Alcohol use and risk factors for self-harm behavior in Spanish adolescents

Consumo de alcohol y factores de riesgo de conductas autolesivas en adolescentes españoles

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Abstract

Self-harm behaviors in children and adolescents constitute an important public health problem with prevalence figures in the clinical population between 40 and 80%. The objectives of the study were to analyze and compare the Spanish sub-samples of two studies, SEYLE and WE-STAY to determine prevalence, self-harm patterns and factors associated with self-harm behaviors, notably the use of alcohol or drugs. The questionnaires used in both studies were the Global School Health Survey (GSHS), the Beck Depression Inventory (BDI-II), the Strengths and Difficulties Questionnaire (SDQ). The self-harm behaviors were evaluated with a modified 6-item version of s the Deliberate Self-Harm Inventory (DSHI). The independence of the study's categorical variables was assessed using the Chi-square test. The change in the relative risk of self-harm between the SEYLE study and WE-STAY was evaluated through the odds ratio (OR) calculation. Two different logistic regression models were calculated in order to establish the factors associated with self-harm behaviors in each study. In the present study, the rates of DSH vary according to study and sex, ranging from 0.58% to 2.08%, and different patterns of self-harm are evidenced by sex, with males self-injuring more frequently by self-inflicted blows and burns, while young women more often cut themselves. The presence of depressive symptoms and alcohol use were the factors most strongly associated with an increased risk of DSH.

Key Words: Self-harm behaviors; Adolescents; Depression; Alcohol consumption; SEYLE; WE-STAY.

Resumen

Las conductas autolesivas en niños y adolescentes constituyen un importante problema de salud pública con cifras de prevalencia en la población clínica entre el 40 y 80%. Los objetivos del estudio son analizar y comparar las submuestras españolas de dos trabajos, SEYLE y WE-STAY, para conocer la prevalencia, los patrones de autolesión y los factores asociados a las conductas autolesivas, en particular el consumo de alcohol o drogas. Los cuestionarios utilizados en ambos estudios fueron la Encuesta Global de Salud Escolar (GSHS), el Inventario de Depresión de Beck (BDI-II), el Cuestionario de Fortalezas y Dificultades (SDQ). Los comportamientos autolesivos fueron evaluados con una versión modificada de 6 ítems basada en el Inventario de Autolesiones Deliberadas (DSHI). La independencia de las variables categóricas del estudio se evaluó mediante la prueba Ji-Cuadrado. El cambio en el riesgo relativo de autolesión entre el estudio SEYLE y WE-STAY, se evaluó a través del cálculo de odds ratio (OR). Se calcularon dos modelos de regresión logística diferentes con el fin de establecer los factores asociados con comportamientos autolesivos en cada estudio. En el presente estudio las tasas de DSH varían en función del estudio y del sexo en un rango entre 0,58% y 2,08%, presentando patrones de autolesiones diferentes según el sexo, los hombres se autolesionaron más frecuentemente mediante golpes autoinfligidos y quemaduras, mientras que las mujeres se hicieron más frecuentemente cortes. La presencia de síntomas depresivos y el consumo de alcohol fueron los factores asociados de forma más robusta a un mayor riesgo de DSH.

Palabras clave: Conductas autolesivas; Adolescentes; Depresión; Consumo de alcohol; SEYLE; WE-STAY.

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Adolescence is a period during which risky behaviors appear that have been linked both to characteristics of the brain maturation process and to social and cultural factors typical of this life stage (McCormick, Qu & Telzer, 2017; Somerville, Hare & Casey, 2011). Among the most frequent risky practices found in adolescents are self-injurious behaviors (Kaess, Fischer-Waldschmidt, Resch & Koenig, 2017).

