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Risk and protective factors for drug abuse in adolescents. A longitudinal research

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Introduction. The aim of the present study was to identify possible risk and protective factors for the development of problems with the use of drugs in adolescents.

Methods. A two years follow-up was carried out (from the 2nd to the 4th year of the Compulsory Secondary Education). Sociodemographic variables, general and eating psychopathology, family functioning and patterns of drugs use were assessed in 1,076 students.

Results. After controlling the effect of having problems with the use of drugs at the beginning, cigarettes smoking at the age of 13 years predicted the consumption of alcohol 2 years later and vice versa. Independently of the effect of this association, general psychopathology, body image dissatisfaction and self-harm at the beginning were risk factors for alcohol consumption 2 years later. Moreover, besides female gender and high academic achievements, normal family functioning was a protective factor against the fact of suffering problems with drugs later on.

Conclusions. These present findings might have relevance in the development of preventive strategies for the use of drugs in adolescent population.

Key words:

Risk factors. Protective factors. Use of drugs. Adolescents. Family function.

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Factores de riesgo y de protección para el uso de tóxicos en adolescentes. Un estudio longitudinal

Introducción. El objetivo del presente estudio era identificar posibles factores, tanto de riesgo como protectores, para el hecho de sufrir problemas con el consumo de tóxicos en adolescentes.

Métodos. Realizamos un seguimiento durante 2 años (en segundo y en cuarto de Educación Secunda-

ria) sobre variables sociodemográficas, psicopatología general y alimentaria, funcionamiento familiar y consumo de tóxicos de 1.076 alumnos.

Resultados. Controlando el efecto del consumo de tóxicos inicial, consumir tabaco a los 13 años predice el consumo de alcohol 2 años después y viceversa. Independientemente del efecto de esta asociación, la psicopatología general, la insatisfacción con la imagen corporal y las autolesiones al inicio son factores de riesgo para el consumo de alcohol 2 años después. Junto al sexo femenino y las altas calificaciones académicas, el buen funcionamiento familiar constituye un factor de protección contra el hecho de sufrir posteriormente problemas con los tóxicos.

Conclusiones. Estos hallazgos podrían tener relevancia en el desarrollo de estrategias preventivas para el consumo de tóxicos en población adolescente.

Palabras clave:

Factores de riesgo. Factores protectores. Consumo de tóxicos. Adolescentes. Funcionamiento familiar.

INTRODUCTION

Drug abuse in adolescence is a health care aspect having special relevance. This is due to both epidemiological reasons (at this age, the first contact with these substances frequently occurs) and the repercussion it entails from the health care, social, academic and relational point of view. It is of great interest to know the possible risk factors for this consumption. Without correct identification of these factors, it would be difficult to design effective preventive campaigns. However, it is not possible to speak of a «primary causal factor» even though many risk factors for the use of drugs in adolescence have been identified¹. The findings reflect the interaction of many variables in the initiation and continuation of drug use among adolescents. Thus, the model of risk factors is applied. Within this, the use of drugs is considered as a function of the complete group of factors, none of which are essential. This model makes it possible to integrate the different theories and possibility of embarking on preventive programs on many fronts. The methodology used to identify both the risk and protective factors should consider

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the fact that the interaction between these mechanisms occurs over time. Therefore, they should be longitudinal studies that also control the effect of consumption once initiated. In this way, it can be excluded that any of the variables studied may be more a consequence than a cause of the consumption.

The main international longitudinal studies on risk factors for substance consumption and dependence in adolescence stress that: *a)* the mechanisms that encourage tobacco consumption at 11-12 years are different in each gender. Rebelliousness, followed by attitudes towards the effect of smoking on other persons, influence in boys. The most important factor in girls is consumption of tobacco by their mother, followed by rebelliousness²; *b)* scholastic failure and absence of precise family rules and low frequency of family support of the adolescent regarding school work are related with subsequent alcohol abuse and dependence³; *c)* depressive symptoms in adolescence predict problems with alcohol in early adulthood⁴; *d)* group pressure, drug availability, low self-esteem level, competence, family background of consumption and previous experiences with legal drugs have also been indicated as significant risk factors for early development of cannabis usage in adolescent. The following stand out among protective factors: being involved in extracurricular activities, family influence, positive expectations of the parents towards academic achievement and family support perceived⁵.

