



**HAL**  
open science

## Patterns of substance use in adolescents attending a mental health department

Rosa Díaz, Javier Goti, Montse García, Antoni Gual, Lourdes Serrano, Laura  
González, Rosa Calvo, Josefina Castro-Fornieles

► **To cite this version:**

Rosa Díaz, Javier Goti, Montse García, Antoni Gual, Lourdes Serrano, et al.. Patterns of substance use in adolescents attending a mental health department. *European Child and Adolescent Psychiatry*, 2011, 20 (6), pp.279-289. 10.1007/s00787-011-0173-5 . hal-00690066

**HAL Id: hal-00690066**

**<https://hal.science/hal-00690066>**

Submitted on 21 Apr 2012

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## **PATTERNS OF SUBSTANCE USE IN ADOLESCENTS ATTENDING A MENTAL HEALTH DEPARTMENT**

Rosa Díaz, PhD<sup>1</sup>, Javier Goti, MD<sup>1</sup>, Montse García, PhD<sup>3</sup>, Antoni Gual, MD, PhD<sup>2</sup>, Lourdes Serrano, MA<sup>1</sup>, Laura González, MA<sup>1</sup>, Rosa Calvo, MD, PhD<sup>1</sup>, Josefina Castro-Fornieles, MD, PhD<sup>1,4,5</sup>

<sup>1</sup> Department of Child and Adolescent Psychiatry and Psychology. Institute of Neurosciences. Hospital Clínic Universitari of Barcelona. Biomedical Research Center in Mental Health Network CIBER-SAM. Spain.

<sup>2</sup> Alcohol Unit. Department of Psychiatry. Institute of Neurosciences. Hospital Clinic Universitari of Barcelona, Spain.

<sup>3</sup> Cancer Prevention and Control Unit. Catalan Institute of Oncology. Barcelona. Spain.

<sup>4</sup> IDIBAPS (Institut d'Investigacions Biomèdiques August Pi Sunyer). Barcelona. Spain.

<sup>5</sup> Department of Psychiatry and Clinical Psychobiology. Health Sciences Division. University of Barcelona. Spain.

### **Address correspondence to:**

Rosa Díaz

Department of Child and Adolescent Psychiatry and Psychology

Institute of Neurosciences

Hospital Clinic Universitari of Barcelona

C/ Villarroel, 170 – 08036 - Barcelona

Tel: + 34 93 227 99 74

FAX: + 34 93 227 91 72

E-mail address: [rdiaz@clinic.ub.es](mailto:rdiaz@clinic.ub.es)

## **ABSTRACT**

**Objective:** To describe patterns of substance use in adolescents initiating mental health treatment, and to analyse factors associated to a high risk pattern of substance use differentially by gender.

**Methods:** Two hundred and thirty seven 12- to 17-year-old new patients in an urban public mental health service were prospectively recruited and evaluated using semi-structured interviews and standardized questionnaires to obtain socio-demographic, psychopathological, family, school and substance use data.

**Results:** The most prevalent primary diagnoses among males were attention deficit disorder and conduct disorder, while among females they were eating disorders, affective and conduct disorders. Substance use disorder was diagnosed as follows: cannabis in 10.1% of the sample, alcohol in 3.4% and other drugs in 0.4%. A pattern of substance use with high risk of developing problems (at least regular use of alcohol or occasional use of cannabis or other illegal drugs) was found in 48.9% of the sample. After adjusting for age in the multivariate logistic regression, this pattern of risky use of drugs was found to be associated with Youth Self Report scales of thought problems, delinquent and aggressive behaviour, in both genders. Altered family structure, having had to repeat a school grade and Youth Self Report attention problems were only significantly associated with risky drug consumption in females.

**Conclusion:** The high prevalence of risky and problematic substance use in adolescents entering mental health treatment warrant early systematic screening and specific preventive and therapeutic interventions, addressing mental health psychoeducation and motivation to avoid drugs, as well as differential associated risk factors for males and females.

**Key words:**

Substance abuse, dual disorders, risk factors, adolescents.

## INTRODUCTION

Recent epidemiological studies in different countries report an increase in substance use and substance related problems among adolescents [1-3]. According to data from the Spanish Observatory of Drugs [1] the prevalence of recent cannabis use (last 30 days) among adolescents aged 14-18 increased from 12.4% in 1994 to 25.1% in 2004, and the prevalence of recent cocaine use increased from 1.1% to 3.8% during the same period. Additionally, patterns of alcohol use have shown a tendency towards uniformity with other North European countries, with recreational binge drinking concentrated in the weekend. Furthermore, a decrease in the age of first use of the different drugs has been reported. These changes could be related to a high availability of drugs and to a reduced perception of risk of drug use, due to current global socio-cultural influences. This trend to the “normalization” of the use of drugs could affect specially to adolescents with emotional or behavioural disorders since they are especially vulnerable to the development of substance use disorders (SUD) [4].

In adolescents with psychiatric disorders, rates of comorbidity with SUD vary from 11 to 70% depending on the setting (primary care vs. clinical or legal settings; drug vs. psychiatric service, outpatient vs. inpatient), the type of drug (legal vs. illegal) and the type of SUD (abuse vs. dependence) [5,6]. Most of the studies in this field have been conducted with inpatients or severely impaired psychiatric patients [7-9], with rates of SUD reported at between 60 and 70%. One of the few studies carried out with outpatients [10] examined 220 adolescents (51% males, 12-18 years old) and found that approximately half of them had used nicotine and alcohol, one third marijuana and 10% narcotics. In the same year, Wilens et al. [11] reported a 11% prevalence of SUD in adolescents referred for psychopharmacological evaluation. A more recent study, based on a sample comprising 80% outpatients [12], reported a prevalence of SUD of 16.6%.