Self-injury is the act of deliberately hurting oneself by causing a physical wound, placing oneself in situations of risk or being negligent in self-care (Bifulco et al., 2014). "Non-suicidal self-injury" (NSSI) has been proposed as one of the "DSM-5 diagnostic categories that require further study", and is defined as intentionally self-inflicted harm to the surface of the body without conscious suicidal intent and with purposes not socially sanctioned; it includes behaviors such as cutting, burning, biting, or scratching the skin (American Psychiatric Association, 2013; Zetterqvist, 2015). "Deliberate self-harm" (DSH) is a similar concept in which the existence or not of suicidal intentionality is not taken into account (Pattison & Kahan, 1983), and which can be direct (cutting or hitting) and indirect, or self-destructive behavior (drinking alcohol, smoking, etc.) (Nock, 2010).

Self-harm behaviors in children and adolescents represent an important public health problem, with annual incidence rates in children and adolescents of between 12.3 and 37.4 per 10000 (Morgan et al., 2017). Establishing prevalence figures for self-harm in the general population is difficult due to the scarcity of data, but the evaluation of studies available in different countries leads to the conclusion that it is a frequent phenomenon in adolescents and young adults in the general population (13% to 42%) and even more frequent in clinical populations (40% to 80%) (Lenkiewicz, Racicka & Bryńska, 2017). Prevalence does not vary depending on cultural factors, socioeconomic status or area of residence (Lenkiewicz, Racicka & Bryńska, 2017; Muehlenkamp, Claes, Havertape & Plener, 2012).

The effect of sex on self-injurious behaviors is controversial; some studies show a higher frequency in women (female:male ratios up to 6.5:1), while others find no differences between the sexes (Bresin & Schoenleber, 2015; Sornberger, Heath, Toste & McLouth, 2012; Whitlock et al., 2011). Some studies have linked gender and self-harm taking into account other associated factors such as: parental alcohol use, which is associated with a higher risk of self-harm in men; or the degree of urbanicity, as shown by a higher prevalence of non-suicidal self-harm in women in rural areas, which is not matched in urban zones (Pisinger, Hawton & Tolstrup, 2018; Yang & Feldman, 2017). One factor which does appear to have a clear link to self-injurious behavior is age, with the phenomenon usually starting to manifest itself between 12 and 14 years, and its frequency diminishing with increasing age (Cipriano, Cella & Cotrufo, 2017; Hawton & Harriss, 2008; Lenkiewicz, Racicka & Bryńska 2017). Links have also been found between self-harm and psychopathology. The presence of externalizing psychopathology in adolescents (related to manifestations of aggression, lack of attention, disobedience and criminal behavior) is associated with more non-suicidal self-harm, and adolescents who are subjected to life situations which generate frustration or existential emptiness present more suicidal behavior (Blasco-Fontecilla, 2018; Meszaros, Horvath & Balazs, 2017).

Recently, two multicenter studies, SEYLE (Wasserman et al., 2010) and WE-STAY (Strittmatter et al., 2015) have carried out in-depth research into self-injurious and suicidal behaviors among adolescents in several European countries, including Spain. In the present study, the Spanish subsamples of the aforementioned studies are analyzed in order to determine the prevalence of self-injurious behaviors, the types of self-harm and the associated risk factors. In addition, we compared the data of both studies based on the hypothesis that, due to their temporal proximity and their methodological similarities, they should yield similar results.

Method

The present study analyzes the Spanish sub-samples data of two studies carried out in the European area: *Saving and Empowering Young Lives in Europe* (SEYLE) implemented between 2009 and 2010, and *Working in Europe to Stop Truancy Among Youth* (WE-STAY) from 2011-2012. The procedures used in the SEYLE and WE-STAY studies have been the subject of specific publications (Carli et al., 2014; Strittmatter et al., 2015; Wasserman et al., 2010).

Participants

The Spanish sub-sample of the SEYLE study is composed of 1026 adolescents, with a mean age (MA) of 14.52 years and a standard deviation (SD) of 0.70 years; 51.66% of the sample were males. Participants were recruited in 12 state schools randomly selected from those in the Autonomous Community of the Principality of Asturias, taking into account the inclusion and exclusion criteria of the SEYLE project (Bousoño et al., 2017; Wasserman et al., 2010). The Spanish sub-sample of the WE-STAY study comprises 1409 adolescents, with an MA of 15.16 years (SD = 1.23 years), of which 48.83% were males. They were recruited in 26 state schools in the Principality of Asturias. The two studies did not involve the same schools.