Many studies have found cross-sectional association between substance use and depression in adolescents⁶. However, only a few prospective studies have evaluated the association between psychopathology in adolescents and subsequent substance abuse. Brook et al.⁷ found a relationship between depression and conduct disorders in adolescents with substance abuse in young adults. A longitudinal association between conduct and emotional problems in adolescence and substance use in young subjects has been reported⁸. It has also been report that depressive symptoms in adolescence predict problems with alcohol in early adulthood⁹. There are few Spanish longitudinal studies that consider the relationship between psychopathological and environmental variables with drug consumption^{10,11}.

The objective of this study was to analyze the frequency of use of different substances in 13 and 15 year old male and female adolescent population and the psychological, family and social factors that predict and protect against having problems with drug use at 15 years. The effect of the initial use of drugs on these variables was controlled. This study fits into a larger longitudinal study that also aimed to identify predictive factors for the development of eating behavior disorders in adolescents.

METHODS

We were interested in analyzing a large number of socio-demographic, psychological and family variables suggested as significant for drug consumption in previous investigations.

These were self-esteem, general psychopathology, family relationships, and academic performance. We also wanted to identify which ones of these factors could influence having problems with drugs (admitted by self-report). We designed a longitudinal study in two phases. The study methodology has been extensively described in other studies^{12,13}.

The original sample was made up of 1766 13 year old adolescents who were studying the second course of Compulsory Secondary Education (ESO) in an area of 250,000 inhabitants (rural and urban) of Ciudad Real province. This period was chosen because it is the time when risk behaviors are initiated and also because maximum participation could be assured because this period included compulsory education. Since the students did not know when the interviews were going to take place, losses to follow-up could not be attributed to the study but rather to school absenteeism or because the student changed centers. A total of 35 schools in our province were invited to participate. Thirteen of them did not answer our request. However, these centers had no sociodemographic difference with the 22 that accepted.

Two years later, we re-contacted the same centers to apply the same series of questionnaires. A total of 1,076 students (500 boys and 576 girls) completed both evaluations. We analyzed the psychopathological and environmental variables present in the first evaluation that predicted subsequent abandonments. The logistic regression analysis with successive steps method showed that the losses were related with having very low academic results, poor relationships with the teachers and drug use at 13 years of age ($\Delta LR \chi^2 = 6,803$; $df = 8$, $p < 0,001$).

Instruments and procedures

In both the first (t_1) and second evaluations two years later (t_2), the participants filled out a semistructured questionnaire in the classes. This included socio-demographic variables, conducts such as consumption of different drugs, theft, self-harm, suicidal thoughts and ideas, and questions on their feelings on their parents attitudes (control, demands, tension, violence) related with teachers and friends, performance of leisure activities alone or accompanied, academic performance. They were also asked to answer the following self-applied questionnaires that had been validated in Spanish: *a)* General Health Questionnaire GHQ-28¹⁴, for screening of anxiety, depression, somatic manifestations of these and social difficulties; *b)* Eating Attitudes Test EAT-40¹⁵, for screening of anorexic symptoms; *c)* The Bulimic Investigatory Test Edinburgh (BITE)¹⁶, for screening of bulimic symptoms; *d)* Body Shape Questionnaire (BSQ)¹⁷, that evaluated dissatisfaction with body image; *e)* Rosenberg Self-esteem Scale¹⁸, that evaluated self-esteem understood as the feeling of respect and acceptance towards oneself, and *f)* Family APGAR¹⁹, that evaluated the degree of family functioning, including the following components: adaptability, companionship, growth, affect and resolution.

