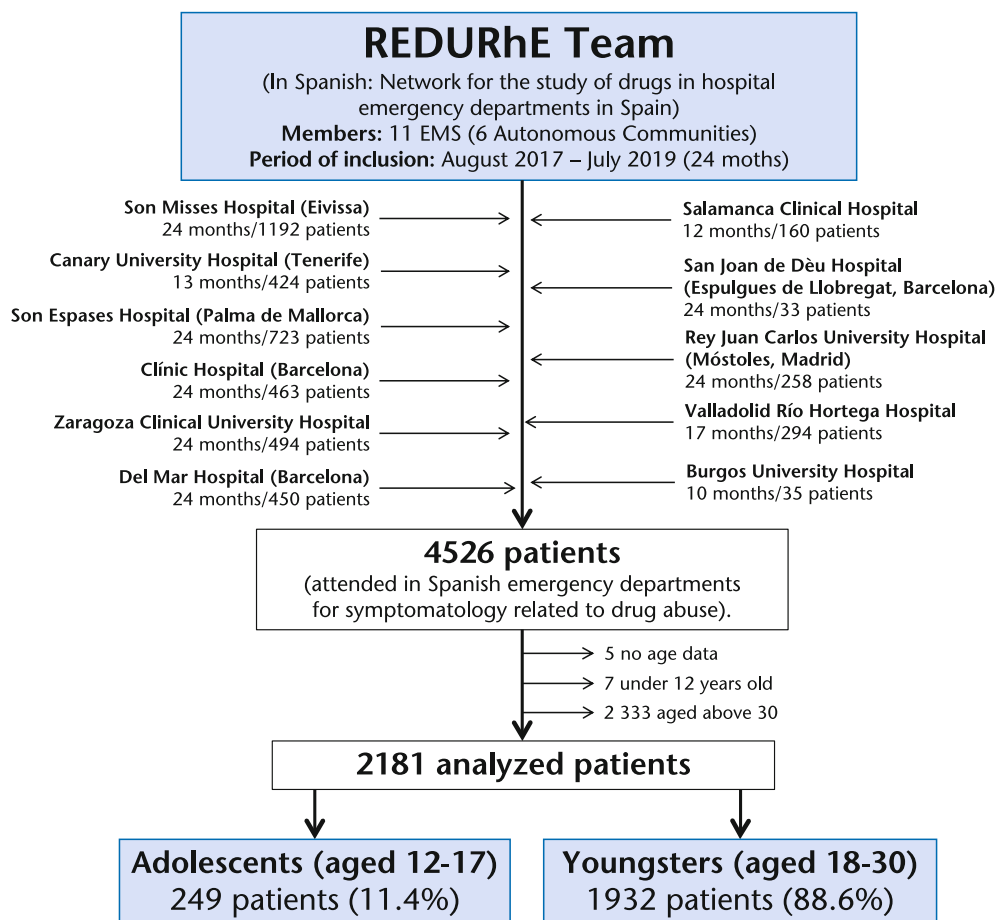


Figure 1. Patient inclusion flowchart.

the value 1. The SPSS vs 25.0 package for Windows was used for statistical analysis.

The study was approved by the Research Ethics Committee of the Hospital Universitario de Canarias (Tenerife), with reference protocol number 2016-71. The study was exempted from the request for informed consent from patients, as it is an epidemiological study that complies with the objectives of the National Plan on Drugs (Spanish Acronym, PND) in its calls for projects and lines of research, and an anonymized database was used.

Results

2181 patients were analysed (adolescents = 249, 11.4%; young adults = 1932, 88.6%) (Figure 1), of whom 27% were female. 52.9% of the adolescents were brought to the ED by ambulance and were more frequently female (36.1% vs. 25.8%; $P = .001$), attended the ED more frequently on holidays (56.6% vs 49.6%; $P = 0.036$), in the evening ($P < .001$) and more frequently from non-tourist areas ($P < .001$). They also had less ethanol intake (47.6% vs. 62.8%; $P < .001$) and fewer intoxications due to drug combinations (31.7% vs. 40.2%; $P = .01$) (Table 1). There was a higher per-