Procedure

In compliance with the rules governing research with young people, and prior to the start of both studies, the authorization of the juvenile prosecutor was obtained, as was the approval of the Clinical Research Ethics Committee of the Principality of Asturias. In both cases, the local

school authorities gave permission to access the selected schools, and students agreed to participate and granted informed consent, as required. A structured self-report questionnaire was completed by the participants and the collected data were anonymized. The assessment was conducted during school hours and covered a wide range of demographic, psychological and social factors.

Assessment methods

For the assessment of substance use, the Global School-based Student Health Survey questionnaire, GSHS (World Health Organization, 2015), was used, with the following cut-off points: the criterion for "alcohol use" was considered to be the intake of any amount of alcohol two or more times a week, for "drug use", having used illicit drugs at least three times in his/her life, and for "smoking", to smoke more than ten cigarettes a day (Bousoño et al., 2018).

To evaluate the "depressive symptoms", Beck's inventory (BDI-II) was used (Beck, Steer, Ball & Ranieri, 1996), in which a score equal to or higher than 20 represented "risk of depression". For the present study, we have used a modified version, the BDI-II, eliminating the item "loss of libido" since it was considered an unsuitable question for the population under scrutiny. The omission of this question does not affect the reliability or validity of the instrument (Byrne, Stewart & Lee, 2004).

To assess psychopathology, the Capacity and Difficulties Questionnaire (SDQ) (Goodman, Meltzer & Bailey, 2003) was used, which assesses emotional symptoms, behavior problems, hyperactivity/inattention, relationship problems between peers and prosocial behavior. The established cut points were: a score equal to or greater than 7 for emotional symptoms, a score equal to or greater than 5 for "behavioral problems" and a score equal to or greater than 7 for "hyperactivity". In the case of "problems with peers", the cut-off point was set at a score of equal to or greater than 6, while the "lack of prosocial behavior" was defined by a score of equal to or less than 4 (Carli et al., 2014).

DSH was assessed using a modified six-item version (Brunner et al., 2014) of the Deliberate Self-Harm Inventory (DSHI) (Gratz, 2001) which measures different forms of self-injurious behavior, with a cut-off point for students reporting these behaviors three times or more in the last year (Carli et al., 2014). The six questions (Q1, Q2 ...) comprising the questionnaire are: Q1: During the last year, have you ever intentionally cut your wrists, arms or other parts of your body, or punctured your skin with sharp objects like needles, pins, pin buttons, staples (do not include tattoos, ear or other piercings, or syringe needles for drug use)?; Q2: During the last year, have you ever intentionally burned yourself with a cigarette, a lighter or a match?; Q3: During the last year, have you ever cut your skin intentionally to carve words, drawings, designs or other markings, or have you scratched yourself so much that you bled or scarred yourself?; Q4: During the last year, have you ever intentionally prevented wounds from healing or have you bitten so hard that you have punctured your skin?; Q5: During the last year, have you ever banged your head or another part of your body causing a bruise?; Q6 During the last year, have you ever intentionally hurt yourself so badly in any of the aforementioned ways that you had to be hospitalized or was it severe enough to receive medical treatment?

Statistical analysis

In order to verify the independence of the categorical variables of the study, the Chi-square test was applied. In addition, two logistic regression models were also calculated, one for the SEYLE study and another for WE-STAY, in which the dependent variable was the risk of self-harm and the independent variables were age, sex, SDQ emotional symptoms, SDQ behavioral problems, SDQ hyperactivity, SDQ problems with peers, SDQ lack of prosocial behavior, BDI-II smoking, alcohol and drug use.

Results

Subjects meeting the criteria for deliberate self-injurious behavior (Total DSHI ≥ 3) made up 1.56% (n = 16) of the SEYLE Spanish sub-sample, compared to 0.92% (n = 13) in the WE-STAY study ($X2 = 2.046$, $gl = 1$, $p < 0.153$).