The majority of epidemiological studies in this field have tended to consider either rates of any substance use or rates of SUD, without taking into account the continuity from experimental substance use to SUD. Moreover, adult based DSM-IV diagnostic criteria of SUD (abuse or dependence) have been criticized as not being fully applicable to adolescents, and several authors have supported a more dimensional approach [4,6,13]. More specifically, Shrier et al. [6]

suggested the use of the additional category of substance use problems (SUP), also called “sub-diagnostic” or “diagnostic orphans”, for those adolescents that while not strictly fulfilling the diagnostic criteria for SUD, have a high probability of fulfilling them in the future if they maintain their pattern of consumption. Therefore, in this study we have used an ordinal categorization of the patterns of substance use to cover the above-mentioned continuity, from non-use to dependence.

In an attempt to explain the development of drug problems, several risk factors have been identified as being related to SUD in non-clinical samples, as externalizing symptoms (especially impulsivity and delinquent predisposition, but also attention dysfunction), low self-esteem or depressive symptoms, disrupted family structure or dynamics, family history of SUD and/or other psychiatric disorders, poor school achievement, deprived socio-economic status, negative life events (i.e., parental death before the age of 15 or child abuse), and early initiation in use [4,14-16]. Some of these factors could be more specific to males (i.e., externalizing symptoms) and others to females (i.e. internalizing symptoms) [4,17,18].

In clinical adolescent samples, SUD diagnoses are frequently co-morbid with conduct disorder (CD), attention-deficit/hyperactivity disorder (ADHD) and depression [19-21]. Gender differences in risk factors associated with SUD have also been identified in clinical samples [7,17,19]. In a sample of adolescent psychiatric inpatients, Becker & Grilo [7] reported that anti-social tendencies seem to be one of the common factors in both males and females; low self-esteem and childhood abuse seem more specific to females, and age for males. In this particular study, the authors considered the dimensionality of substance use by using quantitative scores from alcohol and drug screening questionnaires, although the study of inpatients reduced the applicability of these results to prevention and added confounding factors related to severity of psychiatric symptoms. Martin et al's. study with outpatients [10], found that substance use correlated significantly with high-risk behaviours and feelings of impulsivity and need (bodily wants) in males, and with self-destructive behaviours and sociopathic feelings in females.

Replications of the above described results and more thorough analysis of risk factors associated with the early stages of substance use in patients that do not present particularly marked psychiatric impairment could be of great help for improving selective preventive interventions, as

has been suggested for other at-risk populations such as the children of alcoholics [22]. Therefore, in this study we prioritize some socio-demographic and psycho-social variables for their potential significance as early risk factors in the initial phases of substance use involvement, in order to suggest specific targets for early preventive interventions in high risk clinical populations. This study could have special value, given the lack of such studies in Spain.

The main objective of this study is to describe substance use patterns in non-severely impaired adolescents initiating mental health treatment, according to their age, gender and primary psychiatric disorder. In addition, the study aims to replicate in this non-severe clinical sample the association between several family, clinical and academic factors and early stages of SUP-SUD. Finally, according to established reports, we expect to find differential psychopathological traits between males and females.

## **METHODS**

### **Subjects**

The patients included in this study were 12- to 17-year-old adolescents, consecutively admitted to treatment for psychiatric reasons other than SUD, between March 2004 and September 2005, at the Department of Child and Adolescent Psychiatry and Psychology in a general public hospital in an urban area of Barcelona (Spain). Patients in a psychotic acute state or severely depressed (n=10) and those mentally retarded or with severe learning disabilities (n=15) were excluded. From a total of 324 eligible patients, 48 refused to participate, 33 failed to complete a substantial part of the protocol and six patients were referred to residential treatment before finishing the evaluation protocol. More than 80% of the sample were outpatients with non-severe psychiatric problems. Complete evaluation was performed on 237 adolescents (73.15% of the eligible sample).

### **Procedure**

Patients were recruited prospectively at the time of their first visit to the center. After written informed consent had been obtained from adolescent patients and their parents or mentors, they

were assessed with a battery including the instruments described below, according to a protocol approved by the ethics committee of the Institution. The assessment was conducted in two sessions coinciding with the patient's initial visits to the Department.

## **Study variables**

### *Socio-demographic, clinical and school data*

Adolescents were evaluated with semi-structured interviews translated and adapted from those used in the *Collaborative Studies on Genetics of Alcoholism*, the clinical and research utility of which have been demonstrated in previous studies [22, 23]. These interviews allowed us to obtain measures of socio-demographic variables (age, gender, family structure, and socio-economic status), family biological antecedents of alcohol and drug abuse or dependence, and school achievement (number of repeated school grades). The need for psychological or psychiatric care before the age of twelve was also recorded.

### *Substance use pattern and age at first use*

According to quantity/frequency measures of drug consumption, situational variables and problem associated to use obtained from the semi-structured interviews, the pattern of use of each drug (tobacco, alcohol, cannabis and other drugs) was coded into five ordinal categories: 1) No consumption, 2) Occasional consumption, from time to time, at parties, during holidays or social events, 3) Regular consumption, almost daily use for tobacco, almost weekly use for alcohol and cannabis, almost monthly use for stimulants or other drugs, with no evidence still of drug-related problems, 4) SUP, quantity-frequency and/or situational pattern of consumption that cause some problems with drugs, as regular drunkenness, hangover, use of cannabis during school days, conflicts at home, difficulty to have fun without using drugs, etc., although still sub-diagnostic, according Shrier [6] and Mason [4], and 5) SUD, a clear diagnosis of abuse or dependence according to DSM-IV-TR criteria [24]. Finally, the age at first use of each drug was also recorded.