centage of intoxications with the presence of cannabis (81.1% vs. 49.0%) and benzodiazepines (13.3% vs. 5.5%) and a lower percentage with cocaine (10.8% vs. 45.1%), amphetamine derivatives (17.3% vs. 32.3%), ketamine (0.4% vs. 6.0%) and gamma-hydroxybutyrate (0.4% vs 4.0%) ($P < .001$ for all comparisons). The percentage of unknown substances was 5.2%, with no differences between the two groups (Table 1). Adolescents presented agitation/aggressiveness (28.9%), decreased level of consciousness (23%), anxiety (15.9%), vomiting (14.2%), palpitations (11%) and psychotic symptoms (7.8%) as the most frequent symptoms and signs in emergency care. Regarding young people, adolescents presented more frequently with decreased consciousness (23.0% vs. 16.9%; $P = .019$) and less frequently with anxiety (15.9% vs. 26.3%; $P < .001$), palpitations (11.0% vs. 19.5%; $P = .001$) and chest pain (2.8% vs. 9.2%; $P = .001$) (Table 2). These same significant associations were found when analyzing only the subgroup of patients who had consumed. Adolescents presented agitation/aggressiveness (28.9%), decreased level of consciousness (23%), anxiety (15.9%), vomiting (14.2%), palpitations (11%) and psychotic symptoms (7.8%) as the most frequent symptoms and signs in emergency care. Regarding young people, adolescents presented more frequently with de-

Table 1. Sociodemographic characteristics and drugs detected in patients, and comparison between adolescents and young adults

	Total N = 2181 n (%)	Missing Data n (%)	Adolescents N = 249 n (%)	Youngsters N = 1932 n (%)	P
Sociodemographic characteristics					
Sex: Male	1593 (73.0)	0	159 (63.9)	1434 (74.2)	.001
Brought to the emergency department by EMS	1235 (58.5)	0	127 (52.9)	1108 (59.2)	.062
Attention in the emergency department on a public holiday	1099 (50.4)	0	141 (56.6)	958 (49.6)	.036
Emergency room hours of operation					
Night (0-8h)	879 (40.3)	0	93 (37.3)	786 (40.7)	< .001
Morning (8-16 h)	594 (27.2)	0	48 (19.3)	546 (28.3)	
Afternoon (16-24 h)	708 (32.5)	0	108 (43.4)	600 (31.1)	
Location of emergency services					
In high leisure tourism area	1139 (52.2)	0	79 (31.7)	1060 (54.9)	< .001
In large metropolis area	515 (28.1)	0	70 (28.1)	505 (26.1)	
In non-tourist city area	467 (21.4)	0	100 (40.2)	367 (19.0)	
Substances identified					
Ethanol use	1148 (60.9)	296 (13.6)	110 (47.6)	1038 (62.8)	< .001
Multiple drug use	856 (39.2)	0	79 (31.7)	777 (40.2)	.010
Number of drugs used [mean (SD)]	1.52 (0.74)	0	1.37 (0.59)	1.54 (0.75)	.001
Drugs involved					
Cannabis and derivatives	1149 (52.7)	0	202 (81.1)	947 (49.0)	< .001
Cocaine and derivatives	898 (41.2)	0	27 (10.8)	871 (45.1)	< .001
Amphetamines and derivatives	668 (30.6)	0	43 (17.3)	625 (32.3)	< .001
Benzodiazepines	139 (6.4)	0	33 (13.3)	106 (5.5)	< .001
Ketamine	117 (5.4)	0	1 (0.4)	116 (6.0)	< .001
Gamma-hydroxybutyrate and derivatives	78 (3.6)	0	1 (0.4)	77 (4.0)	.004
Opiates	68 (3.1)	0	6 (2.4)	62 (3.2)	.494
LSD and other hallucinogenic substances	25 (1.1)	0	4 (1.6)	21 (1.1)	.469
Psychotropic drugs (not included in other groups)	21 (1.0)	0	2 (0.8)	19 (1.0)	.784
New psychoactive drugs (not included in other groups)	3 (0.1)	0	0 (0)	3 (0.2)	1.000
Other substances (not included in other groups)	35 (1.6)	0	7 (2.8)	28 (1.4)	.107
Unknown substance	114 (5.2)	0	15 (6.0)	99 (5.1)	.548

Values in bold represent those reaching statistical significance ($P < .05$).

EMS: emergency medical system; LSD: lysergic acid diethylamide; SD: standard deviation.