Analyzing DSH by sex yielded no prevalence differences among females across the two studies [1.01% (n = 5) vs. 1.26% (n = 9), respectively; $X2 = 0.149$, $gl = 1$, $p = 0.699$], whereas male prevalence did produce a statistically significant difference [2.08% (n = 11) vs. 0.58% (n = 4), respectively; $X2 = 5.494$, $gl = 1$, $p = 0.019$]. It should be noted that when both studies are analyzed separately, no differences are found in the prevalence of self-injurious behaviors between young men and women in either of the two studies (SEYLE: 2.08 vs. 1.01%, $X2 = 1.902$, $gl = 1$, $p = 0.168$; WE-STAY: 0.58% vs. 1.26%, $X2 = 1.713$, $gl = 1$, $p < 0.191$).

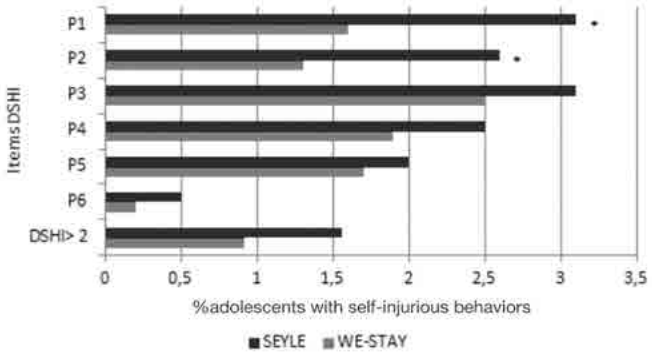
Table 1 shows the item-by-item results of the DSHI questionnaire in each study by sex. As can be seen, the frequency of young men exceeding the cut-off point in the SEYLE study (3 times or more in the last year) in items 2 (self-inflicted burns) and 5 (blows/bruises) is significantly higher to that of young women. Conversely, in the WE-STAY study, females exceed the cut-off point (3 times or more in the last year) in items 1 (cuts or use of sharp piercing objects) and 3 (carving words, drawings, etc.) with a frequency significantly higher than that of men.

A comparison of the results of both studies yields a significantly higher percentage in the SEYLE study of responses exceeding the cutoff point (3 times or more in the last year) in the first two questionnaire items (cuts or use of sharp objects, and self-inflicted burns) (Q1: 3.12 vs. 1.56%, $X2 = 6.642$, $gl = 1$, $p = 0.010$; Q2: 2.63% vs. 1.28%, $X2 = 6.001$, $gl = 1$, $p < 0.014$) (Figure 1).

Table 1. *Comparison of types of self-harm between the SEYLE and WE-STAY studies, according to individual scores on the different DSHI questionnaire items, disaggregated by sex.*

		Total n (%)	Males n (%)	Females n (%)	X2 (gl)	p
Q1	SEYLE	32 (3.12%)	14 (2.64%)	18 (3.63%)	0.827 (1)	0.363
	WE-STAY	25 (1.77%)	6 (0.87%)	16 (2.23%)	4.156 (1)	0.041
Q2	SEYLE	27 (2.63%)	19 (3.58%)	8 (1.61%)	3.889 (1)	0.049
	WE-STAY	28 (1.99%)	11 (1.59%)	7 (0.98%)	1.101 (1)	0.294
Q3	SEYLE	32 (3.12%)	17 (3.21%)	15 (3.02%)	0.029 (1)	0.866
	WE-STAY	35 (2.48%)	8 (1.15%)	27 (3.77%)	9.689 (1)	0.002
Q4	SEYLE	26 (2.53%)	15 (2.83%)	11 (2.22%)	0.389 (1)	0.533
	WE-STAY	27 (1.92%)	11 (1.59%)	16 (2.23%)	0.721 (1)	0.396
Q5	SEYLE	21 (2.05%)	17 (3.21%)	4 (0.81%)	7.368 (1)	0.007
	WE-STAY	17 (1.21%)	8 (1.15%)	9 (1.26%)	0.022(1)	0.883
Q6	SEYLE	5 (0.49%)	4 (0.75%)	1 (0.20%)	1.616 (1)	0.204
	WE-STAY	3 (0.21%)	1 (0.14%)	2 (0.28%)	0.289 (1)	0.591
DSHI≥ 3	SEYLE	16 (1.56%)	11 (2.08%)	5 (1.01%)	1.902 (1)	0.168
	WE-STAY	13 (0.92%)	4 (0.58%)	9 (1.26%)	1.713 (1)	0.191

Note. DSHI= Deliberate Self-Harm Inventory



Note. *p ≤ 0.050; DSHI= Deliberate Self-Harm Inventory.