Due to the need of dummy variables to perform logistic regression, the sample was divided into two groups, according the estimated risk to develop SUP-SUD, based in the global pattern of substance use. We excluded tobacco from this global variable, following other authors [9,11]), because its use affects less dramatically daily adaptive behaviour (i.e. school achievement, motivation to usual activities). This new variable had two categories: a) *Low risk pattern of use*, if no consumption of any drug or only occasional and very moderate use of alcohol, and b) *High risk pattern of use*, if regular or more use of alcohol or at least occasional use of cannabis or any use of other illegal drugs. Taking into account the psychiatric status of the study population, even regular use of alcohol or occasional use of illegal drugs may increase significantly the risk of problems, due to a higher probability of impulsive or compulsive behaviour, or to a greater reinforcement from drugs in alleviating psychiatric symptoms [20, 30].

### *Family Environment*

The Family Environmental Scale (FES) [25] was completed by one of the parents (usually the mother) to assess the quality of family relationships and functions in eight different domains (rank:1-9): cohesion, expressiveness, conflict, achievement orientation, socio-cultural orientation, moral-religious orientation, organization and control.

### *Behavioural and emotional problems*

In order to obtain dimensional data on adolescent behavioural and emotional problems in the six months prior to evaluation, each patient completed the Youth Self-Report scale (YSR) and their parents the Child Behaviour Checklist (CBCL) [26].

## **Data Analysis**

After an initial descriptive analysis of the sample for the different variables studied, and specifically patterns of substance use, we divided the sample into two groups (low and high risk pattern of substance use) and performed comparative analyses using  $\chi^2$  for categorical variables, non-parametric tests for ordinal variables or those not fulfilling normative conditions or homocedasticity, and Student's t-test or ANOVA (if more than two groups) for quantitative



variables. Multivariate logistic regression methods, controlling for possible confounding variables, were used to examine the relationship between the different significant socio-demographic or psycho-social factors and a risky pattern of substance use. Some relevant variables were dichotomized to be included in the analysis of the odds ratio and alpha was set at 0.05. Data were analyzed with SPSS (*Statistical Package for the Social Sciences*) version 14.0.

## **RESULTS**

### **Characteristics of the sample**

#### *Socio-demographic and psychiatric data*

Among the 237 patients included in this study, 33.3% were male and 66.6% female. The mean age was  $14.75 \pm 1.48$  years, and male patients were significantly younger than female' (Table 1). Almost half the sample came from families that were constituted by both parents, either biological or foster, living at home since the child's birth. Patients came predominantly from families with a middle socio-economic status.

- Insert Table 1 about here -

Table 1 also shows the prevalence of primary diagnoses in the sample by gender. For males, the most prevalent psychiatric diagnosis in this sample was ADHD followed by CD. Eating disorder was the predominant diagnosis in females, followed by mood disorder and CD. In this sample, only five subjects (2.1%) received a primary diagnosis of SUD (abuse or dependence) although more than 12% presented SUD as a second or third diagnosis (excluding tobacco). In fact, more than 90% of the patients presented multiple diagnoses (i.e. eating disorder and major depression, or ADHD and CD)

#### *Analysis of missing data*

Eligible patients refusing to collaborate or early referred to a more intensive treatment (n=87) were more frequently male than those actually included in the study (43.5% vs. 33.2%). They

also presented more frequently a primary diagnosis of CD (22.9% vs. 11.39%) or SUD (9.14% vs. 2.10%). There were no significant differences in age between patients included and those not included in the study.

### *Substance use pattern and age of first use*

Table 2 shows subject distribution according to the pattern of each substance use. It also differentiates by gender and two age groups (from 12- to 14- and 15- to 17-year-olds). Over half the sample (55.8%) drank alcohol at least occasionally, 50.6% smoked tobacco and 44.3% cannabis; 9.3% had tried other drugs. Regarding SUD, 3.4% of the patients fulfilled diagnostic criteria for abuse or dependence of alcohol, 23.2% of tobacco, 10.1% of cannabis, and only one patient (0.4%) presented SUD related to illegal drugs other than cannabis. Overall, 13.9% of the sample fulfilled SUD diagnostic criteria for any drug, except tobacco.

- Insert Table 2 about here -

### *Influence of age and gender on substance use*

In order to assess age and gender effects on the substance use pattern, a 2x2 ANOVA was performed for the level of use of each substance (1 to 5), with age and gender as factors. The use of all the substances increased significantly with age ( $F=96.38$ ,  $p<0.001$  for alcohol,  $F=87.83$ ,  $p<0.001$  for tobacco,  $F=73.60$ ,  $p<0.001$  for cannabis,  $F=8.80$ ,  $p<0.001$  for other substances). There were also significant differences by gender for alcohol ( $F=4.58$ ,  $p<0.05$ ) and cannabis use ( $F=22.13$ ,  $p<0.001$ ), indicating that females tended to adopt a more occasional use, whereas males presented more SUP and SUD related to both substances. Finally, a significant interaction between age and gender was found for alcohol ( $F=9.88$ ,  $p<0.05$ ) and cannabis use ( $F=12.84$ ,  $p<0.01$ ) (Figure 1), since the increase in use with age was greater among males than among females.

- Insert Figure 1 about here-

## **Factors associated with a high risk pattern of substance use**

Taking into account the criteria described in the methods section, 121 patients (51.1%) were classified as presenting a low risk pattern of substance use and the resting 116 (48.9%) as having a high risk pattern.

### *Socio-demographic, family and school variables*

Socio-demographic and school data, and initial age of use for each substance are presented in Table 3, dividing the sample according to the pattern of risk of substance use. No differences between high and low risk groups were found for gender or any of the FES scales. As expected, the high risk group had a greater proportion of older adolescents. Patients in this high risk group were less likely to have lived with both parents from birth; they had repeated more school grades and had needed more psychiatric or psychological care before the age of 12, although these differences only reach marginal level of statistical significance. The age of first use of cannabis was significantly lower for the high risk group.