Table 2. Clinical characteristics of patients and comparison of their frequencies, in adolescents and young adults

	Total N = 2181 n (%)	Missing Data n (%)	Adolescents N = 249 n (%)	Youngsters N = 1932 n (%)	P
Agitation/Aggressive behavior	690 (31.8)	13 (0.6)	71 (28.9)	619 (32.2)	.289
Anxiety	545 (25.1)	13 (0.6)	39 (15.9)	506 (26.3)	< .001
Palpitations	401 (18.5)	13 (0.6)	27 (11.0)	374 (19.5)	.001
Decreased consciousness	368 (17.6)	86 (3.9)	55 (23.0)	313 (16.9)	.019
Vomiting	287 (13.2)	13 (0.6)	35 (14.2)	252 (13.1)	.627
Psychotic symptoms	206 (9.5)	14 (0.6)	19 (7.8)	187 (9.7)	.321
Chest pain	181 (8.5)	41 (1.9)	7 (2.8)	174 (9.2)	.001
Hallucinations	156 (7.2)	15 (0.7)	12 (4.9)	144 (7.5)	.138
Coma	120 (5.7)	86 (3.9)	10 (4.2)	110 (5.9)	.275
Seizures	114 (5.3)	13 (0.6)	11 (4.5)	103 (5.4)	.557
Symptomatic hypertension	100 (4.7)	51 (2.3)	6 (2.4)	94 (5.0)	.075
Headache	81 (3.7)	14 (0.6)	11 (4.5)	70 (3.6)	.510
Extreme tachypnea (> 30 brpm)	13 (3.3)	1786 (81.9)	1 (3.0)	12 (3.3)	.930
Arrhythmias	65 (3.1)	74 (3.4)	8 (3.3)	57 (3.1)	.843
Symptomatic hypotension	46 (2.2)	53 (2.4)	9 (3.7)	37 (2.0)	.086
Extreme tachycardia (> 150 bpm)	36 (1.8)	225 (10.3)	1 (0.5)	35 (2.0)	.112
Extreme bradypnea (< 10 brpm)	3 (0.8)	1786 (81.9)	0 (0)	3 (0.8)	1.000
Hypothermia (< 34°C)	6 (0.4)	731 (3.5)	0 (0)	6 (0.5)	.404
Cerebellar symptomatology	6 (0.3)	22 (1.0)	0 (0)	6 (0.3)	.379
Extreme bradycardia (< 40 bpm)	2 (0.1)	225 (10.3)	1 (0.5)	1 (0.1)	.208
Hyperthermia (> 40°C)	2 (0.1)	731 (33.5)	0 (0)	2 (0.2)	1.000

Values in bold represent those that reach statistical significance ($P < .05$).

brpm: breaths per minute; bpm: beats per minute; °C: degrees Celsius.

Table 3. Comparison of clinical features that were present in more than 5% of cases of adolescents and young adults seen in the emergency department for cannabis and amphetamine intoxication

	Cannabis (N = 1.149)			Amphetamines (N = 668)		
	Adolescents N = 110 n (%)	Youngsters N = 1.038 n (%)	P	Adolescents N = 43 n (%)	Youngsters N = 625 n (%)	P
Agitation/Aggressive behavior	61 (30.7)	320 (34.1)	.347	13 (30.2)	228 (36.5)	.405
Axiety	29 (14.6)	234 (24.9)	.002	8 (18.6)	160 (25.6)	.304
Palpitations	18 (9.0)	162 (17.3)	.004	6 (14.0)	147 (23.6)	.147
Decreased consciousness	40 (20.8)	112 (12.3)	.002	10 (23.8)	113 (19.3)	.475
Vomiting	32 (16.1)	160 (17.1)	.738	3 (7.0)	59 (9.5)	.558
Psychotic symptoms	16 (8.1)	129 (13.8)	.030	5 (11.6)	46 (7.4)	.310
Chest pain	4 (2.0)	68 (7.3)	.005	3 (7.0)	49 (8.0)	.802
Hallucinations	11 (5.5)	88 (9.4)	.079	0 (0)	39 (6.3)	.091
Coma	8 (4.2)	26 (2.9)	.345	2 (4.8)	52 (8.9)	.359
Seizures	7 (3.5)	54 (5.8)	.203	2 (4.7)	25 (4.0)	.836

Values in bold represent those reaching statistical significance ($P < .05$).

creased consciousness (23.0% vs. 16.9%; $P = .019$) and less frequently with anxiety (15.9% vs. 26.3%; $P < .001$), palpitations (11.0% vs. 19.5%; $P = .001$) and chest pain (2.8% vs. 9.2%; $P = 0.001$) (Table 2). These same significant associations were found when only the subgroup of patients who had consumed cannabis was

analyzed, but not for the consumption of amphetamine derivatives (Table 3). The direct association with decreased level of consciousness was maintained in the multivariate analysis adjusted for age group, alcohol intake and drug type, with an adjusted OR of 1.851 (95% CI: 1.204-2.844), as was the inverse association