Figure 1. Comparison of the type of self-injury between the SEYLE and WE-STAY studies, according to individual DSHI questionnaire item scores.

In Figure 2 (A and B), the item-by-item distribution of positive responses is shown in each study by sex. As can be seen in Figure 2A, males participating in the SEYLE study present a significantly higher percentage of positive responses for all items except 4 and 6 (Q1: 2.64 vs. 0.87%, X2 = 5.803, gl = 1, p = 0.016; Q2: 3.58% vs. 1.59%, X2 = 4.915, gl = 1, p = 0.027; Q3: 3.21% vs. 1.15%, X2 = 6.226, gl = 1, p = 0.013; Q5: 3.21% vs. 1.15%, X2 = 6.226, gl = 1, p = 0.013). Similarly, there is a higher percentage of young men with a DSHI score of ≥ 3 in SEYLE than in WE-STAY (2.08 vs. 0.58%, X2 = 5.494, gl = 1, p = 0.019). In contrast, no differences were observed among young women (Figure 2B) in the percentage of positive responses in any of the items, nor in the percentage of females with a DSHI score of ≥ 3, which is similar in both studies.

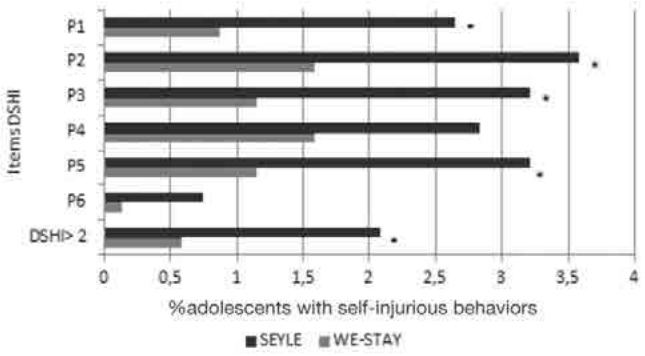


Figure 2A: Males

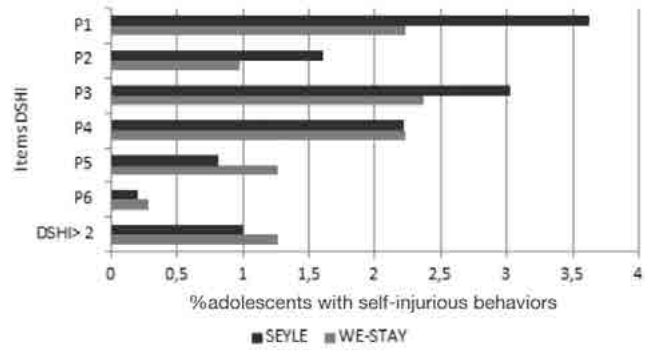


Figure 2B: Females

Note. *p ≤ 0,050; DSHI= Deliberate Self-Harm Inventory.

Figure 2. Type of self-harm observed in the SEYLE and WE-STAY studies, according to individual DSHI questionnaire item scores, disaggregated by sex.

In order to determine the factors associated with self harming, two independent logistic regression analyses were carried out (one for each study), in order to try to replicate (or not) the results in two independent samples. In both cases, age and sex were used as control variables.