- Insert Table 3 about here -

### *Primary psychiatric diagnosis*

Overall, we found significant differences between adolescent patients at low and high risk according patterns of substance use on the prevalence of the various psychiatric diagnostic categories ( $\chi^2= 23.662, p<0.01$ ). This was attributable mainly to a significantly greater proportion of incidences of CD in high risk patients (Table 3). Here, SUD as a primary diagnosis was not included for purposes of comparison and psychotic disorders were virtually absent in this sample (only two cases) because of the exclusion criteria. After separating the high risk sub-sample by gender, ADHD and CD were found to be more prevalent in males than in females (40.5% vs. 4.1%, and 26.2% vs. 12.2%, respectively), while eating disorder was more prevalent in females than in males (58.1% vs. 4.8%). The remaining diagnoses were found to be equally present in both genders.

### *Behavioural and emotional symptoms (CBCL / YSR)*

Mean raw scores on the various CBCL and YSR scales according to the substance use risk group are presented in Table 4. Adolescents with a high risk pattern of substance use showed significantly more behavioural (externalizing) problems than those at low risk and, to some extent, they also presented more emotional (internalizing) problems, although here these differences were more marked in the youth self reports (YSR) than in the parent reports (CBCL). More specifically, attention problems, delinquent and aggressive behaviours and “other problems” scales were clearly related to a high risk pattern of substance use on both the CBCL and YSR checklists. Nevertheless, two of the internalizing symptom scales, anxiety-depression and thought problems, only revealed significant differences between groups on the YSR, while on the CBCL the difference was only marginally significant.

- Insert Table 4 about here -

### **Multivariate logistic regression**

As age by gender interaction effects were observed for alcohol and cannabis levels of use, and bivariate analyses revealed significant differences by gender in several psychopathological variables and in school achievement (repeating at least a school grade), we decided to conduct logistic regression models separated by males and females. However, in order to formally test for gender differences we conducted supplementary analyses on the whole sample including product-terms. Gender differences were only observed regarding the number of repeated courses ( $p=0.011$ ;  $OR=5.32$ ;  $95\% CI=1.47-19.19$ ) and the delinquent behaviour scale of YSR ( $p=0.046$ ;  $OR=0.69$ ;  $95\% CI=0.48-0.99$ ).

In order to analyze gender differences in the degree of association between risk factors and a high risk pattern of substance use, we segregated male and female subjects in subsequent multivariate analyses and adjusted the odds ratio for age. Table 5 presents the odds ratio for each factor associated significantly to a high risk pattern of use in the bivariate analysis, adjusted for age, and for males and females separately. The association between age and the high risk group was twice as high in males as in females: the risk increased six times in adolescent males over the age of 15

compared to just three times in females. An altered family structure, having repeated at least one school grade and the report of attention problems on the YSR all were related significantly with a risky pattern of substance use in females, whereas the “other problems” scale on the YSR (phobias, sleep and eating problems, etc.) was significantly associated with the high risk pattern of use in males. Other YSR scales (thought problems, delinquent and aggressive behaviour and, consequently, global externalizing symptoms) were significantly related with a risky pattern of use in both genders.

- Insert Table 5 about here -

## **DISCUSSION**

This study has demonstrated a high prevalence of substance use, SUP and SUD among 12- to 17-year-old non-severe patients entering mental health treatment. Although we cannot make direct comparisons with data contained in the 2004 Spanish national surveys [1] because of methodological differences, it is noteworthy to point out that in our sample there is a tendency to a higher prevalence of use for the different drugs, except for alcohol. For instance, 56.9% of our 15- to 17-year-old sample reported at least occasional cannabis use (see Table 2) compared to 42% of 14- to 18-year-old students in the general population who reported having used cannabis at least once lifetime. In addition, our sample showed an earlier age of initiation in the consumption of different drug types (e.g., 14.7 years for cannabis in the national survey vs. 14.2 years in our sample, and 13.2 years for tobacco in the national survey vs. 12.6 years in our sample). These results corroborate the status of high vulnerability to SUP-SUD of this non-severe clinical sample. These results stress the importance to start selective prevention as early as possible in children with behavioural and emotional problems [10].

In comparing our results with those reported by authors who have studied clinical samples in other countries it is necessary to take into account differences in sample selection and drug use categories. Typical SUD rates in inpatients or adolescents with severe psychiatric disorders stand at over 60% [8,9], while our rate was just 13.9%. In their study with outpatients, Wilens et al. [11] reported a SUD rate of 11%, which is more in line with our findings. Martin’s study with outpatients [10] also revealed substance use rates similar to ours, with the exception of cannabis

use (33% in their sample of 13- to 19-year-olds vs. 44.3% in our sample of 12- to 17-year-olds). This last difference probably reflects the growth in cannabis use over the last decade [2-3]. A more recent study in which 80% of the sample were outpatients [12] reported a total SUD rate of 16%.

Age and gender differences in substance use patterns presented by our sample resemble, bridging methodological and cultural differences, patterns of use reported elsewhere [7,19,27]. While the level of use for all drug types was similar in males and females in the 12- to 14- year-old group, differences between genders increased with age, reaching statistical significance in the 15- to 17-year-old group for alcohol and cannabis (see Fig. 1). This result could be related with the presence of women specific protective factors that stop them from progressing from initial substance use to SUP and SUD, at least for some substances [4]. Nevertheless, the use of tobacco progress in a similar way in males and females, reflecting probably social tendencies to gender equality and the high capacity of nicotine to generate dependency.

With the exception of age, no other socio-demographic, family or academic variable was found to be significantly associated with risky or problematic substance use in the bivariate analysis. However, after adjusting for age and splitting by gender in the multivariate logistic regression, the influence of an altered family structure and the fact of having had to repeat a school grade reached statistical significance only in girls. A possible explanation of these data could be that females seem to be more sensitive to family and environmental disadvantages. These results bear some similarity with those reported by Becker & Grilo [7] who found an association between drug use and negative environmental/family experiences only in girls. In the study of Masten et al. [28], school failure have also been significantly more related to substance use in females than in males.