The use of substances was evaluated by self-report. Four categories were identified: no consumption admitted or less than once a year; once a month or less; weekly and daily. Some previous investigations have converted this type of frequency data to categoric data in the same way²⁰. For cigarette consumption, the categories were the following: no admitted consumption or only occasionally; ten or less cigarettes per day; more than ten cigarettes per day. The following question was also introduced in the semistructured questionnaire: Have you ever had problems with alcohol or drug use? The question had five possible answers, going from «No, never» to «Yes, extreme». Afterwards, this variable was transformed in dichotomic for the statistical analysis.

Written informed consent was obtained from the parents and consent of the boys and girls, asking them to sign the informative sheet. Confidentiality and anonymity were assured in all the questionnaires.

Statistical analysis

The χ^2 test and Fisher's exact test were used to study the relationship between qualitative variables. Logistic regression with the successive stepwise forward method was used to evaluate the predictive power of the independent variables on the dependent ones (report problems with drug

consumption). The effect of some variables over others and of the variable «recognizing problems with drug consumption» in «t₁» were controlled. The SPSS statistical package for Windows V.10.0 was used for this purpose²¹.

RESULTS

Sociodemographic characteristics

The students generally lived with their family (n = 1.000; 92.5 %), had no partner (n = 1.000; 92.5 %) and were the elder (n = 443; 42.4 %) of two siblings (n = 492; 46.1 %). Most of the fathers (n = 629; 58.5 %) and mothers (n = 537; 49.9 %) only had primary studies; 60.7 % of the mothers were housewives and the fathers were mostly qualified or administrative workers (28.8 %), followed by small businessmen or university graduates (24.5 %). Significant differences were not found in regards to the mentioned socio-demographic characteristics among the students who reported having problems with drugs and those who did not.

Psychopathological and familial characteristics

Table 1 shows the frequency of the different psychopathological disorders in the first and second phase. In 13 year

Table 1 Relationship between psychopathological variables and reporting drug problems at 13 and 15 years

Psychopathological and behavioral variables in t ₁ (13 years)	Drug problems (% subjects: n = 20)	No drug problems (% subjects: n = 1,039)	Total (% subjects: n = 1,059)
Pathological GHQ	7 (35)	124 (12.1)	131 (12.5)**
Pathological EAT-40	5 (25)	83 (8.2)	88 (8.5)*
Pathological BSQ	3 (15.8)	38 (3.8)	41 (4)*
Pathological BITE	7 (35)	82 (8.2)	89 (8.7)***
Self-harm	10 (52.6)	102 (9.9)	112 (10.7)***
Suicidal thoughts	9 (45)	126 (12.2)	135 (12.8)**
Suicide attempt	1 (5)	27 (2.6)	28 (2.7) NS
Theft	13 (65)	288 (28.7)	301 (28.9)***
Psychopathological and behavioral variables in t ₂ (15 years)	Drug problems (% subjects: n = 53)	No drug problems (% subjects: n = 1,007)	Total (% subjects: n = 1,060)
Pathological GHQ	8 (15.1)	145 (14.4)	153 (14.4) NS
Pathological EAT-40	3 (5.7)	71 (7.1)	74 (7.0) NS
Pathological BSQ	2 (3.8)	39 (3.9)	41 (3.9) NS
Pathological BITE	5 (9.4)	83 (8.3)	88 (8.3) NS
Self-harm	7 (13.5)	82 (8.2)	89 (8.5) NS
Suicidal thoughts	14 (26.4)	175 (17.4)	189 (17.9) NS
Suicide attempt	5 (9.4)	36 (3.6)	41 (3.9)*
Theft	31 (58.5)	339 (34)	37 (35.2)***

χ^2 test. *p < 0.05; **p < 0.01; ***p < 0.001. NS: non-significant statistical relationship.

olds, a significantly greater percentage of subjects who reported problems with drugs versus those who did not have the following: general psychopathology measured with the GHQ, pathological scores on the questionnaire to evaluate bulimic behaviors (BITE), self-harm, suicidal thoughts and theft conducts. At 15 years of age, the subjects who reported drug problems only had theft conducts and suicide attempts more frequently (table 1).