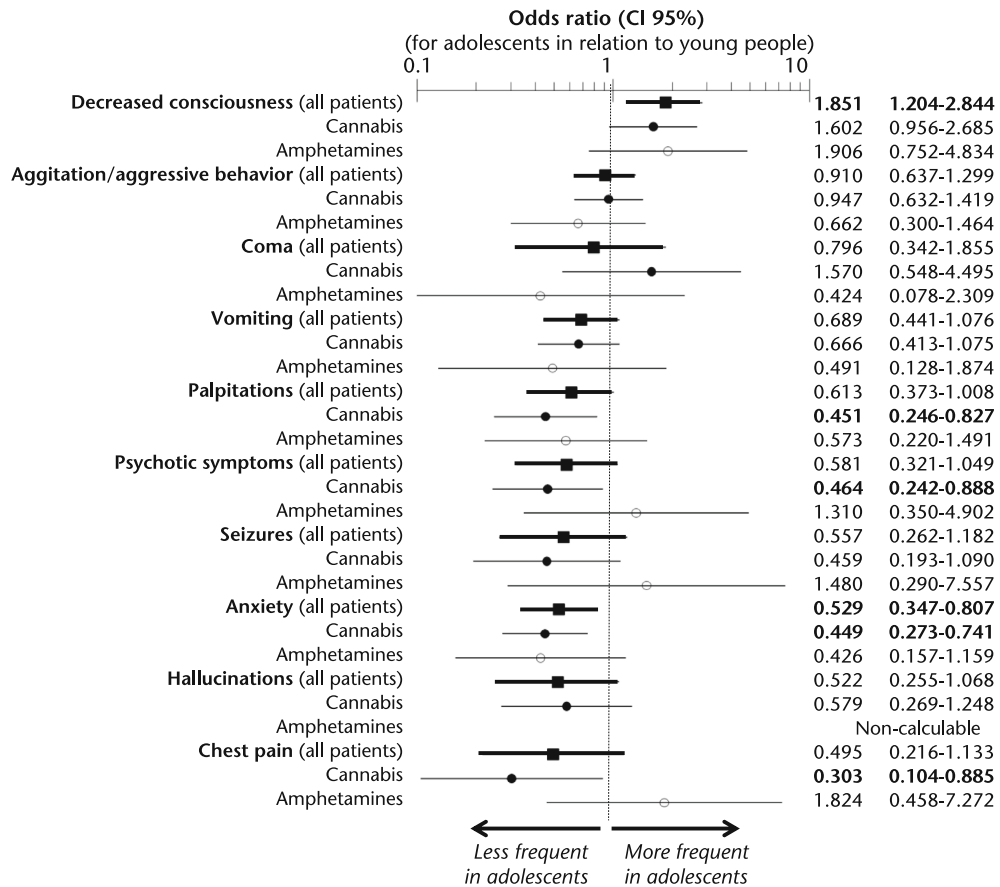


Figure 2. Analysis adjusted for sex, alcohol intake and drug type of the association between adolescent and symptomatology presented during drug intoxication. Symptomatology that was present in at least 5% of the cases was included in the model, and the association was calculated for all intoxicated individuals in general and for those intoxicated by the two drugs most frequently involved (cannabis and amphetamine derivatives) in particular. Values in bold represent those reaching statistical significance ($P < .05$).

Table 4. Primary and secondary markers of severity of the episode of care of patients attended for drug intoxication in the emergency department and magnitude of their association in adolescent patients compared with young patients

	Total N = 2181 n (%)	Missing Data n (%)	Adolescents N = 249 n (%)	Youngsters N = 1932 n (%)	P	Raw Odds ratio (CI 95%)	Adjusted Odds ratio (CI 95%)
Primary Objective							
Combined adverse event	46 (2.1)	17 (0.8)	2 (0.8)	44 (2.3)	.129	0.349 (0.084-1.449)	0.568 (0.131-2.468)
Secondary Objectives							
Need for intubation	28 (1.3)	14 (0.6)	1 (0.4)	27 (1.4)	.191	0.286 (0.039-2.116)	0.494 (0.063-3.892)
Initial cardiorespiratory arrest	3 (0.1)	0 (0)	0 (0)	3 (0.2)	.534	NC	NC
ICU hospitalization	30 (1.4)	9 (0.4)	2 (0.8)	28 (1.5)	.410	0.551 (0.130-2.325)	0.780 (0.175-3.475)
Death during the episode	0 (0)	0 (0)	0 (0)	0 (0)	NC	NC	NC