In line with previous reports [5,11,21], the only primary diagnosis significantly related with a risky or problematic substance use was CD. Accordingly, after controlling for age in the multivariate logistic regression, youth self-reports of symptoms also showed significant differences for aggressive, delinquent, and global externalizing symptoms. The relationship between self-reported attention problems and risky or problematic substance use became significant only in girls, after adjusting for age. Some authors have suggested that CD may

account in part for the association between ADHD and SUD [16,29] but our results alternatively suggest that attentional problems seem to be related independently to a pattern of risky use of drugs, at least in girls. Elkins et al. [19] stated that the failure in previous research to observe a significant relationship between ADHD and substance use or abuse could be due to the use of categorical diagnoses instead of a dimensional approach. A further reason could be the lack of control of age or gender variables.

Regarding internalizing symptoms, after adjusting for age in the multivariate analysis, the effect of the anxiety-depression scale (YSR) on the risky pattern of substance use found in the bivariate analysis was lost (as was similarly reported by Becker & Grilo) [7], suggesting that this effect was related to older females [17, 18, 21]. Nevertheless, the scale “thought problems” maintained their significant association with the risky substance use, indicating the need for a more thorough study of the internalizing symptoms and their possible role in the development of SUP-SUD, at least in girls, as has been suggested elsewhere [4, 11, 20]. Some authors have proposed that females could be more predisposed to self-medication of emotional distress with drugs like cannabis or nicotine [4,10].

Overall, our results are in line with those obtained in other settings and patients with different degree of psychiatric severity, strengthening the validity of the high rate of cooccurrence of psychiatric disorders and substance use problems. The most interesting feature of this study is probably the fact that it undertakes a dimensional approach in the analysis of psychopathology and substance use [6,13] in non-severe psychiatric outpatients, in order to analyze early stages of dual disorders.

However, we should point out that our results cannot be generalized to other psychiatric samples, as in the present sample eating disorders are especially prevalent because our Department acts as a specific referral unit for these disorders. Moreover, it is likely that some of the patients with SUP-SUD refused to participate or were excluded from this study (i.e., those with CD, those with acute psychotic symptoms or those who were referred directly to residential treatment).

Additionally, it is well documented that adolescent self-reports about their own drug use in this clinical context need to be treated with caution as they tend to minimize or deny their drug use or related problems [31] although this problem was partly offset here assuring confidentiality in

separate interviews for parents and patients. We also acknowledge that we cannot disregard type I errors due to multiple comparisons, thus further research is necessary to confirm our findings. Finally, as this is a cross-sectional study, the question as to whether some of the identified factors are causes or consequences of substance use cannot be adequately addressed. Follow up of this sample is warranted to study this issue.

In conclusion, the high rates of substance use and related problems found in adolescents initiating treatment in mental health centers corroborate the need to implement routine screening procedures for early detection of substance use and associated risk factors in this population. Early preventive programs and integrated intervention protocols that address simultaneously substance use and other psychiatric symptoms are also necessary, with particular attention to externalizing symptoms in both genders and emotional symptoms and family and academic support especially in girls. A close collaboration between specialists in adolescent mental health and in drug-addiction treatment is required to prevent the growth of dual disorders among adolescents with psychiatric problems.

## **ACKNOWLEDGEMENTS**

This study has been supported by a grant from the INIFD (National Drug Research and Training Institute) (Ref: INT/1525/2003) of the Spanish Governmental Delegation for the National Drug Plan.

## **FINANCIAL DISCLOSURES**

The authors reported no biomedical financial interest or potential conflicts of interests.

## **REFERENCES**

1. Observatorio Español sobre Drogas. *Encuestas sobre drogas a población escolar, 1996-2006 y Encuestas domiciliarias sobre consumo de drogas, 1995-2005*. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas (Spanish Drug Watch. *Drug use among the*