Adolescents who admit having problems with drugs have a greater family dysfunction ($APGAR \leq 3$), both at 13 years (29.4 % versus 4.4 %; $p < 0.001$) and at 15 (12.2 % versus 5.7 %; $p < 0.001$). Furthermore, these adolescents reported having greater tension, family violence, control and demand by their parents and feeling unimportant for their parents and having worse academic grades more frequently ($p < 0.01$). At 15 years of age, these differences were only significant in the case of academic grades and having worse relationships with the teachers ($p < 0.01$).

Consumption frequency

Tables 2 and 3 show the consumption frequency of the different substances at 13 and 15 years. A total of 25.8 % of the boys and 17.5 % of the girls initiated weekly alcohol consumption in this time interval. In addition, 3 % of the boys and 1.6 % of the girls began to consume cannabis weekly at this time. Weekly alcohol consumption at 15 years

was significantly greater in males ($\chi^2 = 10.86$; $gl = 3$; $p = 0.012$). However, statistically significant differences were not found in regards to gender versus alcohol consumption frequency at 13 or of «joints» at 13 and 15 years. In general, ten boys (2 % of the males) and 10 girls (1.8 % of the females) admitted having drug problems in phase 1. In phase 2, 40 boys (8.2 %) and 13 girls (2.3 %) admitted these problems ($\chi^2 = 19.325$; $gl = 1$; $p = 0.000$).

Table 4 shows the tobacco consumption frequency which, at 15 years, was significantly greater in girls (31 % of the girls versus 23 % of the boys smoked, $\chi^2 = 7.782$; $gl = 1$; $p = 0.003$) (table 4).

Tobacco, alcohol consumption predictive factors and admitting drug problems at 15 years of age

To analyze if the psychopathological and family disorders in adolescents with drug consumption were a consequence of consumption or, on the contrary, were predictive factors, we controlled the effect of the substance consumption at the onset in the successive logistic regression analyses. Even when this effect was controlled ($-2\text{LogLikelihood} = 987.853$; $p = 0.006$) in the multinomial logistic regression analysis, the variables associated most with alcohol consumption 2 years later were: self-harm ($-2\text{LogLikelihood} = 980.882$; $p = 0.01$), smoking ($-2\text{LogLikelihood} = 988.139$; $p = 0.031$), GHQ scores ($-2\text{LogLikelihood} = 977.911$; $p = 0.044$) and BSQ scores

Table 2

Consumption rate of the different substances at 13 and 15 years¹

Boys (n = 500)	Never or once a year (%)	Monthly (%)	Weekly (%)	Daily (%)
Alcohol	445 (93.1)	16 (3.3)	15 (3.1)	2 (0.4)
	260 (53.6)	84 (17.3)**	140 (28.9)**	1 (0.2)
Amphetamines	468	0	0	0
	454	0	0	0
Benzodiazepines	464 (99.1)	2 (0.4)	1 (0.2)	1 (0.2)
	455	1	0	0
LSD	468 (99.8)	1 (0.2)	0	0
	437 (99.3)	3 (0.7)	0	0
Cannabis	467 (99.2)	2 (0.4)	0	1 (0.2)
	420 (90.9)	22 (4.98)*	14 (3.0)	6 (1.3)
Heroin	464	0	0	0
	467	0	0	0
Pills (ecstasy)	464 (99.1)	3 (0.6)	1 (0.2)	0
	436 (98.6)	4 (0.9)	2 (0.5)	0
Cocaine	467	0	0	0
	429 (99.3)	2 (0.5)	1 (0.2)	0

¹ The first row corresponds to the consumption rates at 13 years and the second at 15 years. χ^2 test: a significant increase was found in alcohol and cannabis consumption at 15 years. * $p < 0.01$; ** $p < 0.001$. Frequency of the remaining substances was not sufficient for the analysis.