NC: not calculated.

with anxiety, with an adjusted OR of 0.529 (95% CI: 0.347-0.807). The adjusted analysis for the subgroup of patients with cannabis intoxication showed similar results to those of the crude analysis, with significant inverse associations with palpitations, psychotic symptoms, anxiety and chest pain (Figure 2). The presence of CADs was observed in 46 patients (2.1%), less frequently in adolescents than in young people, although without statistically significant differences (0.8% vs. 2.3%; $P = .129$). The adjusted OR in adolescents for AE was 0.568 (95% CI: 0.131-2.468). The adjusted ORs for orotracheal intubation and intensive care admission were also non-significant (OR = 0.494, 95% CI: 0.063-3.892; and OR = 0.780, 95% CI: 0.175-3.475; respectively). No deaths were recorded in the series (Table 4).

Discussion

In Spain, poisonings in patients aged 0 to 14 years account for 0.3% of pediatric emergencies. Between 1.5% and 9% of these poisonings are due to drugs, depending on the age subgroup or the inclusion or not of ethyl alcohol as a drug.^{6,7,11,12}

In this study, it should be noted that, although alcoholic beverages are a legal product, their sale and consumption by minors is not permitted in Spain. Even so, 47.6% of the adolescents who attended the emergency department consumed alcoholic beverages. In this series, more than one third of the intoxicated adolescents were women. This figure is significantly higher than expected: in both the ESTUDES survey and the EDADES survey (age group under 30 years), males predominate in all types of consumption (sporadic, monthly), and the representation of females does not exceed 23.5%.^{1,13} Given that we studied hospital emergency room attendances, we cannot rule out the possibility that this difference is due either to higher consumption or to pathophysiological factors associated with the female gender.

The predominance of females could also be explained, in part, by the greater presence of benzodiazepines among adolescents, where their use among females does predominate in the surveys. However, their relatively low presence (13.3%) compared to cannabis (81.1%) makes this hypothesis implausible. In any case, it is important to keep this prevalence of use in women

in mind when inquiring about the existence of chemical submission phenomena in EDs.¹⁴

We observed a different pattern of care in terms of the drugs involved between adolescents and young people, mainly associated with the majority presence of cannabis in ED visits by those under 18 years of age, as well as a greater presence of benzodiazepines than expected. According to the latest data from the ESTUDES¹⁹ survey, conducted on a sample of 38 010 high school students, in 2018 cannabis was the third most prevalent drug among students aged 14 to 18 years and the most prevalent illegal substance. Thirty-three percent reported having used it at some time in their lives, 27.5% in the previous 12 months, 19.3% in the last month and 2.3% doing so daily. These prevalences have remained practically stable since 2006, after an increase from 2000 until that year. The mean age of onset of consumption also remained stable, at 14.9 years, and practically similar in men and women (15 vs. 14.9 years, respectively). However, the increased potency of cannabis in recent years,¹⁵ the rise of new forms of use such as vaping¹⁶ (whose use has increased from 1.8% in 2016 to 5.4% in 2018)¹ where synthetic cannabinoids more potent than naturally occurring cannabis¹⁶⁻¹⁸ are most likely used, and the greater availability to adolescents relative to other illegal drugs¹⁹ may be behind the incidence of cannabis cases seen in the ED.²⁰ Also the trivialization of its use,²¹ associated with the powerful cannabis industry, the misnamed medical cannabis²² and the legalization of its use in certain countries,²³ probably contribute to this higher incidence.

It is noteworthy that, although the prevalence of use in the last 12 months increased from 12.3% at 14 years of age to 38.7% at 18 years of age, in our series there was a significant decrease in emergency room visits involving cannabis, from 81.1% in adolescents to 49% in young people. Something similar occurs with so-called problematic cannabis use (CAST score > 4),²⁴ which goes from 10% at 14 years of age to 19.3% at 18 years.¹ It is possible that as the age of the adolescent advances, the use of other substances of abuse (which cause the relative representation of cannabis-related ED visits to decrease) may be more common, while there may be greater tolerance or adaptation to the symptomatology derived from cannabis use, and thus fewer ED visits for its use.¹² In drug-intoxicated ad-