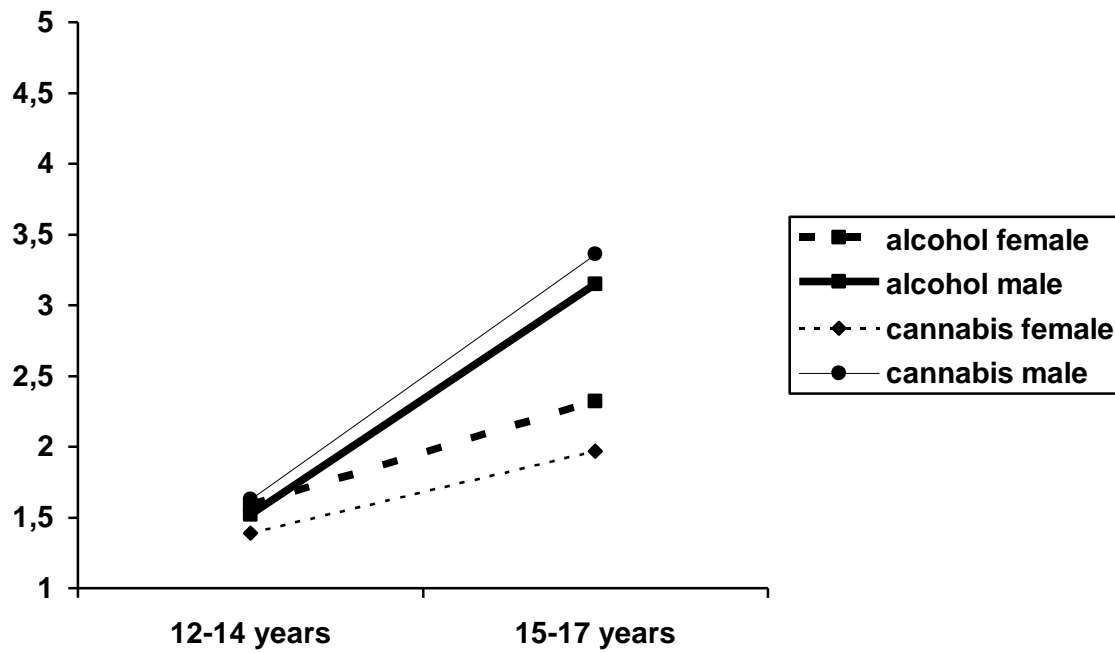


- school population survey, 1996-2006 and Home survey on drug use, 1995-2005*. Madrid: National Drugs Plan).
2. European Monitoring Center for Drugs and Drug Addiction. *The state of the drugs problem in the acceding and candidate countries to the European Union and Norway*. Annual Report. Luxembourg: Office of the Official Publications of the European Communities; 2006.
  3. Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. *Monitoring the future national survey results on drug use, 1975-2005: Vol I, Secondary School Students*. NIH Publication No-06-5883. Bethesda, MD: National Institute on Drug Abuse; 2006.
  4. Mason WA, Hitchings JE, Spoth RL. The interaction of conduct problems and depressed mood in relation to adolescent substance involvement and peer substance use *Drug Alcohol Depend*. 2008;96:233-248.
  5. Roberts RE, Roberts CR, Xing Y. Comorbidity of substance use disorders and other psychiatric disorders among adolescents: Evidence from an epidemiologic survey *Drug Alcohol Depend*. 2007;88:4-13.
  6. Shrier LA, Harris SK, Kurland M, Knight JR. Substance use problems and associated psychiatric symptoms among adolescents in primary care *Pediatrics*. 2003;111:699-705.
  7. Becker DF, Grilo CM. Prediction of drug and alcohol abuse in hospitalized adolescents: Comparisons by gender and substance type. *Behav Res Ther*. 2006;44:1431-1440.
  8. Swadi H, Bobier C. Substance use disorder comorbidity among inpatient youths with psychiatric disorder *Aust N Z J Psychiatry*. 2003;37:294-298.
  9. Niethammer O, Frank R. Prevalence of use, abuse and dependence on legal and illegal psychotropic substances in an adolescent inpatient psychiatric population *Eur Child Adolesc Psychiatry*. 2007;16:254-259.
  10. Martin CA, Milich R, Martin WR, Hartung CM, Haigler ED. Gender differences in adolescent psychiatry outpatient substance use: Associated behaviors and feelings *J Am Acad Child Adolesc Psychiatry*. 1997;36:486-494.
  11. Wilens TE, Biederman J, Abrantes AM, Spencer TJ. Clinical characteristics of psychiatrically referred adolescent outpatients with substance use disorder *J Am Child Adolesc Psychiatry*. 1997;36:941-947.

12. Kramer TL, Robbins JM, Phillips SD, Miller TL, Burns BJ. Detection and outcomes of substance use disorders in adolescents seeking mental health treatment *J Am Acad Child Adolesc Psychiatry*. 2003;42:1318-1326.
13. Deas D. Adolescent substance abuse and psychiatric comorbidities. *J Clin Psychiatry*. 2006;67:18-23.
14. Von Sydow K, Lieb R, Pfister H, Höfler M, Wittchen HU. What predicts incident use of cannabis and progression to abuse and dependence? A 4-year prospective examination of risk factors in a community sample of adolescents and young adults. *Drug Alcohol Depend*. 2002;68:49-64.
15. Kostelecky KL. Parental attachment, academic achievement, life events and their relationships to alcohol and drug use during adolescence *J Adoles*. 2005; 28:665-669.
16. Tapert SF, Baratta MV, Abrantes AM, Brown SA. Attention dysfunction predicts substance involvement in community youths *J Am Acad Child Adolesc Psychiatry*. 2002;41:680-686.
17. Poulin C, Hand D, Boudreau B, Santor D. Gender differences in the association between substance use and elevated depressive symptoms in a general adolescent population *Addiction*. 2005;100:525-535.
18. Winters KC, Stinchfield RD, Latimer WW, Stone A. Internalizing and externalizing behaviors and their association with the treatment of adolescents with substance use disorder *J Subst Abuse Treat*. 2008;35:269-278.
19. Elkins IJ, McGue M, Iacono WG. Prospective effects of attentional deficit hyperactivity disorder, conduct disorder and gender on adolescent substance use and abuse *Arch Gen Psychiatry*. 2007;64:1145-1152.
20. Volkow ND. The reality of comorbidity: Depression and drug abuse *Biol Psychiatry*. 2004;56:714-717.
21. King SM, Iacono WG, McGue M. Childhood externalizing and internalizing psychopathology in the prediction of early substance use *Addiction*. 2004;99:1548-1559.
22. Díaz R, Gual A, García M et al. Children of alcoholics in Spain: from risk to pathology. Results from the ALFIL Program *Soc Psychiatry Psychiat Epidemiol*. 2008; 43:1-10.
23. Díaz R, Castro-Fornieles J, Serrano L et al. Clinical and research utility of Spanish Teen-Addiction Severity Index (T-ASI) *Addict Behav*. 2008;33:188-195.

24. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders-Text Revision*, 4TH ed. DSM-IV (Spanish version). Barcelona: Ed Masson; 2000.
25. Moss RH, Moss BS, Trickett EJ. *Las escalas de clima social: Familia, trabajo, instituciones penitenciarias y escuela*. Madrid: TEA Ediciones; 1984. (Adapted from “*The Social Climate Scales: Family, Work, Correctional Institutions and Classroom Environmental Scales*”, Palo Alto, CA: Consulting Psychologists Press Inc; 1974.)
26. Achenbach TM. *Integrative guide for the 1991 CBCL/4-18, YSR, and TRF profiles*. Burlington, VT: University of Vermont; 1991.
27. Wagner FA, Anthony JC. Male-female differences in the risk of progression from first use to dependence upon cannabis, cocaine and alcohol. *Drug Alcohol Depend*. 2007;86:191-198.
28. Masten AS, Roisman GI, Long JD et al. Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years *Dev Psychol*. 2005;41:733-746.
29. Flory K, Lynam DR. The relationship between attention deficit hyperactivity disorder and substance abuse: What roles does conduct disorder play? *Clin Child Fam Psychol Rev*. 2003;6:1-16.
30. Chambers RA, Taylor JR, Potenza MN. Developmental neurocircuitry of motivation in adolescence: A critical period of addiction vulnerability *Am J Psychiatry*. 2003;160:1041-1052.
31. Brener ND, Billy JO, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature *J Adolesc Health*. 2003;33:436-457.