Table 3

Consumption rate of the different substances at 13 and 15 years¹

Girls (n = 576)	Never or once a year (%)	Monthly (%)	Weekly (%)	Daily (%)
Alcohol	502 (92.4) ¹ 332 (58.1)	22 (4.1) 120 (21.0)**	18 (3.3) 119 (20.8)**	1 (0.2) 0
Amphetamines	555 534	0 1	0 0	0 0
Benzodiazepines	530 (98.5) 546 (97.8)	6 (1.1) 9 (1.6)	1 (0.2) 2 (0.4)	1 (0.2) 0
LSD	538 (100) 538 (100)	0 0	0 1 (0.2)	0 1 (0.2)
Cannabis	530 536 (95.2)	7 (1.3) 13 (2.3)*	0 9 (1.6)	0 5 (0.9)
Heroin	540 (100)	0	0	0
Pills (ecstasy)	537 (99.8) 540 (99.4)	1 (0.2) 3 (0.6)	0 0	0 0
Cocaine	539 527 (99.8)	0 1 (0.2)	0 0	0 0

¹ The first row corresponds to the consumption rates at 13 years and the second at 15 years. χ^2 test: a significant increase was found in alcohol and cannabis consumption at 15 years. * $p < 0.01$; ** $p < 0.001$. Frequency of the remaining substances was not sufficient for the analysis.

(-2LogLikelihood = 977.668; $p = 0.049$). Table 5 shows the odds ratio and 95 % confidence interval obtained for each one of the previous risk factors table 5).

In the binary logistic regression analysis, the variables associated most with smoking at 15 years, even when the effect of smoking at 13 was controlled ($\beta = 1.964$; $p = 0.000$), were: drinking alcohol ($\beta = 20.62$; $p = 0.01$), BSQ scores ($\beta = 0.014$; $p = 0.000$), and theft conducts ($\beta = 0.516$; $p = 0.006$). Good academic grades at 13 years were a protective factor against smoking at 15 ($\beta = -1.223$; $p = 0.002$).

Students with theft conducts ($\beta = 1.279$; $p = 0.001$) and suicide attempts ($\beta = 1.919$; $p = 0.003$) at 13 years had greater

likelihood of having drug problems two years later. Female gender ($\beta = -0.859$; $p = 0.027$), good family functioning (APGAR) ($\beta = -0.199$; $p = 0.027$) and good academic grades ($\beta = -1.529$; $p = 0.031$) were protective factors against this conduct.

CONCLUSIONS

The present study is one of the few longitudinal studies performed in Spain that analyze predictive and protective power of a large number of psychopathological and envi-

Table 4

Tobacco consumption in adolescents at age 13 and 15 years

	13 years		15 years	
	Boys (%)	Girls (%)	Boys (%)	Girls (%)
Do not smoke	410 (92.6)	467 (89.8)	357 (76.8)	389 (69)
≤ 10 cigs./day	26 (5.9)	46 (8.8)	90 (19.8)	158 (28)
> 10 cigs./day	7 (1.6)	7 (1.3)	18 (3.9)	17 (3)

χ^2 test: greater frequency in girls ($p < 0.01$).

Table 5

Risk factors for monthly and weekly consumption of alcohol at 15 years

Variables at 13 years	Monthly		Weekly	
	OR	95% CI	OR	95% CI
Previous smoking	913.24	271.59-307.40	2.322	2.322-2.322
Self-harm	9.12	2.92-28.46	1.48	1.48-1.48
Previous alcohol	1.187	0.17-7.87	—	—
GHQ scores	1.14	1.03-1.26	1.05	1.05-1.05
BSQ scores	1.03	1.02-1.04	1.04	1.04-1.04

Multinomial logistic regression. Final goodness of fit of the model: -2LogLikelihood = 977.990; chi squared: 243.675; $gl = 195$; $p < 0.01$.

ronmental variables evaluated in thirteen year old adolescents on alcohol, tobacco consumption and on the fact of admitting suffering problems with drugs two years later. When the variable of reporting problems with drugs at 13 was controlled, only theft conducts and suicide attempts had a predictive power on the fact of reporting drug problems two years later. Although the students who admitted having drug problems at 13 years had a greater degree of general psychopathology measured with the GHQ at this age, this relationship did not remain stable over time. This finding suggests that problems with drug consumption are related more with specific conduct problems than with general psychopathological disorders. Previous studies on the influence of psychopathological factors are not conclusive.