As can be seen in Table 2, the factors associated with self-injurious behaviors in the SEYLE study (after controlling for age and sex), were the presence of hyperactivity/inattention (SDQ score hyperactivity/inattention ≥ 7) (OR = 2.367, CI 95% = 1.389-4.033; p = .002), peer relationship problems (SDQ peer relationship score ≥ 6) (OR = 3.096, CI 95% = 1.230-7.797; p = .024), presence of depression (BDI-II score ≥ 20) (OR = 4.046, CI 95% = 2.321-7.050; p < .001), alcohol use (≥ twice/week) (OR = 2.362, CI 95% = 1.240-4.499; p = .012), illicit drugs (≥ 3 times/lifetime) (OR = 2.843, CI 95% = 1.360-5.944; p = .007), and smoking (> 10 cigarettes/day) (OR = 3.464, CI 95% = 1.632-7.353; p = .002).

However, Table 3 shows that in WE-STAY only three factors are associated with self-injurious behaviors, namely the lack of pro-social behavior (pro-social SDQ score ≤ 4) (OR = 2809, CI 95% = 1199-6581; p = 027), the presence of depression (BDI-II score ≥ 20) (OR = 6357, CI 95% = 3613-11183; p < 001) and alcohol use (≥ twice/week) (OR = 2353, CI 95% = 1259-4399; p = 010).

Table 2. *Factors associated with self-injurious behaviors in the Spanish sample of the SEYLE study.*

Variable	B	SE	Wald	df	p	OR	CI 95%
Emotional symptoms (SDQ)	0.312	0.31	1.006	1	0.736	1.151	0.509-2.603
Behavior problems (SDQ)	0.265	0.38	0.486	1	0.328	1.495	0.676-3.302
Hyperactivity (SDQ)	0.450	0.28	2.620	1	0.002	2.367	1.389-4.033
Peer problems (SDQ)	0.715	0.26	7.447	1	0.024	3.096	1.230-7.797
Lack of prosocial behavior (SDQ)	1.140	0.44	6.743	1	0.306	1.727	0.626-4.769
Depression (BDI-II)	1.812	0.29	39.861	1	‹ 0.001	4.056	2.321-7.050
Smoking	0.218	0.56	0.154	1	0.002	3.464	1.632-7.353
Alcohol use	0.751	0.32	5.474	1	0.012	2.362	1.240-4.499
Drug use	-0.210	0.4	0.261	1	0.007	2.843	1.360-5.944
Constant	-4.190	0.24	294.741	1	0.009		

Note. SDQ= Strengths and Difficulties Questionnaire; BDI-II= Beck Depression Inventory; SE=Standard error; df= Degrees of freedom; OR= Odds ratio; CI= Confidence interval.

Table 3. *Factors associated with self-injurious behaviors in the Spanish sample of the WE-STAY study.*

Variable	B	SE	Wald	df	p	OR	CI 95%
Emotional symptoms (SDQ)	0.141	0.42	0.115	1	0.320	1.375	0.739-2.560
Behavior problems (SDQ)	0.401	0.41	0.980	1	0.454	1.330	0.639-2.764
Hyperactivity (SDQ)	0.862	0.27	10.043	1	0.088	1.614	0.929-2.771
Peer problems (SDQ)	1.130	0.47	5.756	1	0.180	1.776	0.791-3.987
Lack of prosocial behavior (SDQ)	0.547	0.52	1.115	1	0.027	2.809	1.199-6.582
Depression (BDI-II)	1.398	0.28	24.403	1	‹ 0.001	6.357	3.613-11.183
Smoking	1.242	0.38	10.461	1	0.593	1.354	0.457-4.017
Alcohol use	0.859	0.33	6.817	1	0.010	2.353	1.259-4.399
Drug use	1.045	0.38	7.724	1	0.637	0.828	0.375-1.829
Constant	-3.39	0.19	322.288	1	0.213		

Note. SDQ= Strengths and Difficulties Questionnaire; BDI-II= Beck Depression Inventory; SE=Standard error; df= Degrees of freedom; OR= Odds ratio; CI= Confidence interval.

Discussion

The present study analyzed the DSH, its characteristics and the risk factors associated with them in the groups of Spanish adolescents included in two European multicenter studies (SEYLE and WE-STAY).