**Figure 1.** Interaction between gender, by age group, and the level of alcohol ( $p < 0.05$ ) and cannabis use ( $p < 0.01$ )



**Table 1.** Sociodemographic and psychiatric variables by gender.

	Male n=79 (33%)	Female n=158 (66%)	t/U/ $\chi^2$	p
Age (years)	14.37±1.54	14.94±1.43	-2.818	0.005
Family structure			2.47	0.076
Both parents since birth	38 (48.1%)	93 (58.9%)		

Other (divorce, death, etc.)	41 (51.9%)	65 (41.1%)		
Family history of SUD (yes)	38 (48.1%)	63 (39.9%)	3.14	0.208
Psychological or psychiatric care before 12 (yes)	48 (60.8%)	72 (47.7%)	3.56	0.059
Repeated school grades (yes)	41 (52.6%)	46 (29.9%)	11.377	0.001
Primary psychiatric diagnosis:			77.42	<0.001
Eating disorder	5 (6.3%)*	90 (57%)*		
ADHD	28 (35.4%)*	7 (4.4%)*		
Mood disorder	5 (6.3%)	15 (9.5%)		
Anxiety disorder	9 (11.4%)	11 (7%)		
Adaptive disorder	6 (7.6%)	10 (6.3%)		
SUD	2 (2.5%)	3 (1.9%)		
Psychotic disorder	1 (1.3%)	1 (0.6%)		
CD#	14 (17.7%)*	13 (8.2%)*		
Mild psychological problems£	9 (11.4%)	8 (5.1%)		

# Conduct disorder (CD) includes oppositional defiant disorder, dissocial disorder and significantly disordered behavior due to impulsive or Cluster B personality traits

£ Mild psychological problems refer to mild to moderate achievement or social problems in school, parent-children relationships or slight emotional distress

\* Significant Percentage Confidence Interval  $p \leq 0.05$

**Table 2.** Substance use pattern among the total sample, by age group and gender

Substance	Total sample (n=237)	Gender		Age group	
		Male (n=79)	Female (n=158)	12-14 years (n=100)	15-17 years (n=137)
<b>ALCOHOL</b>					
Occasional	46 (19.4%)	11 (13.9%)	35 (22.2%)	18 (18%)	28 (20.4%)
Regular	48 (20.3%)	13 (16.5%)	35 (22.2%)	8 (8%)	40 (29.2%)
SUP	30 (12.7%)	14 (17.7%)	16 (10.1%)	6 (6%)	24 (17.5%)
SUD	8 (3.4%)	4 (5.1%)	4 (2.5%)	1 (1%)	7 (5.1%)
<b>TOBACCO</b>					
Occasional	24 (10.1%)	6 (7.6%)	18 (11.4%)	10 (10%)	14 (10.2%)
Regular	17 (7.2%)	4 (5.1%)	13 (8.2%)	5 (5%)	12 (8.8%)
SUP	24 (10.1%)	9(11.4%)	15 (9.5%)	10 (10%)	14 (10.2%)
SUD	55 (23.2%)	20 (25.3%)	35 (22.2%)	10 (10%)	45 (32.8%)
<b>CANNABIS</b>					
Occasional	45 (19%)	10 (12.7%)	35 (22.2%)	15 (15%)	30 (21.9%)
Regular	20 (8.4%)	9 (11.4%)	11 (7%)	5 (5%)	15 (10.9%)
SUP#	16 (6.8%)	9 (11.4%)	7 (4.4%)	3 (3%)	13 (9.5%)
SUD&	24 (10.1%)	13 (16.5%)	11 (7%)	4 (4%)	20 (14.6%)
<b>OTHER DRUGS</b>					
Occasional	5 (2.1%)	1 (1.3%)	4 (2.5%)	-	5 (3.6%)
Regular	4 (1.7%)	1 (1.3%)	3 (1.9%)	1 (1%)	3 (2.2%)
SUP#	12 (5.1%)	4 (5.1%)	8 (5.1%)	2 (2%)	10 (7.3%)
SUD&	1 (0.4%)	-	1 (0.6%)	-	1 (0.7%)

#SUP: Substance Use Problems (subdiagnosis)

&SUD: Substance Use Disorder (definite diagnosis of abuse or dependence)

**Table 3.** Comparison of the sociodemographic, psychosocial and psychiatric variables of adolescents presenting low and high risk patterns of substance use (excluding tobacco).

	Low risk pattern n=121	High risk pattern n=116	t/U/ $\chi^2$	p
Age (years)	14.18±1.47	15.34±1.26	-6.464	0.000
Gender (% male)	37 (30.6%)	42 (36.2%)	0.844	0.358
Family Structure			3.461	0.068
Living with both parents since birth	74 (61.1%)	57 (49.1%)		
Other (divorce, death, monoparental)	47 (38.9%)	59 (50.9%)		
Primary psychiatric diagnosis#:			23.662	0.003
Eating disorder	50 (41.3%)	45 (38.8%)		
ADHD	15 (12.4%)	20 (17.2%)		
Mood disorder	10 (8.3%)	10 (8.6%)		
Anxiety disorder	13 (10.7%)	7 (6%)		
Adaptive disorder	13 (10.7%)	3 (2.6%)		
Psychotic disorder	2 (1.7%)	-		
CD	7 (5.8%)*	20 (17.2%)*		
Mild psychological problems	11 (9.1%)	6 (5.2%)		
Psychological or psychiatric care before 12 (yes) (n=230)	55 (46.2%)	65 (58.6%)	3.505	0.061
Repeated school grades (yes)	38 (31.7%)	49 (43.8%)	3.609	0.057
Age at first drug use				
Alcohol	13.60±1.71 (n=30)	13.37±1.53 (n=109)	0.721	0.472
Tobacco	12.89±1.59 (n=28)	12.36±2.03 (n=108)	1.286	0.201
Cannabis	14.73±1.27 (n=11)\$	13.67±1.44 (n=106)	2.342	0.021
Other drugs	-	14.72±1.34 (n=25)	-	-