olescents, decreased consciousness is more frequent and anxiety is less frequent, without this being related to age, gender or the coexistence of ethanol or multiple drugs. On the other hand, although some of the psychiatric symptoms (agitation, psychosis, hallucinations) can be related to cannabis use (which was more frequent in the group of adolescents), their prevalence was not increased in them in the overall analysis of intoxicated patients and, in the case of acute psychosis, its presence was even significantly lower in the specific subgroup of those intoxicated by cannabis. In any case, we should be alert to the development of variegated psychotic symptomatology, an increasingly frequent phenomenon related to both phytocannabinoids and synthetic cannabinoids.^{25,26} In the present study, as we did not know the potency of the cannabis consumed or its concentrations in blood, it is not possible to elaborate any pathophysiological or clinical thesis on this fact. Nor was it possible to investigate drug consumption with the presence of chemical submission, or with previous psychiatric antecedents, as their collection was not included in the study design. Vomiting was similar in both groups, with an incidence of 13.2%, and there were also no differences when the cases in which cannabis was present were analyzed individually. We must draw attention to the need to consider cannabis hyperemesis syndrome as a differential diagnosis in emergency department care,^{27,28} as it is too often overlooked,²⁸ despite the increasing awareness of this relatively new clinical entity. Although it is unlikely to occur in the adolescent segment of the population, because of the long period of heavy cannabis use required for its development, some data indicate that due to circumstances that are not well known (potency of cannabis, synthetic varieties, etc.) it may develop early in heavy users with a few years of use.²⁹⁻³¹

Regarding the severity of intoxications, none of the AEs analyzed, combined or individually, was statistically increased in adolescents, and all the estimates offered ORs below 1 in relation to young people. We believe that this fact should not be interpreted as a theoretical safety profile in the use among adolescents, but is possibly related to the lower use by adolescents of sympathomimetic (amphetamine derivatives, cocaine), sedative (opiates, GHB) and dissociative (magic mushrooms, LSD) drugs, and to the moderate co-ingestion of multiple drugs and the lower number of drugs consumed, as is the case in other European^{32,33} and American series.³⁴ Even so, the percentage of severe symptoms among adolescents is not negligible: 4.2% of coma, 4.5% of convulsions, 3.7% of symptomatic hypotension or 3.3% of arrhythmias.³⁵

For this reason, it is essential to monitor severe poisoning in this vulnerable population segment, and emergency departments can play an important role in this regard, as demonstrated by the REDURHE registry.³⁶

This study has several limitations. First, the participation of the centers was voluntary and, therefore, did not cover the entire Spanish territory homogeneously and may not be representative of certain areas. This as-

pect has already been highlighted by Salazar et al. in the case of pediatric poisoning.¹¹ Secondly, recruitment in some EDs was not carried out throughout the study period. Third, the diagnosis of the type of drug involved was based on the clinical history and in some cases by drug identification using enzyme immunoassay techniques.³⁷ Therefore, some substances may not have been identified by the patient or by the analysis. It could also happen that the drug reported by the patient was not really the one consumed, due to the use of other substances or drugs as adulteration products.³⁸ However, we believe that these aspects do not detract from the validity of the study, based on the one hand on the usual clinical practice in the emergency department, where drug screening is not always performed, and on the other hand on the fact of considering a priori that, when requesting medical assistance, patients are likely to report truthfully the drugs consumed.

Fourth, the adjudication of serious events was performed locally, by the principal investigator of each center, without external monitoring. Nevertheless, the events considered are very objective and probably subject to little interpretative bias, so we consider this limitation to be of little relevance. And fifth, despite being a large series, for some symptomatology or for AE the number of cases was small, so we could have incurred a beta error by dismissing the existence of statistical significance in some differences found.

Nevertheless, we believe that the present study presents an important volume of cases of drug intoxication in Spain, comparable to that of other series,⁷ and covers both pediatric emergency departments and general emergency departments, so we believe that it contributes to the knowledge of this health problem with data not found to date and that it complements existing data.^{7,8} In addition to establishing a comparison of adolescents with the next age group, that of young people with full health and legal autonomy.

As conclusions, we can say that drug intoxicated adolescents seen in the ED present less frequently with ethanol or multiple drug co-ingestion, and that the most frequently implicated drug is cannabis. Intoxicated adolescents develop more decreased consciousness and less anxiety. We detected no differences in the severity of drug intoxication episodes between adolescents and young adults. Nevertheless, EDs constitute an epidemiological niche in which to develop programs for early detection of changes in consumption patterns,³⁹ intensity or type of AE, and in which it would be potentially possible to carry out interventions in relation to drug use in adolescents.^{40,41}

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Adenda

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