The DSH prevalence rates of 1.56% and 0.92% found in these samples are at the lower end of the scale of rates evidenced in samples from the other European countries participating in the SEYLE and WE-STAY studies; the lowest rate (1.9%) was found in Romania, while Germany presented the highest rate (10.4%).

Prevalence rates varied according to the population groups analyzed. Statistically significant differences were found in the comparison of males across both studies (the prevalence of DSH among young men in the SEYLE study was 3.5 times higher than in the WE-STAY group). Previous studies have also found wide differences in prevalence figures for self-injurious behaviors, ranging from 3% (Taliaferro & Muehlenkamp, 2015) to 11.5% (Madge et al., 2008), with the differences being explained, fundamentally, by the heterogeneity of the concept of self-injurious behavior employed and by differences in the methods used for the detection of cases (Hargus, Hawton & Rodham, 2009; Silverman, Berman, Sanddal, O'Carroll & Joiner, 2007). The studies compared here also showed variations in rates of prevalence, despite being carried out at similar times, with samples of similar characteristics and with similar evaluation methods; thus, it is likely that, in addition to conceptual and methodological differences, there are other circumstances that influence the variability of the prevalence of self-injurious behaviors, such as the scarcity of the phenomenon studied, which leads to small variations in the absolute number of affected people resulting in large changes in rates.

The rates of self-injury observed in the Spanish samples of the SEYLE and WE-STAY studies are lower than those observed in other Spanish samples. A study with 1,171 secondary school students (518 boys and 653 girls) aged between 12 and 16 from state and private schools in Barcelona and surrounding areas (Kirchner, Ferrer, Forns & Zanini, 2011) found a prevalence of 11.4% of DSH in the previous year. This study used a different evaluation method, the Youth Self Report (YSR) scale (Achenbach, 1991), and of the positive responses to the item that investigated

self-injurious behaviors, 2.9% answered "completely true" and 8.5% "possibly true". Another recent study, conducted with a large sample of 1664 adolescents (average age = 16.12 years) in the Autonomous Community of La Rioja found that 4.1% had attempted to take their own lives in the previous year (Fonseca-Pedrero et al., 2018), although the survey did not assess self-injurious behaviors. Another Spanish study provides figures of 21.7% for lifetime deliberate self-harm, although the data are not comparable because it is a clinical sample (adolescents seen in psychiatric outpatient clinics in a general hospital) (Díaz de Neira et al., 2015).

As with data from previous studies, the analysis of prevalence rates in the SEYLE and WE-STAY studies disaggregated by sex does not provide clear results that could conclusively establish the influence of sex on DSH. However, different patterns of self-injury between the sexes were found: in one of the studies, males self-injured more frequently through self-inflicted blows and burns, while females more often cut or scratched themselves. It seems that the male pattern (blows, burns) has characteristics of immediate tension-releasing impulse, while the female one is a more complex behavior, less impulsive, more compulsive and in which, in addition to the pain, what is sought is to leave marks that denote a distinct identity or personality, in the manner of tattoos or piercings, that is, with an identity-related meaning.

The risk factors linked to the presence of DSH differed in the two studies analyzed, which is consistent with the fact that self-harm risk factors demonstrate very low specificity and low predictive value (Barrigón & Baca-García, 2018). The following risk factors appeared as significantly associated with DSH in only one of the studies: hyperactivity, problems with peers, smoking, drug use and lack of prosocial behavior. Risk factors associated with DSH in both studies were the presence of depressive symptoms and alcohol use.

Thus, the presence of depressive symptoms and alcohol use emerge the factors most associated with DSH. A depressive state of mind has been shown to be a factor associated with self-harm behaviors in most studies conducted with adolescents (Dougherty et al., 2009; Fliege, Lee, Grimm & Klapp, 2009; Hawton, Rodham, Evans & Weatherall, 2002; Lowenstein, 2005; Portzky & van Heeringen, 2007; Skegg, 2005; Stewart, Baiden & Theall-Honey, 2014; Swahn et al., 2012; Vajani, Annest, Crosby, Alexander & Millet, 2007; Valencia-Agudo, Burcher, Ezpeleta & Kramer, 2018). It should be noted that the effect of depressive symptoms is complex and depends not only directly on their presence but also on their intensity, the coexistence with other associated psychopathological symptoms and the sex of the person involved (Lundh, Wångby-Lundh & Bjärehed, 2011).