The relationship between mental problems and substance use seems to vary according to age, gender and substance type. McGee et al.²² found that mental disorder at age 15 led to a greater risk of cannabis use at 18. On the contrary, cannabis use at this age increased risk of mental disorder at 21. Thus, according to their study, there would be a relationship between mental disorder and cannabis use in adolescence, this being the opposite in the adult age. Regarding gender, some differences have also been reported. These may be that conduct problems are important precursors of early onset of cannabis consumption, above all in girls²³. In a study pending publication, based on the population of this present study, it was found that the general psychopathology was a predictor of reporting drug problems 2 years later in males but not in females, since in the latter, this was a risk factor for the development of altered eating behavior. In regards to substance type, it has been proposed that the development pathways may be different for each type of substance. However, in some cases, there is an increase from drugs considered legal toward the illegal ones²⁴. In our study, smoking at 13 years was associated with alcohol consumption 2 years later and vice versa. Independently of the effect of this association, general psychopathology, dissatisfaction with body image and self-harm at the onset were risk factors for alcohol consumption 2 years later. Body dissatisfaction and theft conducts at 13 years together predicted alcohol consumption, smoking at fifteen years while good academic grades were a protective factor. It was not possible to analyze predictive factors for consumption of cannabis and other substances in the population of this study due to the low frequency of these conducts, which decreases the analysis power.

The present study has some limitations. Most of them are derived from the large difficulties which an epidemiological study of these characteristics has. In the first place, the losses, that is the percentage of students who did not complete both evaluations (39%), included a significantly larger proportion of individuals with substance consumption at thirteen years. Therefore, consumption frequency in the adolescent population studied is greater than that found in the study. It is the following: weekly alcohol consumption goes from 3.1 % at 13 years in boys to 28.9 % at 15 and

from 3.3 % at 13 for girls to 20.8 % at 15. Cannabis consumption in this age range went from 0 % to 3 % in boys and from 0 % to 1.6 % in girls. The percentage of adolescents who smoked was: 7.5 % of the boys at 13 and 23.7 % at 15; 10.1 % of the girls at 13 and 31 % of the girls at 15. The losses were fundamentally due to school absenteeism or change of school. Absenteeism is related with substance use and bad relationships with the teachers. However change of school in some cases was simply because the school did not offer the possibility of studying the 3rd and 4th course of Compulsory Secondary Education. Another limitation is that a structured clinical interview was not used to evaluate consumption and the problems arising from it. However, previous studies using the same methodology have demonstrated that anonymous self-reports are quite reliable¹⁸. In the third place, it was not possible to structurally evaluate variables such as conduct problems, hyperactivity attention deficit disorder and family background of substance abuse that have been related with consumption in adolescents. In spite of this, the present study is one of the few Spanish prospective studies that considers a wide range of psychopathological and family factors and that controls the effect of initial consumption. Thus, its results merit consideration.

The principal findings of the present study may have important implications from the preventive point of view. These may be that, together with female gender and high academic grades, good family functioning is a protective factor against having subsequent drug problems. The objectives should thus be aimed not only at isolating the adolescents from closeness to the drugs or providing them a stress free setting (situations characteristic of the human existence) but also providing elements that protect and modify the effect of the risk factors. This could be a stable family link that permits them, within a constructive atmosphere, to adopt a positive attitude with confidence that they can pull through the problem and in which the persons can control the stimuli they receive.

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