# Conduct (or disruptive) disorder (CD) includes oppositional defiant disorder, dissocial disorder and disordered behavior due to impulsive or Cluster B personality traits

£ Mild psychological problems refers to moderate achievement or social problems in school, parent-children relationships or slight emotional reactive distress

\* Significant Percentage Confidence Interval  $p \leq 0.05$

# SUD diagnoses (n=5) were excluded from the chi-square analysis and, therefore, high risk diagnoses do not sum to 100%.

\$ These 11 “low risk” adolescents had experimented with cannabis once or twice without continuity in use.

**Table 4.** Comparison of the mean scores of the CBCL and YSR subscales recorded by adolescents presenting low or high risk pattern of substance use (excluding tobacco).

	Low risk pattern n=121 mean±SD	High risk pattern n=116 mean±SD	t	p
<b>CBCL</b>				
Withdrawn	6.83±5.19	6.17±3.23	1.068	0.287
Somatic complaints	3.88±3.28	4.03±3.13	-0.337	0.736
Anxiety-Depression	10.04±6.43	11.90±6.67	-1.961	0.051
Social problems	4.26±3.92	4.20±3.61	0.115	0.909
Thought problems	2.81±3.60	3.75±3.30	-1.881	0.062

<b>YSR</b>	Attention problems	5.50±3.56	7.89±4.41	-4.128	0.000
	Delinquent behavior	3.66±3.44	6.78±4.62	-5.317	0.000
	Aggressive behavior	9.19±6.72	13.64±8.90	-3.908	0.000
	Other problems	7.84±4.60	10.13±5.93	-2.979	0.003
	<i>Internalizing</i>	<i>20.12±9.74</i>	<i>21.44±10.24</i>	<i>-0.910</i>	<i>0.364</i>
	<i>Externalizing</i>	<i>12.97±8.95</i>	<i>20.52±12.60</i>	<i>-4.789</i>	<i>0.000</i>
	Withdrawn	5.63±5.05	5.50±4.06	0.199	0.842
	Somatic complaints	3.59±3.57	4.07±3.52	-0.954	0.341
	Anxiety-Depression	10.57±7.52	13.23±8.35	-2.361	0.019
	Social problems	3.01±2.86	3.21±2.99	-0.491	0.624
	Thought problems	2.63±2.50	4.44±3.80	-3.960	0.000
	Attention problems	6.72±3.32	8.99±4.40	-4.103	0.000
	Delinquent behavior	3.26±2.63	6.78±4.29	-6.975	0.000
	Aggressive behavior	8.70±5.31	12.74±6.59	-4.761	0.000
	Other problems	9.68±4.82	12.30±5.99	-3.390	0.001
	<i>Internalizing</i>	<i>19.31±12.66</i>	<i>22.44±13.12</i>	<i>-1.708</i>	<i>0.089</i>
	<i>Externalizing</i>	<i>11.91±7.04</i>	<i>20.06±9.92</i>	<i>-6.680</i>	<i>0.000</i>

**Table 5.** Factors associated with a pattern of high risk of substance use by gender and adjusted for age.

<b>Males</b>				
<b>Variable</b>	<b>categories</b>	<b>Age-adjusted OR*</b>	<b>95% CI</b>	<b>p</b>
Age#	12-14	1		
	15-17	6.9	2.5-19.5	0.000
Family structure	Both parents	1		
	Other	1.1	0.4-2.9	0.872
Psychological or psychiatric assistance during infancy	No	1		
	yes	0.8	0.3-2.3	0.678
Repeated grades	None	1		
	≥1	0.4	0.1-1.3	0.133
YSR-Thought problems 5	Continuous	1.6	1.1-3.0	0.008
YSR-Attention problems 6	Continuous	1.1	0.9-1.3	0.286
YSR-Delinquent behavior 7	Continuous	1.9	1.3-2.6	0.000
YSR-Aggressive behavior 8	Continuous	1.2	1.1-1.4	0.001
YSR-Other problems 9	Continuous	1.2	1.1-1.2	0.017
Externalizing	Continuous	1.2	1.1-1.4	0.000

<b>Females</b>				
<b>Variable</b>	<b>categories</b>	<b>Age-adjusted OR*</b>	<b>95% CI</b>	<b>p</b>
Age#	12-14	1		
	15-17	3.4	1.7-6.9	0.001

Family structure	Both parents	1	1.0-4.2	0.038
	Other	2.1		
Psychological or psychiatric assistance during infancy	No	1	0.9-3.5	0.126
	yes	1.7		
Repeated grades	None	1	1.2-5.5	0.016
	≥1	2.5		
YSR-Thought problems 5	Continuous	1.1	1.0-1.3	0.050
YSR-Attention problems 6	Continuous	1.2	1.1-1.3	0.003
YSR-Delinquent behavior 7	Continuous	1.3	1.1-1.2	0.000
YSR-Aggressive behavior 8	Continuous	1.1	1.0-1.2	0.003
YSR-Other problems 9	Continuous	1.1	1.0-1.1	0.067
Externalizing	Continuous	1.1	1.0-1.2	0.000

\*OR=Odds Ratio

#Bivariant OR