Regarding the use of alcohol and drugs, with the exception of some studies which do not find a relationship between self-injurious behaviors and these variables (Madge et al., 2008), their direct influence on self-harm behaviors has been robustly established (Balázs, Győri, Horváth, Mészáros & Szentiványi, 2018; Fulwiler, Forbes, Santangelo & Folstein, 1997; Heerde et al., 2015; Ilomäki, Räsänen, Viilo, Hakko & STUDY-70 Workgroup, 2007; Vargas-Martínez et al., 2018).

In terms of the other factors associated with DSH, the data in the literature are less clear. Prosocial behavior is a complex behavior resulting from the interaction between intrapsychic and environmental aspects. It is likely that the search for a link between personality traits and suicidal behavior, which was not a focus of this study, would provide more conclusive data of association with self-injury than the study of behavioral manifestations such as prosocial behavior (Villar et al., 2018) or other behavioral variables, such as the lack of relationships with colleagues, a variable for which the literature also provides diverging data (Kaminski et al., 2010; Ruchkin, Sukhodolsky, Vermeiren, Koposov & Schwab-Stone, 2006).

Hyperactivity is similar, yielding a significant but weak association with suicidal behavior only in the SEYLE study. Previous studies have found a relationship between hyperactivity as a disorder and self-injurious behaviors (Balázs et al., 2018; Bentley, Cassiello-Robbins, Vittorio, Sauer-Zavala & Barlow, 2015; Meszaros et al., 2017). It has also been postulated that the relationship of hyperactivity with self-harm could be indirect through common factors such as impulsivity, as indicated by the results of different studies, which also show that the association would be different depending on sex (Hinshaw et al., 2012; Huang et al., 2017; Kashden, Fremouw, Callahan & Franzen, 1993; Meza, Owens & Hinshaw, 2016). The characteristics of the present study do not allow the nature of the influence of hyperactivity or impulsivity on self-injurious behaviors to be defined.

Finally, drug use and smoking were shown to be factors significantly associated with self-injurious behaviors in the SEYLE study but not in WE-STAY. The case of smoking deserves special consideration since social changes related to smoking took place during the period of time between the two studies: a price increase, the implementation of prevention and awareness programs aimed at the young population, and the enactment of laws to restrict smoking (Law 42/2010, December 30, 2010). Other earlier studies have also found a link between smoking and self-injurious behavior (Huang et al., 2017; Madge et al., 2011; Romero, Rodríguez, Villar & Gómez-Fraguela, 2017). The hypothesis that the measures taken in Spain to restrict smoking could have modified the prevalence of DSH in young people is attractive but would need an analysis of longer time series for confirmation.

The present study presents a series of limitations, among them the fact that it is an analysis of retrospective data which was collected by self-report, that the populations, albeit similar, are not totally comparable, and that the

populations are not representative of Spanish adolescents, which prevents generalization to population prevalence. Moreover, differences in the data between two studies with similar methodology and population could raise doubts about the reliability of the results. However, it is also worth highlighting the main strengths of this study, which include the fact that the results analyzed are from two methodologically similar studies with large and homogeneous samples, and the methodological soundness guaranteed by the international projects of which they form a part.

In conclusion, the analysis of two studies on self-injurious behaviors in adolescents, carried out with a similar methodology and in populations with comparable sociodemographic characteristics in close temporal proximity shows that DSH rates vary depending on study and sex and range from 0.58% to 2.08%, that men self-harm more frequently by self-inflicted blows and burns, while women more frequently cut and scratch themselves, and that the presence of depressive symptoms and alcohol use are the factors most strongly associated with an increased risk of DSH; both would be the priority factors on which preventive and intervention campaigns should focus.

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Conflict of interests

The authors declare that there is no conflict of interest.

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